



Capital Project Appraisal Presentation

Doing it ourselves!

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Background

PCT Group Sales LTD. is a small to medium-sized manufacturing enterprise specializing in the production of lifting equipment, including hoists, cranes, and jibs, among others. The company's distinctiveness lies in its ability to offer comprehensive solutions tailored to the energy sectors. This includes supplying explosion-proof equipment for potentially hazardous environments in the Oil & Gas industry, providing decontaminable and safety-compliant equipment for the nuclear sector, and utilizing corrosion-resistant materials in the offshore industry.

PCT's operations revolve around four core activities: Sales, Design, Procurement, and Manufacturing, as depicted in Figure 1. These processes are all overseen by the company's management team.

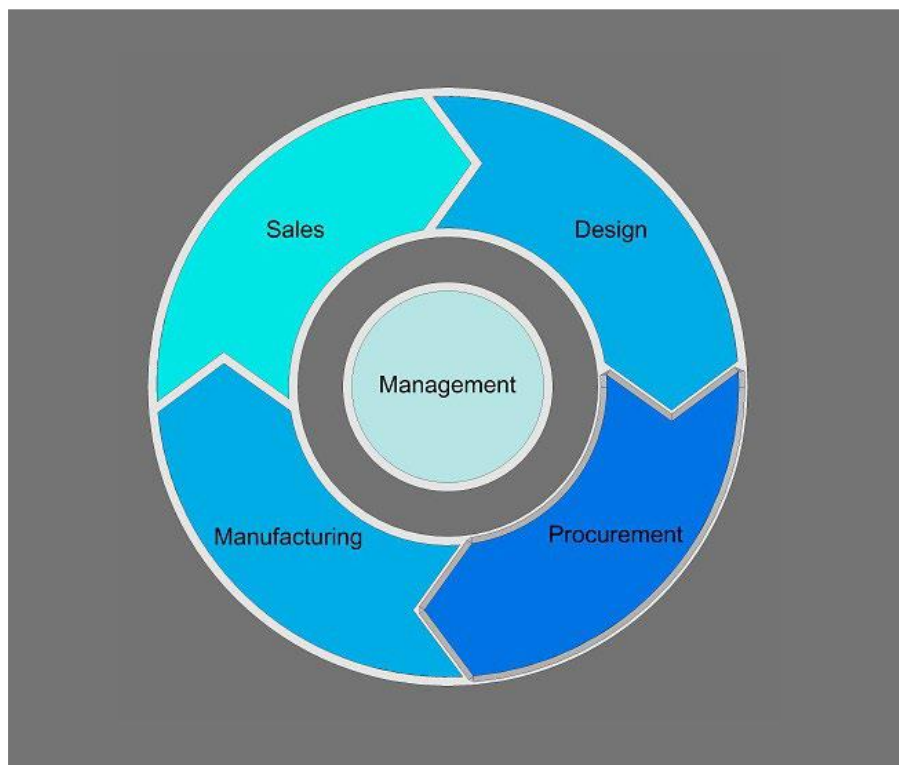


Figure 1 - PCT Group Sales LTD Departments

The business is a long-term player in the tier 2 level of the supply chain for the sector, supplying major Energy developments globally for close to 50 years.

In its storied history, PCT has known cycles of expansion and contraction, normally at the tail end of similar cycles within the industries it serves (Budd, Ison et al. 2020).

As a result of these economic business cycles, the company has grown to incorporate all aspects of manufacturing its catalogue products, from receipt of raw materials to full mechanical assembly, followed by testing and delivery to the client. (Harding, Pagan 2016)

The latest expansion cycle culminated in 2016-2018, with the business turnover of around £ 18 to 20 million per year. Since then, the industry has experienced an abrupt reduction, with many of the biggest players suffering following the Oil price fall, COVID-19 (Raval, England 2020), and the Ukrainian War.



Figure 2 - Saudi Aramco Net Income 2019-2020 (Raval, England 2020)

On top of the major factors contributing to the shrinkage of the business, the company found itself also affected by Brexit (Strachan 2022). The most significant impact on PCT was the decision to part ways with the in-house machine shop, which broke off into a new company. This decision was taken as a response to the global crisis at the time, and it was regarded as a measure to survive, reduce expenditure (salaries of 9 staff members), and obtain a substantial cash infusion through the sale of the machines (Harding, Pagan 2016).

Since then, the company has relied on subcontracting the machining process, with limited success. The aim of this report is not to analyze and dissect the past decisions of the company. Instead, its emphasis lies on determining whether it is possible to forecast the expansion of the manufacturing process or pinpoint the correct capital investment relative to the present state of the economic health of the company. This is commonly referred to as "nowcasting" as opposed to traditional forecasting. (Harding, Pagan 2016)

Another part of the manufacturing process that has always been outsourced is the surface cleaning in preparation for painting. This process is applied to 100% of the equipment PCT sells, and bringing this within the fold for the first time would have both costs and benefits.

Bringing any of the two processes in-house would bring, plant efficiency enhancements, and cost improvements, it would remove restrictive factors from our business, and streamline the manufacturing process.

The case for in-house manufacturing

Bringing manufacturing processes in-house as opposed to subcontracting can have several advantages and is a strategic decision that depends on various factors. Here are some reasons why a company might consider in-house manufacturing:

- **Cost Control:** In-house manufacturing allows for greater control over production costs. When you outsource, you may have less visibility into the cost structure of your products, which can lead to unexpected cost increases. In-house manufacturing allows you to manage expenses more closely and optimize production processes for cost efficiency.
- **Quality Assurance:** Maintaining control over the manufacturing process enables you to ensure consistent product quality. You can implement strict quality control measures, conduct inspections, and make real-time adjustments as needed to meet quality standards. This is especially crucial for industries where product quality is paramount.
- **Intellectual Property Protection:** Some products and processes may involve proprietary technology or intellectual property. In-house manufacturing can help protect your IP, as it reduces the need to share sensitive information with third-party suppliers who might not have the same level of commitment to safeguarding your intellectual assets.
- **Speed and Flexibility:** In-house manufacturing often allows for quicker response times to changes in demand or product design. You can adjust production schedules and processes more rapidly to meet market demands, launch new products, or make design iterations without relying on external suppliers.
- **Customization and Innovation:** When you have full control over the manufacturing process, you can be more innovative and agile in product development. You can experiment with new materials, processes, and technologies to create unique and customized products that may not be feasible with external suppliers.
- **Supply Chain Resilience:** In-house manufacturing can enhance your supply chain resilience (Chatterjee, Chaudhuri 2022). By reducing dependency on external suppliers, you become less vulnerable to disruptions caused by factors like geopolitical events, natural disasters, or economic crises that may affect your suppliers.
- **Confidentiality and Security:** For industries dealing with sensitive or classified materials, such as defense or healthcare, in-house manufacturing provides greater confidentiality and security. It minimizes the risk of information leakage (Busse, Schleper et al. 2017) that can occur when working with external partners.
- **Long-Term Cost Savings:** While setting up in-house manufacturing may require significant initial investment in infrastructure, equipment, and skilled personnel, it can lead to long-term cost savings and improved profitability (Marais, Saleh 2009). Over time, the cost advantages of in-house production can outweigh the initial capital expenditure.

- **Quality Control:** Maintaining control over the manufacturing process allows for tighter quality control (Marais, Saleh 2009). You can ensure that products meet your specific standards and regulatory requirements.
- **Better Integration:** In-house manufacturing can result in better integration with other departments such as R&D, design, and marketing, fostering collaboration and innovation across the organization.

It's important to note that the decision to bring manufacturing in-house should be made after careful analysis of your company's unique circumstances, including financial resources, expertise, and market dynamics. In some cases, a hybrid approach (Invest Northern Ireland), combining in-house manufacturing with strategic outsourcing for certain components or processes, may be the most effective solution. Ultimately, the choice should align with your business goals and competitive strategy.

The case for subcontracting

Subcontracting and in-house manufacturing are two distinct approaches to production, each with its own set of advantages and disadvantages. Here are some advantages of subcontracting (also known as outsourcing) compared to in-house manufacturing:

- **Cost Savings:** Subcontracting can often be more cost-effective, especially for small and medium-sized businesses that may not have the capital to invest in manufacturing facilities, equipment, and skilled labor (, Subcontracting: How It Works, Benefits, Types and Process | TranZactundefined). Outsourcing allows you to leverage the economies of scale and expertise of specialized suppliers.
- **Focus on Core Competencies:** By outsourcing non-core manufacturing processes, companies can concentrate their resources, time, and efforts on their core competencies, such as product development, marketing, and innovation (, Subcontracting: How It Works, Benefits, Definition, and Taxation2021). This specialization can lead to higher-quality products and improved competitiveness.
- **Scalability:** Subcontracting offers greater flexibility and scalability. When demand fluctuates, it's easier to adjust production levels by working with external suppliers who can quickly adapt to changes in volume (Busse, Schleper et al. 2017).
- **Reduced Risk:** Outsourcing can mitigate risks associated with manufacturing, such as technological obsolescence, changing regulations, or market fluctuations. Suppliers often bear some of these risks, helping to stabilize your business (Hesser, Wohner et al. 2017).
- **Access to Expertise:** Specialized suppliers often have deep expertise in their field, which can lead to higher product quality and efficiency. You can tap into the knowledge and skills of these specialists without needing to develop them in-house.

- **Faster Time to Market:** Outsourcing can expedite product development and time to market. Suppliers with established processes and capabilities can often produce components or products more quickly than if you had to build those capabilities internally.
- **Reduced Capital Investment:** Subcontracting requires less upfront capital investment compared to establishing and maintaining in-house manufacturing facilities. This can free up capital for other strategic purposes ([Invest Northern Ireland](#)).
- **Global Reach:** Outsourcing allows you to tap into a global network of suppliers, potentially accessing lower-cost labor, materials, and production capabilities from different regions.
- **Risk Sharing:** In some cases, subcontracting can involve shared risks with suppliers. For example, if the quality of the outsourced product is subpar, the supplier may bear some responsibility for rectifying the issue ([Atto](#)).
- **Focus on Innovation:** By delegating manufacturing to external partners, your organization can allocate more resources to research and development, driving innovation and staying competitive in your market.

It's important to note that while subcontracting offers these advantages, it also comes with certain risks and challenges ([Invest Northern Ireland](#)), such as potential loss of control, quality issues, longer supply chains, and dependency on external suppliers.

The “Nowcasting” Discussion (Reviewing Project Priorities)

The discussion must focus on the aims of the project appraisal ([Davies 2023](#)). These are:

- Selecting the best project
- Gauging project creditworthiness,
- Measuring the profitability of the project.
- Calculating the probable cost and benefit.
- Evaluating the fixed and working capital.
- Anticipating the possible impact of the improvement on the business.
- Finding out whether the various factors of production are available.

To achieve these aims, certain financial appraisal techniques have been employed. These techniques are payback period, internal rate of return, net present value, annual rate of return, Benefit-cost ratio, and profitability index ([Borad, Borad 2019](#)).

Two projects have been put forward for consideration.

Project Machining involves the purchase of a CNC machine that would cover most of the machining requirements, along with the hiring of a skilled operator for this machine.

Project Shotblasting centres around the purchase of a shotblasting facility, and the training of our painting operators to use it in our coating process.

	Project MACHINING	Project SHOTBLASTING
Representative image		
Payback period	2.7 years	1.8 years
Discount Rate (WACC)	8%	8%
Annual Rate of Return (ARR)	39%	68%
Net Present Value (NPV)	£ 259,304	£ 32,214
Internal Rate of Return (IRR)	28.6%	48.5%
Profitability Index (PI)	1.70	2.47
Benefit-Cost Ratio	0.70	1.47

The tabled data can be interpreted as follows:

- Following an initial screening, comprising of Payback Period and Annual Rate of Return, SHOTBLASTING is the most beneficial (Tailor 2013), paying back almost a year earlier than MACHINING, with a very healthy ARR of 68%.
- The Net Present Value of both projects is positive – a good sign for future cashflows (*How To Calculate Net Present Value.*), and MACHINING has a much larger NPV compared with the other project.
- The IRR gives the annual rate of return necessary to reach the break-even point. SHOTBLASTING has a much higher ratio – 48.5% - the bigger the better (Cuthbert, Magni 2016).
- For every £1 invested in SHOTBLASTING, £2.47 are returned – an excellent PI score. The BCR is also positive, with a benefit of £1.47 for every £1 spent. MACHINING also has positive, but lower results.
- Most importantly, the investment for SHOTBLASTING can be self-financed within the company, making it more attractive and easier to implement. The higher initial outlay for purchasing the machine will require external funding and would take a longer time and a more involved process (banks, loans, applications, etc.) to achieve (Pike, Neale et al. 2018).

Conclusion

The project team has identified the capital investment project that will add the largest value (Tailor 2013) to the manufacturing process within our business. While the team has analysed two potential projects, the recommendation is to pursue the project SHOTBLASTING with immediate effect.

Because both projects have been identified as having a positive impact on the business (Pike, Neale et al. 2018), the team's recommendation is to enquire with the financial department and with the board whether funding can be secured for the MACHINING project as well, as a second priority.

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Appendix 1 – Excel calculation extract for Project Machining

Project Machining		Year					
		1	2	3	4	5	6
Investment							
Present Value	(372,660)	136,700	136,700	136,700	136,700	136,700	136,700
Net Benefit	(372,660)	(235,960)	(99,260)	37,440	174,140	310,840	447,540
Payback	2.7 years	Manually Calculated					
Discount Rate (WACC)	8.00%						
Denominator	1.00	0.926	0.857	0.794	0.735	0.681	0.630
Future Value	(372,660)	126,584	117,152	108,540	100,475	93,093	86,121
NPV	259,304				PI	1.70	
NPV (Excel Calculated)	259,288				BCR	0.70	
IRR	28.6%						
Residual Value	£85,000						
ARR	39%						

Cost	£	Benefit/yr	£
Kiheung U1200N	£333,000.00	Subcontracting	140,000
Transportation	£15,000.00	Utility	-9700
Installation	£15,000.00	Reduced Transport and	25000
Service/Maint/Parts	£6,660.00	3 month mothball	-7500
Training	£3,000.00	Programing	-5600
		Cleaning	-5500
	£372,660.00		136,700

Appendix 2 – Excel calculation extract for Project Shotblasting

Project Shotblasting		Year					
Investment		1	2	3	4	5	6
Present Value	(21,876)	11,700	11,700	11,700	11,700	11,700	11,700
Net Benefit	(21,876)	(10,176)	1,524	13,224	24,924	36,624	48,324
Payback	1.8 years	Manually Calculated					
Discount Rate (WACC)	8.00%						
Denominator	1.00	0.926	0.857	0.794	0.735	0.681	0.630
Future Value	(21,876)	10,834	10,027	9,290	8,600	7,968	7,371
NPV	32,214	PI					
		2.47					
NPV (Excel Calculated)	32,212	BCR					
		1.47					
IRR	48.5%						
Residual Value	£3,500						
ARR	68%						

Cost	£	Benefit/yr	£
Shotblasting container	£12,000.00	Subcontracting	14,000
Consumables	£1,775.60	Utility	-5400
Installation	£2,430.00	Reduced Transport and	7500
Service/Maint/Parts	£1,870.00	PPE	-1800
Training	£3,800.00	Cleaning	-2600
	£21,875.60		11,700