

Erin Dixon  
Jennifer Gagner  
Travis Norris  
Hary Teklegiorgis

3<sup>rd</sup> of May, 2017

# Developing a Green Business Opportunity for Self-Sustainability in Windhoek's Informal Settlements



Report Submitted to:

Ms. Crystal Beukes  
MSR

Professor Sarah Jane Wodin-Schwartz, ME  
Professor Robert Kinicki, CS  
Worcester Polytechnic Institute



**WPI**



Connecting people to employment opportunities



**WPI**



# **Developing a Green Business Opportunity for Self-Sustainability in Windhoek's Informal Settlements**

by  
Erin Dixson  
Jennifer Gagner  
Travis Norris  
Hary Teklegiorgis

Date:  
3<sup>rd</sup> of May, 2017

An Interactive Qualifying Project  
submitted to the Faculty of  
WORCESTER POLYTECHNIC INSTITUTE  
in partial fulfilment of the requirements for the  
degree of Bachelor of Science

Report Submitted to:

Ms. Crystal Beukes  
MSR

Professor Sarah Jane Wodin-Schwartz, ME  
Professor Robert Kinicki, CS  
Worcester Polytechnic Institute

*This report represents work of WPI undergraduate students submitted to the faculty as evidence of a degree requirement. WPI routinely publishes these reports on its web site without editorial or peer review. For more information about the projects program at WPI, see <http://www.wpi.edu/Academics/Projects>.*

## **ABSTRACT**

This project developed the basis for a business opportunity to create marketable products from recycled materials in Katutura, an informal settlement in Windhoek, Namibia. The team used shared action learning, asset-based community development, interviews, observations, surveys, focus groups, interview coding, and prototyping to select two final products: a table made from wooden pallets and a chair made from tires. After prototyping alongside potential entrepreneurs, the team recommended a production plan and a sales strategy to help start their businesses. The production plan included production instructions, transportation options, and recommendations for material sources. The sales strategy included advertising methods, sales prices, and target customers.

## EXECUTIVE SUMMARY

Namibia is a developing nation in Southern Africa with a high unemployment rate. According to the 2014 Namibia Labour Force Survey, 27% of Namibians are unemployed (Namibia Statistics Agency, 2015). A history of apartheid rule and rural-to-urban migration created informal settlements around major cities in Namibia. Katutura, shown in Figure 1, is one of these informal settlements in Windhoek. It houses approximately 200,000 residents and sustains a vibrant community of various ethnic groups, informal businesses, and bustling markets. In these informal settlements, there is limited access to modern amenities such as running water, reliable electricity, and permanent housing.



Figure 1. A Dirt Pathway in Katutura

MSR, formerly Men on the Side of the Road, is an organization in Windhoek that aims to reduce unemployment by providing training and job opportunities to men and women in the informal settlements of Windhoek and Swakopmund. MSR conducts monthly trainings in money management and life skills and sends its members to other vocational and technical trainings. However, MSR does not have sufficient funding to provide job-specific trainings for every member. As a result, the organization is working to create low-cost employment opportunities.

The lack of formal economy, structured education, and professional training in the informal settlements make self-employment vital for subsistence. One common method for self-employment in the informal sector is starting a business. Some examples of jobs in Namibia's informal sector include selling kapana—beef grilled in a local style—on the side of the road, slicing meat in small stalls, and running a salon, restaurant, or bar in a stall rented from the municipality. MSR encourages members to start their own businesses and has recently trained a group of members in entrepreneurial skills.

MSR members are not formally employed and do not have the financial resources to start a business. Recycled materials such as wooden pallets, used tires, and plastic bags are commonly discarded in Katutura and Windhoek. Additionally, MSR has a workshop in Katutura where members can manufacture products. This workshop has a number of oil drums and hand tools available for the members to use. This project assisted MSR by developing a low-cost

business opportunity for unemployed men and women to create marketable products from recycled materials.

During the preparation term, the project team compiled a list of thirty-eight products made from plastic bags, wooden pallets, tires, and oil drums from do-it-yourself websites. These products needed few additional materials and required skills that MSR members commonly possess. After arriving in Windhoek, the team discussed these product ideas with MSR personnel to narrow down the list of thirty-eight to a list of eleven products. Since MSR personnel are familiar with Katutura and Windhoek lifestyles, their recommendations helped to reduce the number of viable options. The next step was to use a qualitative analysis to further trim the list to three final products. Then, the team members worked alongside five MSR members to prototype these final products and determine their production viability. This report refers to these five MSR members as producers because they expressed interest in making products to start their own businesses. Finally, this research recommended production plans and a sales strategy for making and selling the viable products.

To narrow down the list of products from eleven to three, this investigation evaluated each potential product based on five categories: customer interest, required tools, producer interest, required skills, and amount of materials. The team determined these categories with the help of MSR and weighted each category using a pairwise comparison chart. This comparison resulted in the highest weights for customer interest and required tools.

To evaluate customer interest, the team collected data on three target markets: tourists, Katutura residents, and Windhoek residents. The researchers observed twenty-six craft stalls in Windhoek to gain insight on the tourist market. At these craft stalls, the team took note of the sizes and styles of products for sale. The project team conducted a focus group with thirty-six MSR members, who live in Katutura, to evaluate the appeal of products to Katutura residents. During the focus group, shown in Figure 2, the team surveyed the members about potential products and asked them to discuss the products they liked and disliked. Based on the focus group discussion, MSR members preferred products that were durable, but made from inexpensive materials.



Figure 2. MSR Member Focus Group

The project also evaluated customer appeal of Windhoek residents by surveying customers at four weekend markets in Windhoek. The team conducted oral surveys of twenty-seven market attendees and asked them to indicate the items they liked or would purchase based on pictures of the eleven products. Additionally, the team asked the customers to indicate any products they disliked. Figure 3 shows the responses to this survey.

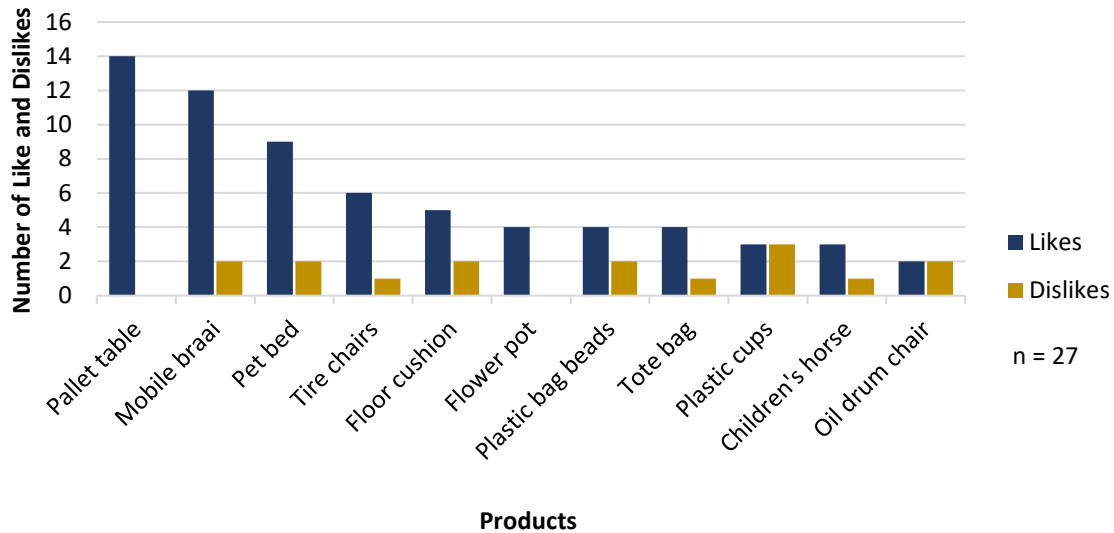


Figure 3. Distribution of Products Based on the Weekend Market Customer Survey

To evaluate the tools required to make the eleven potential products, team members reviewed do-it-yourself (DIY) instructions. Since the MSR producers currently only have access to hand tools, the study evaluated products based on the need for power tools. If the product did not need any power tools, it exceeded the expectations of a viable product. For example, the plastic bag beads, which do not need power tools, fit under this category. If an item could be made with or without power tools, it met the expectations of a viable product. An example of this is the pallet table, which does not need power tools for manufacturing, but can be improved by the use of power tools. If the item required power tools, it failed to meet the expectations of a viable product. For example, the mobile braai, or grill, needs welding equipment so it failed to meet this expectation.

The team interviewed eight MSR producers to gauge the producer interest of the eleven products. Interviewers asked the producers about their product preferences, access to materials, existing skills, and interest in working with a colleague. Additionally, the team used DIY instructions to determine required skills and amount of materials needed to make the products.

After evaluating the eleven products based on the five categories, this research used a Pugh analysis to determine three products to prototype. A Pugh analysis is a qualitative technique used to rank possible solutions based on certain weighted characteristics. A higher Pugh analysis score indicates a better solution. As shown in yellow in Figure 4, the top three products from the Pugh analysis were the plastic bag beads, the pallet table, and the tire chair. The plastic bag beads exceeded expectations in required tools, required skills, and amount of materials, while the table and chair exceeded expectations in customer and producer interest.

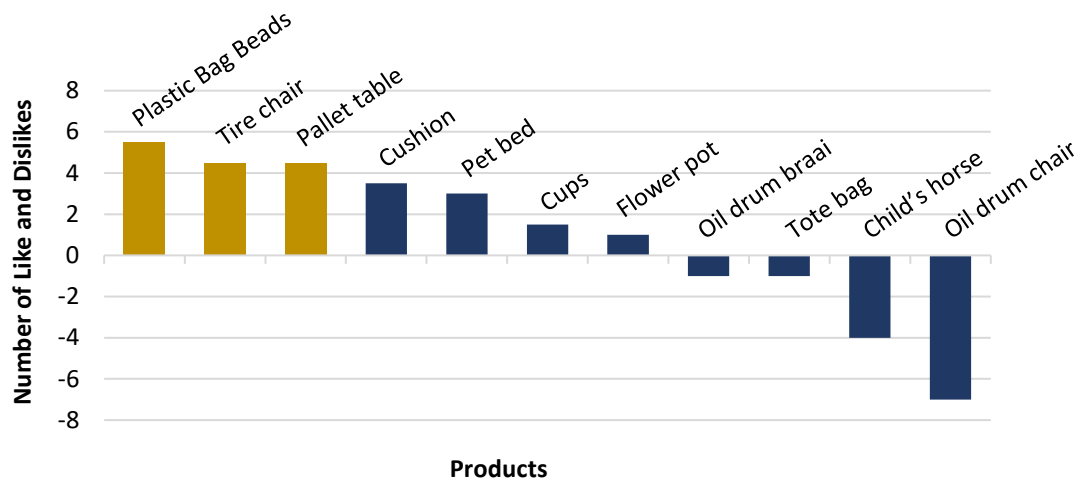


Figure 4. Results of the Pugh Analysis

Using shared action learning, the team worked alongside five producers to prototype these three products and determine their manufacturing feasibility. Team members first met with the producers to schedule five days for prototyping and create a plan for gathering materials. On the first two days of prototyping, the researchers worked hand-in-hand with the producers. One team member led the construction of each product, while the fourth member took photographs and recorded notes about the production steps, required materials, and amount of time needed to prototype each product. On the last three days, the producers worked by themselves to manufacture the products. This allowed the producers to practice making the products on their own, while still having access to the team for assistance. Over two days, the group built two tables and one chair. Figure 5 shows one of the tables and the chair. Two team members attempted to prototype the plastic bag beads, but determined that they were too difficult and required too much time to make. Additionally, the producers were more interested in making furniture. Therefore, the team and the MSR producers only proceeded prototyping the tables and chairs.



Figure 5. (Left) Completed Pallet Table. (Right) Completed Tire Chair

To help producers transition from prototyping to running a business, the team developed a production plan and sales strategy for the tables and chairs. The production plan

included a detailed set of instructions for making each product, options for transportation, and recommendations for finding materials. The production instructions consisted of photos from prototyping and written steps for each product. The team wrote the steps in simple English to reduce the language barrier for future, non-native English speakers. The instructions also included a list of materials and tools used for prototyping. The sales strategy included recommended prices, target customers, and advertising methods. To gain insight on the sales strategy, team members interviewed entrepreneurs and an entrepreneurship organization in Katutura and Windhoek.

The researchers spoke with three existing entrepreneurs: a kapana seller, a taxi driver, and a welder. Two team members also interviewed a representative from Team Namibia, an organization that promotes entrepreneurship in Namibia. This non-governmental organization has recently been working to train entrepreneurs in Katutura. These four interviews provided insight into common customers, pricing methods, advertising strategies, and challenges of local entrepreneurs. The entrepreneurs typically sold to members of their community and priced their products based on the cost of materials. Team Namibia emphasized the importance of advertising and suggested the use of business cards, social media posts, and high pedestrian traffic sales locations. The entrepreneurs also expressed the challenges of gaining customers and advised new entrepreneurs to learn from others and attend trainings.

Based on these interviews, the study compiled recommendations for sales prices, target customers, and advertising methods. The team conducted a cost analysis using material costs and labor from prototyping to determine minimum recommended sales prices. The researchers advised producers to first sell their prototypes in their communities in Katutura and then expand to additional locations around Windhoek to sell to Windhoek residents. The project eliminated tourists from the target customers because it is not practical for tourists to pack a pallet table or tire chair in their suitcases. Additionally, this project recommended advertising methods including distributing business cards, selling in high pedestrian traffic areas, using word-of-mouth, and posting on social media. Moreover, the researchers created a sample business card for the producers to use in the future.

Using these recommendations, the producers can continue manufacturing furniture and expanding their businesses. MSR should recruit more producers by promoting this project to MSR members as a low-cost and wide-reaching opportunity. The producers may not have the tangible resources to start a business, but by using available recycled materials and the provided recommendations, they can leverage their internal motivation to launch their businesses. Instead of waiting for employment, these producers can begin developing businesses to provide a reliable income for themselves and their families. They can expand their businesses and increase their profits as they become more efficient in the manufacturing process and improve their sales techniques. The interviewed entrepreneurs emphasized that this work will not be easy, but it will help the producers become self-sustainable and independent in the future.

## **EXECUTIVE SUMMARY BIBLIOGRAPHY**

Namibia Statistics Agency (2015). The Namibia Labour Force Survey 2014 Report. Retrieved from <http://cms.my.na/assets/documents/9b8e77842e3dec459407c2a76b9d79ab.pdf>



# TABLE OF CONTENTS

<b>ABSTRACT .....</b>	<b>II</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>III</b>
<b>TABLE OF CONTENTS .....</b>	<b>VIII</b>
<b>LIST OF FIGURES .....</b>	<b>XII</b>
<b>LIST OF TABLES .....</b>	<b>XIII</b>
<b>AUTHORSHIP .....</b>	<b>XIV</b>
<b>ACKNOWLEDGEMENTS.....</b>	<b>XV</b>
<b>CHAPTER 1: INTRODUCTION .....</b>	<b>1</b>
<b>CHAPTER 2: BACKGROUND .....</b>	<b>3</b>
2.1 HISTORY AND ECONOMICS OF NAMIBIA .....	3
2.1.1 <i>History of Katutura</i> .....	3
2.1.2 <i>Formal and Informal Economies in Namibia</i> .....	7
2.1.3 <i>Ecopreneurship in Windhoek</i> .....	11
2.1.4 <i>Previous Interviews with Entrepreneurs in Katutura</i> .....	12
2.2 MSR .....	13
2.2.1 <i>History of MSR</i> .....	13
2.2.2 <i>Current MSR Members</i> .....	14
2.2.3 <i>Trainings for MSR Members</i> .....	15
2.2.4 <i>The Paper Block Project</i> .....	16
2.3 RECYCLING IN NAMIBIA .....	16
2.3.1 <i>A Growing Waste Problem in Namibia</i> .....	16
2.3.2 <i>Existing Recycling in Namibia</i> .....	18
2.3.3 <i>Habitat Research and Development Centre</i> .....	20
2.3.4 <i>Worldwide Recycled and Sustainable Entrepreneurial Case Studies</i> .....	21
2.4 STAKEHOLDER ANALYSIS .....	22
<b>CHAPTER 3: METHODOLOGY.....</b>	<b>24</b>
3.1 RESEARCH TECHNIQUES .....	27
3.2 RESEARCH ENTREPRENEURSHIP STRATEGIES IN KATUTURA AND WINDHOEK.....	28
3.2.1 <i>Interview Entrepreneurs</i> .....	28
3.2.2 <i>Interview Team Namibia</i> .....	30
3.2.3 <i>Code Interviews</i> .....	30
3.3 EVALUATE CUSTOMER APPEAL IN TARGET MARKETS .....	31
3.3.1 <i>Observe Craft Fairs</i> .....	31
3.3.2 <i>Conduct a Focus Group with MSR Members</i> .....	32
3.3.3 <i>Survey Customers at Weekend Markets</i> .....	33
3.4 DETERMINE FINAL PRODUCTS FOR PROTOTYPING .....	34

3.4.1	<i>Observe the MSR Workshop</i>	35
3.4.2	<i>Discuss Potential Products with MSR Personnel</i>	35
3.4.3	<i>Interview Producers</i>	36
3.4.4	<i>Analyze Potential Products</i>	38
3.5	DETERMINE PRODUCTION VIABILITY OF FINAL PRODUCTS	39
3.5.1	<i>Coordinate Prototyping with Producers</i>	40
3.5.2	<i>Gather Supplies</i>	41
3.5.3	<i>Prototype Products with Producers</i>	42
3.5.4	<i>Conduct a Focus Group with Producers after Prototyping</i>	42
3.5.5	<i>Record Prototype Sales</i>	43
3.6	SUGGEST PRODUCTION PLANS AND A SALES STRATEGY	43
3.6.1	<i>Compile Production Instructions</i>	43
3.6.2	<i>Recommend Materials Source</i>	44
3.6.3	<i>Suggest Target Customers</i>	44
3.6.4	<i>Specify Sales Prices</i>	44
3.6.5	<i>Recommend Advertising Methods</i>	45
3.6.6	<i>Present at MSR Community Meeting</i>	45
3.7	METHODOLOGY CONCLUSION	45
<b>CHAPTER 4: RESULTS AND ANALYSIS</b>		<b>47</b>
4.1	ENTREPRENEURSHIP INTERVIEWS	47
4.1.1	<i>Kapana Seller Interview</i>	47
4.1.2	<i>Taxi Driver Interview</i>	48
4.1.3	<i>Welder Interview</i>	48
4.1.4	<i>Interview with Team Namibia</i>	49
4.1.5	<i>Entrepreneurship Insights</i>	51
4.2	CUSTOMER APPEAL IN TARGET MARKETS	52
4.2.1	<i>Craft Fair Observations</i>	52
4.2.2	<i>MSR Member Focus Group</i>	53
4.2.3	<i>Weekend Market Survey</i>	54
4.3	FINAL PRODUCTS FOR PROTOTYPING	56
4.3.1	<i>MSR Workshop Observations</i>	56
4.3.2	<i>Product Discussion with MSR Personnel</i>	57
4.3.3	<i>Producer Interviews</i>	58
4.3.4	<i>Product Analysis</i>	60
4.4	PRODUCTION VIABILITY OF FINALIST PRODUCTS	62
4.4.1	<i>Coordinate Prototyping with Producers</i>	62
4.4.2	<i>Supplies</i>	63
4.4.3	<i>Prototypes</i>	66
4.4.4	<i>Producer Focus Group Post-Prototyping</i>	71
4.4.5	<i>Recorded Prototype Sales</i>	72
4.5	SUGGESTED PRODUCTION PLANS AND A SALES STRATEGY	72
4.5.1	<i>Production Instructions</i>	73
4.5.2	<i>Material Sources</i>	73

4.5.3 Target Customer Recommendations .....	74
4.5.4 Suggested Advertising Methods .....	75
4.5.5 Suggested Sales Prices .....	76
4.5.6 Transportation Options.....	78
4.5.7 Community Meeting Presentation.....	79
<b>CHAPTER 5: CONCLUSION .....</b>	<b>80</b>
<b>CHAPTER 6: DISCUSSION.....</b>	<b>82</b>
6.1 EFFECTIVE METHODS .....	82
6.2 INEFFECTIVE METHODS.....	83
6.3 FUTURE WORK .....	84
<b>BIBLIOGRAPHY .....</b>	<b>86</b>
<b>APPENDIX A: INTRODUCTION AND PREAMBLE FOR ALL INTERVIEWS .....</b>	<b>93</b>
<b>APPENDIX B: PRODUCT-BASED ENTREPRENEURS INTERVIEW QUESTIONS.....</b>	<b>94</b>
<b>APPENDIX C: SERVICE-BASED ENTREPRENEURS INTERVIEW QUESTIONS.....</b>	<b>95</b>
<b>APPENDIX D: TEAM NAMIBIA INTERVIEW QUESTIONS .....</b>	<b>96</b>
<b>APPENDIX E: SURVEY QUESTIONS FOR MSR MEMBERS AND WEEKEND MARKETS .....</b>	<b>97</b>
<b>APPENDIX F: MSR PRODUCER FOCUS GROUP POST-PROTOTYPING QUESTIONS .....</b>	<b>98</b>
<b>APPENDIX G: FULL LIST OF INITIAL THIRTY-EIGHT PRODUCT IDEAS .....</b>	<b>99</b>
<b>APPENDIX H: KAPANA SELLER INTERVIEW NOTES .....</b>	<b>105</b>
<b>APPENDIX I: TAXI DRIVER INTERVIEW NOTES.....</b>	<b>107</b>
<b>APPENDIX J: WELDER INTERVIEW NOTES .....</b>	<b>109</b>
<b>APPENDIX K: TEAM NAMIBIA INTERVIEW NOTES .....</b>	<b>111</b>
<b>APPENDIX L: ENTREPRENEUR INTERVIEWS AND CODES.....</b>	<b>114</b>
<b>APPENDIX M: MSR KATUTURA CUSTOMER SURVEY .....</b>	<b>118</b>
<b>APPENDIX N: WEEKEND MARKET CUSTOMER SURVEY .....</b>	<b>121</b>
<b>APPENDIX O: ORIGINAL PALLET TABLE DO-IT-YOURSELF INSTRUCTIONS.....</b>	<b>123</b>
<b>APPENDIX P: ORIGINAL TIRE CHAIR DO-IT-YOURSELF INSTRUCTIONS .....</b>	<b>127</b>
<b>APPENDIX Q: ORIGINAL PLASTIC BAG BEADS DO-IT-YOURSELF INSTRUCTIONS.....</b>	<b>130</b>
<b>APPENDIX R: SUMMARIZED DO-IT-YOURSELF INSTRUCTIONS FOR PROTOTYPING .....</b>	<b>133</b>
<b>APPENDIX S: PRODUCTION INSTRUCTIONS FOR THE PALLET TABLE .....</b>	<b>135</b>
<b>APPENDIX T: PRODUCTION INSTRUCTIONS FOR THE TIRE CHAIR .....</b>	<b>140</b>
<b>APPENDIX U: MSR MEMBER FOCUS GROUP NOTES.....</b>	<b>146</b>
<b>APPENDIX V: MSR PRODUCER FOCUS GROUP POST-PROTOTYPING NOTES.....</b>	<b>148</b>

**APPENDIX W: CUSTOMER FEEDBACK FROM WEEKEND MARKETS ..... 150**  
**APPENDIX X: SALES STRATEGY ..... 152**

## LIST OF FIGURES

FIGURE 1. A DIRT PATHWAY IN KATUTURA .....	III
FIGURE 2. MSR MEMBER FOCUS GROUP.....	IV
FIGURE 3. DISTRIBUTION OF PRODUCTS BASED ON THE WEEKEND MARKET CUSTOMER SURVEY .....	V
FIGURE 4. RESULTS OF THE PUGH ANALYSIS .....	VI
FIGURE 5. (LEFT) COMPLETED PALLET TABLE. (RIGHT) COMPLETED TIRE CHAIR .....	VI
FIGURE 6. MAP OF KATUTURA (GOOGLE MAPS, 2017A) .....	4
FIGURE 7. KATUTURA IN 2017 .....	5
FIGURE 8. MAP OF KATUTURA (PENDLETON, 1996).....	6
FIGURE 9. (LEFT) A SHEBEEN IN KATUTURA. (RIGHT) TEAM MEMBERS VISITING THE KAKUKAZE MUNGUNDA MARKET.....	7
FIGURE 10. (RIGHT) AVERAGE EXPENDITURES OF KATUTURA RESIDENTS (ADAPTED FROM FAES, 2013) .....	8
FIGURE 11. MSR MEMBERS GATHERED AT A MONTHLY COMMUNITY MEETING .....	14
FIGURE 12. LOCATION OF KUPFERBERG LANDFILL (GOOGLE MAPS, 2017B) .....	17
FIGURE 13. PERCENTAGE OF RECYCLABLE MATERIALS IN KUPFERBERG LANDFILL (HASHEELA, 2009) .....	18
FIGURE 14. A RENT-A-DRUM RECYCLING STATION IN KLEIN WINDHOEK.....	19
FIGURE 15. A BUILDING MADE FROM TIRES AT THE HRDC.....	20
FIGURE 16. METHODOLOGY FLOW CHART .....	25
FIGURE 17. MAP OF THE THREE CRAFT FAIRS .....	32
FIGURE 18. MAP OF THE FOUR WEEKEND CRAFT MARKETS.....	34
FIGURE 19. PRODUCER SURVEY .....	37
FIGURE 20. MSR PRODUCER SUPPLIES AND SCHEDULE .....	41
FIGURE 21. LIKES AND DISLIKES OF PRODUCTS FROM MSR MEMBER FEEDBACK .....	54
FIGURE 22. DISTRIBUTION OF PRODUCTS BASED ON THE WEEKEND MARKET CUSTOMER SURVEY .....	55
FIGURE 23. INSIDE A ROOFING TOOLBOX AT THE MSR WORKSHOP.....	57
FIGURE 24. MSR PRODUCER SUPPLIES AND PROTOTYPING SCHEDULE .....	63
FIGURE 25. MR. NORRIS AND TWO PRODUCERS ATTACHING THE TABLE CROSSBAR.....	67
FIGURE 26. COMPLETE WOODEN PALLET TABLE PROTOTYPE.....	68
FIGURE 27. MS. GAGNER AND A PRODUCER PUNCTURING HOLES IN A TIRE .....	69
FIGURE 28. NEEDLE TOOL USED FOR WEAVING TIRE CHAIR .....	70
FIGURE 29. COMPLETE TIRE CHAIR PROTOTYPE .....	70
FIGURE 30. COMPLETED PLASTIC BAG BEAD PROTOTYPE.....	71
FIGURE 31. MSR FACEBOOK PRODUCT POST.....	75
FIGURE 32. A SAMPLE BUSINESS CARD .....	76

# LIST OF TABLES

TABLE 1. PRICES OF COMMON COMMODITIES IN WINDHOEK, NAMIBIA (ADAPTED FROM NUMBEO, 2017)..... 9

TABLE 2. MSR PROJECT TIMELINE ..... 26

TABLE 3. SCORING METHOD FOR PUGH ANALYSIS ..... 39

TABLE 4. PRODUCER FEEDBACK ..... 59

TABLE 5. FEEDBACK ON AVAILABILITY OF RECYCLED MATERIALS ..... 60

TABLE 6. PAIRWISE COMPARISON CHART ..... 61

TABLE 7. PUGH ANALYSIS ..... 62

TABLE 8. LIST OF MATERIALS, TOOLS, AND SAFETY EQUIPMENT AND THEIR COSTS ..... 65

TABLE 9. MATERIAL NUMBER AND COST FOR THE PALLET TABLE ..... 77

TABLE 10. RECOMMENDED SALES PRICE FOR THE PALLET TABLE ..... 77

TABLE 11. MATERIAL NUMBER AND COST FOR THE TIRE CHAIR ..... 78

TABLE 12. RECOMMENDED SALES PRICE FOR THE TIRE CHAIR..... 78

TABLE U1. MSR MEMBERS FOCUS GROUP FEEDBACK TALLIES..... 146

TABLE U2. COMMENTS FROM MSR MEMBERS ..... 147

# AUTHORSHIP

## **Abstract** (Jennifer Gagner)

*Reviewed by Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis*

## **Executive Summary** (Travis Norris)

*Reviewed by Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis*

## **Chapter 1: Introduction** (Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis)

*Reviewed by Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis*

## **Chapter 2: Background** (Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis)

*Reviewed by Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis*

### **2.1 History and Economics of Namibia**

#### **2.1.1 History of Katutura** (Jennifer Gagner)

#### **2.1.2 Formal and Informal Economies in Namibia** (Erin Dixson, Jennifer Gagner, and Hary Teklegiorgis)

#### **2.1.3 Ecopreneurship in Windhoek** (Travis Norris and Hary Teklegiorgis)

#### **2.1.4 Previous Interviews with Entrepreneurs in Katutura** (Travis Norris)

### **2.2 MSR**

#### **2.2.1 History of MSR** (Erin Dixson)

#### **2.2.2 Current MSR Members** (Erin Dixson)

#### **2.2.3 Trainings for MSR Members** (Travis Norris and Hary Teklegiorgis)

#### **2.2.4 Paper Block Project** (Travis Norris)

### **2.3 Recycling in Namibia**

#### **2.3.1 A Growing Waste Problem in Namibia** (Travis Norris)

#### **2.3.2 Existing Recycling in Namibia** (Erin Dixson and Travis Norris)

#### **2.3.3 Habitat Research and Development Centre** (Travis Norris)

#### **2.3.4 Worldwide Recycled and Sustainable Entrepreneurial Case Studies** (Erin Dixson, Travis Norris, and Hary Teklegiorgis)

## **Chapter 3: Methodology** (Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis)

*Reviewed by Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis*

## **Chapter 4: Results and Analysis** (Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis)

*Reviewed by Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis*

## **Chapter 5: Conclusion** (Erin Dixson)

*Reviewed by Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis*

## **Chapter 6: Discussion** (Jennifer Gagner)

*Reviewed by Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis*

## **Appendices** (Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis)

*Reviewed by Erin Dixson, Jennifer Gagner, Travis Norris, and Hary Teklegiorgis*

## ACKNOWLEDGEMENTS

We would like to thank the following people and groups for assisting and supporting us throughout this project:

- Our project sponsor, MSR
- Ms. Crystal Beukes, MSR CEO, for her guidance and feedback
- Mr. Tomas Shilongo and Ms. Hilya Kambanda, MSR personnel, for their daily assistance with logistics and translation
- Professors Sarah Wodin-Schwartz and Bob Kinicki, WPI Namibia project advisors, for continued counsel and direction of our project
- Professor Scott Jiusto, our project preparation advisor, for always giving us insightful guidance and relevant education
- Professor Creighton Peet, Namibia Project Center Director, for establishing our project and furthering our cultural background
- Nelson Michael, our driver, for bringing us to and from work every day
- Rini Coetzee, Margarete Roux, and Christo Roux, Pension Cori personnel, for their help in gathering materials for prototyping



## CHAPTER 1: INTRODUCTION

Namibia is a developing nation in southern Africa struggling with a high rate of unemployment. According to the 2014 Namibian Labour Force Survey, 27% of Namibians are unemployed. Men and women move from rural areas in northern Namibia to urban areas looking for jobs, but often they do not find employment and cannot afford to live within the formal city limits. This shortage of employment has caused an increase in the size and number of informal settlements on the outskirts of major cities (Pendleton, 1996). Katutura is an informal settlement in the north-western part of Windhoek, the capital of Namibia. Reduced prosperity and regulation in these informal settlements has led to a lack of a formal economy, structured education, and professional training (Kaze, 2014). These challenges make self-employment and entrepreneurship vital for subsistence in informal economies. In 2014, 59.8% of the Namibian population worked in the informal sector. Common informal businesses in Namibia include running hair salons, bars, or food stalls (Namibia Statistics Agency, 2015, Shindondola-Mote & Ohlson, 2013). Many individuals without employment seek opportunities for self-sustainability, while individuals with informal jobs desire to improve and formalize their businesses.

MSR, formerly known as Men on the Side of the Road, is a non-profit organization that aims to reduce unemployment in Windhoek and Swakopmund, focusing on residents in informal settlements. MSR provides men and women with professional training programs, connects them to short and long term employment opportunities, and encourages them to start their own businesses (Windhoek Express, 2016). To create business opportunities, MSR seeks to take advantage of available materials in the city (Beukes, personal communication, February 2, 2017). The government encourages the efforts of private recycling companies such as Rent-A-Drum, but the city of Windhoek has no formal government recycling collection program (Trepper, 2011). Individuals or businesses in Windhoek and Katutura commonly discard wood pallets, oil drums, tires, and plastic bags. MSR aims to provide its members with opportunities to manufacture products and create a business from these recyclable materials.

This project is not the first attempt by MSR to establish an entrepreneurship opportunity in Katutura and promote self-sustainability. A previous MSR project attempted to sell blocks of compressed paper in Katutura as an alternative to firewood. MSR discontinued the project due to marketing and distribution issues, product faults, and lack of profit. In 2014, a team of researchers from Worcester Polytechnic Institute (WPI) proposed an improved block design, a more appealing price structure, and a better distribution scheme (Hunt et al., 2014). Their suggested business model focused on selling the blocks to existing third-party retailers, who would sell them for a profit. However, MSR again abandoned the project because of product faults and lack of customer appeal.

Previous attempts to introduce entrepreneurship in Windhoek have failed due to a lack of necessary understanding of the market, while successful employment efforts have not created enough jobs. Poverty is still rife, with the unemployment rate remaining high over the past five years (Karter, 2016). Past research did not include proper collaborations with existing entrepreneurs to create appealing products. Furthermore, previous projects have not developed appropriate production and sales strategies. These types of strategies provide immediate guidance to those starting a business and include the target customers and advertising techniques for building a business. A project that engages current entrepreneurs, develops a desirable product, and provides production and sales strategies should be more successful in creating opportunities for self-sustainability.

This project assisted MSR in providing a business opportunity for unemployed men and women to create marketable products from recycled materials. This investigation conducted interviews with existing business owners and potential entrepreneurs, observed local markets, surveyed potential customers, and prototyped product designs with MSR members. The team used this research to recommend production plans and a sales strategy for two products. The production plan gave instructions for building the two products as well as options for transporting materials and products and sourcing materials. The sales strategy included suggested target customers, sales prices, and advertising methods for the products. The intention of these recommendations is to help the potential entrepreneurs develop their business for self-sustainability.

## **CHAPTER 2: BACKGROUND**

This chapter explains the historical and economic contexts of unemployment in Namibia, describes the work of this project's sponsor, MSR, examines recycling processes in Windhoek, and identifies the stakeholders of this project. These topics lay the ground work and provide insight into the context of the project. Section 2.1 examines Namibia's history of colonial rule and apartheid control, and their effects on employment opportunities in the informal settlements. Section 2.2 discusses MSR, which has worked with residents of these informal settlements since 2007. Section 2.3 describes existing recycling programs in Windhoek, and explores companies that produce goods from recycled materials. Finally, Section 2.4 discusses the stakeholders concerned with this project.

### **2.1 History and Economics of Namibia**

This section discusses the historical and economic context of entrepreneurship in Namibia. It describes the history of Katutura, examines the formal and informal economies of the country, and describes current entrepreneurship activities in Windhoek that focus on environmentally friendly practices.

#### **2.1.1 History of Katutura**

The roots of informal settlements in Namibia stem from the country's German colonization in 1883. European colonization created a socioeconomic structure in which whites coerced indigenous people into becoming unskilled, low-wage workers. This structure persisted after Namibia came under South African rule after the First World War. As a South African colony, the apartheid laws segregated Namibia by race and whites controlled the government despite constituting less than 15% of the total population. During apartheid, blacks could not enter the city of Windhoek except to work (Pendleton, 1996). Laws required black employees to carry a kopf ('head') card, only obtainable if a man had work in the city, to be allowed into downtown (Hayne as cited in McIntyre, 2015). Police could ask any black or colored man in Windhoek to produce his kopf card and could jail or fine him for failing to produce it.

During apartheid, ‘locations’ were areas outside the city where the indigenous Africans lived apart from whites. Ethnic differences further segregated these locations into smaller communities. The largest location was ‘Main Location’. In the 1950s, the Windhoek government closed Main Location because the city desired the land for expansion. Residents opposed the closure because they did not want to lose their homes. Although the homes were meager, residents valued them greatly. Main Location residents protested the closure and boycotted municipal busses, beer halls, and buildings in Main Location. Demonstrations lasted until December 1959 when one protest led to a police shooting that killed eleven people and injured forty-four more (Pendleton, 1996). After this incident, the residents agreed to move north of Windhoek, to Katutura, as shown in Figure 6 (Pendleton, 1996). In the Otjiherero language, ‘Katutura’ translates to ‘the place we do not stay’ (Kemper & Royce, 2002). The name reflects local attitude towards moving from Main Location to Katutura (Pendleton, 1996).

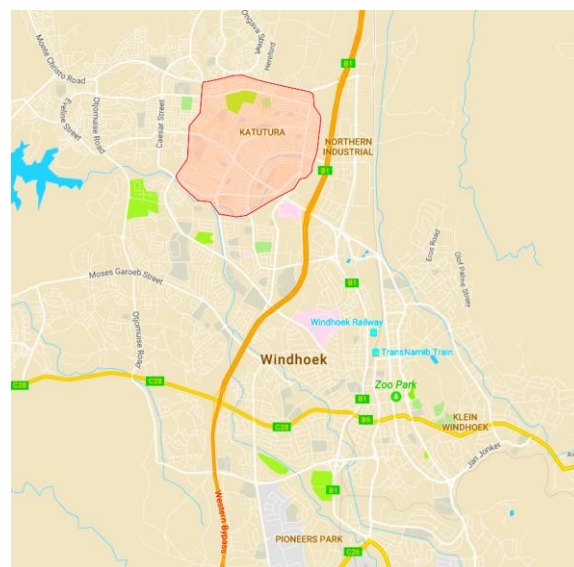


Figure 6. Map of Katutura (Google Maps, 2017a)

The official population of Katutura in 2015 was approximately 40,000 but the unofficial population was closer to 200,000. These estimates vary because tracking statistics in the informal settlements is difficult, as many people come and go from the city (Hayne as cited in McIntyre, 2015). Many rural-dwelling black and colored Namibians move to urban areas, such

as Windhoek, looking for work. Once they arrive, however, they cannot afford to live in the city and settle in peri-urban areas such as Katutura. Life in Katutura is more similar to life in rural Namibia than the modern city life of Windhoek. The majority of people in Katutura speak Oshiwambo. Within Katutura, cultures cluster together and there is limited access to modern amenities such as electricity, running water, technology, and permanent housing, as displayed in Figure 7. Figure 8 is a map of Katutura from 1996, showing that the ethnic boundaries set during apartheid lasted even after independence (Pendleton, 1996).



Figure 7. Katutura in 2017



Map C: Katutura

Note: Areas 1, 2, 3, 4 and 5 represent old Katutura. The above names and their boundaries as indicated on the map are the generally-recognized names and boundaries within Katutura. This map is based on an earlier map of areas by the author, a map by C. Fröhlich, and the municipal map of Katutura.

Figure 8. Map of Katutura (Pendleton, 1996)

In addition to work, migrants come to Windhoek seeking education and settle in Katutura. Though Katutura and the surrounding areas have schools, many families cannot afford a uniform, so their children cannot attend school (Hayne as cited in McIntyre, 2015). As a result, Katutura residents are largely uneducated and only about 2% of urban blacks go to secondary school (Pendleton, 1996). Most men and women in informal settlements are unskilled laborers who lack funds for training.

Life in Katutura is vibrant despite a challenging history. Social life is centered around weekends and 'shebeens,' such as the one in Figure 9. A shebeen is an informal bar, often built onto an existing home (Pendleton, 1996). Shebeens typically serve homemade alcohol made from corn grown in the owner's small yard such as "tombo", a maize beer (Hayne as cited in McIntyre, 2015). Additionally, there are two large markets in Katutura: Soweto, on

Independence Avenue, and Kakukaze Mungunda Market, on Mungunda Street (McIntyre, 2015). Popular businesses in these markets are food vendors, clothing stores, and hairdressers.



Figure 9. (Left) A Shebeen in Katutura. (Right) Team Members Visiting the Kakukaze Mungunda Market

## 2.1.2 Formal and Informal Economies in Namibia

### 2.1.2.1 Market and Currency

Before understanding the economy in Namibia and Windhoek, one must understand the currency. Namibia pegs its dollar to the South African rand, which provides stability as the rand's inflation rate is relatively low. Perhaps the most conspicuous disadvantage of the Namibian dollar being pegged to the rand is that the country cannot create independent monetary policies to stimulate the economy (Nunuhe, 2016). This restriction is a hindrance, particularly for a country with high unemployment, because it limits the government's feasible approaches to curb unemployment.

A large economic gap exists between the city of Windhoek and the informal settlements. The average net monthly disposable salary after tax in Windhoek is almost N\$9,000 (Numbeo, 2017), while the average net monthly income in Katutura is N\$1,000 (Faes, 2013). The average monthly total expenditure of Katutura residents is N\$1,365 and households

spend the majority of their income on food (Faes, 2013). Figure 10 illustrates an estimated distribution of expenses in Katutura.

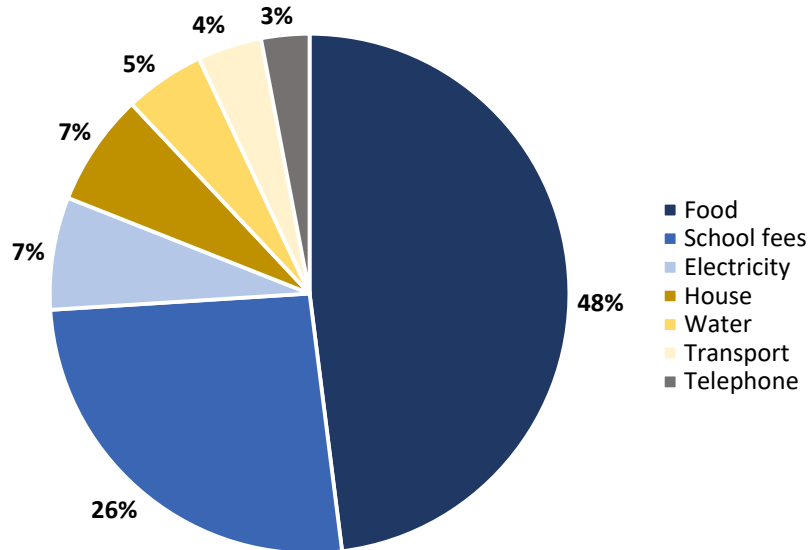


Figure 10. (Right) Average Expenditures of Katutura Residents (adapted from Faes, 2013)

Markets and prices vary greatly between Katutura and Windhoek. Table 1 shows the typical cost of goods and services in Windhoek. These commodities exceed the budget of most Katutura residents, yet are suitable for the formal markets in Windhoek. Windhoek has several shopping centers, such as Maerua Mall and The Grove Mall of Namibia, as well as weekend markets where local craftspeople sell their goods.



Table 1. Prices of Common Commodities in Windhoek, Namibia (adapted from Numbeo, 2017)

<b>Prices of Common Commodities in Windhoek, Namibia</b>			
<b>Commodity</b>	<b>Average Cost (N\$)</b>	<b>Range Low (N\$)</b>	<b>Range High (N\$)</b>
<b>Restaurants and Markets</b>			
Meal, Inexpensive Restaurant	100	70	140
Meal for 2 People, Mid-range Restaurant, Three-course	400	252	500
Domestic Beer (0.5 liter draught)	20	15	20
Cappuccino (regular)	22	18	25
Coke/Pepsi (0.33 liter bottle)	10	9	15
Water (0.33 liter bottle)	9	6	14
Milk (regular), (1 liter)	17	14	20
Loaf of Fresh White Bread (500g)	11	9	13
Eggs (12)	30	16	40
Chicken Breasts (Boneless, skinless), (1 kg)	67	57	95
Bananas (1kg)	25	18	30
<b>Transportation</b>			
One-way Ticket (Local transport)	10	10	20
Gasoline (1 liter)	12	11	12

### *2.1.2.2 Employment*

According to the 2014 Namibia Labour Force Survey, 27% of Namibians are unemployed. More people are unemployed in cities than in rural areas, particularly unskilled workers (Namibia Statistics Agency, 2015). Unemployed Namibians move from rural areas in

search of better employment opportunities, leading to higher unemployment in urban areas than rural areas. Between 2004 and 2015, the percentage of Namibians living in urban areas grew from 35.7% to 46.7% (Statista, 2015; CIA World Factbook, 2017). When these low-income, rural Namibians come to cities for employment, they often find that there is not enough land to settle on, causing informal settlements to expand. A survey of 190 people living in shack-dwellings in Windhoek found that these migrants typically feel like transients; they feel that they will not live and work in this settlement forever or that they must live somewhat like their former rural life (Niikondo, 2010).

Before independence, segregation laws prevented women from working in the city. Therefore, women needed to find employment to sustain themselves at home, which caused an increase in unemployment as they could not easily find jobs (Niikondo, 2010). As the nation progresses socially, more women are entering the workforce, increasing the overall amount of unemployment (Mwinga, 2012).

Low levels of education significantly reduce the chances of gaining formal employment. The unemployment rate for individuals with university education or teacher's training is much lower than for people with junior, secondary, or primary education (Kaze, 2014). Therefore, Budlender theorized that unemployment may not be caused by the lack of jobs but rather by the lack of correct skills for the jobs available (Budlender, 2011).

### *2.1.2.3 Informal Economy*

The high unemployment rate and large scale rural-to-urban migration in Namibia causes people to make a living in the informal sector, which provides income for more than half of Namibians. The term informal sector refers to "the production and employment which takes place in unincorporated small or unregistered enterprises" (Chen, 2012). An informal economy includes all units, activities, and workers in the informal sector (Chen, 2012). Informal jobs are not subject to standard labor legislation, income taxation, and social protection or employment benefits specified in a national definition (Budlender, 2011).

Retail and distribution dominate the Namibian informal economy. Manufacturing is not a predominant practice in the informal sector because of past apartheid policies, which secured

cheap black labor for the white-dominated mining, agriculture, and manufacturing industries (Ministry of Trade and Industry, 2012). Eighty-three percent of the population working in the informal sector is engaged in agriculture and fishing industries, while ninety-three percent of the population is in private households (Kaze, 2014). Occupations not in the informal sector include agriculture used for barter, enterprises using high technology, and professionals such as doctors, lawyers, and dentists (United Nations Economic and Social Council, 2007). Some common examples of informal jobs in Namibia include selling kapana, meat grilled in a local style, on the side of the road, offering to slice meat in small stalls, and running a hairdresser, a restaurant, or a bar (Shindondola-Mote & Ohlsonn, 2013). Due to the lack of formal jobs, many individuals in the informal sector start their own businesses. Hence, entrepreneurship is crucial for self-sustainability in Namibia's informal settlements.

### **2.1.3 Ecopreneurship in Windhoek**

Entrepreneurship in Windhoek has been growing in recent years, with many ventures seeking environmentally friendly opportunities. "Ecopreneurs" are entrepreneurs who focus on ecologically conscious projects (Pastakia, 1998). There are programs in Windhoek such as Havana Entrepreneur and Team Namibia that promote and support entrepreneurship.

There are two types of ecopreneurs: commercial ecopreneurs and social ecopreneurs. Commercial ecopreneurs seek to maximize gains from eco-friendly businesses, whereas social ecopreneurs focus on promoting green ideas or technologies (Pastakia, 1998). Often, forces from four stakeholders shape these enterprises. These stakeholders include investors seeking green opportunities, customers purchasing sustainable products, citizens exercising environmental activism, and governments regulating harmful industries (Pastakia, 2002). However, one of the biggest barriers to ecopreneurship is customer resistance, which is particularly high when eco-friendly products require a change in lifestyle (Pastakia, 1998). Green products that substitute for existing products without systematic changes or cost increases are more accepted by customers (Pastakia, 2002). In order for ecologically conscious ventures to succeed, producers must adapt to the market forces, and ease customer resistance.

Existing entrepreneurship programs in Windhoek provide opportunities and promote eco-friendly business ventures. Havana Entrepreneur was a two-year project focused on promoting youth entrepreneurship in Havana, Katutura (Angula et al., 2015). The Havana project included challenges inspired by the American reality game show, *The Apprentice*. Two teams of youth from the Havana community competed in four entrepreneurial challenges: develop a business plan for the Havana community center, sell second-hand clothes locally, manufacture products out of recycled material, and take tourists on a tour through Havana. Upon completion of each challenge, judges rated the groups based on their marketing, presentation, teamwork, and creativity skills. For the challenge on manufacturing products out of recycled material, participants collected newspapers, light bulbs, plastic bags, bottles, and cardboard. The groups used these materials to design objects that could be used in everyday life, such as a light bulb holder from cardboard, a jewelry box from newspapers, and necklaces from plastic, string, and newspapers (Angula et al., 2015).

Team Namibia, another entrepreneurship program in Windhoek, aims to improve small-scale entrepreneurship in Katutura over the next two years (Carter, 2016). Team Namibia encourages Namibians to purchase and produce quality local goods (Team Namibia, 2017) and will train twenty-five small and micro entrepreneurs to develop their business skills for both existing and informal businesses (Carter, 2016). The Embassy of Finland sponsors this training and gave N\$1.9 million to help develop businesses and talented people break out of poverty. Team Namibia hopes to promote socially and environmentally responsible practices, and support businesses that make a positive impact on the environment.

#### **2.1.4 Previous Interviews with Entrepreneurs in Katutura**

In 2016, a team of WPI researchers conducted interviews with six existing entrepreneurs in Katutura for MSR, formerly known as Men on the Side of the Road. These interviews helped identify common market needs, sources of initial business funding, and strategies for overcoming challenges of starting a business. According to these interviews, entrepreneurs created their businesses to increase their income and to bring services or products closer to customers. Two entrepreneurs identified the difficulties of collecting payment for goods and

services. The interviews also revealed the importance of understanding customers and adjusting the business accordingly. Interviews showed that local entrepreneurs typically price their product by adding a flat amount to the cost of materials (Chico et al., 2016). These entrepreneur interviews served as research for developing a self-employment training program with MSR.

## **2.2 MSR**

MSR is a non-profit organization in Windhoek, Namibia, whose goal is to reduce unemployment, challenge discrimination, and lift Namibian families out of poverty (Men on the Side of the Road, 2014a). This section discusses the history of MSR, provides information about their current members, explains the training programs, and examines a previous entrepreneurial project available to the members.

### **2.2.1 History of MSR**

The high unemployment rate in Namibia causes hundreds of men and women to congregate by the side of the road every day in Windhoek with the hope of finding a casual day's labor (Admin, 2014). Organizations such as MSR have attempted to mitigate unemployment by providing job opportunities for Namibians in informal settlements. MSR was established in 2007 by the Dutch Reformed Church, located in Eros, the northeastern part of Windhoek. MSR has helped over 1,100 men since 2007. In 2016 MSR rebranded to increase the number and range of people they assist (Typesetter, 2016). Prior to rebranding, MSR's labor demographic was men physically sitting by the road, but MSR has since expanded to include women, people who did not complete high school, and a wider range of people considered unemployed by the government (Typesetter, 2016). MSR provides training programs and resources to their members, which Section 2.2.3 examines. Members gain valuable life skills, attitudes, and connections that prepare them for self or long-term employment.

## 2.2.2 Current MSR Members

As of February 2016, Men on the Side of the Road had about 1,580 registered members (Nashuuta, 2016). Figure 11 shows some of these members at a monthly community meeting. As previously mentioned, MSR recently expanded to include women, and youth who have failed the 10th or 12th grade Namibia National Exam. When students fail this test, the education system does not permit them to continue in the schooling system, decreasing their chances of finding future employment. MSR has been working to register these students in equivalent education programs so they can continue their studies, giving them a better chance at finding jobs (Beukes, personal communication, February 2, 2017).



Figure 11. MSR Members Gathered at a Monthly Community Meeting

Men and women typically come into MSR with some existing proficiencies such as painting, bricklaying, mowing, gardening, or other manual skills (Admin, 2014). MSR is constructing a database that includes the skills, interests, age, and level of formal education of each member. Companies can hire MSR members and apply to become a registered customer by contacting the MSR staff through their website or by phone. MSR encourages its members to accept a wage of at least N\$100 per day (Men on the Side of the Road, 2014a). Ideally,

members are able to support themselves and their families without assistance after two years of training and mentorship (Beukes, personal communication, February 2, 2017).

### **2.2.3 Trainings for MSR Members**

MSR not only helps members find employment, but also offers trainings to improve technical and life skills. People looking to become members must attend a life-skills training and a money-management training (Beukes, personal communication, February 2, 2017). The life skills training focuses on developing communication, interview, and negotiation skills, CV writing, and evaluating the roles and responsibilities of an employee. The money management course develops members' financial skills and attitudes by providing new insights and perspectives on fiscal management. As part of this program, MSR requires members to complete the "Budget wise, Save wise, Spend wise" course sponsored by the Ministry of Finance (Cline et al., 2010). Once members complete required sessions, MSR connects them with additional training institutions based on the members' interests and MSR's budget (Beukes, personal communication, February 2, 2017). After members acquire sufficient skills in their field of interests, they go through an internship program to apply their acquired knowledge. After training and experience, members are more likely to obtain formal or self-employment (Windhoek Express, 2016).

In addition to life skills and money management training programs, MSR recently developed a third training program called "Pathways to Self-Employment" (Chico et al., 2016). A team of WPI students worked closely with MSR members to develop this self-employment training. This eight-hour course focuses on entrepreneurship, problem solving, and business management (Chico et al., 2016). It helps MSR members gain the knowledge and experience they need to start their own business. Since many of these skills take more training to develop fully, MSR provides funds for members to take additional training courses at other institutions (Chico et al., 2016).

## **2.2.4 The Paper Block Project**

In 2011, MSR developed an environmentally friendly alternative to firewood made from compressed paper and sawdust, and marketed the fuel in Katutura (Cline et al., 2012). MSR members sold these fuel blocks door-to-door, but MSR terminated the project in 2013 (Hunt et al., 2014). A research team from WPI investigated issues with this process in 2014 and found that the major problems included design faults, lack of distribution, and poor profit structure. The paper blocks did not produce a strong enough flame to cook with, door-to-door sales failed to reliably find customers, and MSR members received little profit. WPI researchers proposed an improved block design, an equitable payment plan for block producers, and a distribution scheme through local informal shops (Hunt et al., 2014). Despite these changes, MSR discontinued the paper block project due to unsatisfactory performance. Burning the blocks created too much ash, rather than usable coals, and customers stopped buying the blocks (Beukes, personal communication, February 16, 2017).

## **2.3 Recycling in Namibia**

Recycling across Namibia is scarce and the methods used in recycling vary widely, leading to an excess of recyclable materials being discarded formally and informally. This section examines waste in Namibia, explains existing recycling practices in Windhoek, describes the Habitat Research and Development Center, and identifies organizations that create and sell products from recycled materials.

### **2.3.1 A Growing Waste Problem in Namibia**

Across Namibia, waste collection and disposal varies greatly. Collection methods range from modern compactor trucks to donkey carts to people carrying items in bags. In a survey of forty-six Namibian towns, 88% had a designated landfill, and the majority burned at least some of their waste. The informal settlements create difficulties for collection, due to their narrow streets and lack of infrastructure. Many informal settlements have informal landfills where residents leave or burn their garbage and communal 'skips', which are trash containers similar to American dumpsters.



Windhoek's only formal general landfill, Kupferberg, sits eleven kilometers south west of the city center, shown in Figure 12, and receives formally collected household garbage (Hasheela, 2001).

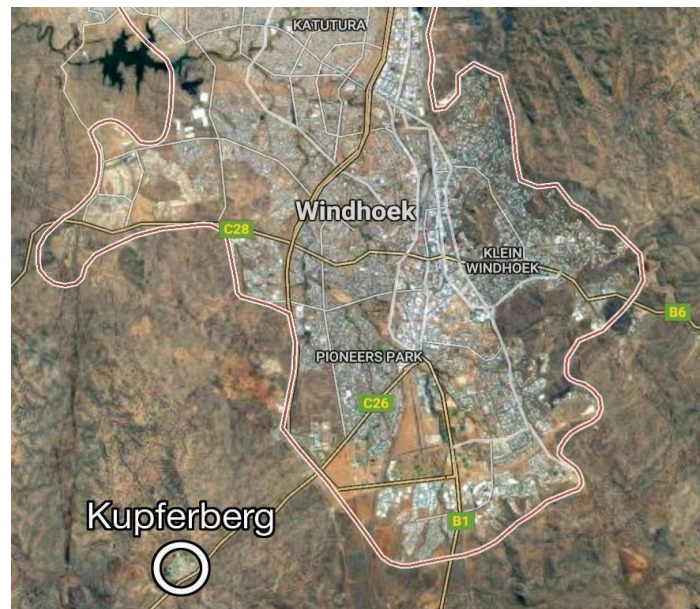


Figure 12. Location of Kupferberg Landfill (Google Maps, 2017b)

The Kupferberg landfill contractor hires 'litter pickers' to retrieve recyclable items from the general waste areas. However, dozens of Windhoek residents began scouring the dump to provide for their families after the city government discontinued a food-for-work program in 2013. Careful not to be sighted by landfill guards, these 'scavengers' search through piles of garbage at night for anything edible or valuable (Thijenuna, 2016).

Non-recyclable material, such as garden refuse or food products, makes up an estimated 55% of the waste collected in Windhoek. Glass, paper, and plastic compose most of the remaining 45% of recyclable waste as shown in Figure 13. Informally discarded recyclable waste is often easy to obtain and can be reused to make useful products (Hasheela, 2009).

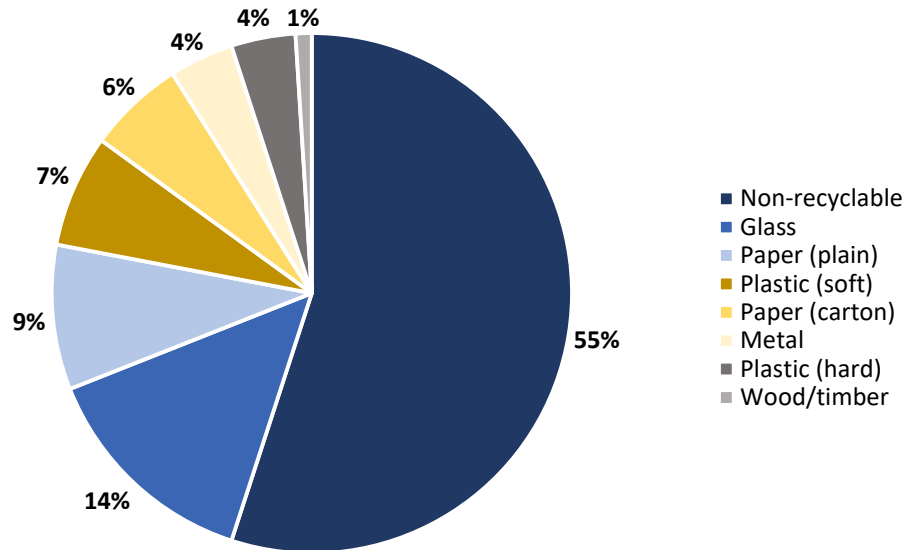


Figure 13. Percentage of Recyclable Materials in Kupferberg Landfill (Hasheela, 2009)

Waste disposal differs among income groups and negatively impacts low income populations. Windhoek waste audits from 2004 and 2008 show that members of high-income groups generate more than twice as much waste as members of medium or low income groups. Furthermore, the amount of waste generated by all income groups increased over the sampled years (as cited by Hasheela, 2009). Additionally, low-income urban populations are particularly vulnerable to the ill effects of poor waste management in southern Africa (Hope & Lerokwe, 1999). Poor waste management can cause health issues, generate sanitation concerns, and decrease quality of life (Hope & Lerokwe, 1999).

### 2.3.2 Existing Recycling in Namibia

Namibia has no formal recycling collection service (Trepper, 2011). However, recycling centers and programs have become more popular in recent years. Companies such as Namibia Breweries Limited, The Glass Recycling Company, and Rent-A-Drum sponsored prizes for schools that collected the most recyclable goods (Recycle Namibia Forum, n.d.). Plastic Packaging, Namibia Polymer Recycling Company, and the City of Windhoek Solid Waste Management Department negotiated with local shopping centers to set up recycling stations

outside of stores. Each of these stations has four containers: one each for cans, glass, plastics, and paper products. Since people are more likely to go to shops that have recycling containers, stores used this innovative technique to bring more customers to their shops (Schneck, 2009).

There are more programs in Namibia that promote the habit of recycling. The Clear Bag System launched in 2010, encourages residents to separate their paper, glass, plastics, and cans (Global-recycling, 2017). After the residents sort their waste, Rent-A-Drum collects the recycled materials, further sorts, and then sells the materials to South Africa for recycling (Global-recycling, 2017). Figure 14 shows the recycling containers of Rent-A-Drum. Other privately owned companies, such as Keetmanshoop, also collect recycled materials such as glass, plastic, paper, metal, hazardous material, bio, and e-waste (Magen, 2010). Furthermore, Windhoek hosts a yearly community recycling day, called Windhoek Recycle Day. On this day, Windhoek residents bring recyclables to a gathering place in the city (Staff Reporter, 2016).



Figure 14. A Rent-A-Drum Recycling Station in Klein Windhoek

In Namibia, particularly in informal settlements, residents discard recyclable materials informally. Items such as wooden pallets, oil drums, old tires, and plastic bags are commonly thrown away by businesses. MSR has approximately seventy oil drums in their old location (Beukes, personal communication, February 2, 2017). The oil drums at MSR and the available recyclable waste in Windhoek and Katutura are great resources for making recycled products and starting a business.

### 2.3.3 Habitat Research and Development Centre

Another type of recycling in Namibia involves using available materials for construction of buildings. The Habitat Research and Design Centre (HRDC) in Windhoek researches and promotes sustainable strategies for housing. Designed by architect Nina Maritz, the HRDC features buildings made from tires, steel drums, and branches of invasive plants (Cockram, 2007). Figure 15 shows a building at the HRDC made by filling tires with compressed soil.



Figure 15. A Building Made from Tires at the HRDC

The Ministry of Local and Regional Government Housing, the Municipality of Windhoek, and the National Housing Enterprise developed the HRDC as a partnership (Maritz, 2004). The HRDC partners with governmental institutions, higher education institutions, and non-governmental organizations (NGOs) to conduct research and trainings. Its mission is to use available materials for housing, promote research in urban development, and apply this research to solve housing problems in Namibia. The HRDC's main activities include researching building materials and designs, advocating for alternative housing and urban settlement designs, and educating Namibians about renewable energy, land tenure, and more (Ministry of Urban and Rural Development, n.d.). It serves as an educational resource for students in primary and secondary schools, and hosts events to celebrate and raise environmental awareness (HRDC, 2007).

### **2.3.4 Worldwide Recycled and Sustainable Entrepreneurial Case Studies**

Many individuals, companies, and organizations use recycled materials to produce crafts and other goods. This section examines three successful organizations that specialize in recycled and sustainable products from countries around the world: Ten Thousand Villages, Sole Rebels, and Repurpose Schoolbags.

Ten Thousand Villages is a nonprofit organization that works with artisan groups around the world, particularly women and socially disadvantaged populations (Wolfer & Del Pilar, 2008). It provides an opportunity for unemployed or underemployed artisans in developing countries to earn income by bringing their products to markets and selling them. Using fair trade principles, these artisans sell crafts that reflect cultural traditions and environmental consciousness (Wolfer & Del Pilar, 2013). The term “fair trade” refers to business principles that benefit economically disadvantaged producers, maintain fair prices, and ensure safe working conditions (World Fair Trade Organization, 2013). In 2014, sales in the United States totaled USD\$27.6 million (Ten Thousand Villages, 2015), approximately one third of which goes directly to the artisans (Wolfer & Del Pilar, 2008). Their customers are typically females between the ages of thirty and fifty, who are well educated and culturally minded (Wolfer & Del Pilar, 2008). These artisans make many of their products from recycled materials, such as newspapers, plastic bags, or aluminum cans.

Bethlehem Tilahun Alemu founded SoleRebels in 2005 to increase job opportunities for Ethiopians. This organization employs and trains those thought to be unemployable. The employees manufacture shoes and sandals from discarded tires and sustainable, handmade fabrics (Mayer, 2016). The company has achieved market success by opening and sustaining outlet stores in the United States, Taiwan, Japan, Greece, Switzerland, Spain, Austria, and Singapore. The company is expanding, and predicts having over fifty stores by 2018. Forbes featured the founder, Bethlehem Tilahun Alemu, on the “100 Most Powerful Women” list (Mayer, 2016).

Repurpose Schoolbags is a green initiative, South Africa-based social startup founded by Thato Kgathanye. This company designs and manufactures school bags from recycled plastic bags. The employees wash and heat-bond twenty discarded plastic bags to stitch each durable,

waterproof backpack (Brand South Africa, 2014). They then fit the school bags with a portable solar panel that charges during the day and can be detached from the bag to power a small lamp for up to twelve hours to give students the ability to study at night. In the first year, Repurpose Schoolbags grew from two employees to eight, and produced twenty bags per day. It has now teamed up with local individuals and corporates in South Africa to cover the cost of the bags on behalf of the students (Repurpose Schoolbags, 2017). The founders plan to expand to other countries in Africa, and develop a luxury brand to subsidize the costs of production (Said-Moorhouse, 2014).

These case studies show a potential for viable businesses that sell recycled materials. Despite differing markets, materials, and products, all three organizations succeed in producing and distributing useable and valuable products from recycled materials. Ten Thousand Villages has developed a market in North America, while SoleRebels has expanded globally. Meanwhile, Repurpose Schoolbags has created a product that changes lives. These organizations show the potential for ecopreneurship, and show its long-term feasibility in a global market.

## **2.4 Stakeholder Analysis**

The stakeholder's in this project are:

- MSR members interested in starting their own business
- Katutura residents, Windhoek residents, and tourists as possible target customers for the final products
- Existing entrepreneurs in Katutura and Windhoek
- Existing entrepreneurship programs in Windhoek
- Markets in Katutura and Windhoek who may sell the final products

MSR members are unemployed men and women generally living in the informal settlements around Windhoek and Swakopmund. MSR members that are stakeholders in this project live in Katutura and are interested in starting their own business. They include both older, skilled workers who migrated from rural areas, and younger untrained workers who did not complete high school. These members are the producers manufacturing and selling

products made from recycled materials. These producers gain the opportunity to support themselves and their families.

Katutura residents, Windhoek residents, and tourists are considered as the target customers for the created products. Based on their needs and interests, the customers benefit from useful, eco-friendly items that are often less expensive than similar products made from new materials.

Existing entrepreneurs in Katutura and Windhoek are self-employed individuals who have experience in starting a business. The entrepreneurs run product-based or service-based businesses. Product based entrepreneurs sell physical items while service based entrepreneurs sell services that customers need. Existing entrepreneurs have experience in starting a business. They have learned which products or services to sell, methods for selling them, prices for selling them, and the competitors to them. They are stakeholders because they allocate personal time to give advice to those looking to start their own business. They have vested interest in this project because starting businesses that sells recycled products contributes to the betterment of their communities.

There are existing entrepreneurship programs in Windhoek that support and promote eco-friendly business ventures. They benefit from this project because it aligns with their own goals of fostering entrepreneurship. This project could potentially increase or decrease the number of entrepreneurs attending their program. If people see that trainees became successful entrepreneurs, more individuals may attend these entrepreneurship programs. However, it is possible that, people may be inclined to work with MSR instead of participating in other entrepreneurship programs.

Finally, sellers at markets in Katutura and Windhoek have knowledge of the types of products people want in the area. These business owners know how to interact with customers and market their products. They are stakeholders as they can potentially buy the final products from the producers and profit from selling them.

## CHAPTER 3: METHODOLOGY

This project assisted MSR, formerly Men on the Side of the Road, a non-profit training and employment organization in Windhoek, Namibia, by developing a business opportunity for unemployed men and women to create marketable products from recycled materials. The objectives for achieving this goal were:

1. Research entrepreneurship strategies in Katutura and Windhoek
2. Evaluate customer appeal in target markets
3. Determine final products for prototyping
4. Determine production viability of the final products
5. Suggest production plans and a sales strategy

Figure 16 gives a visual representation of these objectives and the tasks associated with completing each one. The gray boxes show each objective and blue boxes show the corresponding methods used. The team concurrently researched entrepreneurship strategies and evaluated customer appeal. Then, the team determined final products for prototyping based on customer appeal, producer interest, required tools, required skills, and amount of additional materials needed for construction. Prototyping determined the production viability of these final products. Finally, the researchers used the entrepreneurship research, customer appeal, and production viability data to suggest production plans and a sales strategy for the products.



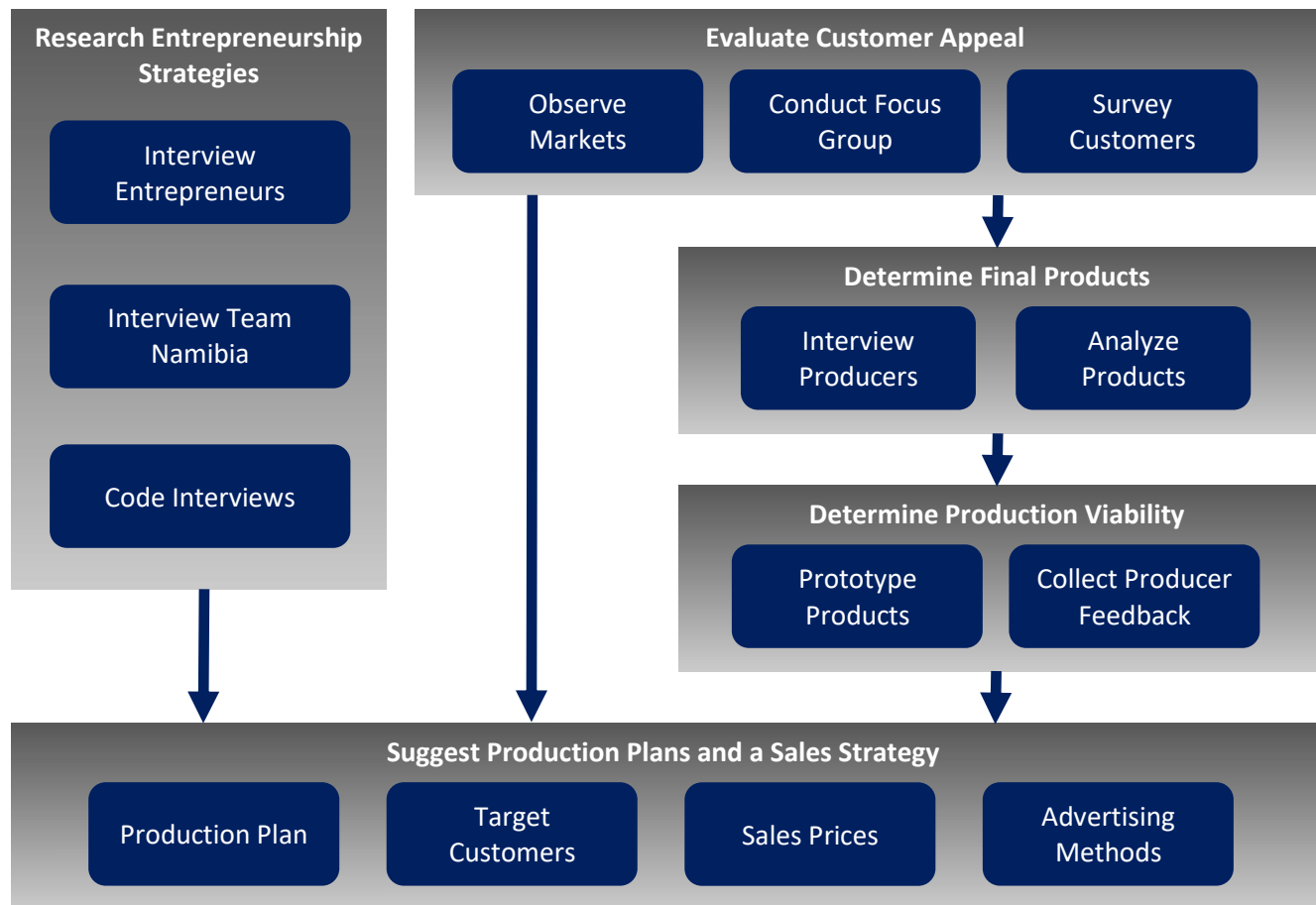


Figure 16. Methodology Flow Chart

Successfully meeting these objectives relied on interviews with existing entrepreneurs, focus groups with MSR members, surveys of potential customers, observations of local markets, interviews and prototyping with MSR members interested in starting a business, and discussions with MSR personnel Crystal Beukes, Hilya Kambanda, and Tomas Shilongo. Table 2 shows the timeline for the project objectives and tasks. To accomplish every objective within the timeframe, the team often worked on several tasks concurrently.

Table 2. MSR Project Timeline

Objective	Task	Week						
		1	2	3	4	5	6	7
Research entrepreneurship strategies in Katutura and Windhoek	Interview entrepreneurs	■	■	■				
	Interview Team Namibia					■		
	Code interviews		■	■		■		
Evaluate customer appeal in target markets	Observe craft fairs	■						
	Conduct a focus group with MSR members	■						
	Survey customers at weekend markets			■				
Determine final products for prototyping	Observe MSR workshop		■					
	Discuss potential products with MSR personnel		■					
	Interview producers			■				
	Analyze potential products			■	■			
Determine production viability of final products	Coordinate prototyping with producers			■				
	Gather supplies				■			
	Prototype products with producers				■	■		
	Conduct a focus group with producers after prototyping				■			
	Record prototype sales					■	■	
Suggest Production Plans and a Sales Strategy	Compile production instructions						■	■
	Recommend materials source						■	■
	Suggest target customers						■	■
	Specify sales prices						■	■
	Recommend advertising methods						■	■
	Present at MSR community meeting						■	

### 3.1 Research Techniques

This investigation utilized shared action learning, asset-based community development, oral history interviews, observations, surveys, community focus groups, interview coding, and prototyping to gather information.

**Shared action learning** encourages researchers to work closely with community members as co-researchers and guides communities to develop their strengths and overcome their weaknesses (Jiusto et al., 2013). This method suits research that has local applications, involves a range of stakeholders, and requires the community to take steps towards an end goal. Shared action learning can address real-world challenges in intricate environments by understanding social and cultural contexts, working with local communities in shaping the research, and creating action that involves the community members (Jiusto et al., 2013). The team incorporated shared action learning by involving MSR members during prototyping.

**Asset-based community development (ABCD)** advances communities by recognizing existing underutilized resources. ABCD is appealing because it leverages local support, as opposed to an outside source. Local residents identify existing assets such as community leaders, programs, and resources. Then, researchers use these resources to address perceived weaknesses in the community (Sustaining Community, 2016). The project team utilized ABCD by incorporating underutilized resources, such as recyclable materials and MSR's business training programs in this project.

**Oral history interviews** provide a firsthand account of personal experiences that provide the interviewer with a historical context (Lummis as cited in Mckenzie, 2005). Collecting oral history interviews suited the team's entrepreneurship research as it provided first-hand insight into the motivations, procedures, and challenges related to starting a business.

**Observations** gather data based on information the researcher has heard, seen, or noticed about places, people, or objects. In this project, observations took place in Katutura and Windhoek to identify the common items sold at local markets, their prices, and customer demand.

**Surveys** are a series of questions used to gather specific information from a sample population. Researchers collect data from responses to these questions (Scheuren, 2004). The

project team used a survey to gauge customer interest when conducting research in Windhoek weekend markets.

**Focus groups** exemplify the thought process and opinions of a group of people as they discuss a product, service, or idea (Nagle and Williams, n.d.). During customer appeal research, team members asked focus groups of MSR members in an inclusive setting for their thoughts and opinions about potential products.

**Interview coding** is an analysis system used to categorize and identify results within qualitative data (Gibbs, 2007). To interpret data from interviews, the team used coding to analyze the interviews with entrepreneurs for common activities, strategies, and conditions. This method allowed the researchers to identify the most common target customers, advertising methods, and challenges of entrepreneurship.

**Prototyping** is a process of constructing an early sample or model of a design. It allows the producer to test and refine the functionality and performance of the design (Monosoff, n.d.). The project team utilized prototyping to determine the production viability of products and create production plans.

## **3.2 Research Entrepreneurship Strategies in Katutura and Windhoek**

Researching entrepreneurship strategies helped the team understand the procedures of starting and maintaining a business in Katutura and Windhoek. The team completed the following subtasks for researching entrepreneurship:

1. Interview entrepreneurs
2. Interview Team Namibia
3. Code interviews

### **3.2.1 Interview Entrepreneurs**

The team interviewed existing entrepreneurs in Katutura to gain insight into their business practices, advertising techniques, and knowledge of starting a business. To get a firsthand account of the entrepreneurs' experiences, the group utilized the oral history approach when conducting these interviews. The team started each interview with the

introduction and preamble found in Appendix A. The interviewers asked about the reasons for becoming entrepreneurs and choosing their specific business to understand their motivations for starting a business. To obtain insight on marketing and pricing methods, the team asked these entrepreneurs about finding customers, choosing target markets, and pricing their services or products. Team members also inquired about challenges the interviewees have faced when starting a business and their advice for new entrepreneurs. Appendices B and C contain these stakeholder questions.

MSR staff identified three local entrepreneurs to interview: a kapana seller, a taxi driver, and a welder. Assisted by MSR personnel, the group scheduled interview times based on the entrepreneurs' availability. Team members interviewed the kapana seller on a weekday morning before her lunch customers arrived. The taxi driver interview occurred at 12:00PM on a weekday to avoid conflicting with rush hour and his personal plans. The project team interviewed the welder on a Saturday because he worked on weekdays and could not spare work time for an interview. Two team members visited each entrepreneur at their work to conduct the interview. One member asked questions while the other took notes using pen and paper. The team paired group members randomly to lessen the effects of response bias during interviews. To make interviewees feel more comfortable, team members encouraged the interviewees to ask questions about the interviewers' personal lives and the project to foster connections with the entrepreneurs. The group took pictures of the interviewees who gave informed consent.

To minimize any language barriers, Mr. Tomas Shilongo, MSR fieldworker, translated interviews between English and Oshiwambo when necessary. When Ms. Gagner and Ms. Dixson interviewed the kapana seller, Mr. Shilongo translated the full conversation, as the kapana seller did not speak English. During the interview with the taxi driver, Mr. Shilongo translated Mr. Norris and Ms. Teklegiorgis' questions for clarity. Mr. Shilongo translated an introduction and preamble during Ms. Gagner and Mr. Norris's interview with the welder, but the interviewers conducted the remainder of the questions in English. Additionally, the interviewees often responded with short answers to the open-ended questions. Hence, the team members repeated questions and prompted the interviewees to give detailed answers.

Furthermore, the informal nature of the entrepreneurs' businesses occasionally conflicted with the formality of the interview. For example, if a customer came during an interview, the team members paused or curtailed the interview.

### **3.2.2 Interview Team Namibia**

Interviewing Team Namibia enabled the group to understand the process of promoting and supporting business ventures in Katutura and Windhoek. The interview began with the introduction and preamble found in Appendix A. The team asked about Team Namibia's goals and projects to understand the efforts of the organization. To get insight on Team Namibia's promotion of entrepreneurship, they were asked about their methods of reaching individuals and the groups of people they target. Additionally, the interview inquired about the resources the organization requires to support business ventures and the challenges it has faced. Appendix D contains the specific interview questions.

The team scheduled an interview with representatives of Team Namibia via email. They requested a meeting in April, to provide them with more time to develop their program. On April 10, 2017, a pair of team members interviewed a representative of Team Namibia at their headquarters. One member asked questions, while the other recorded notes on pen and paper.

### **3.2.3 Code Interviews**

To analyze data from the three entrepreneur interviews and determine common entrepreneurship practices, the first step was to code the notes from these interviews. Using a list of pre-set codes, exhibited in Appendix L, the team reviewed the notes and transcripts of the entrepreneur interviews to identify commonalities. The researchers determined pre-set codes based on answers from the interviewees. The codes included target customers, marketing and pricing methods, reasons for starting a business, resources or advice for other entrepreneurs, and changes in their business. Ms. Dixon and Ms. Teklegiorgis coded the kapana interview, Mr. Norris coded the taxi driver interview, and Ms. Dixon coded the welder interview. The team members highlighted these coding themes using different colors for each theme. The group then discussed and identified the most common data points in each theme.

### **3.3 Evaluate Customer Appeal in Target Markets**

During the first three weeks, the project group evaluated customer appeal in three target markets: tourists, Katutura residents, and Windhoek residents. This study used this data to identify customer interest in various products and to understand the differences in customer appeal across locations and demographics. The next task was to evaluate these markets using the following steps:

1. Observe craft fairs
2. Conduct a focus group with MSR members
3. Survey customers at Windhoek markets

#### **3.3.1 Observe Craft Fairs**

To research the tourist market, the team observed three Windhoek craft markets, the Namibian Craft Centre (labelled “Craft Café” in Figure 17), stalls on Independence Avenue, and Namcrafts, displayed as stars in Figure 17. Ms. Beukes identified these crafts fairs as common shops for tourists. The market observations helped determine common products, target customers, and advertising methods. Individual team members visited every craft stall at each local craft fair with notebooks to record products and advertising methods. The researchers compared notes the following day to identify common products and typical advertising methods.

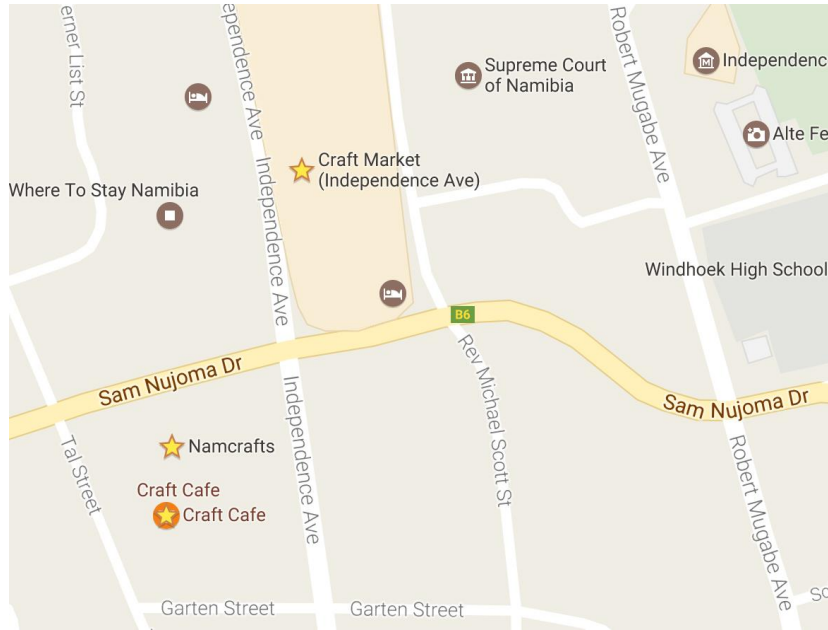


Figure 17. Map of the Three Craft Fairs

### 3.3.2 Conduct a Focus Group with MSR Members

To evaluate the customer appeal in the Katutura market, the team originally planned to survey Katutura residents. However, Ms. Beukes informed the project team that conducting a survey in Katutura is unsafe and outside persons approaching the close-knit community would not be well received by residents. Based on Ms. Beukes' recommendation, the researchers modified this method and conducted a focus group with MSR members, most of whom are from Katutura.

The focus group occurred in week one, during MSR's monthly community meeting. The thirty-six members that attended the community meeting participated in the focus group. The team presented pictures of fourteen product ideas, surveyed attendees, and collectively discussed the pros and cons of the products with participants of the focus group. Appendix E contains these discussion questions. The inquiry process used a simple survey sheet that listed each product, its photo, and two check boxes—one titled 'like' and the other titled 'dislike' as shown in Appendix M. Check boxes simplified the participants' experience because some attendees do not feel comfortable writing in English.



The researchers picked fourteen products from a list of thirty-eight items compiled during the preparation term. Section 3.4 discusses this list of products in more detail. The team identified and chose products that could potentially be sold in all three target markets. To aid in viewing when printed in black and white and projected on a wall, the team also picked products that had visually clear images.

Mr. Norris led the discussion, while the other three team members took pictures and recorded comments on pen and paper about products and demographics of the attendees. Mr. Norris spoke slowly, clearly, and repeated key points to make it easier for participants, who are not native English speakers, to understand. As some participants did not speak English, Mr. Shilongo served as a translator between English and Oshiwambo when Mr. Norris spoke. Most attendees, however, communicated their comments in English. After the focus group, the next step was to discuss all the product ideas with MSR personnel to gauge their preferences, discussed later in Section 3.4.2.

### **3.3.3 Survey Customers at Weekend Markets**

Based on Ms. Beukes' recommendations, the team's research shifted to visiting four weekend markets in Windhoek: Boeremark farmer's market, Green/Bio market, Tuuthikeni flea market, and Post Street mall. Figure 18 displays a map of these markets. These markets differ from the tourist craft fairs because they target Namibians. The goal of visiting these markets was to identify customer appeal of Windhoek residents. When observing and analyzing the markets, the investigation followed the same methods used for the craft fairs.

Additionally, the team worked in groups of two to verbally survey market customers about a list of eleven products shown in Appendix N. Section 3.4 discusses these products in detail. In each group, one team member showed the products to the customers while the other member recorded responses, gender, and approximate age range of the market-goer. The survey included questions about their interest in products and their reasoning for liking or disliking products. Customers commented on as many products as they desired. Appendix E contains these questions, which the study used to identify customer appeal and any recurring

comments. The team orally surveyed nine customers at Boeremark farmer’s market, ten at the Green/Bio market, four at Tuuthikeni market, and four at Post Street Mall.

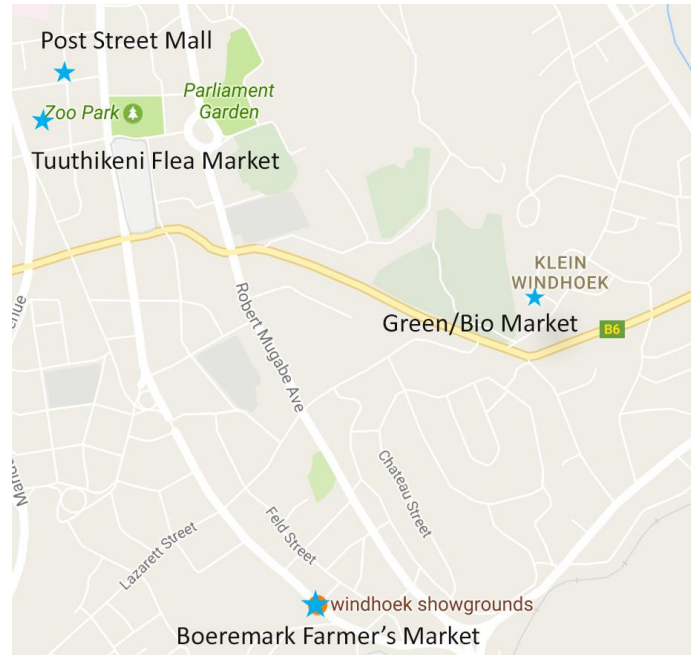


Figure 18. Map of the Four Weekend Craft Markets

### 3.4 Determine Final Products for Prototyping

During the preparation term, the team researched potential products. As part of the project description, MSR recommended using recycled plastic bags, tires, pallets, or oil drums to create products. The researchers used do-it-yourself (DIY) project websites, such as Pinterest and Instructables.com, to find product ideas. Each idea included a set of DIY instructions for creating the product. The team chose product ideas that required a variety of skills, including knitting, welding, carpentry, and painting. The project team chose these skills based on common skills of MSR members in the MSR database. The products suited the three target markets: Katutura residents, Windhoek residents, and tourists. MSR members are unemployed and have minimal capital to invest in starting a business. Therefore, the products chosen required few additional materials to manufacture. Appendix G includes a list of thirty-eight

ideas that served as a starting point for finalist products. To reduce this list of ideas and determine final products for prototyping, the project utilized the following subtasks:

1. Observe the MSR workshop
2. Discuss potential products with MSR personnel
3. Interview MSR producers
4. Analyze potential products

### **3.4.1 Observe the MSR Workshop**

Ms. Beukes informed the team during the preparation term that MSR's warehouse in the HRDC contained open space, tools, and materials the team and producers could use to create their products. The team observed the warehouse with Mr. Shilongo as a guide to evaluate the available space, tools, and materials. On the tour, one member took notes on the quantity and types of tools available using pen and paper and another member took photos of the space. MSR personnel identified additional available materials for prototyping.

### **3.4.2 Discuss Potential Products with MSR Personnel**

The next step in the project involved discussing the original list of thirty-eight products with MSR personnel and reducing the list to eleven products. The team consulted MSR personnel because they have unique knowledge about the area, the project, the producers, and customers. Mr. Shilongo, Ms. Kambanda, and Ms. Beukes indicated their top ten products out of the thirty-eight. Ms. Kambanda preferred to rank her top ten choices, while Mr. Shilongo and Ms. Beukes preferred to select their top ten favorite products. The team then took their feedback and supplemented it with data from the focus group to gather a list of eleven products. While narrowing down the list, the researchers considered products that could appeal to customers in different target markets and required diverse production methods. Finally, the team compiled and printed images of each product to use for customer surveys at the weekend markets and interviews with producers.

### 3.4.3 Interview Producers

As mentioned earlier, producers are MSR members interested in starting their own business. Before arriving in Windhoek, MSR provided a list of members who had recently attended an entrepreneurship training and were interested in becoming producers. This list increased as more members expressed interest in working with the team at the MSR member community meeting. The researchers interviewed eight producers to determine their product preferences, interest in collaboration, and access to recyclable materials. Since producers were available at different times, the team scheduled three interview sessions on three consecutive days. Based on their availability, producers came to the MSR office to attend one interview session.

Three producers attended the first interview session. Each attendee received images of the eleven products, discussed in Section 3.4.2 and shown in Appendix N, during the group interview. The team distributed a survey sheet, shown in Figure 19, which asked the interviewees to note three products they believed could easily be sold, three products they were interested in producing, the recyclable materials they could access, the skills they possess, and their interest in working with a colleague. Figure 19, along with any materials given to Windhoek or Katutura residents, uses the local spelling of tire, 'tyre'. After interviewees filled out the survey, the researchers asked each producer to explain their answers. One team member led the interview while the other three took pictures and notes with pen and paper. Two of the three interviewees spoke English while the third did not. One of the two English speakers served as a translator between English and Oshiwambo for the third interviewee.

<b>Easiest to Sell</b>	<b>Want to Make</b>
1.	1.
2.	2.
3.	3.

**Ready to make:**

**Existing Skills:**

**Materials:**

Tyres     
 Plastic Bags     
 Oil Drums     
 Pallets

**Do you want to work with a colleague?**

Yes     
 No

Figure 19. Producer Survey

One producer attended the second interview session. Two team members conducted this interview following similar procedures to the first session. One team member led the interview while the other took notes using pen and paper. Four people attended the third interview session. This session used similar procedures to the first interview session and involved a group interview. The team conducted the last two interview sessions in English as all the interviewees spoke English.

### 3.4.4 Analyze Potential Products

After interviewing producers, the next phase of the investigation analyzed potential products for prototyping using a pairwise comparison chart and a Pugh analysis. This method helped organize the importance of different criteria and weighted each feature according to its importance.

A pairwise comparison chart is a method used to weigh the importance of characteristics required for a set of designs that have the potential to solve a problem. This method lists out the characteristics in a table as categories going both across and down in the same order. A value of '1' in a box indicates that the characteristic in the column is more important than the characteristic in the row. A '0.5' shows that the characteristic in the column and row have equal importance. A '0' signifies that the characteristic in a column is less important than the characteristic in a row. The sum of each column then determines the weight of each characteristic

This process used producer interest, amount of materials, customer interest, required skills, and required tools as important characteristics required for the products. To determine the importance of the characteristics, the team asked Ms. Beukes to rank them in order of importance. The researchers used Ms. Beukes' feedback and discussed the importance of each characteristic relative to every other one to determine whether to put a 1, 0.5 or 0 in each box.

A Pugh analysis uses the weights determined in the pairwise comparison chart to indicate the best design. The first two columns of a Pugh analysis table contain the characteristics and their respective weights, while the first row includes the different designs. A value of '1' indicates that the design exceeds the expectations of the characteristic in that row. A '0' signifies that the design meets the expectation and a '-1' denotes that it fails to meet the expectation. The values multiplied by the weight of the respective characteristics in each column sum up to give a final score for each design. These final scores determine the ranking of each design.

The team used data from producer interviews to determine whether or not the products appeal to producers. Data from target markets helped determine if the products met customer interests. Additionally, the researchers examined the DIY instructions for the eleven

products to determine required skills, tools, and amount of materials. Finally, the analysis chose the three products with the highest final scores to prototype: the tire chair, the wooden pallet table, and the plastic bag beads. Table 3 shows the scoring method for the Pugh analysis. This table of scoring methods also summarize each method used in narrowing down the list of potential products from eleven to three.

Table 3. Scoring Method for Pugh Analysis

Category	Data Used	Data From	+1	0	-1
Producer Interest	Number of producers interested	Producer interviews	Three or more	Two	One or fewer
Amount of Materials	Number of materials	DIY instructions	Four or more	Two or three	One or fewer
Customer Interest	Number of “like” responses to products	MSR member focus group and customer surveys	Top four products	Middle three products	Bottom four products
Required Skills	Existing skills of producers	DIY instructions and producer interviews	No skills required	Skills possessed by majority of producers	Skills not possessed by producers
Required Tools	Use of power tools	DIY instructions	No power tools	Can be completed with or without power tools	Must have power tools

### 3.5 Determine Production Viability of Final Products

This investigation utilized shared action learning to work closely with MSR producers and asset-based community development to utilize available resources in determining the production viability of final products. Accomplishing this objective required completion of the following subtasks:

1. Coordinate prototyping with producers
2. Gather supplies
3. Prototype products with producers

4. Conduct a focus group with producers after prototyping
5. Record prototype sale

### **3.5.1 Coordinate Prototyping with Producers**

Before prototyping, the researchers met with the producers to discuss the plans and procedures. The team invited all MSR members who expressed interest in working on the project to the MSR office. Each of the eight producers who attended the meeting received a list of tools and materials desired, as well as the calendar of prototyping dates shown in Figure 20. This list uses the local spelling of tire, 'tyre'. One team member led the discussion and asked the producers about their availability and access to materials. Mr. Shilongo attended the meeting and translated the team's introduction into Oshiwambo. Ms. Beukes also attended the meeting to assist with logistics. One producer volunteered to collect tires and another producer to collect pallets. MSR agreed to arrange a truck driver to pick up these items and deliver them to the MSR workshop, the location for prototyping. The team also provided each producer with Ms. Teklegiorgis' contact information in case they had any further questions.



Requested Tools	Requested Materials
<ul style="list-style-type: none"> <li>• Saw</li> <li>• Power drill</li> <li>• Scissors</li> <li>• Knife to cut tyres</li> <li>• Screw driver</li> <li>• Measuring tape</li> </ul>	<ul style="list-style-type: none"> <li>• Paint</li> <li>• Paintbrushes</li> <li>• Nails</li> <li>• Screws</li> <li>• String or rope</li> <li>• Glue</li> </ul>

SCHEDULE				
Monday	Tuesday	Wednesday	Thursday	Friday
<b>3 April</b> Gather materials	<b>4 April</b> Gather materials	<b>5 April</b> Meet at old MSR office with materials	<b>6 April</b> Work at old MSR office	<b>7 April</b>
<b>10 April</b> Work at old MSR office	<b>11 April</b>	<b>12 April</b> Work at old MSR office	<b>13 April</b> Work at old MSR office	<b>14 April</b>

Figure 20. MSR Producer Supplies and Schedule

### 3.5.2 Gather Supplies

Prototyping required gathering materials and supplies from several places. The team compared the instructions for each final product with the list of existing MSR tools and materials, and created a shopping list of additional materials. Two team members went to a local hardware store to purchase the additional supplies, and noted the cost of each item. They also noted the cost of items already available in the warehouse, to include them in the cost analysis.

Team members brought plastic bags, while producers gathered tires and pallets. MSR arranged a driver to collect and deliver the tires and pallets the day before prototyping. Additionally, Ms. Beukes contacted other businesses in an attempt to establish a more reliable source of pallets and tires for future use.

### **3.5.3 Prototype Products with Producers**

To determine the manufacturing feasibility of the final products, the project group worked with producers to create product prototypes. Prototyping occurred on April 5, 6, 10, 12, and 13 of 2017 to accommodate the schedules of producers. The team prototyped products alongside producers on April 5 and 6 and the producers worked without the team's assistance on April 10, 12, and 13. This schedule allowed producers to practice making products on their own, but still have access to team members for assistance or questions. On the first two days, one team member led the manufacturing of each product, while the fourth member managed tools, took photos, and recorded notes. The team members brought simplified DIY instructions for each product, located in Appendix R. Appendices O, P, and Q contain the original DIY instructions. While prototyping, one researcher measured the space required for making each product, and recorded the time needed for each step of the process. One researcher also recorded notes with pen and paper about tools used, materials needed, and potential improvements suggested by the team members and producers during the manufacturing process.

Producers chose which product to prototype based on their interests and skills. They also chose whether to work alone, or in groups. This prototyping method allowed everyone involved to understand the feasibility of each production method and helped create improved instructions for production of the final products.

### **3.5.4 Conduct a Focus Group with Producers after Prototyping**

After prototyping on April 6, 2017, the team conducted a focus group with the producers to gather feedback on the process, discuss their manufacturing interests, and determine their opinions of the products. Two team members led a discussion with the four attending producers. One member asked questions while the other took notes. The pair asked questions about improvements to the production process, their opinions of each product, their interest in making more of the products, and their interest in selling the prototypes. Appendix F contains the specific focus group questions. The process included filming these discussions, with consent, and using the recordings to supplement the written notes.

### **3.5.5 Record Prototype Sales**

To gain insight about feasible sales locations and prices, the project asked producers to sell their prototyped products. The producers kept any product they built to sell their finished products. The team calculated the cost of the materials used for each prototype. Based on background research and recommendation from entrepreneur interviews, the study recommended a minimum price discussed later in Section 3.6.4. However, the producers determined their own pricing in the final sale. If the producers created prototypes in groups, they fairly split profits made from selling the products. The team followed up with producers who sold their products and noted information about the sales location, pricing, and techniques for finding customers.

## **3.6 Suggest Production Plans and a Sales Strategy**

To provide support for the logistics and marketing of these products after completion of this project, the project compiled a list of recommendations and advice for the producers. The producers received a paper copy of these recommendations and MSR received them digitally. The team utilized the following subtasks to achieve this objective:

1. Compile production instructions
2. Recommend materials sources
3. Suggest target customers
4. Specify sales prices
5. Recommend advertising methods

### **3.6.1 Compile Production Instructions**

To provide a documented means of replicating the prototypes for future MSR members to use, this investigation utilized the notes and pictures from prototyping to write a production plan. During prototyping, Ms. Dixson took detailed notes on each step of production for each product, including materials and tools used, time taken, and comments from the team members or producers about the production process. Ms. Dixson also took pictures throughout the process to document in the production instructions later on. The production plans

contained the time, materials, and tools required for production as well as step-by-step instructions of the production process, including pictures from the prototyping process and custom graphics. To aid in understanding for non-native English speakers, the team reduced the amount of text used and wrote in simple language. To verify the usability of the production plans, the researchers discussed the plans with MSR personnel. The team encouraged producers to modify and improve the designs as these instructions were a starting point for the products.

### **3.6.2 Recommend Materials Source**

In the recommended production plans, the team described their methods for obtaining materials used during prototyping and made recommendations for improving this process. The project group called businesses to locate available materials for pick-up. To initially supplement producer resources, the team consulted with MSR personnel and personal connections to identify additional available materials. Future producers could use a similar process to find materials. These recommendations served as a starting point for future producers and the group encouraged them to use their own knowledge, experience, and skills to find the method that best suits them.

### **3.6.3 Suggest Target Customers**

To give producers an understanding of the different target customers around Windhoek, the researchers compiled information from the analysis of entrepreneur interviews and customer appeal research described in Sections 3.2 and 3.3. Entrepreneur interviews gave information about picking a target customers for a business. Customer appeal research identified possible markets for the final products. The team provided specific market locations and dates for producers to use in the future.

### **3.6.4 Specify Sales Prices**

The team recommended a price for the producers to use when selling each product. The price resulted from a cost analysis of the prototypes that accounted for the cost of materials,

supplies, and labor. The analysis used the time taken to make each prototype and the recommended daily wage of MSR members to determine the cost of the labor. The analysis assumed an eight-hour work day because the workshop is only open eight hours per day. The team used the sum of these costs as a recommended price for each product. During the producer focus group, the team members asked the producers for their estimated price for each product to verify that the calculated prices were acceptable. The producers received the recommended prices verbally during the focus group, and the written cost analysis in the final recommendations.

### **3.6.5 Recommend Advertising Methods**

To promote products and increase sales, this project recommended advertising methods for the producers to use. The group used the coded data from interviews with entrepreneurs, advice from Team Namibia, and observation data from markets to determine the most common advertising methods. Recommendations also included a list and description of four advertising methods recommended by Team Namibia and used by existing entrepreneurs or market vendors. Finally, the project delivered these advertising methods to the producers and included them in the final recommendations.

### **3.6.6 Present at MSR Community Meeting**

To promote this business opportunity to more MSR members, one team member and one producer presented the prototyping results at the MSR community meeting on April 21, 2017. The team displayed photographs of the prototyping process and the producer answered questions about making and selling each product. Mr. Shilongo translated the questions and responses from Oshiwambo to English. After the meeting concluded, the producer collected contact information of members interested in producing and selling the final products.

## **3.7 Methodology Conclusion**

These methods intended to research entrepreneurship strategies, evaluate customer appeal, determine final products for prototyping, determine the production viability of the final

products, and recommend production plans and a sales strategy. Asset-based community development planned to leverage the existing skills of MSR members and available materials to create prototypes. Oral history interviews and observations aimed to provide the necessary background knowledge, while focus groups attempted to connect the team with MSR members. Prototyping enabled the researchers to work alongside MSR members through shared action learning and determine the viability of products. The team collected quantitative data about customer interest from local markets and MSR members through surveying. The following chapter discusses the results collected from these methods.

## **CHAPTER 4: RESULTS AND ANALYSIS**

This results and analysis chapter details the outcomes of the methods described in Chapter 3. Section 4.1 explains the information gained from interviewing entrepreneurs and Team Namibia. Section 4.2 details the products that attract tourists, Katutura residents, and Windhoek residents in their respective markets. Section 4.3 outlines the results of workshop observations, discussions, and interviews used to determine the final products for prototyping. It also details the final, prototyped products. Section 4.4 gives the production viability of each final product based the expended supplies, prototyped products, producer feedback given, and product sales information. Section 4.5 outlines the suggested production plans and a sales strategy recommended by the team.

### **4.1 Entrepreneurship Interviews**

This section describes the results of the team’s interviews with three existing entrepreneurs and Team Namibia, an entrepreneurship organization. The end of this section explains the insights gained from interview coding.

#### **4.1.1 Kapana Seller Interview**

On March 23, 2017, two members of the project team interviewed a kapana seller through translation by Mr. Shilongo. Appendix H contains the questions the team members asked during this interview and the kapana seller’s answers. The kapana seller started her business in 2002 to support her family because she was not satisfied with the pay from her previous job. Once she had put aside enough money, she began selling kapana with only one small pot. The beginning was challenging because she had no help, little money, and very few customers. Fifteen years later however, her business is thriving due to her relationships with customers, better and abundant supplies, and successful location for selling kapana. She has increased her products to include kapana, small candies, and “fat cakes”—balls of fried dough. She and two other people sell kapana in the shade of a tree across the street from a busy depot. She purchases supplies from Pick ‘n Pay, a local supermarket, and makes the kapana and

fat cakes herself. She explained to the two team members that anyone who starts a business is bound to make mistakes, but these mistakes can be used as lessons. When starting her business, for example, she did not know how to make fat cakes, but eventually learned the process from experience. At the end of the interview, she advised new entrepreneurs to seek advice from people with experience.

#### **4.1.2 Taxi Driver Interview**

On March 27, 2017, two team members interviewed a taxi driver, named Nelson Michael, through partial translation by Mr. Shilongo. Appendix I contains the questions the project members asked during this interview and the taxi driver's answers. There are over 7,000 taxi drivers in Windhoek and Mr. Michael has been one since 2014. He became a taxi driver because there were not enough jobs available for him, but there was a need for taxis. Mr. Michael received guidance from MSR to attain his license and register his family's car as a taxi. He did not face any significant challenges when starting his business. Mr. Michael characteristically drives around Katutura and Windhoek, but occasionally drives customers to other towns, such as Swakopmund. Returning customers may call him when they require taxi service, but he also 'hoots' at pedestrians to recruit clients. Hooting means honking the car horn. Mr. Michael reported that his business has not changed since he first started and that he was fully prepared to become a taxi driver because he attended training courses at KAYEC, Katutura Youth Enterprise Centre. His advice for people starting a business is to work hard because starting a business is not easy. He also recommends that people pay attention to the information provided to them and attend trainings when available.

#### **4.1.3 Welder Interview**

On April 1, 2017, two members of the project team interviewed a welder, named Lukas Toivo. Mr. Shilongo translated the researcher's introduction and preamble, which can be found in Appendix A, from English to Oshiwambo, but the team members conducted the remainder of the interview in English. Appendix J includes the questions the project group asked during this interview and Mr. Toivo's answers. Mr. Toivo started his welding and repair business, called



“Iyambo Cooling Aircon & Welding”, four years ago in Havana, Katutura. He works with three colleagues and their most common services are making trailers, chairs, and repairing refrigerators. Mr. Toivo started his business in a colleague’s home with money he had saved. They later turned the home into a full workshop. Mr. Toivo started his business because it was difficult to find employment and work for another person; however, he commented that starting a business was not easy either. Mr. Toivo told the interviewers that “if you want to achieve, you must struggle first.” Most of his customers knew him before they came to him for his services, and they continue to use his services because they know the quality of his work. Mr. Toivo expands his business by word-of-mouth as his customers tell other people about his work. Mr. Toivo also gives out business cards so that new and returning customers can call him to request services. Though other welders exist near his shop, the competition is not a problem because each business has its own customers. Mr. Toivo also noted the importance of negotiation and payment. A customer usually pays upfront, but if he knows the person and they do not have the money to pay initially, he will allow them to pay in a month or two. Since starting his business, Mr. Toivo has upgraded his equipment. He has always used grinders and a welding machine, but as his business grew, he reinvested the profits to purchase more tools. Mr. Toivo would like more machinery, such as a bending machine. Currently, he takes the metal pieces to another shop, eight kilometers away, and pays to use their bending machine. Mr. Toivo prices his services based on the materials, electricity, and time needed to complete the job. He advised starting entrepreneurs to shadow another person until they can come up with their own idea.

#### **4.1.4 Interview with Team Namibia**

On April 10, 2017, two researchers interviewed the marketing officer of Team Namibia, Faith Arnat. Appendix K includes the questions the two team members asked during this interview and Ms. Arnat’s answers. Team Namibia is a non-governmental organization formed in 2004 and funded by Bank Windhoek, FNB Namibia Holdings, Mobile Telecommunications, NAMDEB, Ohlthaver & List Group of Companies, and Telecom Namibia. This organization promotes local products and supports local organizations by advertising their products through

media and editorials. Local organizations and companies pay Team Namibia to become members and Team Namibia in turn endorses and promotes their products. Team Namibia aims to increase the number of domestic products Namibians purchase and reduce the number of imported items. Endorsed products display Team Namibia's logo to increase customer interest in the product. To become a Team Namibia member, companies have to meet certain criteria such as number of employees, minimum revenue, and registration with the municipality. Large corporations can meet these criteria easily, but SMEs (Small and Micro Entrepreneurs) and low-income individuals in the informal sector often do not have the resources to meet them.

In 2016, Team Namibia started an ongoing project to help SMEs in the informal sector develop their businesses over two years. Entrepreneurs apply to receive training, funding, and support through Team Namibia. They advertised this project by conducting an awareness campaign, posting on Facebook, and approaching the consulars, location leaders in Katutura, to reach community members. 400 SMEs applied, and Team Namibia is currently working towards reading each application to select 100 participants. Team Namibia will then interview the selected applicants to conduct a needs assessment and determine the resource gaps of each applicant. Team Namibia will bring in entrepreneurship experts to mentor and train these individuals in finance and marketing, product development, business expansion, operations management, standards and quality of products, and additional topics based on the specific needs of the SMEs. Team Namibia aims for the individuals in the program to utilize the trainings in their businesses. They will then visit the entrepreneurs at their work places to monitor their businesses and note improvements that can be made. Team Namibia expects this full procedure of developing the businesses of SMEs in the informal sector to take two years.

Team Namibia also recommended advertising strategies in Windhoek and Katutura. Facebook is an effective advertising method in Windhoek and anyone can pay Facebook to advertise their page or post. Ms. Arnat estimated that a 'Facebook Ad' set to reach 7,000 people costs N\$50. It is also a good idea for entrepreneurs to bring products to locations near schools when parents drop off and pick up their children. In Namibia, word-of-mouth is also an important advertising method. Personal recommendations influence Namibians more than displayed advertisements influence Namibians to buy a product. As a result, it is important to

attend trade fairs and places with large customer bases and proactively approach people to publicize products and hand out business cards.

#### **4.1.5 Entrepreneurship Insights**

Based on the interview with Team Namibia and the coding analysis of the interviews with existing entrepreneurs, found in Appendices K and L respectively, this investigation identified three common themes of successful entrepreneurs.

1. Self-sustainability allows entrepreneurs to make more money than they did working for another person or not working at all.
2. Starting a business is not easy. Entrepreneurs should learn from mistakes, other people, and trainings.
3. Sales location and word-of-mouth are key marketing strategies.

Each entrepreneur identified these commonalities and Team Namibia noted the latter two. The following paragraphs expand on each of the above themes.

The entrepreneurs noted that they did not make as much money as they would like or believed that they could not reach their full earning potential while working for someone else. A self-sustainable business often brings in more money than a standard employee job because the business owner has control over business profits. Additionally, the entrepreneurs found it difficult to find a good job, so starting a business allowed them to best utilize their skills without looking for a specific job.

All three interviews suggested that it is important to learn as a business grows, listen to others' ideas, and ask for advice from those with experience, because starting a business is a challenging process. The Kapana seller and Mr. Toivo had difficulties making their products or performing their services when they first began, but learned how to avoid these mistakes over time with practice, training, and advice. Similarly, Mr. Michael attended trainings and received assistance from MSR to start his business. An entrepreneur should also adapt as customers, products, and prices change and interact with people to learn how to succeed. Team Namibia plans to train entrepreneurs on these topics.

Each entrepreneur that the team interviewed noted the importance of marketing. There are common ways that businesses market in Windhoek and Katutura including busy locations, word-of-mouth, business cards, and Facebook. The location dictates the number and type of customers a business will have because people who walk or drive by will be a large source of customers. Additionally, once customers develop a relationship with a business, the entrepreneur will gather more customers through word-of-mouth as the customers tell their friends and family about the business. Team Namibia also recommended busy areas, business cards, and Facebook as effective marketing techniques. When an entrepreneur gives out business cards the customer has the contact information and can easily call or visit the business when they want to buy something. Finally, many people use Facebook for their business in Windhoek. Customers rely on these pages more often than other websites.

These three insights provided knowledge about businesses in Windhoek and Katutura and helped to inform the group's recommendations on a sales strategy as seen in Section 4.5.

## **4.2 Customer Appeal in Target Markets**

The team evaluated customer appeal of products generally sold in Windhoek and information about the project's potential products in three target markets: tourists, Katutura residents, and Windhoek residents. This section gives the customer appeal results of craft fair observations, an MSR member focus group, and weekend market surveys. The project members used this information to narrow down the list of potential products.

### **4.2.1 Craft Fair Observations**

The team observed twenty-six craft stalls in the Namibia Craft Centre, Namcrafts, and on Independence Avenue in Windhoek to learn the types of items commonly sold to tourists. Figure 17 in Section 3.3.1 includes a map of these stalls. The Namibia Craft Centre and Namcrafts were indoor craft markets, while Independence Avenue had street vendors. The team found that though vendors independently owned the stalls, most stalls sold similar items. The stalls sold products such as key chains, tapestries, woodcarvings, and jewelry. Most products featured Namibian or African symbols and animals. Many products were compact

enough to be able to fit in a traveler's suitcase. The key chains were made from cloth, beads, string, wood, or local nuts. Tapestries, known as "batiks," varied in size from 0.3 square meters to about one square meter. Some wooden products included bowls, utensils, and animal figures ranging from approximately twenty millimeters to one meter tall. There were also small animal figures made from wires and beads. Necklaces, bracelets, and rings were typically made from beads, wood, string, or local nuts and stones.

The street vendors on Independence Avenue advertised to customers by direct interactions, product demonstrations, and displays in high-traffic areas. In the indoor craft markets, the sellers greeted all customers, but were more reserved in their marketing strategies than street vendors. In the Namibia Craft Centre, each seller had a business card with his or her contact information.

#### **4.2.2 MSR Member Focus Group**

During the MSR member focus group, the members gave opinions on whether they liked or disliked the fourteen products. The team determined this list using each product's potential to sell at all three types of Windhoek markets. Section 3.3.2 discusses this selection process. The thirty-six attendees who completed the survey, shown in Appendix M, preferred the tire rim braai, pallet table, cups, tire chair, and drum drawers. The attendees expressed dislike toward the rug, sandals, flower pot, and flower holder. Figure 21 shows the results of this survey. The navy, light blue, and yellow bars reflect the percentages of 'like', 'dislike', and unanswered responses, respectively. Inconclusive responses had marks in both the 'like' and 'dislike' boxes or illegible marks.

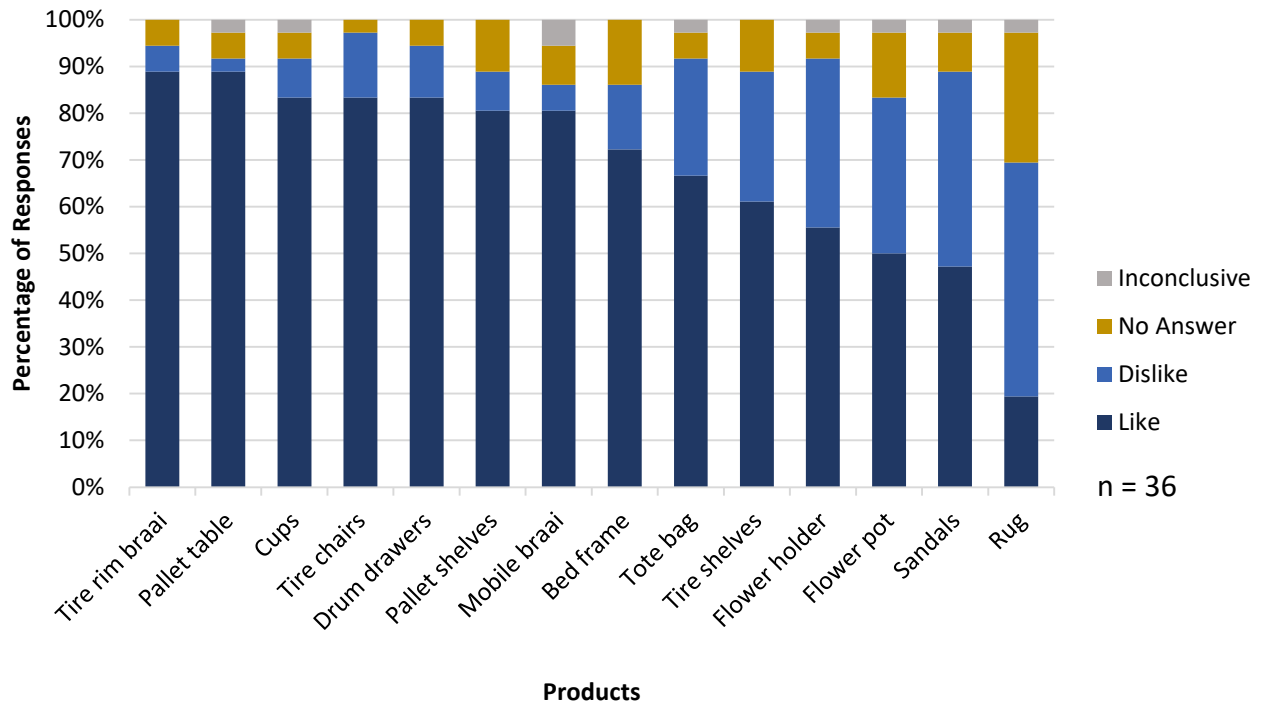


Figure 21. Likes and Dislikes of Products from MSR Member Feedback

After the focus group attendees completed the survey, the project team asked the participants to raise their hands and discuss their reasoning for liking or disliking the products. According to their feedback, the members were most interested in the products that were durable, inexpensive, and easy to transport. The plastic bag sandals received the most comments. Some members liked the design, but others were concerned with the safety of the thin soles. Appendix U contains the full list of recorded comments, found in Table U2, as well as the tallied responses to the survey, found in Table U1.

### 4.2.3 Weekend Market Survey

On Saturday, April 1, the researchers visited four weekend markets in Windhoek to observe vendors and survey customers: the Boeremark Farmer’s Market, the Green/Bio Market, the Tuuthikeni Flea Market, and the Post Street Mall, shown in Figure 18 in Section 3.3.3. The team found these markets by searching newspapers, WhatsOn Namibia, and Google.

Windhoek residents frequent these markets, according to Ms. Beukes. The following paragraphs describe the written observations of each market. This investigation also included an oral survey of twenty-seven customers. Appendix N contains this survey. The project members used this survey to understand customer interest in the eleven remaining products paired down by MSR personal as discussed in Section 3.4.2. The team surveyed nine customers at the Boeremark market, ten customers at the Green/Bio market, four customers at the Tuuthikeni market, and four customers at the Post Street Mall. Customers indicated which products they liked and disliked, for as many or as few products as they preferred. Figure 22 shows the number of likes and dislikes for each of the surveyed products. The navy bar indicates the number of likes, and the yellow bar indicates the number of dislikes. Appendix W contains the responses and comments of the surveyed customers.

The customer comments did not identify any major concerns or desires of customers. The recurring comments generally featured appearance or applied to the customer’s lifestyle. Some customers disliked the pet bed because they did not own pets, while others expressed interest in the furniture because it can be hard to find in Windhoek.

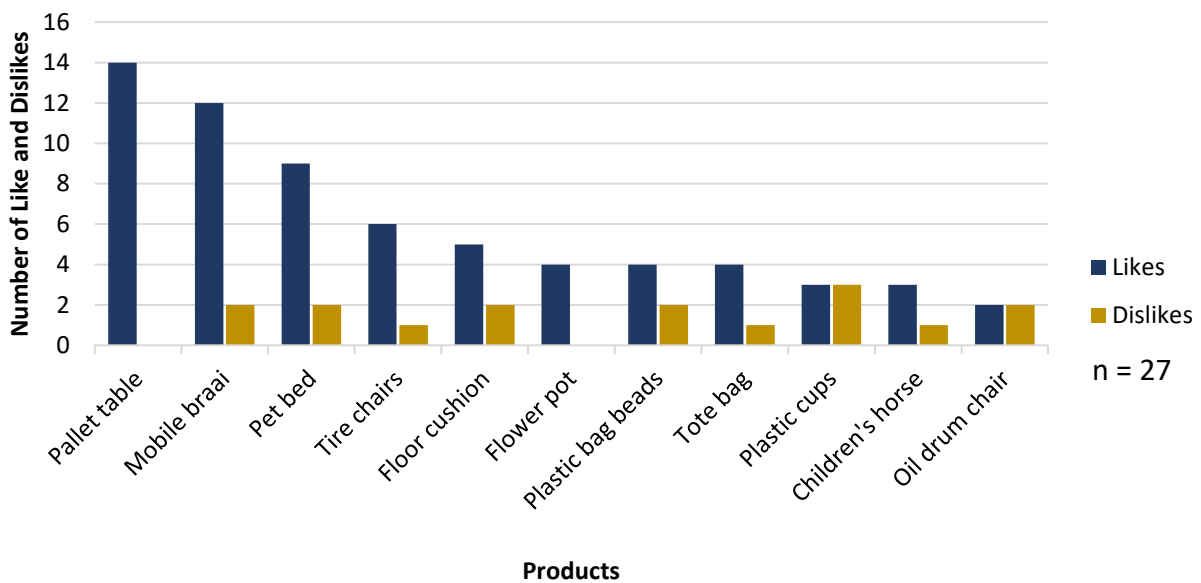


Figure 22. Distribution of Products Based on the Weekend Market Customer Survey

The Boeremark Farmer's Market was an upscale market that occurs on the first Saturday of each month at the Windhoek Fairground. Boeremark is a community market with consistent stalls each month. The primary customers are Afrikaans speaking individuals. Most of the stalls have pop-up tents, business cards, and organized merchandise. The team noted a woman selling flowerpots made from painted tires. She sold a large flowerpot for N\$200, a small flowerpot for N\$150, and a one meter teakettle flowerpot for N\$500.

The Green/Bio Market is a German market located at the Stephanus Church in Klein Windhoek. This market held fewer stalls, primarily selling crafts and produce. Many stalls had business cards, and most of the sellers were from Katutura. Prices were quite high, because the church takes a 17% commission on sales and the value-added tax (VAT) is 3%. The team visited this market later in the day and observed fewer customers than at the Boeremark Market.

Tuughikeni Flea Market is a smaller market that sells used clothing, jewelry, and small, inexpensive items. There is also food, music, and children's entertainment.

Post Street Mall contained informal sellers set up on tarps. This market had many more customers and sellers than in the previous three markets. The items sold at this market resembled items from the craft fair observations.

## **4.3 Final Products for Prototyping**

This section discusses the process and results for choosing final products for prototyping. Section 4.3.1 describes the resources provided by MSR. Section 4.3.2 explains the input of MSR personnel. Section 4.3.3 describes the team's interactions with producers. Finally, Section 4.3.4 explains the analysis of data from Sections 4.2 and 4.3 and the resulting final products.

### **4.3.1 MSR Workshop Observations**

The MSR workshop is an unused building at the Habitat Research and Development Center, HRDC, with approximately eighty square meters of workspace and two ten-square-meter closets. As the former MSR office, the workshop stores all of the tools used for MSR's previous Paper Block Project, roof thatching trainings, and electrician trainings. The main



workspace contained scrap wood and four of the seventy available oil drums. One closet contained four toolboxes for roofing and two locked toolboxes of electrician supplies. The other closet held supplies from the previous Paper Block Project and an assortment of work boots (Hunt et al., 2014).



Figure 23. Inside a Roofing Toolbox at the MSR Workshop

The roofing toolboxes, shown in Figure 23, contained hammers, crowbars, wood saws, hacksaws, twine, pliers, and other tools. There were also locked toolboxes, but other miscellaneous boxes stored measuring tapes, safety glasses, nails, and work gloves. Mr. Shilongo verified that the group could use all of these items for prototyping.

At the MSR office, Ms. Beukes provided several more items for prototyping. When the office was painted recently, the painters left extra sandpaper, paint, and protective clothing in the office closet. Ms. Beukes provided these materials, along with a bundle of plastic bags.

#### **4.3.2 Product Discussion with MSR Personnel**

Mr. Shilongo, Ms. Kambanda, and Ms. Beukes ranked their favorite products to compile list of products for producer interviews and customer surveys. Mr. Shilongo liked the products made of oil drums because they looked sturdy and nice. He also liked the plastic bag floor cushions, tire chair, pallet coffee table, and pallet table and chairs. He thought these items were useful, beautiful, and innovative. Ms. Kambanda ranked her ten favorite products in the

following descending order: mobile braai, oil drum dresser, stationary braai, oil drum chair, tire rim braai, tire swing, game board, pallet table and chairs, pet bed, and flower pot. Ms. Beukes liked the tire chair, pallet table and chair, flower pot, children's horse, tire rim braai, mobile braai, plastic bag beads, oil drum drawers, and pallet shelves. The researchers used this information to narrow down the list of thirty-eight products to a list of eleven, as discussed in Section 3.4.2. Five of the eleven products overlapped with the fourteen products the team presented at the MSR member focus group. This list included products that would interest customers in each of the target markets.

### **4.3.3 Producer Interviews**

The project team interviewed eight producers, who are MSR members interested in starting their own businesses, to determine their product interests and access to resources. These producers had attended the focus group discussed in Section 4.2.2. Each producer filled out a survey sheet, shown in Figure 19, and then discussed the reasons for their responses. Table 4 shows the feedback from these eight interviews.

The producers expressed interest in making the pallet table because it seemed easy to sell and could be made from available wood. The producers also expressed interest in the mobile braai. Despite saying it would be hard to make, they believed it would be easy to sell because braais are very popular.

Table 4. Producer Feedback

Product	Easy to sell (Number of producers)	Want to make (Number of producers)	No training required (Number of producers)	Interview Comments
1. Mobile Braai	4	3	1	<ul style="list-style-type: none"> <li>• Hard to make</li> <li>• Easy to sell because braais are popular</li> <li>• Very strong</li> <li>• Beautiful</li> </ul>
2. Wooden Pallet Table	6	5	6	<ul style="list-style-type: none"> <li>• Easy to make and sell if it looks good</li> <li>• Buying a table would be expensive but making it would be cheap, about N\$600-700 and sell it for N\$2000</li> <li>• They like it because it is made from wood</li> </ul>
3. Plastic Cups	2	0	0	<ul style="list-style-type: none"> <li>• Easy to carry</li> <li>• Doesn't take up a lot of room</li> <li>• Can grow seeds in them</li> </ul>
4. Tire Chair	2	3	0	<ul style="list-style-type: none"> <li>• There is a need for chairs</li> <li>• Comfortable</li> <li>• Looks nice</li> <li>• Durable because it will not be damaged by the sun or dust</li> <li>• Easy to make with assistance</li> <li>• Easy to find materials</li> </ul>
5. Plastic Bag Beads	3	2	0	<ul style="list-style-type: none"> <li>• New design, not common</li> <li>• Fashionable</li> <li>• Easy to sell and carry</li> <li>• Attractive to children because it is colorful</li> </ul>
6. Tote Bags	2	2	0	<ul style="list-style-type: none"> <li>• Looks attractive</li> <li>• Easy to transport</li> <li>• Can make more money on it</li> <li>• Useful to carry materials</li> </ul>
7. Floor Cushion	0	0	0	<ul style="list-style-type: none"> <li>• No comments</li> </ul>
8. Pet Bed	1	1	0	<ul style="list-style-type: none"> <li>• Materials are easy to find</li> </ul>
9. Flower Pot	1	4	0	<ul style="list-style-type: none"> <li>• Easy to sell in town but hard to sell in Katutura</li> <li>• Looks attractive, easy to handle, and new design</li> </ul>
10. Children's Horse	1	2	0	<ul style="list-style-type: none"> <li>• Easy to sell to schools and small children</li> <li>• Easy to make</li> </ul>
11. Oil Drum Chair	0	2	1	<ul style="list-style-type: none"> <li>• Nobody will buy it</li> </ul>

The producers also listed their existing skills. Four members indicated that they had skills in painting, four knew carpentry or wood working, and two had skills in cutting tires or

wood. Individual producers also possessed skills in forklift driving, drawing, mechanical skills, welding, and electrical skills.

Next, the producers elaborated on their interest in working with a colleague. Seven of the eight interviewed producers wanted to work with someone else. When the team asked their reasons for wanting to work with another person, the producers said they would learn more and help one another.

Finally, the producers discussed the materials they could access and the locations to find them. Table 5 shows the responses to this question. Each producer indicated that they had access to more than one recycled material. Table 5 displays the results from these questions. Plastic bags and tires were easily accessible to seven producers, while pallets and oil drums were more difficult to find.

Table 5. Feedback on Availability of Recycled Materials

<b>Recycled Material</b>	<b>Number of members who have access to the material</b>	<b>Where the material can be found</b>
Tires	7	Discarded from tire repair shops
Plastic Bags	7	Grocery stores and gas stations
Oil Drums	2	From companies
Pallets	4	Can buy them from companies for N\$5

#### **4.3.4 Product Analysis**

Using the data collected during the MSR member focus group, weekend market surveys, and producer interviews, the group used a Pugh analysis to determine three finalist products to prototype as described in Section 3.4.4. The weighting for each category resulted from the pairwise comparison described in Section 3.4.4 and displayed in Table 6 below. Table 7 shows the Pugh analysis details. The team combined the customer interest data from the MSR member focus group and the weekend market surveys by scoring each set individually and summing the results with limits of positive and negative one. The scores for the eleven products

ranged from negative seven to five and a half. The researchers chose three products to prototype so one team member could lead the manufacturing of each product and the fourth team member could take pictures and detailed notes of the prototyping process. The top three products from this analysis were the pallet table, the tire chair, and the plastic bag beads. The pallet table and tire chair both exceeded expectations in producer and customer interest, while the plastic bag beads exceeded expectations in amount of materials, required skills, and required tools based on the analysis described in Section 3.4.4.

Table 6. Pairwise Comparison Chart

	Producer Interest	Amount of Materials	Customer Interest	Required Skills	Required Tools
Producer Interest		0.5	1	0.5	1
Amount of Materials	0.5		1	0	0.5
Customer Interest	0	0		0	0.5
Required Skills	0.5	1	1		1
Required Tools	0	0.5	0.5	0	
Total:	1	2	3.5	0.5	3

Despite customer and producer interest in the braai, the Pugh analysis, displayed in Table 7, revealed that it would be too difficult and expensive to prototype. The pet bed and flower pot also received interest, but did not meet or exceed expectations for other characteristics.

Table 7. Pugh Analysis

Category	Weight	Drum Braai	Pallet Table	Cups	Tire Chair	Plastic Bag Beads	Tote Bag	Cushion	Pet Bed	Flower Pot	Child's Horse	Drum Chair
Producer Interest	1	1	1	-1	1	0	0	-1	-1	1	0	0
Amount of Materials	2	-1	0	1	0	1	1	1	0	0	0	0
Customer Interest	3.5	1	1	0	1	0	-1	0	1	0	-1	-1
Required Skills	0.5	-1	0	1	0	1	1	-1	1	0	-1	-1
Required Tools	3	-1	0	0	0	1	0	1	0	0	0	-1
	<b>Total:</b>	-1	4.5	1.5	4.5	5.5	-1	3.5	3	1	-4	-7

## 4.4 Production Viability of Finalist Products

After determining the final products for prototyping, the team collected supplies that were not available in the workshop from a local hardware store, prototyped the three finalist products, and received feedback from a producer focus group after prototyping.

### 4.4.1 Coordinate Prototyping with Producers

The project group met with eight producers on March 30, 2017 to discuss the logistics for prototyping and hand out a schedule, seen in Figure 24 below. Mr. Shilongo was present to answer any questions and translate when necessary. The producers discussed with the team who would locate the tires and pallets. MSR agreed to arrange a truck driver to pick up these items and deliver them to the MSR workshop, as later discussed in Section 4.4.2. The schedule also requested that producers bring any extra tools and supplies they could access for

prototyping, as seen in Figure 24. One member contributed a measuring tape during the meeting that could be used by everyone for prototyping. Before the producers left, Mr. Shilongo described the location of the old MSR office, the workshop, for those who did not know.

<b>Requested Tools</b>	<b>Requested Materials</b>
<ul style="list-style-type: none"> <li>• Saw</li> <li>• Power drill</li> <li>• Scissors</li> <li>• Knife to cut tyres</li> <li>• Screw driver</li> <li>• Measuring tape</li> </ul>	<ul style="list-style-type: none"> <li>• Paint</li> <li>• Paintbrushes</li> <li>• Nails</li> <li>• Screws</li> <li>• String or rope</li> <li>• Glue</li> </ul>

<b>SCHEDULE</b>				
<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<b>3 April</b> Gather materials	<b>4 April</b> Gather materials	<b>5 April</b> Meet at old MSR office with materials	<b>6 April</b> Work at old MSR office	<b>7 April</b>
<b>10 April</b> Work at old MSR office	<b>11 April</b>	<b>12 April</b> Work at old MSR office	<b>13 April</b> Work at old MSR office	<b>14 April</b>

Figure 24. MSR Producer Supplies and Prototyping Schedule

#### 4.4.2 Supplies

The day before prototyping, Ms. Dixon, an MSR producer, Mr. Shilongo attempted to collect tires and wooden pallets with a pick-up truck driver, who charged N\$200 for transportation. They collected six tires at no cost from a tire repair shop called Quick Services Tyres Repairs in Lafrenz, Windhoek. When they arrived at a pallet supply company, each pallet cost N\$165 which far exceeded the expected cost of N\$5. The project group decided to find an alternative source of pallets, so the driver delivered only the tires to the workshop. The team

then contacted several local businesses to inquire about old pallets, but failed to find a donor. The next day, the group arranged for a personal connection to collect old pallets from a shipping company he knew in Northern Industrial, Windhoek at no cost and with no delivery charge. Ms. Beukes tried contacting the Namibian Brewery about obtaining pallets, but received no response.

Two team members went to a local hardware store to purchase needed supplies that were not available at the MSR workshop. The team members purchased short nails, wood glue, craft glue, paintbrushes, scissors, a box knife, toothpicks, sandpaper, and jewelry string. The researchers group also recorded prices of materials already available in the workshop. Table 8 contains the cost of purchased items and items already available in the workshop.



Table 8. List of Materials, Tools, and Safety Equipment and Their Costs

<b>Materials and Tools</b>	<b>Available?</b>	<b>Cost (N\$)</b>
40mm nails (500)	No	28.00
40mm screws (500)	No	52.00
50mm nails (500)	No	32.00
80 grit sandpaper	No	8.63
Auger	Yes	210.00
Box knife	No	82.00
Craft glue	No	27.82
Crowbar	Yes	350.00
Gloves	Yes	75.00
Hammer	Yes	218.00
Handsaw	Yes	279.00
Level	Yes	72.00
Measuring tape	Yes	56.00
Paint (5 gal. oil-based)	Yes	650.00
Paintbrush	No	21.68
Pallets	No	0.00
Pen	Yes	0.50
Pencil	Yes	0.50
Plastic bags	No	0.00
Pliers	Yes	178.00
Safety goggles	Yes	65.00
Scissors	No	54.50
Medium screwdriver	Yes	88.00
Spool of thick string (500 m)	Yes	155.00
Square	Yes	98.00
Tires	No	0.00
Toothpicks	No	20.00
Wire cutters	Yes	164.00
Wire hanger	Yes	1.00
Wood glue	No	58.95
Wood sealant	No	118.80

### **4.4.3 Prototypes**

On April 5, 2017, MSR personnel came with the project team to unlock the workshop for the first day of prototyping. Prototyping took place on April 5, 6, 10, 12, and 13 from 9:00AM to 3:30PM. MSR supplied a medical kit, in case of injury, and lunch for the producers every day of prototyping. Team members worked alongside the producers for the first two days of prototyping, but the producers worked on their own for the remaining days with the team members assisting by answering questions. This allowed the producers to practice manufacturing on their own, but still access the project group for help.

Five producers attended the first day of prototyping, four on the second day, one on the third day, two on the fourth day, and one on the fifth day. Attendance varied due to the producers' other work commitments. One producer received a permanent job, while another received temporary work, but expressed interest in continuing to make products at a later date. A third producer worked night shifts, and was unable to continue working during the daytime. Mr. Shilongo was unable to follow up with the fourth producer.

This investigation later used the prototyping notes to create production instructions for the pallet table and tire chair, located in Appendices S and T respectively. The following sections refer to specific steps in these instructions to provide context on the progress of each prototype in place of the transcribed production notes. However, the manufacturers followed the summarized do-it-yourself instructions in Appendix R when building the prototypes.

#### ***4.4.3.1 Product 1: Pallet Table***

Mr. Norris and two MSR producers started constructing two pallet tables on April 5, 2017. After deconstructing and sanding the pallets, the group attached the legs to the table skirt and nailed the tabletop boards to a central crossbar. The group then completed the table skirt and placed the tabletop on the skirt. Finally, the group attached the tabletop and crossbar, as shown in Figure 25, and finished the table with sandpaper and wood sealant. Appendix S contains all twenty-one steps for making a pallet table.



Figure 25. Mr. Norris and Two Producers Attaching the Table Crossbar

The group completed the table construction, steps one through seventeen, on the first day of prototyping and the table finishing, steps eighteen through twenty-one, on April 6, 2017. On average, it took a total of ten and a quarter man-hours to complete one table. The manufacturers found that sanding the boards took much longer than expected and used more sand paper than anticipated. Since the pallet boards varied in thicknesses, constructing the tables required the use of box cutters to smooth the tabletop in step eighteen. Furthermore, the manufacturers used additional nails to stabilize both of the tables. The larger of the two tables, as seen in Figure 26, is about one meter long by sixty centimeters wide by sixty centimeters tall. The smaller of the two tables is about eighty centimeters long by sixty centimeters wide by fifty centimeters tall. After the completion of the first two pallet tables, there was not enough pallet wood to manufacture another full table. On April 11, 2017 Ms. Kambanda contacted a friend to donate additional cabinet wood at no cost. On April 12 and 13, 2017, one MSR producer built two more tables and on April 12, 2017, another MSR producer made one table using this cabinet wood and left over pallets. These tables required less time, because the cabinet wood did not require sanding or finishing.



Figure 26. Complete Wooden Pallet Table Prototype

#### *4.4.3.2 Product 2: Tire Chair*

Ms. Gagner and three MSR producers started the construction of two tire chair on April 5, 2017. Each chair required the group to puncture holes in the tire, shown in Figure 27, and weave twine in a web-like pattern. The group then removed the bottom rim of the tire and attached legs. Weaving string around the removed rim provided the back of the chair. Appendix T contains the detailed steps for making the tire chair.



Figure 27. Ms. Gagner and a Producer Puncturing Holes in a Tire

On the first prototyping day, two producers worked together to weave and cut the legs for the chair, steps one through fifteen, and finished attaching the legs and back, steps sixteen through twenty-five, on April 6, 2017. The third producer completed the weaving and cutting on the first day of prototyping, but did not return to complete the chair on all subsequent prototyping days. After completing a table, one of the producers decided to build a chair on April 6, 2017, but later chose to work on more tables instead of finishing the chair. It took sixteen and a half man-hours to complete one chair.

During prototyping, the manufacturers found that weaving the seat of the chair took longer than expected; and as the weave continued, the string started to fray. The producers initially had trouble pushing the string through the small holes created in the tire during step three. Instead, the producers used a needle-like tool shown in Figure 28, to overcome this issue. If the string was too short to finish weaving, the producers could simply tie another strand to the end of the string. Additionally, Ms. Gagner worked to try a new, faster way to weave the seat using a different type of twine, but the twine broke once someone tested the chair. Due to the availability of pallet wood in the workshop, the producers used pallets to build the legs of the chair. However, any sturdy wood can be used for the legs in the future. When

attaching the legs to the tire, the producers used a screwdriver, which took a very long time. A drill would be useful to accelerate this process.



Figure 28. Needle Tool Used for Weaving Tire Chair

The tire chair, displayed in Figure 29, was about sixty centimeters long, sixty centimeters wide, and ninety centimeters tall. After discussions with MSR personnel and the project advisors, the manufacturers determined that they must wash the tires before using them to make chairs. Washing the tires can reduce the risk of disease for the producers and customers.



Figure 29. Complete Tire Chair Prototype

#### 4.4.3.3 Product 3: Plastic Bag Beads

Ms. Teklegiorgis and Ms. Dixon prototyped the plastic bag beads on April 5 and 6, 2017. The attending producers chose to make furniture instead of plastic bag beads, so Ms. Teklegiorgis and Ms. Dixon prototyped this product on their own. On April 5, 2017, these two team members attempted to make two plastic bag beads, but the purchased glue was not suitable for plastic. The researchers resumed plastic bag bead prototyping on April 6, 2017, after purchasing the correct type of glue. After seven failed attempts, it took the team members forty-five minutes to make three plastic bag beads. The members found that wrapping the plastic bags around two toothpicks instead of one, made removing the plastic bag bead easier after the glue had dried. Ms. Gagner then tried making the plastic bag beads after the other team members explained the process. Ms. Gagner was able to complete three plastic bag beads in thirty minutes. Therefore, it took on average between ten and fifteen minutes for one person to make one plastic bag bead. The project team discussed the viability of the plastic bag beads at the end of the day and determined that they were not feasible to move forward with due to lack of producer interest, difficulty of construction, and construction time required. The completed plastic bag beads ranged from ten millimeters to twenty millimeters in size. Figure 30 shows one of the finished plastic bag beads.



Figure 30. Completed Plastic Bag Bead Prototype

#### 4.4.4 Producer Focus Group Post-Prototyping

On April 6, 2017, the team conducted a focus group with four producers. The notes from these interviews can be found in Appendix V. The focus group took place immediately after

completing the first prototypes: two pallet tables and one tire chair. The producers expressed interest in continuing to build the products, and confidence in their manufacturing abilities. The producers needed more materials to continue building. They also expressed interest in modifying the designs for different styles. One producer suggested using rope or wire to build the tire chair, instead of twine. The producers also requested a bore machine (power drill) to make holes and an electric sander to smooth out the pallet boards.

The producers intended to sell the prototypes they had made. The team asked about their intended sales price to compare them to the price calculated in the cost analysis. The producers intended to sell a table for N\$200 and a chair for N\$250. They chose the table price based on their observations of the price of similar tables. Because of the innovative chair design, the producers decided that a higher price was more appropriate. Section 4.5.5 discusses these prices.

#### **4.4.5 Recorded Prototype Sales**

The team asked the producers to report their sales location, price, and marketing techniques used for selling each prototype. At the conclusion of the project, no producers had reported selling any of their products. One producer indicated that he would continue prototyping tables and is currently looking for customers. Ms. Beukes also stated that selling products in this timeframe could be difficult because customers typically purchase items at the end of the month after they have been paid.

#### **4.5 Suggested Production Plans and a Sales Strategy**

This section gives recommendations for producing and selling the final products. The recommendation for production plans includes production instructions and material sources. Appendices S and T contain these production plans. The sales strategy includes suggestions for target customers, advertising methods, and sales prices. Finally, transportation options contain suggestions for both producing and distributing the final products. Appendix X contains the sales strategy document that the team members gave to the producers.



### **4.5.1 Production Instructions**

The team utilized step-by-step notes and pictures gathered from prototyping to create production instructions for manufacturing a pallet table and a tire chair as shown in Appendices S and T respectively. The project team and the producers used the summarized prototyping instructions, found in Appendix R, as a baseline to learn how to create the products. Appendices O, P, and Q contain the original DIY instructions. The team modified these instructions based on material and tool availability and created more detailed instructions to clearly explain the process. The production instructions include the full list of materials and tools required, the time it takes, and step-by-step guidelines to manufacture the products.

### **4.5.2 Material Sources**

During the post-prototyping focus group, the producers expressed a need for more materials. Despite Ms. Beukes' informing the group that recyclable materials are often informally discarded, suitable recyclable materials more often come from businesses. Because no business could provide a consistent supply of materials, the team recommended the methods used in this project to collect tires and pallets. Producers can collect tires from tire repair shops in Windhoek and have them transported to the workshop using the transportation options discussed in Section 4.5.6. Prior to prototyping, the project team, a producer, and Mr. Shilongo gathered tires from a tire repair shop called Quick Services Tyres Repairs in Lafrenz, Windhoek. This tire shop gave the group the tires at no cost. The team utilized a personal connection to gather pallets at no cost and with no delivery charge from a shipping company in Northern Industrial, Windhoek. The team also suggested that the producers contact several local businesses such as the Namibian Brewery, shipping companies, construction sites, and super markets to inquire about old pallets. The researchers encouraged MSR to continue searching for a reliable source of pallets for the producers to use.

The project team advised producers to use the tools and materials available at the MSR workshop. Section 4.4.2 contains a list of the available supplies in the workshop. The researchers further suggested that producers buy additional materials and tools needed from

local hardware stores. The final recommendation explains that the producers should use the proceeds from selling finished products to buy more supplies.

### **4.5.3 Target Customer Recommendations**

The team researched three different target customers: tourists, Katutura residents, and Windhoek residents. After determining that the two final products were the pallet table and the tire chair, this investigation evaluated which group of target customers were more likely to buy these products. The craft fairs did not sell any items that were similar to the final products. Therefore, the team recommended that the producers not attempt to sell products at tourist markets. After conducting the post-prototyping focus group and working with the producers during prototyping, the researchers determined that the producers would be more comfortable selling their products to Katutura residents before expanding to Windhoek residents. Many of the producers live in Katutura which makes it easier and more convenient to find customers and deliver the products within their own community.

Once the producers have made a profit and learned to market their product, they should expand their customer base to Windhoek residents at weekend markets and trade fairs. Boeremark Farmer's Market and Green/Bio Market are good examples of weekend markets where producers are more likely to sell the two pieces of furniture. Boeremark Market occurs on the first weekend of every month at the Windhoek Fairground. The Bio Market takes place every Saturday at the Stephanus Church in Klein Windhoek. One customer at the Green/Bio Market informed the group members that many customers there support eco-friendly ventures and would be interested in products manufactured from recycled materials. The producers' products were similar to the items being sold at the Boeremark Farmer's Market and the Green/Bio Market. Additional recommendations encouraged the producers to find other markets by reading newspapers, reading 'WhatsOn Namibia' website, and searching on Google.

Furthermore, based on recommendations from Team Namibia, the project members suggested that producers participate in trade fairs to sell their products to Windhoek residents. A trade fair is an exhibition where businesses promote their products and services. According to Ms. Kambanda, trade fairs in Windhoek start between May and June and end between

September and October every year. Producers can find the dates and locations of trade fairs by reading local newspapers.

#### 4.5.4 Suggested Advertising Methods

Information gathered from the team’s three entrepreneur interviews determined that producers should advertise their products on social media, with business cards, by word-of-mouth, and in busy locations. According to Team Namibia, Facebook is the most popular form of social media in Windhoek. Since most producers have a Facebook account, they can use this form of advertising to post images of their products to promote their business. MSR also has a Facebook page where producers can post pictures of their products with permission from MSR personnel. Figure 31 displays a post that the project team created. After producers have developed their businesses, they should create a Facebook business page to increase exposure to potential customers in Windhoek.



Figure 31. MSR Facebook Product Post

Team Namibia also suggested the use of business cards as another advertising method. Business cards are a method for spreading knowledge about a business because producers can

leave them in busy locations for people to pick up. Business cards also help potential customers remember the producers and their products. Additionally, the contact information on a business card is an important factor in allowing customers to reach out to a producer if they decide to purchase an item later on. The researchers made a sample business card for the producers to use displayed in Figure 32.



Figure 32. A Sample Business Card

In addition, the team recommended that producers use word-of-mouth as one of their main methods of advertising. Once customers develop a relationship with a business, they are more likely to bring in additional customers by word-of-mouth. According to Team Namibia, customers are more likely to believe a recommendation from a friend or family member than an advertisement on a poster or Facebook.

Finally, the team suggested that producers sell their products in locations with high pedestrian traffic to reach more customers. An example of a busy location is outside schools at a time when parents drop off and pick up their children.

#### 4.5.5 Suggested Sales Prices

The project team performed a cost analysis to recommend a minimum sales price for the prototypes of the pallet table and tire chair. According to the cost analysis of the pallet table shown in Table 9 and Table 10, the researchers recommended a sales price of at least

N\$231.08. Based on the tire chair cost analysis shown in Table 11 and Table 12, the group recommended a sales price of at least N\$274. The team used a daily wage of N\$100 and an eight-hour work day to calculate the average hourly cost of labor. The cost of transportation included bringing supplies to the workshop, but not the additional costs involved in transporting products that producers would sell. If the customer would like the product delivered, the producer should include a delivery cost for transporting the finished product to the customer. These prices serve as an initial recommendation, but the estimates may change as the costs of labor, materials, and transportation change.

During the post-prototyping focus group with producers, the team asked the producers about their intended sales price in Katutura without knowing the cost of materials. The producers said that they would sell the table for N\$200 because they observed other tables sold at that price. They would sell the chair for N\$250 because it is a new design. These prices are lower than the recommended prices, but as producers gain more experience in making products, the required time should decrease, lowering the cost of labor and increasing profit.

Table 9. Material Number and Cost for the Pallet Table

<b>Material</b>	<b>Number Used Per Table</b>	<b>Cost Per Material (N\$)</b>	<b>Cost Per Table (N\$)</b>
Pallet	2	0.00	0.00
Wood Glue	0.17	58.95	9.83
Nails	0.15	32.00	4.80
Sandpaper	1	8.63	8.63
Varnish	0.25	118.80	29.70
Materials Transportation	0.50	100.00	50.00
<b>Total</b>			102.96

Table 10. Recommended Sales Price for the Pallet Table

<b>Materials Cost</b>	N\$102.96
<b>Hours Worked</b>	10.25
<b>Target Daily Wage</b>	N\$100.00
<b>Recommended Sales Price</b>	N\$231.08

Table 11. Material Number and Cost for the Tire Chair

Material	Number Used Per Chair	Cost Per Material (N\$)	Cost Per Chair (N\$)
Tire	1	0.00	0.00
Pallet	0.25	0.00	0.00
Nails	0.03	32.00	0.80
Sandpaper	0.2	8.63	1.73
Varnish	0.10	118.80	11.88
String	0.10	33.45	3.35
Transportation	0.50	100.00	50.00
<b>Total</b>			67.75

Table 12. Recommended Sales Price for the Tire Chair

<b>Materials Cost</b>	N\$67.75
<b>Hours Worked</b>	16.25
<b>Target Daily Wage</b>	N\$100.00
<b>Recommended Sales Price</b>	\$274

#### 4.5.6 Transportation Options

The producers also expressed a need for transportation of materials and finished products. The team shared how they transported materials in addition to other ideas for future transportation. To transport production supplies and final products, the researchers suggested that producers contact MSR personnel, who can arrange a truck driver. MSR personnel also recommended that producers use a taxi for smaller materials, contact a local car rental company, or find a colleague with a car when transporting items to and from the MSR workshop. The group recommends future research on this topic in the discussion section.

#### **4.5.7 Community Meeting Presentation**

On April 21, 2017, the team and one of the producers presented pictures of the prototypes at the MSR member community meeting. The group discussed the results of prototyping and explained the opportunity to start a business. The purpose of this presentation was to inform and excite members about this opportunity. The presenting producer collected a list of five members interested in making products and distributed his contact information to the new potential producers.

## CHAPTER 5: CONCLUSION

This investigation determined viable recycled products to manufacture and sell in Windhoek and Katutura, Namibia. The team compiled a list of thirty-eight products made from recycled materials including plastic bags, tires, pallets, and oil drums. These ideas came from do-it-yourself websites and each idea included instructions for making the product. These products required common skills possessed by MSR members and few additional materials. The team picked fourteen items out of the thirty-eight initial products based on their potential customer appeal to tourists, Katutura residents, and Windhoek residents. MSR members gave their feedback about these fourteen products during a focus group. To reduce the list to eleven products, the team used the information from the focus group and discussed the thirty-eight potential products with MSR personnel because they possess unique knowledge about Katutura and Windhoek. This project then analyzed these eleven ideas based on customer interest, required tools, amount of materials, producer interest, and required skills to determine three final products. The team worked alongside five MSR members to prototype these final products and determine the production viability of each product. A qualitative analysis demonstrated that plastic bag beads, pallet table, and tire chair had the potential to succeed, but prototyping confirmed the viability of only the pallet table and tire chair. The team conducted a post-prototyping meeting with the producers to gather their feedback on the products, their intended sales prices, and future business plans. Furthermore, the team and one producer presented their findings at an MSR community meeting and encouraged additional members to become producers. This project recommended production plans and a sales strategy for the table and chair to assist the members in making and selling these products. These recommendations came from prototyping insights and interviews with existing entrepreneurs about starting and marketing their businesses.

This report includes the production plans and sales strategy for the pallet table and tire chair in Appendices S and T. The team encouraged MSR to use these recommendations to continue training members to manufacture and sell products manufactured from recycled materials. The five producers involved in the prototyping are knowledgeable about



manufacturing pallet tables and tire chairs and can assist in training new producers in the future. The sales strategy can help producers find customers and sell their products. The team recommended that the producers implement the initial marketing strategies and individually determine the most suitable method for their businesses. The interviewed entrepreneurs each used a different method of recruiting customers, so the producers should utilize the method they prefer. MSR can assist in advertising by promoting the producers' furniture on MSR's Facebook page.

The producers should continue manufacturing and selling these products to develop their businesses. The team and MSR encourage the producers to continue expanding upon these recommendations and take ownership of their businesses. The existing entrepreneurs emphasized that this work will not be easy, but it will help them become self-sustainable and independent in the future.

## **CHAPTER 6: DISCUSSION**

This chapter reflects on methods that were effective and ineffective throughout the project. It proposes future work for the continuation of the business opportunity created by this project and includes general recommendations for future students who may complete a project sponsored by MSR. This chapter aims to aid MSR and future students working with MSR to use effective and efficient methods and analysis techniques.

### **6.1 Effective Methods**

The team used a variety of methods to gather information from each stakeholder group and analyze data. Effective methods include the MSR member focus group, customer surveys, pairwise and Pugh analysis, prototyping and shared action learning.

The team did not learn that MSR held monthly community meetings until arriving in Windhoek. On the first day of the project, MSR informed the team that the community meeting would be held in four days. The team utilized this opportunity to understand the customer appeal of Katutura residents after being told that it was not safe to go into Katutura to perform this assessment. Additionally, speaking with the MSR members in a large group made the members feel comfortable sharing their opinions because they were around familiar colleagues. Attending this community meeting was also a good approach for introducing the team and the project to a large number of MSR members.

Another effective project method was surveying customers at weekend markets. The surveys allowed the team to understand the culture of Windhoek markets and learn about buyer interests firsthand. The surveys lasted as long or as short as the participants wanted. If participants were busy, they simply picked out the products they liked. If participants had enough time and were interested in the project, they held longer conversations, which helped the team learn more about the culture of the market and customer interests.

To select final products for prototyping, the team used a variety of criteria to evaluate potential products using a pairwise comparison and Pugh analysis. This method of analysis served as a good technique to combine the varied criteria and gather quantitative data from

the qualitative data. While the plastic bag beads did not result as a viable product after prototyping, the Pugh analysis correctly identified them as a potential product based on the available information.

Prototyping effectively tested the viability of final products and allowed the team to work alongside a group of producers through shared action learning. The producers quickly learned how to make the pallet table and tire chair by working hand-in-hand with the team. This method also helped the team learn more about the producers and the culture of Katutura residents.

## **6.2 Ineffective Methods**

Although the team utilized several effective methods in this project, some methods could be improved. These ineffective techniques include implementing too many different methods, planning a rigid timeline, recording data when observing craft markets, scheduling excessive meetings with producers, and gathering supplies inefficiently for prototyping.

The researchers used nine different methods in this project, which caused unnecessary confusion for the team and project advisors. The project group used a variety of methods that fit specific purposes. However, it would have been simpler to use fewer methods in accomplishing the objectives.

The team did not follow the timeline initially created during the preparation term. After arriving in Windhoek, the researchers had to accommodate several holidays, the schedules of the interviewees, and the dates of weekend markets. As the project group was not aware of these scheduling issues during the preparation term, team members had to adjust the proposed schedule to haphazardly accomplish tasks whenever an opportunity arose. It would have been more efficient to come to Windhoek with a more flexible timeline, and a clearer understanding of the order of steps for the project. For example, the team took advantage of the opportunity to conduct a focus group at the MSR community meeting the first week in Windhoek. At this time, the team had not discussed the thirty-eight potential products with MSR personnel and needed to narrow down the list to show at the community meeting. This led the researchers to choose fourteen products based on the markets they could be sold in

and the clarity of their photos. If the team had planned better, they would have had the eleven products before the community meeting.

Additionally, the technique the team used to observe craft markets could have been improved. The team simply walked around these markets and noted the available items and some of the costs. If the researchers had created a better plan and taken more detailed notes, data from these markets could have better informed the evaluation of customer appeal in the tourist market. For example, each member could have been responsible for collecting detailed data on a certain product category.

When interviewing and meeting with MSR members before prototyping, the team should have planned fewer meetings at the MSR office. Most members live in Katutura and need transportation to come to the office in Khomasdal, Windhoek. These members do not have access to a car and must pay for a taxi. However, MSR will sometimes reimburse members for taxi fares. MSR personnel informed the team of this expense after the team had already scheduled two appointments with producers. The team could have avoided the unnecessary strain on MSR members by considering these costs and scheduling only one meeting prior to prototyping. Because the MSR workshop is in Katutura, some members were able to walk to the workshop for prototyping and did not face the same predicament of paying for a taxi.

Finally, gathering supplies for prototyping was ineffective. The team did not confirm the existence of tires and wooden pallets before traveling to the locations recommended by MSR members to pick up the materials. Although the team was able to collect the tires, the pallets at the suggested location were more expensive than anticipated. With no backup plan, the team improvised and created a new strategy to gather pallets at the last minute. Though it is important to value the knowledge and opinions of the MSR members, the team should have confirmed the availability of the materials ahead of time by calling the businesses or created a secondary plan to obtain materials if needed.

### **6.3 Future Work**

The overall purpose of this project was to develop a green business opportunity for unemployed men and women. To turn this opportunity into a viable, sustainable business, MSR

or future WPI students working with MSR must continue to advance the project. This section considers suggestions for the next steps in growing this business.

Continued development includes creating plans for a sustainable supply of resources and a reliable mode of transporting materials and products. Although this project relied on the use of materials accessible to producers, an in-depth analysis of gathering materials would be beneficial to future producers who do not have access to tires or pallets. Based on the team's experience, one company often does not have an abundant supply of pallets or tires for long-term production. As a result, producers will need to find multiple sources for materials. Additionally, each producer should have a reliable and sustainable way of transporting materials and finished products. To achieve this, more research will need to be conducted by MSR and the producers.

Future work on this project should include additional research in marketing to potential customers. Producers can supplement the sales strategy the team recommended with business training from MSR or other training organizations to market and advertise their business. Additional marketing to Katutura and Windhoek residents will grow the business' customer base and eventually increase profits.

Currently, producers have access to limited resources. As they grow their businesses, they will have more profit and may have the opportunity to improve their production methods by purchasing better tools, supplies, and materials. At this point, producers and MSR personnel should research the costs and benefits of additional tools, materials, and supplies. Producers may also be able to apply for a small business loan and could consult MSR personnel for assistance in applying. MSR could also seek donations or grants specific to continuing this project. For example, a donation of power tools could decrease the amount of time needed to produce the products and improve the quality.

## BIBLIOGRAPHY

- Admin. (2014, December 12). Men on the Side of the Road. *The Namibia Economist*. Retrieved from <https://economist.com.na/10229/human-resources/men-on-the-side-of-the-road/>
- Angula S., Cabrero D. G., Chivuno-Kuria S., Mendonca H., Ngolo R., & Winschiers-Theophilus H. (2015). A Challenge Based Approach to Promote Entrepreneurship among Youth in an Informal Settlement of Windhoek, presented at SATN Conference, 2015, Sebokeng, South Africa. Retrieved from [https://www.researchgate.net/publication/283346056\\_A\\_Challenge-based\\_Approach\\_to\\_promote\\_Entrepreneurship\\_among\\_Youth\\_in\\_an\\_Informal\\_Settlement\\_of\\_Windhoek](https://www.researchgate.net/publication/283346056_A_Challenge-based_Approach_to_promote_Entrepreneurship_among_Youth_in_an_Informal_Settlement_of_Windhoek)
- Architecture Art Design. (n.d.). Top 30 glorious DIY home projects that you've never heard of. Retrieved from <http://www.architectureartdesigns.com/top-30-glorious-diy-home-projects-that-youve-never-heard-of/>
- Auto Parts Warehouse. (2016). 6 creative ideas you can do with your old car tires (so don't throw them out yet)! Retrieved February 21, 2017 from <http://blog.autopartswarehouse.com/2016/07/6-creative-ideas-you-can-do-with-your-old-car-tires-so-dont-throw-them-out-yet/>
- Bored Art. (2016). Smart ways to use old tires. Retrieved from <http://www.boredart.com/2016/08/smart-ways-to-use-old-tires.html>
- Bowes-Pope, S. (2012, February 24). Farmhouse table, part 2. Retrieved on March 22, 2017 from <http://www.domesticated-engineer.com/2012/02/24/farmhouse-table-part-2/>
- Budlender, D. (2011). *Informal Employment in Namibia, 2008*. Retrieved from the International Labor Organization Website: [http://www.ilo.org/stat/Publications/WCMS\\_166605/lang--en/index.htm](http://www.ilo.org/stat/Publications/WCMS_166605/lang--en/index.htm).
- Butler, J. (2011). Supercyclers! – plastic fantastic. Retrieved February 21, 2017 from <http://thedesigntfiles.net/2011/04/supercyclers-plastic-fantastic/>
- Brand South Africa. (2014, September 23). Solar Schoolbag Lights up Homework for Rural Kids. Retrieved from <https://www.brandsouthafrica.com/play-your-part-category/play-your-part-news/solar-schoolbag-lights-up-homework-for-rural-kids>
- Carter, M. (2016, November 11). Micro-Enterprise Revival in Katutura. *Namibia Economist*. Retrieved from <https://economist.com.na/20393/retail/micro-enterprise-revival-in-katutura/>
- Central Intelligence Agency. (2017). Namibia. In *The World Factbook*. Retrieved from <http://www.cia.gov/library/publications/the-world-factbook/geos/wa.html>
- Chen, M. A. (2012). The informal economy: Definitions, theories and policies. *Women in informal economy globalizing and organizing: WIEGO Working Paper, 1*.

- Chico, L., Conroy, E., Laovoravit, T. D., & Martin, E. (2016). Pathway to Self-Employment [Scholarly Project]. Worcester Polytechnic Institute. Retrieved from [https://web.wpi.edu/Pubs/E-project/Available/E-project-050416-112517/unrestricted/NA16-MSR\\_FinalReport.pdf](https://web.wpi.edu/Pubs/E-project/Available/E-project-050416-112517/unrestricted/NA16-MSR_FinalReport.pdf)
- Cline, J., Domingue, E., Fournier, E., & Villar, M. (2012). Sustainable Paper Insulation for Kambashus in Informal Settlements of Namibia [Scholarly Project]. Retrieved from [https://web.wpi.edu/Pubs/E-project/Available/E-project-050412-111607/unrestricted/MSR\\_Final\\_Paper\\_5.3.12.pdf](https://web.wpi.edu/Pubs/E-project/Available/E-project-050412-111607/unrestricted/MSR_Final_Paper_5.3.12.pdf)
- Cockram, M. (2007, June 13,). The sustainability of Nina Maritz. *Architecture Week*, E1.1.
- DancingPope. (n.d.) Upcycled tyre chair. Retrieved on March 22, 2017 from <http://www.instructables.com/id/Upcycled-Tyre-Chair/>
- Dancing Weapon of Mass Destruction. (2008). New DIY BBQ grill nearly complete! Retrieved from <https://www.flickr.com/photos/dancingweaponofmassdestruction/2855598209/>
- Eco Empire. (2012). What is environmentally conscious? Retrieved February 21, 2017 from <https://ecoempire.org/page/2/>
- Elpel, T. (n.d.) Make your own tire sandals. Retrieved from <http://www.hollowtop.com/sandals.htm>
- Emily. (2006). Crocheted grocery bag shoes! (now with an attempt at a tute!). Retrieved from <http://www.craftster.org/forum/index.php?topic=87737.0>
- Faes, J. (2013). *The Household Organizations in the Precarious Settlements of Windhoek: A Quantitative and Qualitative Study (Masters thesis)*. Retrieved from University of Fribourg website: [http://www.unifr.ch/geoscience/geographie/assets/files/bachelor-theses/jfaes\\_final.pdf](http://www.unifr.ch/geoscience/geographie/assets/files/bachelor-theses/jfaes_final.pdf)
- Gibbs, G. (2007). Thematic coding and categorizing. Analyzing qualitative data (pp. 38-49). London: SAGE Publications, Ltd.
- Global Recycling. (2016, January). Namibia: Long-term Market Opportunities Ahead. Retrieved from <http://global-recycling.info/archives/525>
- Google Maps. (2017a). Map of Katutura. Retrieved from <https://www.google.com.na/maps/place/Katutura,+Windhoek/@-22.5332515,17.0427381,13.84z/data=!4m13!1m7!3m6!1s0x1c0b1cf44da6bce1:0x1b47f80bf789a8ce!2sKatutura,+Windhoek!3b1!8m2!3d-22.5211336!4d17.0598491!3m4!1s0x1c0b1cf44da6bce1:0x1b47f80bf789a8ce!8m2!3d-22.5211336!4d17.0598491?hl=en>
- Google Maps. (2017b). Location of Kupferberg landfill. Retrieved from <https://www.google.com.na/maps/@-22.590032,17.0718632,13421m/data=!3m1!1e3?hl=en>
- Guest. (2016). 11 excellent DIY pallet projects. Retrieved February 21, 2017 from <http://diyshacks.com/11-excellent-diy-pallet-projects/>

- Habitat Research and Development Centre. (2007). Habitat Namibia. Retrieved from [http://209.88.21.36/opencms/export/sites/default/grnnet/MRLGH/HRDC/Documents/habitat\\_committee/habitat\\_namibia\\_vol\\_3\\_no\\_4.pdf](http://209.88.21.36/opencms/export/sites/default/grnnet/MRLGH/HRDC/Documents/habitat_committee/habitat_namibia_vol_3_no_4.pdf)
- Hasheela, R. (2001). *State of the Environment Report on Waste Management and Pollution Control in Namibia*. Retrieved from DLIST Benguela Website: <http://www.dlist-benguela.org/sites/default/files/doclib/Waste%20Management%20and%20Pollution%20control%20in%20Namibia.pdf>
- Hasheela, R. (2009). *Municipal Waste Management in Namibia: The Windhoek Case Study (Doctoral dissertation)*. Retrieved from the Namibia Environmental Information Service.
- Henderson, L. (2015). DIY toy shelves from a used tire. Retrieved February 21, 2017 from <http://spaceshipsandlaserbeams.com/blog/party-crafts-and-diy/diy-toy-shelves-from-a-used-tire>
- Hipcycle (n.d.). 16" stuffed floor cushion. Retrieved February 21, 2017 from <https://hipcycle.com/16-stuffed-floor-cushion.html>
- Holodok S. (2014). Garden path of old tires by hand. Retrieved on February 21, 2017 from <http://postila.ru/post/9263374>
- Home-Dzine. (n.d.) Practical ways to recycle old oil drums. Retrieved on February 21, 2017 from <http://www.home-dzine.co.za/craft/craft-oil-drum.html>
- Hope, K. R., & Lekorwe, M. H. (1999). Urbanization and the Environment in Southern Africa: Towards a Managed Framework for the Sustainability of Cities. *Journal of Environmental Planning and Management*, 42(6), 837-859. doi:10.1080/09640569910858
- Hunt, M., Strauss, M., Vu, P., & Woodyard, A. (2014). Paper Blocks: Improving the Design and Identifying Market Opportunities for a Sustainable Cooking Fuel in Katutura, Namibia [Scholarly project]. Retrieved from [http://www.wpi.edu/Pubs/E-project/Available/Eproject-050814-094534/unrestricted/MSR\\_Final\\_Report\\_5.8.14.pdf](http://www.wpi.edu/Pubs/E-project/Available/Eproject-050814-094534/unrestricted/MSR_Final_Report_5.8.14.pdf)
- Jiusto, S., McCauley, S., & Stephens, J. C. (2013). Integrating shared action learning into higher education for sustainability. *Journal of Sustainability in Higher Education*, 5.
- Johnnyblegs. (n.d.). How to build your own BBQ barrel. Retrieved February 21, 2017 from <http://www.instructables.com/id/How-to-Build-Your-Own-BBQ-Barrel/>
- Katie. (2012). DIY plastic bag jump rope. Retrieved February 21 2017 from <http://childhoodlist.blogspot.com/2012/03/105-diy-plastic-bag-jump-rope.html>
- Kaze, H. (2014, September 15). Females Top the Informal Sector. *The Villager*, retrieved from <http://www.thevillager.com.na/articles/7298/Females-top-the-informal-sector/>
- Keeping S. (2017). 19 DIY tire projects. Retrieved on February 21 2017 from <http://spaceshipsandlaserbeams.com/blog/party-crafts-and-diy/19-diy-tire-project-ideas>



- Kemper, R. V., & Royce, A. P. (2002). *Chronicling Cultures: Long-term Field Research in Anthropology*. Blue Ridge Summit: AltaMira Press.
- Kraftynotkrazy. (2016). Cascade blue chalk-painted pallet bistro set. Retrieved February 21, 2017 from <http://www.1001pallets.com/2016/10/cascade-blue-chalk-painted-pallet-bistro-set/>
- Lab 11. (2017). Pallet garden chair pair. Retrieved on February 21 2017 from <http://www.1001pallets.com/2017/01/pallet-garden-chair-pair-2-fauteuils-de-jardins-en-palettes/>
- Larryshort (2007) Making a soccerball out of plastic bags [Video file]. Retrieved from <https://www.youtube.com/watch?v=d0GQZFIO4tM>
- Lauren, J. (2016). Easy backyard projects to DIY with the family. Retrieved February 21, 2017 from <https://diyprojects.com/backyard-projects/>
- Magen, Y. (2010). *Waste Management and Recycling Study in Namibia (Bachelor thesis)*. Retrieved from [https://www.theseus.fi/bitstream/handle/10024/13310/Magen\\_Yoav.pdf?sequence=2](https://www.theseus.fi/bitstream/handle/10024/13310/Magen_Yoav.pdf?sequence=2)
- Marcos. (n.d.). 5 tired and true trug(s). Retrieved on February 21, 2017 from <http://www.instructables.com/id/Tired-and-True-Trugs/>
- Maritz, N. (2004). Lessons in building sustainably in a developing country: The habitat research and development centre, Namibia. *Sustainable Building for Africa*, Stellenbosh, South Africa.
- Mayer, S. (2016, May 13). SoleRebels: an Ethiopian success story. *Africa Middle East*. Retrieved from <http://africa-me.com/solerebels-ethiopian-success-story/>
- McIntyre, C. (2015). *Namibia* (5th ed.) Bucks, United Kingdom: Bradt Travel Guides
- McKenzie, B. (2005). Collecting Oral Histories for Entrepreneurship Research. *New England Journal of Entrepreneurship*, 8(1), 37.
- Men on the Side of the Road. (2014a). Who is MSR? Retrieved on February 5, 2017 from <http://www.msr.org.na/>
- Men on the Side of the Road. (2014b). *September 2014 Newsletter*. Retrieved from <http://www.msr.org.na/>
- Merissa. (2013). How to make rag rugs. Retrieved on February 21, 2017 from <http://www.littlehouseliving.com/how-to-make-rag-rugs.html>
- Ministry of Trade and Industry. (2012) Industrial Upgrading and Modernization Programme (IUMP) for Namibia. Retrieved from <http://www.mti.gov.na/downloads/MINISTRY%20OF%20TRADE%20AND%20INDUSTRY1.pdf%20IUMP.pdf>
- Ministry of Urban and Rural Development. (n.d.) Habitat research and development centre. Retrieved from <http://www.murd.gov.na/hrdc>
- Monosoff, T. (n.d.). Creating a Product Prototype. Retrieved from <https://www.entrepreneur.com/article/80678>
- Mwinga M. S. (2012). Unemployment in Namibia: Measurement Problems, Causes and Policies. *First Capital Working Paper Series*.

- Nagle, B., & Williams, N. (n.d.). Methodology: Brief Introduction to Focus Groups. *Center for Assessment, Planning, and Accountability*. Retrieved from <http://www.mmgconnect.com/projects/userfiles/file/focusgroupbrief.pdf>
- Namibia Statistics Agency (2015). The Namibia Labour Force Survey 2014 Report. Retrieved from <http://cms.my.na/assets/documents/9b8e77842e3dec459407c2a76b9d79ab.pdf>
- Nashuuta, L. (2016, February 17). Namibia's Often Ignored Street Men. *The Southern Times*. Retrieved from <https://southernafrican.news/2016/02/17/namibias-often-ignored-street-men/>
- Nataliezdrieu. (2010). Fused plastic shopping bags. Retrieved on February 21, 2017 from [http://makezine.com/2010/03/01/fused\\_plastic\\_shopping\\_bags\\_to/](http://makezine.com/2010/03/01/fused_plastic_shopping_bags_to/)
- Nenieh. (n.d.). Pallet table. Retrieved on February 21, 2017 from <http://www.instructables.com/id/Pallet-table-8/>
- Niikondo, A. (2010). *Migrants to Cities and Towns in Namibia: What their Interests are*. Retrieved from Namibia University of Science and Technology Website: <http://ir.polytechnic.edu.na/bitstream/handle/10628/249/Niikondo.%20Migrants%20to%20cities%20and%20towns%20in%20Namibia.pdf;jsessionid=E9355B0ED717257CF1A634188DB4110C?sequence=1>
- Numbeo. (2017). Cost of Living in Windhoek. Retrieved on February 13, 2017 from <https://www.numbeo.com/cost-of-living/in/Windhoek>
- Nunuhe, M. (2016, February 8). The Rand, Nam Dollar and Benefits of Being in the CMA. *The Southern Times*, retrieved from <https://southernafrican.news/2016/02/08/the-rand-nam-dollar-and-benefits-of-being-in-the-cma/>
- Parrish, A. (n.d.). DIY -tire teatherball. Retrieved February 21, 2017 from <https://www.pinterest.com/pin/367676757064688120/>
- Pastakia, A. (1998). Grassroots Ecopreneurs: Change Agents for a Sustainable Society. *Journal of Organizational Change Management*, 11(2), 157-173. doi:10.1108/09534819810212142
- Pastakia, A. (2002). Assessing Ecopreneurship in the Context of a Developing Country. *Greener Management International*, 2002(38), 93-108. doi:10.9774/GLEAF.3062.2002.su.00010
- Pendleton, W. C. (1996). *Katutura: A Place Where We Stay: Life in a Post-Apartheid Township in Namibia*. United States: Ohio University Center for International Studies.
- Plastic Bag Crafts (n.d.) Make plarn. Retrieved on February 21, 2017 from <http://www.plasticbagcrafts.com/make-plarn/>
- Quality Tires. (n.d.) Tire swings. Retrieved on February 21, 2017 from <https://www.pinterest.com/pin/367676757064688179/>
- Ramos, O. (2017). Beautiful pallet bookcase. Retrieved on February 21, 2017 from <http://www.1001pallets.com/2016/07/beautiful-pallet-bookcase/>
- Recycle Namibia Forum. (n.d.) What can be Recycled? (2016). Retrieved from <http://rnf.com.na/>
- Recycle Namibia Forum. (2014). About RNF. Retrieved from <http://rnf.com.na/about-us/>

Repurpose Schoolbags. (2017). Home. Retrieved from <http://www.repurposeschoolbags.com/>

Room Decoration. (2014). Make interesting furniture from car tires. Retrieved on February 21, 2017 from <http://www.room-decorating-ideas.net/make-interesting-furniture-from-car-tires/>

Said-Moorhouse, L. (2014, December 4). This Backpack was Trash, Now it's a Life-saving Schoolbag for Kids. *CNN Wire*. Retrieved from <http://edition.cnn.com/2014/12/04/world/africa/repurpose-schoolbags-south-africa-rethaka/>

Sanguino, J. (2015). 24 ideas para decorar tu hogar sin gastar. Retrieved February 21, 2017 from <http://culturacolectiva.com/24-ideas-para-decorar-tu-hogar-sin-gastar/>

Sarah. (2015). 8 awesome ideas to repurpose metal barrels. Retrieved on February 21, 2017 from <http://diytotry.com/8-awesome-ideas-to-repurpose-metal-barrels/>

Savouré, J. (2015). Décoration: Recycler des barils en meubles! Retrieved February 21, 2017 from <http://edito.seloger.com/lifestyle/ca-buzz/decoration-recycler-des-barils-en-meubles-article-7309.html>

Scheuren, F. (2004). *What is a Survey?* Alexandria, Virginia: American Statistical Association.

Schneck, W. (2009). Bringing Recycling to the Windhoek Community. *Roan News*. Retrieved from <http://wasteportal.net/en/news/bringing-recycling-windhoek-community>

Shindondola-Mote H., & Ohlson J. (2013). Informal Economy & Social Protection in Namibia, presented at FES & SASPEN International Conference, Johannesburg, South Africa, 2013.

Simone. (2009). How-to: Turn bags into beads. Retrieved from <http://thenewnew.blogspot.com/2009/04/how-to-turn-bags-into-beads.html>

Staff Reporter. (2016, October 21). Special day for Windhoek Recycling. *Namibia Economist*. Retrieved from <https://economist.com.na/20004/environment/special-day-for-windhoek-recycling/>

Statista. (2015). Namibia - Urbanization 2004-2015. Retrieved from <https://www.statista.com/statistics/455894/urbanization-in-namibia/>

Stefanie. (n.d.). #tire turned into #planter #garden #flowers. Retrieved on February 21 2017 from <http://indulgy.com/post/rM811gfGD3/tire-turned-into-planter-garden-flowers>

Stepping Thru Crazy. (2010, April 30). Recycled craft: plastic bag beads. Retrieved on March 22, 2017 from <http://www.steppingthrucrazy.com/2010/04/plastic-bag-beads.html>

Sustaining Community. (2013). What is asset based community development (ABCD)? Retrieved from <https://sustainingcommunity.wordpress.com/2013/08/15/what-is-abcd/>

Team Namibia. (2017). Overview. Retrieved from <http://www.teamnamibia.com/page/overview/>

Ten Thousand Villages. (2015). *Ten Thousand Villages Annual Report*. Retrieved from [https://www.tenthousandvillages.ca/about/annual\\_report](https://www.tenthousandvillages.ca/about/annual_report)

Thijenuna, T. (2016, May 13). Kupferberg 'Scavengers' are Back. *The Namibian*. Retrieved from <http://www.namibian.com.na/150745/archive-read/Kupferberg-%E2%80%98scavengers%E2%80%99-are-back>

Trent, J. (2008). Recycled plastic-bag weaving. Retrieved February 21, 2017 from [http://www.weavezine.com/summer2008/wz\\_su08\\_JanaTrent.php.html](http://www.weavezine.com/summer2008/wz_su08_JanaTrent.php.html)

Trepper, E. (2011). *Waste Management Regulations: Local Authorities Act, 1992*.

Typesetter (2016, October 28). Men on the Side of the Road Now MSR. *Namibia Economist*. Retrieved from <https://economist.com.na/20117/community-and-culture/men-on-the-side-of-the-road-now-msr/>

United Nations Economic and Social Council. (2007). *Study on the Measurement of the Informal Sector and Informal Employment in Africa*. Retrieved from [http://www.namibian.com.na/150745/archive-read/Kupferberg-%E2%80%98scavengers%E2%80%99-are-backhttp://repository.uneca.org/bitstream/handle/10855/9302/bib.%2049861\\_1.pdf?sequence=1](http://www.namibian.com.na/150745/archive-read/Kupferberg-%E2%80%98scavengers%E2%80%99-are-backhttp://repository.uneca.org/bitstream/handle/10855/9302/bib.%2049861_1.pdf?sequence=1)

UsefulDIY (n.d.). DIY rubber tire flower. Retrieved February 21, 2017 from <http://www.usefuldiy.com/diy-rubber-tire-flower/#?&cuid=b3f53eae67c2463b53a607c416bbdc75>

VELETAS ANIMADAS ANIMATED VANES (n.d.). Horse tire kids más. Retrieved February 21, 2017 from <https://www.pinterest.com/pin/367676757064688092/>

Windhoek Express. (2016). Training Opportunities for Men on the Side of the Road. Retrieved from <http://www.we.com.na/local-news/training-opportunities-men-side-road.218004>

Wolfer, T. A., & Del Pilar, K. (2008). Ten thousand villages: Partnering with artisans to overcome poverty. *Social Work and Christianity*, 35(4), 449-472.

World Fair Trade Organization. (2013). 10 Principles of Fair Trade. Retrieved from <http://wfto.com/fair-trade/10-principles-fair-trade>

## **APPENDIX A: INTRODUCTION AND PREAMBLE FOR ALL INTERVIEWS**

### **Introduction Given to All Stakeholders**

Hello, we are students from America. We are doing research to help develop a business opportunity for unemployed people with MSR. Would you be willing to take 20 minutes to answer a few questions?

### **A Complete Verbal Preamble for Interviews**

Thank you for your interest in answering a few questions! We are a group of university students from WPI in Massachusetts. We are doing research to learn more about businesses and customers in Katutura and Windhoek. We hope this research will ultimately create more business opportunities for unemployed men and women working with MSR. Your participation in this interview is completely voluntary and you may withdraw at any time and do not have to answer questions you are uncomfortable with.

### **A Complete Verbal Preamble for Surveys**

Thank you for your interest in answering a few questions! We are a group of university students from WPI in Massachusetts. We are doing research to learn more about businesses and customers in Katutura and Windhoek. We hope this research will ultimately create more business opportunities for unemployed men and women working with MSR. Your participation is completely voluntary and you may withdraw at any time and do not have to answer questions you are uncomfortable with. Please remember that your answers will remain anonymous. No names or identifying information will appear in any of our project reports or publications without your permission.

## APPENDIX B: PRODUCT-BASED ENTREPRENEURS INTERVIEW QUESTIONS

1. What is your business?
2. How long have you been \*insert name of business\*?
3. How did you start? Did anyone help you?
4. Why did you decide to start?
  - a. Why did you choose to work for yourself?
  - b. Why did you choose \*insert name of business\*?
5. What was hard about starting or becoming \*insert name of business\*?
6. What do you sell? How much do you sell them for?
7. Do you make your products, or do you buy them from someone else?
  - a. If you make your products, what supplies and tools do you use?
  - b. If you buy your products, where do you buy them?
8. Who do you sell your products to?
9. How do you get customers?
10. How many other \*insert name of business\* are near here?
11. What is different from when you first started your business?
  - a. Do you sell to different people now?
  - b. Have you changed your products?
  - c. Have you changed how you sell your products?
12. Is there anything you wish you had known before starting your business?
13. What advice would you give to someone starting a business?

## APPENDIX C: SERVICE-BASED ENTREPRENEURS INTERVIEW QUESTIONS

1. What is your business?
2. How long have you been \*insert name of business\*?
3. How did you start? Did anyone help you?
4. Why did you decide to start?
  - a. Why did you choose to work for yourself?
  - b. Why did you choose \*insert name of business\*?
5. What was hard about starting or becoming \*insert name of business\*?
6. How much do you charge for \*insert name of service\*?
7. What do you need to provide your service?
  - a. What did you need to do or buy to start your business?
  - b. What supplies and tools do you need? Where do you get them?
8. Who are your customers?
9. How do you get customers?
10. How many other \*insert name of service\* are near here?
11. What is different from when you first started your business?
  - a. Do you have different customers now?
  - b. Have you changed how you get your customers?
12. Is there anything you wish you had known before starting your business?
13. What advice would you give to someone starting a business?

## **APPENDIX D: TEAM NAMIBIA INTERVIEW QUESTIONS**

1. What does your organization do?
  - a. How long has this organization existed?
2. How did you get involved in this organization?
3. What current projects are you working on?
  - a. How long have these projects been going on?
4. What resources (funds, people, buildings, technologies) do you need for your projects?
5. What have you found to be the most successful ways to start businesses around Windhoek?
6. What challenges has your organization faced in starting entrepreneurial projects?
7. What advice would you give to someone starting a business?
8. How many people were interested in being a part of your program? Can you give us examples of people you worked with?



## **APPENDIX E: SURVEY QUESTIONS FOR MSR MEMBERS AND WEEKEND MARKETS**

For the following questions, Appendix M contains the items the team presented to Katutura market customers and Appendix N contains the items the team presented to the weekend market customers.

1. Of these items, which do you like?
  - a. What do you like about this item?
  - b. What do you not like about this item?
2. Of these items, which do you not like? Why?







## **APPENDIX F: MSR PRODUCER FOCUS GROUP POST-PROTOTYPING**



### **QUESTIONS**

1. Do you like building these things? Would keep building them?
2. Do you need more training? Could you do it on your own?
3. What do you like about the product designs? What would you change?
4. What would you change about how you built the products?
5. What tools would you like to have?
6. Do you want to sell these prototypes?
7. How much would you sell the products for? Why that price?
8. Do you have any questions for us?





## APPENDIX G: FULL LIST OF INITIAL THIRTY-EIGHT PRODUCT IDEAS

### Products Made from Plastic Bags






Product Name	Image	Product Name	Image
Plarn Bags	 <p>(Plastic Bag Crafts, n.d.)</p>	Soccer Ball	 <p>(larryshort, 2007)</p>
Braided Rugs	 <p>(Merissa, 2013)</p>	Crocheted Sandals	 <p>(Emily, 2006)</p>
Fused Plastic Bag Tote Bags	 <p>(Nataliezdrieu, 2010)</p>	Plastic Bag Beads	 <p>(Simone, 2009)</p>
Woven Pillow	 <p>(Trent, 2008)</p>	Cups	 <p>(Butler, 2011)</p>

<p>Braided Jump Rope</p>	 <p>(Katie, 2012)</p>	<p>Floor Cushions</p>	 <p>(Hipcycle, n.d.)</p>
--------------------------	--	-----------------------	---







### Products Made from Tires

Product Name	Image	Product Name	Image
<p>Flower pot</p>	 <p>(Stefanie, n.d.)</p>	<p>Chair/table made from a tire</p>	 <p>(Sanguino, 2015)</p>
<p>Pet bed</p>	 <p>(Keeping, 2017)</p>	<p>Teeter totter</p>	 <p>(Lauren, 2016)</p>

<p>Pot</p>	 <p>(Eco Empire, 2012)</p>	<p>Tether ball game</p>	 <p>(Parrish, n.d.)</p>
<p>Sandals</p>	 <p>(Elpel, n.d.)</p>	<p>Game board</p>	 <p>(Bored Art, 2016)</p>
<p>Flower holder</p>	 <p>(Architecture Art Design, n.d.)</p>	<p>Swing</p>	 <p>(Quality Tires, n.d.)</p>
<p>Shelves</p>	 <p>(Room Decoration, 2014)</p>	<p>Grill made from tire rim</p>	 <p>(Auto Parts Warehouse, 2016)</p>

<p>Basket</p>	 <p>(Marcos, n.d.)</p>	<p>Children's horse</p>	 <p>(VEIETAS, ANIMADAS ANIMATED VANES, n.d.)</p>
<p>Flower pin</p>	 <p>(UsefulDIY, n.d.)</p>	<p>Shelves</p>	 <p>(Henderson, 2015)</p>
<p>Tire mat</p>	 <p>(Holodok, 2014)</p>		

## Products Made from Pallets

Product Name	Image	Product Name	Image
Coffee table	 <p>(Nanieh, n.d.)</p>	Bed frame	 <p>(Guest, 2016)</p>
Lawn Chairs	 <p>(Lab 11, 2017)</p>	Book Shelf	 <p>(Ramos, 2017)</p>
Table and Chairs	 <p>(Kraftynotkrazy, 2016)</p>	Swings	 <p>(Guest, 2016)</p>

## Products Made from Oil Drums

Product Name	Image	Product Name	Image
Couch	 <p>(Savouré, 2015)</p>	Dresser	 <p>(Home-Dzine, n.d.)</p>
Chair	 <p>(Sarah, 2015)</p>	Grill 2	 <p>(Dancing weapon of mass destruction, 2008)</p>
Grill 1	 <p>(Johnnyblegs, n.d.)</p>		



## APPENDIX H: KAPANA SELLER INTERVIEW NOTES

### Kapana Seller

Interviewers: Erin Dixson & Jennifer Gagner

Translated by Tomas Shilongo

Date: 23 March 2017

1. What is your business?

*{Not asked}*

2. How long have you been selling kapana?

*She started her business in 2002 to support her family because she had a previous job but they didn't pay well.*

3. How did you start? Did anyone help you?

*She started without any help and with her own money.*

4. Why did you decide to start?

- a. Why did you choose to work for yourself?

- b. Why did you choose to sell Kapana?

*It was very hard to start because she had little money, a small pot to make kapana, and it was hard to find customers. Now it's better because customers come because they know her and where she sells.*

5. What was hard about starting or becoming a kapana seller?

*To start the business, she put aside money, then once she had enough she started her business.*

6. Do you make your products, or do you buy them from someone else? Where do you buy the supplies?

*She buys supplies from the Pick n Pay, but makes the fat cakes and kapana herself.*

7. Who do you sell your products to?

*The location is good because it's right across from a depot where a lot of people come in and there's shade from the tree.*

8. How do you get customers?

*{Not asked}*

9. How many other kapana sellers are near here?

*There are only three kapana sellers in the area including herself, but one is in the north right now.*

10. What is different from when you first started your business?

a. Do you sell to different people now?

b. Have you changed your products?

c. Have you changed how you sell your products?

*A lot is different now from when she started the business. The customers are different and have improved, she started small but the number of products she sells has grown.*

11. Is there anything you wish you had known before starting your business?

*There are always mistakes you make when you start a business but you can learn from them. One mistake she made was that she didn't know how to make fat cakes.*

12. What advice would you give to someone starting a business?

*She has advice for people trying to start a business. She would tell people who are trying to start a business that she would give them help and advice for making food and where you can get the supplies.*

## APPENDIX I: TAXI DRIVER INTERVIEW NOTES

### Taxi Driver

Interviewee: Nelson Michael

Interviewers: Travis Norris & Hary Teklegiorgis

Translated by Tomas Shilongo

Date: 27 March 2017

1. What is your business?

*{Not asked}*

2. How long have you been a taxi driver?

*Nelson has been a taxi driver since 2014.*

3. How did you start? Did anyone help you?

*MSR helped him get his license by sending him to driving school.*

4. Why did you decide to start?

- a. Why did you choose to work for yourself?

- b. Why did you choose to be a taxi driver?

*He decided to become a taxi driver because there aren't many available jobs.*

*However, there's a need for taxis.*

5. What was hard about starting or becoming a taxi driver?

*There was nothing hard about starting his business.*

6. How much do you charge for a taxi ride?

*{Not asked}*

7. What do you need to provide your service?

- a. What did you need to do or buy to start your business?

- b. What supplies and tools do you need? Where do you get them?

*He registered his taxi when he started.*

8. Who are your customers?

*He usually drives around Windhoek and Katutura. He also goes to other towns such as Swakopmund.*

9. How do you get customers?

*He finds customers by driving around Windhoek, Katutura, and other towns. Some of his customers have his number so they call him when they need a ride.*

10. How many other taxi drivers are near here?

*There are more than 7,000 taxi drivers in Windhoek.*

11. What is different from when you first started your business?

a. Do you have different customers now?

b. Have you changed how you get your customers?

*Nothing has changed since he started his business in 2014.*

12. Is there anything you wish you had known before starting your business?

*He attended KAYEC for building maintenance and took other courses. So, there is really nothing he wished he had known before starting his business.*

13. What advice would you give to someone starting a business?

*His advice for people starting a business is to work hard as starting a business is not easy. He also recommends that people should pay attention to the information provided to them and attend trainings when available.*

## APPENDIX J: WELDER INTERVIEW NOTES

### Welder

**Interviewee: Lukas Toivo**

**Interviewers: Travis Norris and Jennifer Gagner**

**Date: 1 April 2017**

1. What is your business?

*His business is welding and repair in Havana. "Iyambo Cooling Aircon & Welding".  
Typically works on trailers, and chairs, and refrigerators.*

2. How long have you been a welder?

*He works with three colleagues, and they have been in business for four years.*

3. How did you start? Did anyone help you?

*To start his business, it was very difficult in the beginning. "If you want to achieve, you must struggle first". "You must try your best to start your own business". He found it a problem to work under another person, and wanted to be his own boss.*

4. Why did you decide to start?

- a. Why did you choose to work for yourself?
- b. Why did you choose to become a welder?

*He started his business because it was difficult to go look for a job.*

5. What was hard about starting or becoming a welder?

*It was not very difficult when starting, but it depends on the customer. If they know you, you do well. Customers that come back know you.*

6. How much do you charge for your welding services?

*The cost of what he sells depend on the materials and time it takes. Materials are N\$2 plus an N\$3 electrode plus the electricity determines the price.*

7. What do you need to provide your service?

- a. What did you need to do or buy to start your business?
- b. What supplies and tools do you need? Where do you get them?

*He gets his materials from the store, goes to buy them and comes back.*

8. Who are your customers?

*His customers are typically people he knows, and they spread the word about his business. He also has business cards for people to call him.*

9. How do you get customers?

*{Not asked}*

10. How many other welders are near here?

*There are a few other welders in the area, but they are not a problem. Everyone has his own customers, and they come because they know he does a good job.*

11. What is different from when you first started your business?

a. Do you have different customers now?

b. Have you changed how you get your customers?

*Not much has changed in his business, except the machinery. Machinery for bending is very expensive, and he must take material to another place for bending and bring it back. This requires a deposit from the customer, then finishing the payment at the end. The machine is 8km away, so he takes a taxi. His main tools are a grinder (big and small) and a welding machine. He only has a small welding machine.*

*He started with his own money from working, and bought more tools with his profit. The shop space used to be a colleague's house, but they turned it into a workshop.*

12. Is there anything you wish you had known before starting your business?

*Negotiation is very important. If somebody can't pay upfront, he comes to collect in a month or two. It depends on the person though, he won't do it for a person he doesn't know. He learned that starting a business is difficult if you don't know what you are doing.*

13. What advice would you give to someone starting a business?

*His advice was to follow someone else until you come up with your own idea.*

## APPENDIX K: TEAM NAMIBIA INTERVIEW NOTES

**Team Namibia**

**Interviewee: Faith Arnat**

**Interviewers: Erin Dixson and Hary Teklegiorgis**

**Date: 10 April 2017**

1. What does your organization do?

a. How long has this organization existed?

*Team Namibia is a non-governmental organization formed in 2004. This organization promotes local products and supports local organizations by advertising their products through media and editorials. Local organizations and companies pay Team Namibia to become members, and Team Namibia in turn endorses and promotes their products. Team Namibia aims to increase the number of domestic products Namibians purchase and reduce the number of imported items. Endorsed products display Team Namibia's logo to increase customer interest in the product. To become a Team Namibia member, companies have to meet certain criteria such as number of employees, minimum revenue, and registration with the municipality. Large corporations can meet these criteria easily, but SMEs (Small and Micro Entrepreneurs) and low-income individuals in the informal sector often do not have the resources to meet them.*

2. How did you get involved in this organization?

*{Not asked}*

3. What current projects are you working on?

a. How long have these projects been going on?

*In 2016, Team Namibia started an ongoing project to help SMEs in the informal sector develop their businesses over two years. Entrepreneurs apply to receive training, funding, and support through Team Namibia. They advertised this project by conducting an awareness campaign, posting on Facebook, and*

*approaching the consulars, location leaders in Katutura, to reach community members. 400 SMEs applied, and Team Namibia is currently working towards reading each application to select 100 participants. Team Namibia will then interview the selected applicants to conduct a needs assessment and determine the resource gaps of each applicant. Team Namibia will bring in entrepreneurship experts to mentor and train these individuals in finance and marketing, product development, business expansion, operations management, standards and quality of products, and additional topics based on the specific needs of the SMEs. Team Namibia aims for the individuals in the program to utilize the learning from the trainings in their businesses. They will then visit the entrepreneurs at their work places to monitor their businesses and note improvements that can be made. Team Namibia expects this full procedure of developing the businesses of SMEs in the informal sector to take about two years.*

4. What resources (funds, people, buildings, technologies) do you need for your projects?  
*Team Namibia needs time, space, and people for this project. They need time to provide training, assess the progress of the businesses, and follow through until the businesses develop. They also need a separate space or building to conduct trainings. Team Namibia has enough people for the project and will give the entrepreneurs information on how to find resources. Additionally, they hope to provide laptops for the entrepreneurs.*

5. What have you found to be the most successful ways to start businesses around Windhoek?  
*Team Namibia also recommended advertising strategies in Windhoek and Katutura. Facebook is an effective advertising method in Windhoek and anyone can pay Facebook to advertise their page or post. Ms. Arnat estimated that a 'Facebook Ad' set to reach 7,000 people costs N\$50. It is also a good idea for entrepreneurs to bring products to locations near schools when parents drop off and pick up their children. In Namibia, word-of-mouth is also an important advertising method. Namibians are more compelled*



*to buy a product if their friends or family recommends it than if they see it displayed as an advertisement. As a result, it is important to attend trade fairs and places with large customer bases and proactively approach people to publicize products and hand out business cards.*

6. What challenges has your organization faced in starting entrepreneurial projects?

*Since the project is in its early phases, no significant challenges have occurred.*

7. What advice would you give to someone starting a business?

*{Not asked}*

8. How many people were interested in being a part of your program? Can you give us examples of people you worked with?

*400 SMEs applied.*

## APPENDIX L: ENTREPRENEUR INTERVIEWS AND CODES

### Codes

- Target Market
  - Katutura
  - Windhoek
  - Tourists
- Sales Strategies
- Pricing
- Why they started
- Resources
- Advice
- Mistakes
- Changes
- Challenges

### Kapana Seller

Interviewers: Erin Dixson & Jennifer Gagner

Translated by Tomas Shilongo

Date: 23 March 2017

- She started her business in 2002 in to support her family because she had a previous job but they didn't pay well.
- She started without any help and with her own money.
- To start the business she put aside money, then once she had enough she started her business.
- It was very hard to start because she had little money, a small pot to make kapana, and it was hard to find customers.
- Now it's better because customers come because they know her and where she sells.
- She buys supplies from the Pick n Pay, but makes the fat cakes and kapana herself.

- There are always mistakes you make when you start a business but you can learn from them. One mistake she made was that she didn't know how to make fat cakes.
- She has advice for people trying to start a business.
- She would tell people who are trying to start a business that she would give them help and advice for making food and where you can get the supplies.
- There are only 3 kapana sellers in the area including herself, but one is in the north right now.
- The location is good because it's right across from a depot where a lot of people come in and there's shade from the tree.
- A lot is different now from when she started the business. The customers are different and have improved, she started small but the number of products she sells has grown.

## Taxi Driver

**Interviewee: Nelson Michael**

**Interviewers: Travis Norris & Hary Teklegiorgis**

**Translated by Tomas Shilongo**

**Date: 27 March 2017**

- Nelson has been a taxi driver since 2014.
- MSR helped him get his license by sending him to driving school.
- He decided to become a taxi driver because there aren't many available jobs. However, there's a need for taxis.
- There was nothing hard about starting his business.
- He registered his taxi when he started.
- He usually drives around Windhoek and Katutura. He also goes to other towns such as Swakopmund.
- He finds customers by driving around Windhoek, Katutura, and other towns. Some of his customers have his number so they call him when they need a ride.
- There are more than 7000 taxi drivers in Windhoek.
- Nothing has changed since he started his business in 2014.

- He attended KAYEC for building maintenance and took other courses. So, there is really nothing he wished he had known before starting his business.
- His advice for people starting a business is to work hard as starting a business is not easy. He also recommends that people should pay attention to the information provided to them and attend trainings when available.

## Welder

Interviewee: Lukas Toivo

Interviewers: Travis Norris and Jennifer Gagner

Date: 1 April 2017

- His business is welding and repair in Havana. "Iyambo Cooling Aircon & Welding". Typically trailers, and chairs, and refrigerators. He works with three colleagues, and they have been in business for four years.
- To start his business, it was very difficult in the beginning. "If you want to achieve, you must struggle first". "You must try your best to start your own business". He found it a problem to work under another person, and wanted to be his own boss.
- He started his business because it was difficult to go look for a job.
- It was not very difficult when starting, but it depends on the customer. If they know you, you do well. Customers that come back know you.
- His customers are typically people he knows, and they spread the word about his business. He also has business cards for people to call him.
- The cost of what he sells depend on the materials and time it takes. Materials are N\$2 plus an N\$3 electrode plus the electricity determines the price.
- He gets his materials from the store, and goes to buy them and comes back.
- There are a few other welders in the area, but they are not a problem. Everyone has his own customers, and they come because they know he does a good job.
- Negotiation is very important. If somebody can't pay upfront, he comes to collect in a month or two. It depends on the person though, he won't do it for a person he doesn't know.

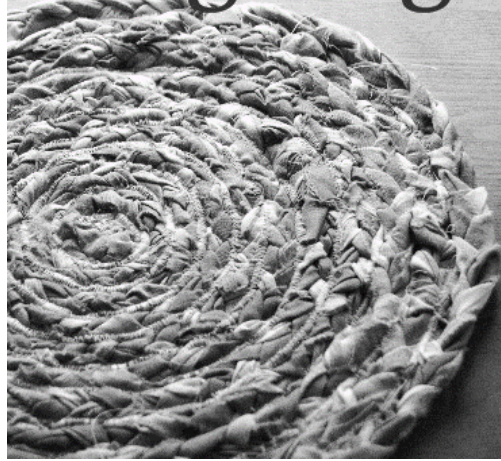
- Not much has changed in his business, except the machinery. Machinery for bending is very expensive, and he must take material to another place for bending and bring it back. This requires a deposit from the customer, then finishing the payment at the end. The machine is 8km away, so he takes a taxi.
- His main tools are a grinder (big and small) and a welding machine. He only has a small welding machine.
- He started with his own money from working, and bought more tools with his profit. The shop space used to be a colleagues house, but they turned it into a workshop.
- He learned that starting a business is difficult if you don't know what you are doing. His advice was to follow someone else until you come up with your own idea.

## APPENDIX M: MSR KATUTURA CUSTOMER SURVEY

1) Bag  Like  Dislike



2) Rug  Like  Dislike



3) Shoes  Like  Dislike



4) Cups  Like  Dislike



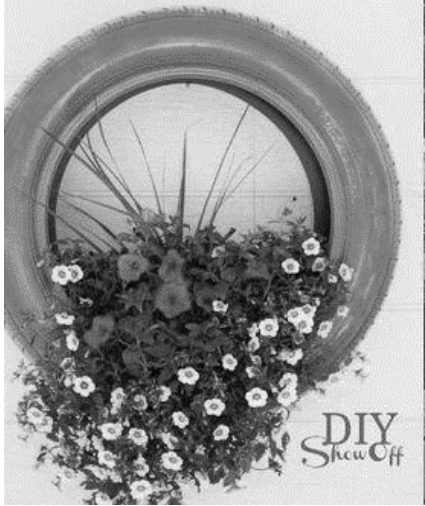
5) Flower Pot  Like  Dislike



6) Braai  Like  Dislike



7) Flower Pot  Like  Dislike



8) Shelves  Like  Dislike



9) Chair  Like  Dislike



10) Table  Like  Dislike



11) Shelves  Like  Dislike



12) Bed Frame  Like  Dislike



13) Drawers  Like  Dislike



14) Braai  Like  Dislike





## APPENDIX N: WEEKEND MARKET CUSTOMER SURVEY

1) Mobile Braai



2) Wooden Pallet Table



3) Plastic Cups



4) Tire Chair



5) Plastic Bag Beads



6) Tote Bags



7) Floor Cushion



8) Pet Bed



9) Flower Pot



10) Children's Horse



11) Oil Drum Chair



## APPENDIX O: ORIGINAL PALLET TABLE DO-IT-YOURSELF INSTRUCTIONS

### Instructions for pallet table (Bowes-Pope, 2012):

With all the wood bought we had the fun task of sanding all of the boards. Alex took charge and powered through this step. A few of the boards were a little damp from the lumber yard (I blame this on the Seattle rain). We had to resand these boards when they dried out.



After the sanding was done we laid out the boards for the table skirt. I held the corner together, using a square, while Alex drilled two pilot holes in each joint. We then drilled a 1/8" counter hole with a depth of about 1/8", just enough for the head of the screw is recessed into the wood.



Wood glue was then applied to overlapping part of each board.



The boards were then held together again while they were screwed together through the pilot holes using 2" screws.



We then used a pencil to mark out equal spacing on the long side of the skirt for the six cross beams. Pilot holes and counter bores were drilled while using a square on both ends. Wood glue was applied and 2" screws were drilled in completing the frame.



Next we then laid out the table top boards on the frame. Using a tape measure we centered the frame under the boards. Then we drilled a pilot and counter bored holes at the both ends going through the table and into the skirt. We then used 2" screws to attach the frame to the table.



We then flipped the table over so the top was facing the floor. Using 1 1/4" screws we attached the center boards to the frame through the cross beams.





After all the boards were screwed in we realized that the ends were a little uneven so we added another 1x4 board to each end.



The table was then moved onto two sawhorses and a leg board was placed in each corner. We used clamps to hold the legs in place while drilling four pilot holes and counter bores through the skirt and into two sides of the leg, for a total of 8 screws per leg. We applied glue and drilled 2" screws in all the holes.



Wood filler was then put in all the counter bored holes. After the wood filler dried we sanded down those areas until they were

smooth. We finished the construction of the table by sanding the table top to smooth out any spots we had missed before or created during the construction.

### **Staining and Finishing:**

#### **Materials needed:**

1. 2 Quarts Benite wood conditioner
2. 1 Quart #41 Walnut Wood Stain
3. 1 Quart Satinthane Polyurethane
4. 3M Final Stripping Pads
5. 110 grit sandpaper
6. Sponge brushes
7. Rags/old t-shirts

#### **Cost of Materials:**

1. US\$33.50 from Daly's
2. US\$10.45 from Daly's
3. US\$17.80 from Daly's
4. US\$2.41 from Daly's
5. already accounted for in construction
6. About US\$3 (already had)
7. Free
8. about US\$20 in test colors
9. Free

#### **Tools needed:**

Paintbrush

#### **Instructions:**

We started off by sampling a couple of different stain colors. We left them on for different lengths of time and put more than one coat on some. We even layered the different colors. In the end we decided that we liked the single coat of Walnut stain left on for 5 minutes.

We got all of our great instructions of how to stain our table from Daly's in Seattle. The first step was to sand the table, not too smooth because the wood conditioner needs "pores" to sink into.

Using a sponge brush we applied Benite wood conditioner to all the surfaces of the table, top and bottom. We pooled the conditioner on. After the whole table was coated, we wiped off all the surfaces with a

rag (very little came off). Wood conditioner helps harden the wood. We were told to use conditioner that requires a 24 hour dry time. The one we got for home depot wanted us to put the stain on within 1 hour of putting the conditioner on. The people at Daly's said this will reduce the strength of the wood.

Next came the wood stain, we applied a thick coat of it on using a sponge brush. After five minutes we wiped it off using a rag. We let the wood stain dry for 24 hours before moving on.



The last and most time consuming step was to apply coats of Satinthane Polyurethane. This is what give the table a smooth texture and also protects the surface. We did this by applying a heavy coat of polyurethane on all the table surfaces (legs, skirt, & top) but not enough so the liquid pooled. We ended up applying two coats to the whole table and an extra coat on the top. In

between each coat we sanded the surfaces using 3M Final Stripping Pads. Because of the cold weather we were told to wait 24 hours between coats (in warmer weather this can drop down to 12 hours).



Yay! The table is done! Ours got done during the snow storm in Seattle, so we had to wait for a break in the snow to carry it up from the garage and through the front door. We love the table! The only thing we might change is the overall height. After we put the pads on the legs to protect the hardwood floor it is about 1 inch too tall. This is an easy fix for the future.

## APPENDIX P: ORIGINAL TIRE CHAIR DO-IT-YOURSELF INSTRUCTIONS

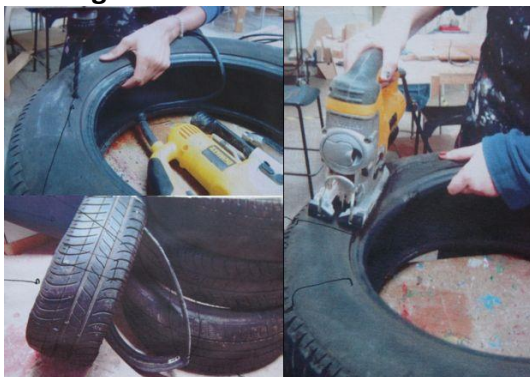
### Instructions for tire chair (DancingPope, n.d.):

Turn a couple of old tyre's in to an industrial style chair for both indoor and outdoor seating. The Orange base and feet are optional. Don't forget to stack your other junker tyre's up underneath the string chair to make a seating height customized to you. Everything I used in this project was upcycled and reused (except for the string), that includes loose and old screws, nuts, bolts, off cut wood pieces etc.

### Materials you'll need:

- 2 tyre's
- Scrap wood
- Screws, nuts, washers and bolts
- Lots and lots of string
- Wooden Dowel
- Jigsaw
- Stanley Knife
- Wood drill bit
- Hammer and chisel (optional for the base)
- Metal drill bit (optional for the base)
- Hand-held drill

### Step 1: Step One: Cutting Out Your Tyre Backing



Using a larger drill bit, pierce a hole through the soft membrane around the outer edge

of the tyre, providing a hole for your jigsaw to go through.

Carefully guide the jigsaw around the edge of the tyre until you're left with nothing but the tread pattern and set this aside for later.

### Step 2: Step Two: Making Your Spirograph Seat



Using a Stanley knife make periodic slices all around the rim of your second tyre where it's at its softest, make the slits about one inch in length around the circle circumference and make sure you cut all the way through the fabric and rubber layer to the other side, leaving one inch gaps between each hole. (You can use a piece of chalk to mark it out before you cut).

You need to create some sort of 'needle' to help you guide your thread through each hole, so I used a piece of strong metal with a hole in it to create a makeshift needle. Then thread your string/yarn on to the 'needle' and start threading through the holes in random sequence, it's probably easiest to not go through the center just yet and to stick to the outsides until you've built up enough layers, then work your way towards the middle the more you build up, pulling the string as taut as you can. Bear in mind this takes a lot of time to do and requires a lot of strength. (I ended up with really callous palms for a while). It'll be easier for you to use four meter lengths of string at a time and then when you run out

just tie the new string on to the end of the other one.

Just keep going until you feel it's strong enough to hold.

### **Step 3: Step Three: Making the Base Frame (optional)**



Cut two pieces of wood to the same length (about 20cms longer than the diameter of the tyre to allow for your legs to be attached later).

Then mark a line in the middle of the wood and then draw a line 3cm away from this mark on either sides so that you end up with a 6cm long square in the center of the wood. Using a chisel and hammer carefully chip out this square only half way in to the thickness of the wood. You can use sandpaper to smooth it up afterwards. Repeat this process for the other piece of wood too so that you now have a lap crossing joint.

### **Step 4: Step Four: Adding 'feet' to Your Base Frame (optional)**



You can use whatever you want to create the feet for your base frame but I happened to have five disused emergency stop button brake cover's from old workshop machinery. (I have no idea what they're called.)

Using a metal drill-bit I put two guiding holes through four of the 'feet', then using the correct screw bit for my screws, drilled the wood against the metal foot whilst upside down, making sure that the screw teeth grab the wood securely. On the first piece of wood you drill from upside down with the lap joint hole downwards, and on the second piece of wood you drill from upside down with the lap joint hold upwards. (This is to make sure you put the feet the right way up on each piece of wood so that when they're crossed they're not wrong side up)

### **Step 5: Step Five: Attaching Your Tyre Seat to the Tyre Backing**



Grab a wide piece of wood, just long enough to span both tyre's, then from the inside the string made tyre, screw this piece of wood upright. Place the tyre you cut apart in the first step on top and 'pinch' it in the middle, pushing it back against the wooden board you just drilled to the string made tyre and then screwing it carefully into place so that you've got two floppy 'arms' attached on top of the string tyre. Drill periodic holes along the length of this floppy tyre going through both layers then find correct sized nuts, bolts and washers and secure through these holes to keep the both sides of the tyre material together.



### Step 6: Step Six: Stabilize Your Chair Arms



To secure the ends of your chair arms in to place, cut two lengths of wood to size (you could even use dowel to give an even finish) and put it through the loops created in the arms, then from underneath the string tyre use another piece of wood from here to

create a sandwiching between the rubber tyre for affixing.

Pull the piece of dowel out as far you can and then screw it in to place from underneath. Do this for both sides of the arms.

Now that your chair arms are both roughly in place, screw the tyre tread against the dowel piece.

## APPENDIX Q: ORIGINAL PLASTIC BAG BEADS DO-IT-YOURSELF

### INSTRUCTIONS

#### Instructions for plastic bag beads (Stepping Thru Crazy, 2010):

I've really been getting into making recycled crafts lately... and when I saw this, I knew I had to try it. Here's how I made myself a plastic-bag bead bracelet:

I used:

- a plastic bag
- Mod Podge (or any other glue)
- tape
- plastic straw
- nail polish
- old t-shirt

Start with a plastic bag. Cut the handles and the bottom off (save these and toss them into one of those plastic recycling bins at the grocery store).



Flatten the bag out, and cut it in half so that you've got two big "sheets" of plastic. Put one aside, and cut the other in half.



Again, put one half aside. Now smear some Mod Podge right in the middle of the sheet.



Fold the bottom up and smooth it out. It doesn't have to be perfect.



Add more glue if you need to and fold the top edge down to the bottom edge.



Now fold it in half 'hot dog' style, and glue it in place. Now you've got one long strip. Cut the strip in half (I guess now hamburger style), put aside one strip half, and grab a straw and some tape. Place the straw at the bottom, and use a little tape to attach it to the plastic.



Let the glue dry for at least a few hours. I whipped up a bag's worth of beads, stuck the straws in a jar of sea glass (which I have sitting around for another project), and left them overnight.

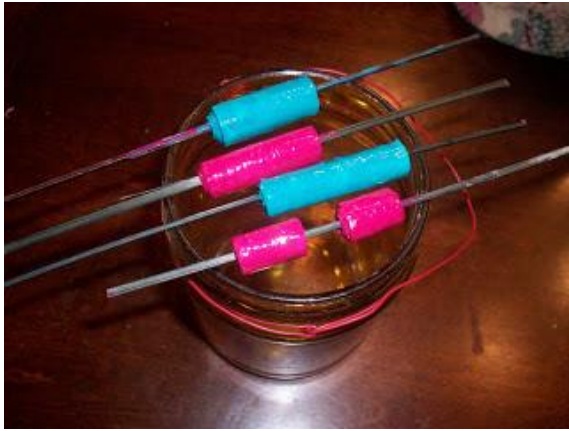
When they're dry, snip the straw off where it meets the plastic. Here's the base of your bead. You can leave it as it is, which can be pretty cool with letters and color showing through... but I wanted some color and sparkle. Considering I have a bag full of nail polish that I hardly ever use...



Smear some more Mod Podge on the plastic, and roll it up on the straw as tightly as you can. Then slap on a good coat of glue. Sometimes you need a little tape on the end of the plastic, if the glue doesn't hold it down.



Obviously you can use whatever colors you like. I chose a cute robin's egg blue, bright pink, black, and a shimmery- clear color. I stuck a bead on a thin wood stick to paint. Paint it your base color- you'll need two or three coats. Let the polish dry between each coat.



When the last coat was dry, I used a toothpick to paint a swirly-dotted design in black.



I also brushed a coat of shimmery polish on top, but forgot to take a picture. Oooops.... Once the beads are all painted and dried, all you need is a way to wear them. I cut a strip from an old t-shirt that was a little bigger than my wrist (big enough to wrap around and be able to tie a knot). String the beads onto the t-shirt strip.

## **APPENDIX R: SUMMARIZED DO-IT-YOURSELF INSTRUCTIONS FOR PROTOTYPING**

### **Instructions for pallet table:**

1. Take apart pallets into individual boards
2. Sand each board
3. Make table skirt
4. Attach cross beams to table skirt
5. Attach tabletop boards to the table frame (skirt + cross beams)
6. Attach a leg board in each corner
7. Sand any rough spots
8. Use a sponge brush to apply stain (if wanted)
9. Apply a heavy coat of polyurethane (possibly multiple, but wait a day before applying the next coat)

### **Instructions for tire chair:**

1. Cut holes in the face of the tire that are evenly spaced
2. Tie a knot at the end of the string and thread it through one of the holes from the inside of the tire
3. Thread the string through each of the consecutive holes, going through the top of the tire each time
4. Once you return to the first hole, thread the string around the loop created in the string between the first and second holes. Create a “hitch” by then threading the string over the loose string. Repeat this until the center of the tire is reached, pulling tighter as the threading continues. Once the end is reached, tie a knot in the final place where the last loop would be
5. Attach legs to the tire chair
6. Attach a back to the tire chair

**Instructions for the plastic bag beads:**

1. Cut out a triangular shape that is about 4 inches long and 1/2 inch wide at the bottom.  
The wider the triangle, the longer the plastic bag bead and the longer the triangle, the fatter the plastic bag bead
2. With a toothpick, apply a thin layer of glue to one side of the triangle. Leave a small strip free of glue at the base of the triangle. Place a clean toothpick at the base and roll up the triangle around the toothpick so it shapes an oval plastic bag bead. Jiggle the toothpick a little to make sure that it doesn't stick to the plastic bag bead
3. Leave the toothpick in the plastic bag bead and stick it into something to dry overnight
4. Remove plastic bag bead from toothpick

## APPENDIX S: PRODUCTION INSTRUCTIONS FOR THE PALLET TABLE

### Materials Needed

- Two pallets
- 80 grit sandpaper
- 50mm nails
- 40mm nails
- Wood glue
- Wood seal/polyurethane



### Tools Needed

- Pen
- Hammer
- Crowbar
- Handsaw
- Square
- Pencil
- Measuring tape
- Box knife
- Large paintbrush

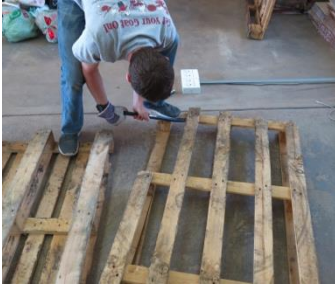
### Protective Equipment

- Thick gloves
- Eye goggles

### Time Needed

One adult making one table will take about ten hours and fifteen minutes

## Instructions



1. Take apart the two pallets using a hammer and crowbar.



2. Remove all nails from the boards with a hammer.



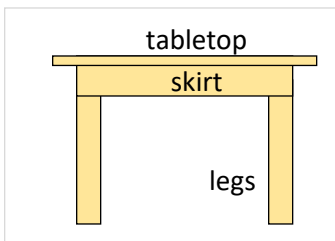
3. Sand all of the boards using sandpaper.



4. Lay out the boards that will be used as the tabletop.



5. Cut any uneven boards to the correct size using a handsaw.



6. Choose boards for the legs, cross bar, and skirt of the table. Cut these to the correct size using a handsaw based on the size of the tabletop. The skirt should be about 30 mm from the edge of the table.





7. Check the fit of the skirt and crossbar. Cut or replace boards that are wrong.



8. Attach the legs to the long boards of the skirt with glue and three 40mm nails. Use the square to make sure that the legs are straight. Leave the wood glue to dry.



9. Choose which sides of the tabletop boards will face up and place all the boards on the ground facing up. Mark the center of each board.



10. Place the cross bar on the ground next to the table top and put some wood glue in the center of the cross bar. Take the middle board of the tabletop and center it on the cross bar based on the mark made in step 9. Use two 50mm nails to attach the board to the cross bar.



11. Glue and nail the remaining tabletop boards. Use two 50mm nails to attach each board to the cross bar. Leave the wood glue to dry.



12. Attach the short boards of the skirt to the long boards using wood glue and four 50mm nails. Place two nails through the long side into the short side, and two nails through the short side into the legs. Leave the glue to dry.



13. Once all of the glue is dry, place the completed tabletop on top of the skirt. Measure the tabletop to center it.



14. Using 50mm nails, nail the table top to the short boards of the skirt.



15. Turn the table on its side and nail the cross bar into the skirt using three 50mm nails in each side of the skirt.



16. Test how sturdy the table is and add more nails where needed.



17. (Optional) Add boards between the legs of the table. Use two 50mm nails on both sides.



18. Using a knife, shave away the uneven parts of the tabletop.



19. Sand the entire table, including the legs, until smooth.

20. Wipe down the table with a damp cloth to remove excess sawdust.



21. Cover a 1m area in newspaper. Place the table on the newspaper. Add one thick coat of wood seal/polyurethane using a paintbrush. Leave to dry overnight.

## APPENDIX T: PRODUCTION INSTRUCTIONS FOR THE TIRE CHAIR

### Materials Needed

- One tire
- Spool of thick string
- One pallet
- 40mm screws
- 40mm nails
- 80 grit sandpaper
- Wood seal/polyurethane
- Paint (if desired)

### Tools Needed

- Pen
- Auger
- Measuring tape
- Screwdriver
- Wire cutters
- Wire hanger
- Pliers
- Box knife
- Hand saw
- Paintbrush
- Level
- Hammer

### Protective Equipment

- Gloves



- Safety glasses

### Time Needed

One adult making one chair will take about 16 hours and 30 minutes.

### Instructions



1. Using soap and a damp cloth, thoroughly wash the tire.  
(Optional) Paint the tire with an oil-based paint.



2. Using a pen, make marks that every 70 mm of the tire, about 50 mm from the inner rim.



3. Use the auger to puncture holes through the marks from step two. Widen the holes by pushing a screwdriver through the holes.



4. Using the wire cutters, make a 60 mm needle from a wire hanger. The eye of the needle should be big enough for the string, but small enough to fit through the holes in the tire.



5. Pull out 7m of string. Thread the string through the needle and thread the needle down through the first hole. Pull the needle through using the pliers. Push the needle up through the second hole then down through the third hole. Leave 30 mm of loose string between each top hole. Repeat all the way around the tire.



6. Take the end of the string and thread it over then under the loop that was created in step five.

7. Thread the loop under the string that was just used to go over and under the loop in step six.



8. Repeat steps six and seven all the way around the tire, until the center of the tire is reached. If the string runs out, tie more on to the end. Once complete, tie the string off.



9. Flip the tire over so the woven seat faces the floor. Using a box knife cut the bottom face of the tire off between seventy-five and one hundred millimeters from the inner rim. This piece will be used as the back of the chair.



10. Clean up the edges of the cut piece and the inner rim using the box knife.



11. Gather pallet wood for the legs. Cut two short legs and two long legs using a handsaw. The long legs should be tall enough to be able to attach the back that was cut in step nine.



12. Sand the legs.

13. Use a paintbrush to coat the legs in wood sealant, polyurethane, or paint. Let dry.



14. Use a pen to mark the bottom of the tire where each leg will go. They should be evenly spaced around the tire. Make the measurements based on the width and thickness of the wood used for the legs.



15. Cut holes for the legs using a box knife.



16. Line up where the long legs will come through the top of the tire and make a mark on the top for both legs based on the size of the wood.

17. Cut the holes using a box knife.



18. Once all of the holes are cut, make sure all the legs fit and the chair will stand evenly.



19. Using the screwdriver and screws, screw the tire onto the short legs. Put four screws in each of the short legs and make sure all of the legs are even by using a level.



20. Attach the long legs the same way in step twenty. Make sure the bottoms of the short legs are level with the bottoms of the long legs.



21. Take the back that was cut in step ten. Puncture holes the same way as in steps two and three and weave as in steps six through nine. About three meters of string will be needed.



22. Attach the back of the chair to the long legs using a hammer and 40mm nails. Measure the location by having someone sit in the chair and mark where the back lines up. Use three nails in each side.



23. Measure the diagonal distance between the legs and cut and sand two pieces of wood to that size. These will be used as the braces for the chair.



24. Connect the first piece diagonally using a hammer and two 40mm nails on either side. Then connect the second piece diagonally using a hammer and two 40mm nails on either side.
25. Wipe down the chair using a damp cloth.

## APPENDIX U: MSR MEMBER FOCUS GROUP NOTES

**Facilitator:** Travis Norris

**Assistant Facilitator:** Hary Teklegiorgis

**Secretaries:** Erin Dixson and Jenn Gagner

**Date and Time:** 17 March 2017, 10h00

**Number of Attendees:** 36 ---- 32 Men, 4 Women

6 also attended the SME training

Approximately two-thirds of the attendees were under thirty years old

Approximately one-third of the attendees were over thirty years old

Table U1. MSR Members Focus Group Feedback Tallies

Product	Like	Dislike	No Answer	Inconclusive
Tire rim braai	32	2	2	0
Pallet table	32	1	2	1
Cups	30	3	2	1
Tire chair	30	5	1	0
Drum drawers	30	4	2	0
Pallet shelves	29	3	4	0
Mobile braai	29	2	3	2
Bed frame	26	5	5	0
Tote bag	24	9	2	1
Tire shelves	22	10	4	0
Flower holder	20	13	2	1
Flower pot	18	12	5	1
Sandals	17	15	3	1
Rug	7	18	10	1

n = 36

Table U2. Comments from MSR Members

<b>Product</b>	<b>+ or –</b>	<b>Comment</b>
Oil drum drawers	+	New design; Strong and safe
Mobile braai	+	Easy to pull; likes the wheels
Pallet bedframe	–	Prone to insects
	+	Made from cheap materials
Tire chair	+	Last for a long time; Cheap
	+	Simple and comfortable
Pallet table	+	In need of a table
Flower pot	+	Beautiful; Easy to handle
Tire shelves	+	Easy to reach and inexpensive
	–	Do not know where to put them
Plastic bag sandals	–	Do not know when to wear them
	–	Something could poke through
	+	“So good you can attract more customers”
	+	Likes the “Jesus Sandal” design; Traditional Africa
Tire rim braai	+	Very strong

## APPENDIX V: MSR PRODUCER FOCUS GROUP POST-PROTOTYPING NOTES

**Facilitator: Travis Norris**

**Secretary: Jenn Gagner**

**Date: 6 April 2017**

**Number of Attendees: Five**

1. Do you like building these things? Would keep building them?

*The producers liked building the products, and will keep building them.*

2. Do you need more training? Could you do it on your own?

*They need more materials, but do not need more training to make the products. They can do it alone.*

3. What do you like about the product designs? What would you change?

*The product designs are good, but the tools are not the specific tools they need. If they had more materials, they could change the designs. They could use rope or wire for the tire chair.*

4. What would you change about how you built the products?

*The steps are good, but they would need to try making both to know for sure. They would not change any steps for either product.*

5. What tools would you like to have?

*The tools they need are a planer or sander to make the wood smooth, a bore machine (drill) to make the holes, better bolts, and wood filler to conceal the nail holes. If they had a welding machine they could build the braai from the product pictures.*

6. Do you want to sell these prototypes?

*Yes, we sell them.*

7. How much would you sell the products for? Why that price?

*Start with the customer. The table would sell for N\$200, because people have sold those in the past, but the chair is a new design and would sell for N\$250.*

8. Do you have any questions for us?

*Are we going to get a certificate for this?*

- a. We will arrange it with MSR. We will speak to Crystal, but it is not guaranteed.

## **APPENDIX W: CUSTOMER FEEDBACK FROM WEEKEND MARKETS**

### **The Boeremark Farmer's Market**

- Customer 1 (female): The tire chair does not suit the aesthetic of her home.
- Customer 2 (male): His son is making furniture out of pallet wood and found that it breaks very easily so you have to be careful when deconstructing the pallets.
- Customer 3 (male): Came to buy food and this market is a community that has the same stalls every time.
- Customers 4 and 5 (males): The braai and table are useful and look nice. They do not need the pet bed because they don't have pets. They do not need the beads or tote because they are men. The cushion does not look comfortable.
- Customer 6 (male): The table looks nice. The braai is too big and too much to maintain. The plastic cups do not look nice. He did not like the tire chair or the oil drum chair because he did not like the materials.
- Customer 7 (female): An older woman would not wear the plastic bag beads.
- Customers 8 and 9 (females): The plastic bag beads and tote look nice. The floor cushion looks comfortable. The pet bed looks nice. The table is practical and nice. The cups are practical.

### **The Green/Bio Market**

- Customer 10 (male): There are bracelets made of safety pins.
- Customers 11, 12, and 13 (2 females, 1 male): Like the concept of the pallet table, pet bed, and children's horse.
- Customers 14 and 15 (females): Everyone has a braai. Furniture is difficult to find, so the pallet table is good. The floor cushions would be good for students, but the adults do not want to sit on the floor. Children's horse is cute. They did not like things made of plastic because they were eco-friendly and did not like anything plastic. The Green/Bio Market is eco-friendly which is why they were there.

- Customers 16 and 17 (females): The pallet and braai were good looking.
- Customer 18 (male): The braai is useful and long-lasting.
- Customer 19 (female): The tire chair looks nice and is cool because it is recycled. Plastic bag beads are cute. She did not like the plastic bag cups.

### **The Tuuthikeni Flea Market**

- Customers 20, 21, and 22 (2 females, 1 female child): The tote, pet bed, pallet table and flower pot are useful and interesting. The child liked the oil drum chair, women thought it was ugly. The child liked the floor cushions and tire chair
- Customer 23 (female): She did not have pets so they did not want the pet bed. She liked the table because furniture is hard to find, the 'hippy' nature of the tire chair, and how the braai was small.

### **The Post Street Mall**

- Customer 24 (male): He liked the pet bed and braai the most, but enjoyed a lot of the items. He did not like the children's horse for the city, but maybe would for a rural area. He did not like the plastic bag beads because they were not his taste.
- Customer 25 (female): She liked the tire chair because it looked nice and comfortable, the flower pot to use for a garden, and thought the rest of the items were cool.
- Customers 26 and 27 (male and female): They both thought the oil drum chair was comfy and durable, that the plastic bag beads looked nice, and they did not dislike any of the products.

## APPENDIX X: SALES STRATEGY

### Recommended Prices

#### Equation:

$$(\text{Materials Cost}) + (\text{Hours Worked}) \times 12.5 = (\text{Product Price})$$

#### Pallet Table:

Materials Cost	N\$102.96
Hours Worked	10.25

**Sell For N\$231.08**

#### Tire Chair:

Materials Cost	\$67.75
Hours Worked	16.5

**Sell For N\$274**

### Transportation

We recommend using one of these methods for transportation, depending on the options you have access too.

- Ask a customer to pay for transportation **(N\$0)**
- Take small items with you in a taxi **(N\$10)**
- Ask to use the back seat of a taxi when transporting finished products and large materials **(N\$30-40)**
- Call Tomas or Hilya to arrange a driver **(N\$100-N\$200)**
- Work with colleagues to manufacture enough products to fill a truck and sell products in a similar location **(N\$100-N\$200)**
- If you have a cart, use it to transport materials and products over short distances **(N\$0)**



## Materials

Below are some methods of obtaining materials to make each of the products. We recommend that you use your proceeds from selling to buy more supplies.

- Ask friends if they know of places that sell pallets or tires
- Tire repair shops may give tires away for free
- Pallets are more difficult to find, but shipping companies may have some for sale
- Additional supplies can be found at the old MSR office or at a local hardware store

## Customers

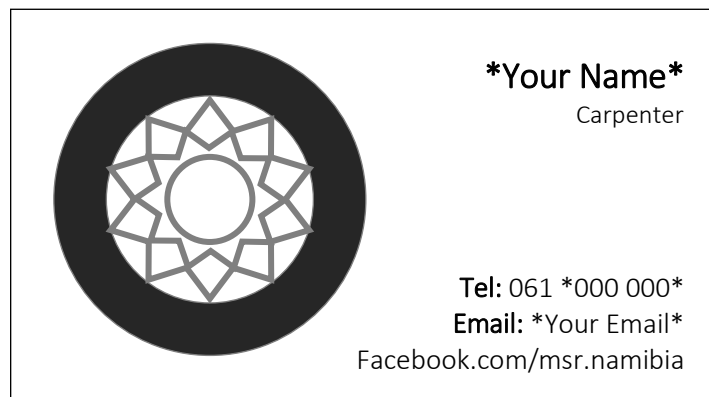
Selling to neighbors and community members at first is easiest. Many entrepreneurs start this way. Expanding to Windhoek will allow you to sell your products for more money. We recommend reading newspapers, "WhatsOn Namibia", and searching Google to find what markets are available. Some specific weekend markets are:

- **Boeremark Farmer's Market:** First Saturday of every month at the Windhoek Fair Grounds
- **Green/Bio Market:** Every Saturday at Stephanus Church in Klein Windhoek

## Advertising Methods

### 1) Business Cards

Give business cards to people so they can contact you to buy products, or give them to others. Here is an example:



### 2) Social Media

Use Facebook to reach customers. Post photos and information on your own profile, or contact Tomas to post on the MSR Facebook page.

### **3) Word-of-Mouth**

Talk to others about your furniture. Tell your customers to tell their friends. Speak to MSR members at the community meeting.

### **4) Busy Locations**

Bring your products to busy locations to attract more customers.

Some ideas include:

- In front of the MSR office
- In front of schools during pickup or drop-off times
- Near existing markets and other vendors