

Project Appraisal Assignment

BUSINESS REPORT OF ALCOHOLIC DRINKS BOTTLING LINE



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FINANCIAL Management and Planning
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Contents

1.	Abstract	3
2.	Introduction.....	3
3.	PRODUCT DESCRIPTION.....	3
4.	PROJECT COMPONENTS.....	4
4.1	PLANT AND MACHINERY.....	4
4.2	FINANCIAL APPRAISAL TOOLS.....	6
	a) Payback Period.....	6
	b) Net Present Value.....	7
	c) Account Rate of Return (ARR)....	7
	d) Internal Rate of Return (IRR)	8
	e) Profitability Index (PI)	8
	f) Benefit Cost Ratio (BCR)	9
5.	Conclusion.....	10
6.	References.....	11
7.	Appendices.....	13

1. ABSTRACT

In order to avoid production losses caused by production disturbances that impair the system's efficiency, performance, and profitability, businesses are now required to continuously analyze and improve their existing manufacturing systems. Low throughput, high inefficiency losses, higher raw material costs, etc. are some of the case production line's main issues.

After examining the production line model, performance metrics were quantified and line behavior, disturbances, and efficiency losses were examined under various sets of conditions. Additionally, a number of issues were noted as problems, such as short stops, starvation, and blockage. The actual system simulation model has then been suggested with a number of changes and modifications. All of it was indicator that need to invest into the new bottling line.

New bottling line would improve amount of stock we can build and will speed up lead time for the customers.

INTRODUCTION

There is a wide variety of drinks that fall under the category of being alcoholic. Beer, wine, and distilled spirits like brandy, whisky, rum, gin, cognac, vodka, tequila, and others are examples of alcoholic beverages. They are made by alcoholic fermentation from a liquid that contains sugar. Sugar, Yeast-fermentable substances are already present or are produced from starting materials. The processing i.e. by hydrolytic cleavage of starch and dextrin, producing simple sugar.

Alcoholic drinks created through distillation are known as distilled beverages, spirits, or liquor. By fermenting grain, ethanol is created (concentration by distillation). beverages that are distilled, unsweetened, and contain at least alcohol.

Penderyn Distillery distill New Make Spirit and Mature whisky in Wales producing Welsh Single Malt Whisky. As well as Whisky we produce Gin, Vodka, Rum and Cream Liquor. With the sale increasing and growing company that sells product all over the world need and better equipment/machinery to be able to support sales.

2. PRODUCT DESCRIPTION

2.1 Bottling of spirits such as Whisky, Gin, Rum, Vodka

2.2 RAW MATERIAL REQUIREMENT FOR ALCOHOL BOTTLING PLANT

Various equipment, labeling equipment, and bottle filling and capping equipment. In a Distillery that bottles alcoholic beverages, units are necessary.

2.3 MANUFACTURING PROCESS

BOTTLE WASHING

Bottles are label-free and impurity-free after being rinsed with filtered water.

To lower the oxygen level in bottles, carbon dioxide is occasionally injected. Bottle is bare. Inspector (EBC) used to inspect the bottles to ensure proper washing before rejecting them.

FILLING AND CAPPING

The filled bottles are then sent to the filling machine after being washed and dried. Inspectors from the FBI inspect bottles for under- or overfilling. Cappers put caps on bottles and closed the bottles.

LABELLING

Labels are used following pasteurization. The batch number and lot must be included. Dates of expiration, quantity, and date and time of bottling.

3. PROJECT COMPONENTS

3.1 PLANT AND MACHINERY

AVE – Technology EFS electronic bottling machines are based on high-precision technology that guarantees great precision and excellent performance in every working step.

EFS systems are suitable for bottling distilled products such as water, fruit juices, nectars, milk, spirits, oils and sauces into plastic or glass bottles. Working steps are automatically managed using collaborative software and electronic dosing units, ensuring superior performance and greater flexibility compared to conventional systems. In addition to stand-alone filling machines, all filling machines for plastic and glass bottles can be supplied in monoblock versions (filling machine + capping machine) and all-in-one versions (rinsing machine + filling machine + capping machine).

- No contact between nozzles and container.
- No contamination between the air in the container and the product in the vessel.
- Extremely precise filling and product dosing.
- Very quick and easy to dismantle, clean and wash

(Electronic bottle filling machine - EFS)

1. BOTTLE WASHING/CLEANING/ RINSING MACHINE

The device employs a rotating glass bottle brushing machine for both the interior and exterior brushing. Before brushing, the bottle is soaked in water. The device for cleaning bottles is appropriate for bottles of water, juice, beer, and wine. The device is appropriate for. When the bottle necks are the same but the bottle is a different size.



2. BOTTLE FILLING AND CAPPING MACHINE

The device includes a capping and filling machine. It is commonly utilized for wine. Beverages like beer, vodka, soy sauce, and vinegar. The machine has a simple design and the vacuum air breathing principle makes filling simple and straightforward. The filling is exact. Level, no bottle breakage or leakage, and simple operation and maintenance. It includes minimum bottle crashes are ensured by electromagnetic capping heads with burden discharge functionality when capping.



3. LABELLING MACHINE

The apparatus is a labeling device for alcohol bottles. The device. consists of a touch-screen control panel that can be used to manage bottle delivery speed. The air cylinder controls the labeling device.



4.2 FINANCIAL APPRAISAL TOOLS

Company would like to invest in new bottling line (filler and labeler) that total cost will be £272656.00

A business must consider whether a new project can make a profit and return the initial investment before moving forward. Capital budgeting evaluates a project's viability and aids a company in determining whether it will produce a return that will satisfy its managers and investors. The internal rate of return, discount rate, net present value, and payback period are a few of the factors that go into capital budgeting.

A) Payback Period

The term "payback period" refers to the amount of time needed to recoup an investment's initial costs, expenses, and cost before it turns a profit, break-even point.

One of the most common formulas used by investors to determine how long it typically takes to recover their investments is the payback period formula, which is calculated as the ratio of the total initial investment to the net cash inflows.

Payback Period the time it takes for a business to make back the initial money it spent on this project. Because of the time value of money (a dollar today is worth more today than it will be tomorrow because you never know what could happen), the shorter the period, the better.

Payback Period	2.9
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Benefits of Using the Payback Period:

- Easily understandable
- Simple to calculate
- Tool for risk assessment
- Helps with comparing and choosing investment options
- Provides insights for financial planning
- Other calculations, such as net present value and internal rate of return, don't
- look at the amount of time it takes to recoup an investment

(Gaille, 2020)

Downsides of Using the Payback Period

The payback period has some drawbacks, despite the fact that it can be a useful calculation for people and businesses who are comparing and considering investments. Only the time frame leading up to the initial investment's recovery is considered in the calculation. It doesn't take into account future earnings, which could be higher or lower and determine whether the investment makes sense as a long-term one.

A longer payback period might be acceptable if earnings will continue to rise. Even if the investment quickly achieves a profit, it may not be wise if earnings are expected to decline after a certain number

of years. On the other hand, a short lifespan investment might need to be replaced soon after its payback period, which could make it a potentially bad investment.

Other ways that an investment might add value, like partnerships or brand awareness, are not taken into account by the payback period. Due to their excessive attention to immediate ROI, investors may as a result overlook the long-term advantages of their investment.

The payback period equation also ignores the potential impact of an investment on other aspects of the business's operations. For instance, new equipment might not be able to run as frequently as it would need to in order to reach the payback goal, or it might need a significant amount of expensive power.

The fact that time value of money (TVM) is not taken into account when calculating the payback period is another drawback. The time value of money postulates that because of the potential for interest, cash will be worth more in the future than it is now. This is significant because as an investment generates returns, the money can be reinvested into another that generates interest or income. This is true not only of the initial capital invested in an investment, but also of returns on returns. This is another factor that contributes to a shorter payback period being a more alluring investment.

B) Net Present Value

$NPV = \text{Cash flow} / (1 + i)^t - \text{initial investment}$ - excel calculation

i = required return or discount rate and t = number of time periods

$NPV = \text{Today's value of the expected cash flows} - \text{Today's value of invested cash}$

	5 years	
Net Present Value (NPV)	£	78,454
Net Present Value (NPV) - Excel	£	78,454

A positive net present value means that the projected earnings outweigh the projected costs and that the investment is likely to be profitable. An investment that has a negative NPV, on the other hand, is probably going to lose money. So, it's generally a good idea to only focus on projects that offer a positive NPV when deciding whether to proceed with an investment.

Net present value is the distinction between the present values of your cash inflows and outflows over a specific period.

Similar to the accounting rate of return (ARR), it is used in investment planning and capital budgeting to assess the profitability of projects or investments. In essence, you can determine whether a specific investment is worthwhile by taking into account all of the money you anticipate making from it and converting those returns into the current dollar value.

C) Account Rate of Return (ARR)

Accounting Rate of Return (ARR) is a useful tool for selecting which long-term project or capital asset to invest in because it is one of the best ways to estimate the potential profitability of an investment. The Accounting Rate of Return (ARR) formula is used to determine the net income anticipated from an asset or investment relative to the investment's initial cost.

ARR = average annual profit / average investment

Years	5
Average Annual Profit	£ 95,000
Average Investment	£ 136,328
Accounting Rate of Return (ARR)	70%

The ARR does not address the time value of money, which is one of the issues critics point out. This is the notion that because money can be invested today and generate income for years to come, its present value is higher than its future value. The ARR does not assess the potential project's worth in relation to other investments. Furthermore, it cannot be modified to account for market or other risks. There is no accurate way to account for cash flow variability. The minimum acceptable return it is compared against is established by management or accountants and might not be a reliable indicator of the market. (Harbour, 2016)

D) Internal Rate of Return (IRR)

IRR stands for internal rate of return, which is the compounded rate of return on an investment.

Internal Rate of Return (IRR) = (Future Value ÷ Present Value)^(1 ÷ Number of Periods) – 1

Internal Rate of Return (IRR)	21.90%
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Our first rule is to accept a project if the IRR is higher than your discount rate and to reject it if it is lower because it will reduce the company's value.

IRR, which is expressed as a percentage, has the benefit of normalizing returns because, unlike NPV, which is expressed as a hypothetical dollar equivalent, everyone is able to understand what a 25% rate means. Sadly, there are a number of significant drawbacks to valuing projects using the IRR.

You should always pick the project with the highest NPV, not necessarily the highest IRR because financial performance is measured in dollars. (Jassy, 2022)

The IRR is only as accurate as the underlying assumptions, which is a drawback of this tool, and a higher rate does not always indicate the highest value project in terms of dollars. The timing and size of cash flows, the amount of leverage used, or different return assumptions can cause multiple projects to have the same IRR but produce drastically different returns. The constant reinvestment rate used in IRR analysis is also assumed to be higher than a conservative reinvestment rate.

E) Profitability Index (PI)

Profitability Index = (Net Present Value + Initial Investment) / Initial Investment

Profitability Index (PI)	1.29
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The PI ratio's main application in corporate finance is for evaluating projects and capital expenditures.

For some general guidelines on interpreting the PI ratio:

- a. If the index is greater than 1, the investment is worthwhile because you might get back more than you put in. You should invest in any investment whose PI is greater than 1 therefore.
- b. It is better to take a step back and look for alternative opportunities if the index is less than 1. Because if PI is less than 1, you wouldn't get the money you invested back. Why even invest?
- c. The project is indifferent or neutral if the index value is 1. If you don't think the project is superior to others that are currently being offered, you shouldn't invest in it. Consider investing in this project if the PI on all other projects is found to be negative. (Chen, 2023)

The PI has drawbacks, despite the fact that cost-benefit analyses frequently use it. PI has some drawbacks, just like every good thing has some restrictions.

When deciding whether to invest in something or not, PI is an excellent metric to use. This metric can be used to determine whether or not to invest in new projects if you run a business and have a limited budget.

The profitability index (PI) is used to determine how much profit could result from a specific investment. Despite being less popular than NPV and IRR among finance professionals, it is still regarded as economically sound. This index is typically used by governments and NGOs to conduct capital analyses. (Kitov, 2023) An effective tool in an analyst's toolbox is the profitability index. It might not always help with project ranking decisions, but it would give some insight into how well a dollar is spent in terms of its cost-benefit ratio. Even though it is relevant, this index's calculation only takes into account an estimate of the cost of capital, so it should not be evaluated on its own. This ratio offers useful information to work with when combined with the Payback Period, Discounted Payback Period, and the Accounting Rate of Return.

F) Benefit Cost Ratio (BCR)

The benefit-cost ratio (BCR), a ratio used in cost-benefit analyses, captures the general relationship between the relative costs and benefits of a proposed project. BCR can be described in terms of money or quality. A project is expected to provide a firm and its investors with a positive net present value if its BCR is greater than 1.

Benefit Cost Ratio (BCR)	1.29
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A project is expected to have a positive net present value (NPV) and an internal rate of return (IRR) that is higher than the discount rate used in the DCF calculations if its BCR is greater than 1. Inferring that the project should be taken into consideration because the NPV of the cash flows exceeds the NPV of the costs.

Key advantages of the benefit-cost ratio include:

- a. It is a useful starting point in determining a project's feasibility and whether it can generate incremental value.
- b. If the inputs are known (cash flows, discount rate), the ratio is relatively easy to calculate.
- c. The ratio considers the time value of money through the discount rate.
- d. The ratio indicates the value generated per dollar of costs.

(Corporate Finance Institute ,2022)

Value for money is a simple tool for assessing the desirability of a project, but it should not be the only factor in determining whether it is economically viable. Other ratios and additional analysis are recommended. Cash flow and discount rate forecasts are highly sensitive to BCR. Do not use the cost-benefit ratio if you believe the associated assumptions are false.

Conclusions

While there is no ideal way to manage accounting, investments, and budgeting in a business, there are undoubtedly some approaches that will be superior to others. Though there are too many variables to take into account for the payback period method to be the standard for most businesses, it does have some validity in some sectors with rapid growth.

Cash flows used in cost-benefit calculations are typically monetary values derived from business projections. If the profit is not in the form of monetary cash flow, the equivalent should be used. Otherwise, this indicator is not applicable for certain types of analysis.

Cash flows need to be estimated separately for benefits and costs. Benefits include but are not limited to revenue, sales, savings, increases of values of assets, interest payments received, etc.

The company can meet the demand. Reduce production costs, increase capacity to increase competitiveness, and improve both operations and performance. Therefore, it can be concluded that need to analyze the line efficiency and the propose model that would be beneficial to the company. It turns out that there are further opportunities to improve business performance.

Since NPV is positive with the high value, would say to accept the project. Payback period: 2 Years & 9 months. As well as all the over calculated tools shows that project will be positive and need to go ahead.

Nerveless, not looking how good or bad would-be business report with the small company not always the case. As it is, Penderyn Distillery is private own company and a lot depend on the main shareholder. If he got money and company needs new bottling line, we will get it.

Reference:

Harbour, S. (2016) How to calculate ARR, Small Business - Chron.com. Available at: <https://smallbusiness.chron.com/calculate-arr-36111.html> (Accessed: 24 May 2023).

(No date) Payback period advantages and disadvantages | top examples - wallstreetmojo. Available at: <https://www.wallstreetmojo.com/payback-period-advantages-and-disadvantages/> (Accessed: 24 May 2023).

Gaille, L. (2020) 18 major advantages and disadvantages of the payback period, Vittana.org. Available at: <https://vittana.org/18-major-advantages-and-disadvantages-of-the-payback-period> (Accessed: 24 May 2023).

Jassy, D. (2022) How do you calculate IRR in Excel?, Investopedia. Available at: <https://www.investopedia.com/ask/answers/022615/what-formula-calculating-internal-rate-return-irr-excel.asp> (Accessed: 24 May 2023).

Profitability index (PI) (2022) Wall Street Prep. Available at: <https://www.wallstreetprep.com/knowledge/profitability-index/> (Accessed: 24 May 2023).

(No date a) Profitability index (meaning, example) | how to interpret? - wallstreetmojo. Available at: <https://www.wallstreetmojo.com/profitability-index/> (Accessed: 24 May 2023).

Chen, J. (2023) Profitability index (PI): Definition, components, and formula, Investopedia. Available at: <https://www.investopedia.com/terms/p/profitability.asp> (Accessed: 24 May 2023).

Benefit-cost ratio (BCR) (2022) Corporate Finance Institute. Available at: <https://corporatefinanceinstitute.com/resources/accounting/benefit-cost-ratio-bcr/> (Accessed: 26 May 2023).

Sebastian (2020) What is the benefit cost ratio (BCR)? definition, formula, example., Project. Available at: <https://project-management.info/benefit-cost-ratio/> (Accessed: 26 May 2023).

Electronic bottle filling machine - EFS (no date) EFS plastic and glass bottle filling machine with an electronic dosing unit. Available at: <https://www.aveuk.net/en/catalogue/bottling-and-packaging/filling-systems/filling-systems/electronic-bottle-filling-machine> (Accessed: 26 May 2023).

How to calculate ROI to justify a project: HBS Online (2020) Business Insights Blog. Available at: <https://online.hbs.edu/blog/post/how-to-calculate-roi-for-a-project> (Accessed: 26 May 2023).

Profitability index (PI) (2022) Wall Street Prep. Available at: <https://www.wallstreetprep.com/knowledge/profitability-index/> (Accessed: 26 May 2023).

Internal Rate of Return (IRR) (2023) Wall Street Prep. Available at: <https://www.wallstreetprep.com/knowledge/irr-internal-rate-of-return/> (Accessed: 26 May 2023).

Management, P. (no date) What are the advantages and disadvantages of using the payback period as a decision criterion?, Payback Period: Pros, Cons, and Best Practices. Available at: <https://www.linkedin.com/advice/1/what-advantages-disadvantages-using-payback-period#:~:text=Advantages%20of%20payback%20period,by%20the%20annual%20cash%20inflow.> (Accessed: 26 May 2023).

GoCardless (2022) How to calculate net present value (NPV) (with formula), GoCardless. Available at: <https://gocardless.com/guides/posts/how-to-calculate-net-present-value/> (Accessed: 26 May 2023).

SoFi (2023) How to calculate the Payback Period: Formula & examples, SoFi. Available at: <https://www.sofi.com/learn/content/how-to-calculate-the-payback-period/> (Accessed: 26 May 2023).

Electronic bottle filling machine - EFS (no date a) EFS plastic and glass bottle filling machine with an electronic dosing unit. Available at: <https://www.aveuk.net/en/catalogue/bottling-and-packaging/filling-systems/filling-systems/electronic-bottle-filling-machine> (Accessed: 26 May 2023).
Kitov, I. (2023) What is profitability index?, 365 Financial Analyst. Available at: <https://365financialanalyst.com/knowledge-hub/corporate-finance/what-is-profitability-index/> (Accessed: 28 May 2023).

Appendices

	£ 272,656	Years				
	Investment	1	2	3	4	5
Present Value	-£ 272,656	£ 95,000	£ 95,000	£ 95,000	£ 95,000	£ 95,000

Net Benefits	-£ 272,656	-£ 177,656	-£ 82,656	£ 12,344	£ 107,344	£ 202,344
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Payback Period	2.9
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Discount Rate (WACC)	11%
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Denominator	1.000	0.901	0.812	0.731	0.659	0.593
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Future Value	-£ 272,656	£ 85,586	£ 77,104	£ 69,463	£ 62,579	£ 56,378
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	5 years	
Net Present Value (NPV)	£	78,454
Net Present Value (NPV) - Excel	£	78,454

Internal Rate of Return (IRR)	21.90%
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Profitability Index (PI)	1.29
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Benefit Cost Ratio (BCR)	1.29
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Accounting Rate of Return (ARR)	70%
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Accounting Rate of Return (ARR)

Years	5
Average Annual Profit	£ 95,000
Average Investment	£ 136,328
Accounting Rate of Return (ARR)	70%

Z-Italia Self-adhesive labelling machine

Proposal 2506/19 AVE UK Ref BP2506/19 Z-Italia ref ME180233 Rev 3 Date 25/06/2019	Equipment	
	Automatic Rotary 6 head machine with 4 stations, including; Sensors for transparant and non-transparant labels Adjustment on 4 axis Orientaion by Fiber optic sensor for seam Orientaion by photocell for embossed logo 4 self-adhesive stations Change parts for 200ml arianne bottle	138,830.00
	Change parts for 350ml arianne bottle	1,190.00
	Change parts for 700ml arianne bottle	1,190.00
	Change parts for 700ml and 750ml PN17 bottle	3,900.00
	Change parts for 750ml arianne bottle	1,190.00
	Change parts for 50ml bottle	5,620.00
	Modem link	2,400.00
	Auto adjustment of labeller turret	1,460.00
	Auto adjustment of 4 labeller stns	10,800.00
	Conveyors	8,750.00
	Total	175,330.00
	Less discount 15%	149,030.50
	Transport from Italy to NEC	0.00
	Storage and packing at NEC	0.00
	Assembly and instal - 2 days	1,200.00
	Comm and trg for 6 days	4,800.00
	1 yr maintenance	0.00
	Total	155,030.50
	Exchange rate (£ to Euro) 1.15	134,809.13

Ave Unibloc filler

Proposal 2606/19 AVE UK Ref BP2606/19 AVE Tech ref MTG SB?LP Date 26/06/2019	Equipment	
	Automatic gravity filler Unibloc	98,000.00
	Automatic AVE vertical Mechanical Cap elevator	8,800.00
	Change parts for corks	12,000.00
	Change parts for 200ml arianne bottle	3,000.00
	Change parts for 350ml arianne bottle	3,000.00
	Change parts for 700ml arianne bottle	3,000.00
	Change parts for 700ml and 750ml PN17 bottle	3,000.00
	One set of 12 filling nozzle hooks	500.00
	Automatic linear OMB twin head capsular inc 200ml parts	22,400.00
	Change parts for 350ml arianne bottle	600.00
	Change parts for 700ml arianne bottle	600.00
	Change parts for 700ml and 750ml PN17 bottle	600.00
	Conveyors	18,500.00
	Total	174,000.00
	Less discount	15% 147,900.00
	Transport from Italy to NEC	0.00
	Storage and packing at NEC	4,623.91
	Assembly and instal - 2 days	1,200.00
	Comm and trg for 6 days	4,800.00
	Total	158,523.91
	Exchange rate (£ to Euro)	1.15 137,846.88

