



Botswana International University of Science and Technology

Department of Business Management and Entrepreneurship

School of Business and Professional Development.

Introduction to Small Business Management and Accounting

GEME 201

ASSIGNMENT 1

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COURSE: Beng Mechanical and Energy Engineering

TABLE OF CONTENTS

TABLE OF CONTENTS	2
INTRODUCTION	3
HOW DFM PRECISION ENGINEERING SOLVES CHALLENGES FACED BY BOTSWANA.	3
DFMPE's CONTRIBUTION TOWARDS BOTSWANA'S CURRENT ECONOMIC SITUATION	4
DFMPE's STRATEGIC BUSINESS LOCATION	4
MARKET RESEARCH (SURVEY RESPONSES)	5
PRIMARY DATA	5
SECONDARY DATA	6
SOURCE OF FUNDING and INTEREST RATES	7
ANTICIPATED STARTUP COSTS & ASSETS	7
HOW ASSETS ARE VALUED	9
	9
REVENUE PROJECTIONS	10
NET PROFIT & RETURN ON INVESTMENT (ROI)	11
NET PRESENT VALUE (NPV)	11
	11
DISCUSSION & CONCLUSION	12
REFERENCES	12

INTRODUCTION

DFM Precision Engineering (DFMPE) is a specialized manufacturing company that specializes in high-precision reverse engineering, additive engineering, CNC machining and PCB printing.

The primary service is to provide rapid production of critical spare parts, custom tooling and low volume production components for the mining, energy, automotive, agricultural sectors in Botswana and the SADC region. The secondary service is to provide PCB printing for the computer, telecommunications industry and regular entities. By offering a local, high-quality, and fast PCB delivery network, DFM mitigates logistical and quality control challenges associated with international sourcing, thereby enhancing regional technological resilience and supporting local enterprise development.

HOW DFM PRECISION ENGINEERING SOLVES CHALLENGES FACED BY BOTSWANA.

Botswana faces persistent challenges in providing reliable power this directly affects industrial output due to power outages and loadshedding. This instability is sometimes due to plant and critical machine breakdowns. DFM Precision Engineering can manufacture critical replacement parts for these generation systems, ensuring faster maintenance and improved grid reliability.

The North South Carrier (NSC) a pipeline and water transfer system that transports water from up-north Botswana down to the south consists of dams, supervisory control, data acquisition systems, electronics and sensors. DFMPE could rapidly reverse engineer and manufacture broken out parts using CNC machining thus reducing downtime which in turn provides a consistent industrial output. The NSC also uses electrical control systems and DFMPE provides PCB printing (printing of circuit boards for monitoring equipment).

This hardware could be produced and repaired locally instead of relying on slow imports. By localizing production of low volume but critical components DFMPE reduces the dependence Botswana has on imports.

DFMPE will also be able to support small to medium enterprises, workshops and schools allowing them to get access to prototype manufacturing. DFMPE can offer rapid and small batch production services allowing enterprises to develop new products

without the heavy cost of imports. This stimulates entrepreneurship in Botswana which has been a challenge for the country and helps achieve pillar 1 of vision 2036 which is to enhance national productivity and competitiveness.

DFMPE will be in Gaborone – this makes recycling achievable which supports sustainable industrial practices aligned with Botswana's green growth objectives

DFMPE's CONTRIBUTION TOWARDS BOTSWANA'S CURRENT ECONOMIC SITUATION

Providing a faster and local alternative to airfreighting replacements from overseas, often resulting in weeks or months of waiting. DFM provides local, rapid turnaround for repairs and replacements and helps support Botswana's import substitution policy which in turn helps The Bank of Botswana to retain capital by stabilizing the pula by using majority of the currency on essential imports.

DFMPE will also provide direct and indirect employment opportunities for Botswana's citizens.

DFMPE's STRATEGIC BUSINESS LOCATION

DFMPE will be located near the Botswana Innovation Hub Park (BIH)/Complex in Gaborone, along the A1 highway which provides:


- Easy logistics access to the northern and southern parts of the country, closer to A1 by 3km.
- Proximity to research facilities and startups for collaboration. (University of Botswana by 8km, BIH Research Park and Startups breed by BIH)
- Great access to electricity and water needed for CNC and PCB operations is also great for the employees too.

MARKET RESEARCH (SURVEY RESPONSES)

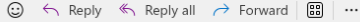
To validate the feasibility of this business I used two methods of data collection, primary and secondary data collection. For primary data collection I used surveys, and this included emailing large utilities and corporations (Botswana Power Corporation, Water Utilities Corporation, Mascom...). Unfortunately, there were no responses from those organizations.

PRIMARY DATA

Request for Input: Local Spare Parts &PCB Manufacturing Survey



OARABILE KOORE
To: fMotswaledi@wuc.bw



Thu 10/2/2025 10:57 AM

Dear Ms. Motswaledi

I was provided with this contact for research purposes by customer services. My name is Oarabile Koore, and I am a student at BIUST, currently enrolled in Beng Mechanical and Energy Engineering and doing *Introduction to Small Business Management and Accounting(GEME 201)*.

As part of my assignment, I am conducting a feasibility study to explore whether a local business could provide spare parts and PCB printing services to industries in Botswana, with the goal of reducing costs, delays, and supply risks.

WUC's experience is especially relevant to my research. I would greatly appreciate your input. You can either:

- Reply directly to this email with your responses to the questions below or
- Complete the survey online at this link: [Microsoft Survey Form](#)

Questions:

1. What types of spare parts or components does your company most frequently require?
2. On average, how long does it take to receive imported parts/components?
3. What challenges do you face with imported parts (e.g., delays, high costs, quality issues, availability)?
4. If a local company could manufacture spare parts or PCBs on-demand, how useful would that be to your business?
5. Would you be interested in exploring partnerships with a local manufacturer in the future?

Your input will remain confidential and will be used only for academic purposes in my assignment.

Thank you very much for your time and valuable insights.

Sincerely,
Oarabile O. Koore

Reply

Forward

Sample Email Survey

SECONDARY DATA

According to the International Merchandise Trade Statistics (IMTS) monthly digest (June 2025) report by Zibo Albert at Statistics Botswana the following categories relevant to DFMPE:

Category	June 2025 Value	Annual Projection	Market Opportunity
Machinery and Electrical Equipment	P1,064.2 million	P12.77 billion	Spare parts
Metals and Metal products	P376.4 million	P4.52 billion	Parts Fabrication
Vehicles and Transport equipment	P562.9 million	P6.75 billion	Custom parts

Source: Statistics Botswana (IMTS Monthly Digest – June 2025) Table 2.1 and Chart 2.1

Most of these imports are from South Africa, China and the EU at 66%, 6.8% and 5.6% respectively according to Table 3.1A of the IMTS Digest.

Secondary data confirms strong market potential for DFM Precision Engineering. Botswana imports billions of pula worth of machinery, electrical equipment, and metal products each year.

Local production of spare parts, prototypes, and PCBs could substitute imports, reducing downtime in critical industries in which DFMPE could fill this spot.

SOURCE OF FUNDING and INTEREST RATES

DFMPE can source funds from the following;

- Citizen Entrepreneurial Development Agency (CEDA) a loan of P 450 000 at an interest rate of 4.25%
- ABSA loan of P200 000 with a 5% interest rate.
- Capital from me of P 80 000

In total I need P 730 000 capital.

ANTICIPATED STARTUP COSTS & ASSETS

FIXED ASSETS	COST
CNC Milling Machine	P 282 520
Industrial 3D Printer	P 46 646
PCB Equipment	P 35 000
Computers and Phone Lines	P 21 000
Furniture	P 12 000
Safety Equipment	P 15 000
Total Assets Cost	P 412 166

MONTHLY EXPENSES	COST
Utilities (Electricity and Water)	P 8000
Staff Training and Safety Wear	P 15000
Lease/Rent	P 36 000
Raw Materials	P 12 000
Insurance	P 1800
Carriage Inwards and Outwards	P 6000
Salaries 2 Engineers at P7000 each Technician at P3500	P 17 500
Owner Salary	P 8000
Miscellaneous	P 3500
Loans CEDA at P6 428 from 4.25% loan of P450 000 ABSA at P3 333 from 5% loan of P200 000	P 9570
TOTAL MONTHLY EXPENSES	P 104 870

Annual Expenses = P 1 258 440

Monthly Working Capital = P 104 870

Yearly Working Capital = P 1 239 600

HOW ASSETS ARE VALUED

3D PRINTER	Secondhand. Sourced From: https://www.machinesseeker.com/3d+printer-zbuilder+ultra/i-19738050
CNC MILLING MACHINE	Secondhand Sourced From: https://www.machinesseeker.com/devlieg-4k-120/i-19236476
PCB EQUIPMENT	Estimated Value

REVENUE PROJECTIONS

Estimates based on secondary data;

SERVICE	UNIT PRICE	ORDERS/Month	MONTHLY REVENUE	ANNUAL REVENUE
CNC Machined Parts	P 2 200	20	P 44 000	P 528 000
PCB Printing	P 1 200	10	P 12 000	P 144 000
Small Batch Prototyping	P 800	8	P 6 400	P 76 800
Total Year 1 Revenue	P 748 000			

The revenue made in the first year shows us a 0.006% market penetration in a P12.77 billion machinery import market, this is a much more nuanced projection. Then we estimate the revenue made in the upcoming years;

Year 2: P1 100 000	<p>This 47% growth from the last year is driven by;</p> <ul style="list-style-type: none"> - The established client relationships from the first year. - Word of mouth referrals from successful results - An average of the 30 orders a month across all services
Year 3: P 1 500 000	<p>The 36% extra growth can be pointed towards;</p> <ul style="list-style-type: none"> - Potential government contracts - Average of 40 orders a month - 2 year track record makes it easier for larger companies to work with us due to established trust - Capacity utilization increased to 55%
Year 4: P 1 800 000	<p>20% growth;</p> <ul style="list-style-type: none"> - Market consolidation and repeat customers - Premium pricing because of good will
Year 5: P 2 100 000	<p>17% growth;</p> <ul style="list-style-type: none"> - Partnerships with major industrial clients

- Capacity utilization at 90%

NET PROFIT & RETURN ON INVESTMENT (ROI)

$$NetProfit = Revenue - Expenses$$

$$ReturnonInvestment = \frac{(NetProfit)}{Total\ Investment} \cdot 100$$

Year	Revenue (P)	Expenses (P)	Net Profit (P)	ROI
1	748 800	1 258 440	-509 640	-69.8%
2	1 100 000	1 258 440	-158 440	-21.7%
3	1 500 000	1 321 362	178 638	24.5%
4	1 800 000	1 359 115	440 885	60.4%
5	2 100 000	1 384 284	715 716	98.0%

NET PRESENT VALUE (NPV)

I will assume a 10% discount rate which is common for manufacturing companies, below are the NPV calculations for a 5-year period.

$$NPV = \frac{\sum CF_t}{(1+r)^t} - I_0$$

Were

- CF_t is the yearly net profit
- I_0 = Initial Investment
- $r = 10\%$

Year	Cash Flow (P)	PV Factor (10%)	Present Value (P)
1	-509 640	0.9091	-463 309
2	-158 440	0.8264	-130 908
3	178 638	0.7513	134 210
4	440 885	0.6830	301 924
5	715 716	0.6209	444 676

$NPV = -1\,651\,766 - 463\,309 - 130\,908 + 134\,210 + 301\,924 + 444\,676$

$NPV = -P1\,365\,173$

DISCUSSION & CONCLUSION

The financial analysis of DFMPE shows us that we have a negative Net Present Value of P 1 365 173 at a 10% discount rate. However, this outcome is not a lack of feasibility because this is common for a newly built manufacturing startup.

DFMPE is a strategically valuable enterprise and addresses Botswana's industrial challenges reducing dependence on imported spare parts and components by providing a local manufacturing alternative whilst reducing lead times, saving foreign currency, and improving industrial reliability. The business model also aligns with Botswana's Vision 2036 goals of enhancing productivity, competitiveness, and innovation-led growth.

REFERENCES

Statistics Botswana (2025). *International Merchandise Trade Statistics (IMTS) Monthly Digest – June 2025*. Gaborone: Statistics Botswana.

Table 2.1 and Chart 2.1: Botswana Imports of Machinery, Electrical Equipment, Metals, and Transport Equipment.