

Outsourcing Apparel Manufacturing and The Effect on Profitability of a Company X

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<p>This project thesis was created primary for the benefit of the commissioning company; an SME in the fashion industry in Finland designing, manufacturing and selling women's apparel and accessories. The project includes a supplier analyses of potential outsourcing partners and classification together with a cost-volume-profit analyses based on the cost of outsourcing the product manufacturing function of the case company.</p> <p>The thesis had an aim to give more insight on the potential suppliers, provide tools for making outsourcing decisions in the form of a supplier classification tool and the profitability analysis on the two most potential supplier partners in manufacturing. The results of the cost-volume-profit analysis provide valuable information in how the case company can make more profitable decisions in producing and selling the different products in their product mix.</p> <p>The case company is in their starting point of outsourcing manufacturing, therefore the information provided in this project will give valuable and practical tools for leading more profitable business.</p> <p>The thesis has been divided into two main sections; the theory part combining supply chain management and managerial accounting methods, and the analysis part of supplier analyses, classification and a cost-volume-profit analysis.</p> <p>The results of the thesis elaborate that the supplier selection and analysis consist of many variants and that the evaluation process should be conducted in detailed manner and tracking the actual results each supplier performs. The results of the CVP analyses emphasize that the volume of sales and the contents of the sales mix have a great impact on the operating income, and different sensitivity analyses should be executed to have the most reliable answers on the most profitable supplier partners. It is highly recommended to partner with multiple suppliers to reduce risks, increase total contribution margin and find the most cost-efficient suppliers for materials in manufacturing apparel.</p>	
Keywords Outsourcing, cost-volume-profit analysis, supplier analysis, managerial accounting, short-term business decisions.	

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1 Introduction

In this chapter, the purpose of the thesis is introduced, the scope of the thesis is demarcated, the risks and benefits for the case company is explained. In addition, the case company itself is introduced and the international aspect of the thesis is elaborated.

1.1 Background

The case company is manufacturing its products inhouse and wants to outsource its product manufacturing to increase the quality of the products and profitability. The company will also run out of capacity to produce desired products with its current manufacturing techniques. It is also required to outsource the manufacturing for the company employees to focus on more important tasks at hand.

The case company will receive a supplier analysis, supplier classification and profitability analyses conducted using two of the most suitable suppliers.

1.2 Project objective and project tasks

The objectives are to analyse possible manufacturing suppliers commissioning company considers cooperating with and provide profitability analyses on the effect outsourcing has on the profitability of the business from the managerial accounting point of view. The case company can apply all knowledge and tools provided into its own business practises, because the data collection and products of the thesis are created in favour of the case company.

Project Tasks:

PT 1. Prepping theoretical framework

PT 2. Forming supplier selection criteria

PT 3. Creating supplier analysis and classification based on chosen suppliers by the company

PT 4. Creating CVP analysis as a result of outsourcing product manufacturing to selected suppliers

PT 5. Evaluating the project management outcomes

Table 1 below presents the theoretical framework, project management methods and outcomes for each project task.

Table 1. Overlay matrix

Project Task	Theoretical Framework	Project Management Methods	Outcomes
PT 1.	Literature on SCM and managerial accounting	Finding the most relevant sources	Theoretical framework
PT 2.	The supplier selection criteria provided by the commissioning company	Arranging the supplier selection criteria	Requirements and their justifications for the new supplier(s)
PT 3.	Supplier data and selection criteria	Tools for analysis and classification: 10C's, supplier selection criteria, Decision Matrix Analysis	Supplier analysis and classifications
PT 4.	Commissioning company data and supplier data	Cost-volume-profit formulas; CM, BEP, sensitivity analysis, product mix	CVP analysis and projected Profit & Loss for two years
PT 5.	Results from the PT's 1-4, evaluation of the project by the commissioning company	Reviewing the results from the tools and analyzing them	Final recommendation for the commissioning company

1.3 Project scope

Related to the project task 3 (Creating supplier analysis and classification based on chosen suppliers by the company), the project will include analyzing the three most potential suppliers provided by the case company. After individually analyzing the different suppliers, the project includes classifying the suppliers and identifying the two most suitable ones.

Based on the two most suitable suppliers for the case company's purpose of outsourcing, in the Cost-volume-profit analysis (project task 4), the cost of product manufacturing is analyzed to provide the results; the most profitable supplier for apparel manufacturing. The variables in the CVP analysis are product returns in e-commerce, having discounts in prices and mixing these two scenarios together. Also, to have a vast overview on the profitability and net income, the projected P&L statements are prepared for years 2022 and 2023.

1.4 Benefits and risks

The case company benefits highly of the project results. The company receives analyses both on the suppliers and profitability analysis related to outsourcing. The company can create more value to their shareholders and the overall business operations long-term. The analyses can be used for different projects when evaluating the return on investment in a certain project. The case company may also present the results of the project to possible investors.

Outsourcing product manufacturing would help improve competitive edge of the company, it is a major risk at the same time. When the outsourcing regards a core function of the company, if the outsourcing leads to poor results it has major negative impacts on profitability of the company.

The thesis writer improves her abilities to apply theory and knowledge in to practise and deliver enormous value to the case company. The fashion industry is where the thesis writer sees her future, alongside with finance related professions. Making an impact and finding new solutions are close to her heart. The motivation to complete this thesis with valuable results is complementing the thesis writer's own skills.

Other entrepreneurs and professional in the fashion, finance or logistics industry can have an interesting insight to the apparel manufacturing industry and learn more about maintaining profitability while making sustainable choices. One goal would be to raise awareness among other professionals on choosing more sustainably throughout the whole chain of processes in a business.

Some of the risks involved in the thesis project can be such as limited access to certain information about the possible supplier(s), regarding for instance financial information, factory properties, employee/employer information and authenticity of the certifications and other information. These can corrupt the supplier analysis and classification due to lack of information or the possible bias in them.

One risks, or rather a challenge, is to keep certain information confidential since all the information is collected and presented for the benefit of only the commissioning company. There needs to be clear rules how information can be stored and presented. For example, names, company details and figures will be modified for the thesis.

1.5 Key concepts

Sustainable apparel manufacturing can be implemented in different stages of manufacturing products and the product lifecycle. Making sustainable apparel can include for instance, designing apparel to minimize production waste in raw materials, design products that are recyclable, avoid chemicals in production, reduce energy and water consumption and utilize technology in enhancing sustainable practises. (Black 87, 2013.)

Supplier analysis

Analysing a supplier is a process of assessment and approval of potential supplier. In the assessment, both quantitative and qualitative methods and be used. The purpose of the analysis is to have a supplier portfolio consisting of the most ideal suppliers. The supplier analysis can be used for the existing suppliers as well to control their performance. Goals of supplier analysis can be reducing costs, controlling risks and make improvements. (Ecovadis 2020.)

Managerial accounting methods for profitability analysis

Leveraging management accounting tools offers the business management techniques for analysing profits and controlling operating expenses. The methods in managerial accounting for analysing and increasing profitability are for instance, breakeven analysis, budgeting expenses, just-in-time inventory management and capital budgeting. (DeBenedetti 20xx.)

Cost-volume-profit analysis

Cost-volume-profit analysis is a tool used for defining how the business can be profitable under certain measures. The CVP analysis consists also a break-even analysis. The CVP analysis includes items like activity level, unit prices, unit variable cost and total fixed costs. (Cousins 2019.)

Break-even point analysis

The break-even point analysis results to the figure where the total revenues equal total costs. At the break-even point for the business, all the costs are covered but there is no profit or loss. (Cousins 2019.)

1.6 Case company

The case company is Finnish SME company in the fashion industry. The company has all of its operations in Finland but having an e-commerce store it delivers products to other EU/Worldwide countries for B2C customers. The products are apparel for women. The raw materials are sourced from the European Union area. The company includes less than 10 employees.

The need for the thesis project aroused from the request of the entrepreneur in the case company wanting to outsource its current apparel manufacturing and making financial plans and analysis related to the process. As the sustainability is essential for the case company, sustainability in all business processes needs to be taken into an account for favourable results.

The need for the thesis project is essential for the business. As the products are manufactured by hand in Finland, the operations are not very scalable at the moment. In addition to wanting to be able to scale the business and production, the products need to be improved in matters of quality and technical manufacturing aspect.

Sustainability is visible in the case company's strategy in many levels at the current stage. The sourced materials are recycled materials, the production is planned in a way that reduces generating waste material in fabric cutting and the delivery partner provides a more sustainable choice for international deliveries for customers.

The values take into account the sustainability in all business activities as well as ethics in terms of employees and partners, strategy and vision. The sustainability is a choice for the business to engage all its operations in ethical and sustainable business practices in the long haul.

2 Relation between supply chain management and managerial accounting in outsourcing apparel manufacturing

The relation between supply chain management and financial management in outsourcing project at the commissioning company is crucial. All the actions that happen in supply chain, effect the financial management of the company.

The effect the different functions have to the financial state of the company help the decision makers in the business to make more beneficial outsourcing decisions.

2.1 Outsourcing apparel manufacturing

The outsourcing of a specific business process definition includes contractual service of transferring specified business processes to a third-party, and the third party then ensures the management, support and infrastructure of the entire process(es) being outsourced. This is also known as offshoring. (Patel & Aram 2005.)

In the fashion industry, the outsourcing process of apparel products consists of different stages. The process of outsourcing and selecting suppliers depend highly on the priority order of cost, quality and lead time. The priority can also vary per product. Also, all these factors are correlated. (Fafadia 2010.)

Therefore, depending on the business, the different priorities are emphasized to make outsourcing decisions on all aspects effecting the manufacturing.

One example of the process of outsourcing apparel manufacturing as a mass production can be following (Sarkar 2017.):

1. Fabric development
 - Fabric lab dip preparation
2. Fabric approval
3. Pattern making
4. Garment sampling
 - Sample approval (prototype, fit, size set, salesman's sample)
5. Final pattern making
 - Pattern grading
6. Fabric purchasing
 - Fabric inspection
 - Fabric shade banding
 - Segregation of fabrics by its widths and shade band
7. Fabric testing

8. Issuing fabric for cutting section

- Fabric layering
 - Marker making
 - Cutting the lay
 - Sorting of cut components
 - Layer numbering
 - Cut bundling and tagging
9. Issue to stitching floor
 - Stitching process
 - Quality check
 10. Garment repair
 11. Garment washing
 12. Garment finishing
 13. Product folding and packing
 14. Shipment inspection
 15. Shipment

As an industry professional, I want to yet emphasize that the outsourcing process look different for every apparel business depending on where, when and how the business buys its materials, services and manufacturing.

2.1.1 Supplier selection criteria

The purpose of this chapter is to provide more insights to the case company on supplier selection criteria. As the thesis writer, I have a goal to understand the supplier selection and the basis for making recommendations after the supplier analyses.

Choosing the right outsourcing partner comes down to first, identify the business objectives which are defined alongside making the business and outsourcing strategies and the strategic gap analysis conducted (Patel & Aram 2005, 88.)

Patel and Aram suggest that the business goals should be clear, actionable and measurable. Also, a segmented goal setting for each business function is recommended (Patel & Aram 2005, 89.)

Regarding the requirements for the outsourcing partner, Patel and Aram (2005, 89) suggests that even if a company for example, has an objective of cost reduction, the company should keep in mind the quality factors of the results of outsourcing whilst another company might outsource because of lack of skills. Therefore, the company should make an elaborated list of factors required from the successful partnership in outsourcing. (Patel & Aram 2005, 89.)

When choosing the country where to outsource, the cost, quantity and quality of labor, level of education and language skills, cultural comparability with the buying party company, infrastructure and political stability should be assessed (Patel & Aram 2005, 90).

In the last step of the Partner Choices Framework, it is the place to find the right outsourcing partner company. Patel and Aram (2005, 93) refer to their earlier research on Business Process Outsourcing players defining the types of outsourcing partners to after choosing the player type, then match the type with the strategic gap analysis and partner requirements. (Patel & Aram 2005, 93).

The type chosen is obvious for the commissioning company, it is industry specialist. The industry specialist is described to be a partner who provides solutions to certain industry needs. They provide variety of solutions and services, but always specific to their industry of speciality. (Patel & Aram 2005, 31)

Patel and Aram (Patel & Aram 2005, 93) introduces a few important questions to think about when considering certain outsourcing partners. The first question relates to having a track record or in other words, customer references of the partner company. If the company has performed on a successful manner earlier, it is a good indicator of successful service commitment. The next question is heavily related to the customer references as in what kind of customers are the existing ones and whether they are satisfied.

Also a crucial question is, how the supplier has priced its services or products. This question refers to if there are any hidden costs and how the pricing will change if the scale/volume changes positively or negatively. The pricing terms give a perspective on how flexible the provider is. (Patel & Aram 2005, 94.)

The last question is about how much flexibility the provider offers as an answer to the customers' needs. It should be considered if the provider is genuinely willing to tailor its services for the customer, but a customer should be very aware if the provider is offering to change the customers' business model or practices to extent. (Patel & Aram 2005, 94.)

Some practicalities that could ease the partnership with the supplier are defined by Patel and Aram (2005, 97) as three different key principles; the both parties must agree on detailed and well-thought statement of work (SOW), the parties must select a way to communicate effectively on a day-to-day basis and establish communication plan including scheduled meetings and framework for reporting.

Patel and Aram (2005, 97) want to emphasize the key principles of a win-win partnership relations. These are trust and confidence, responsiveness and innovation.

Open communication, sharing expectations and information regularly are mentioned as a key to success in trust building. Another communication related aspect is responsiveness. Challenges will arise in outsourcing process, but the difference in being successful in it, depends on responsiveness, too. It is stated that, the service provider which can respond, and even anticipate changes and additions, will consequently add value to the relationship. (Patel & Aram 2005, 98.)

In an effective communication with the service provider, if a customer wants to make alterations in the SOW, the provider will responsively communicate the monetary and delivery impacts of the requested changes (Patel & Aram 2005, 99).

Innovative approaches and out-of-the-box thinking is highly recommended feature of a provider by Patel and Aram (2005, 99), because these features will add a high value to the customer which is expecting highly tailored solutions for specific needs. Innovation is therefore a trait of a provider that should be sought out for.

CTO Pan Kokkilas, interviewed by Patel and Aram, also listed a few important features that she looks for in a target provider. Some key takeaways in addition to earlier mentioned are management structure of the provider company that enables the responsibilities to be defined clearly and strict service-level agreements with relevant penalties in case of poor performance. (Patel & Aram 2005, 109.)

Specific for the apparel industry, some criteria to take into consideration when looking for a manufacturing suppliers are (ST Group 2017):

- Maximum and minimum order quantities
- Lead time
- Delivery options
- Warehousing options
- Quality approval process
- Reference products from previous customers
- Payments terms and conditions
- Communication practices
- Certificates and standards (ISO, SA800)
- Customer references

When the buyer company sets its own standards on these criteria, it is clear for them what they are looking for in a supplier and why.

2.1.2 Supplier evaluation

The purpose of conducting a supplier assessment is to analyse whether the supplier company is able to reliably meet all the requirements of the buyer company in technical, financial and commercial aspects (Lysons & Farrington 2012, 366).

Lysons and Farrington (2012, 367) list important items which indicate that the supplier evaluation is needed. The list includes for instance, purchasing outsourcing services, when engaged in global sourcing and when long-term product support is needed.

It is advised to evaluate the potential suppliers from ten view-points; finance, insurance, productive capacity and service support capacity, quality, health and safety, environmental management, performance per existing contracts, organizational structure, sub-contracting and supply chain management (Lysons & Farrington 2012, 367).

The detailed aspects to assess per topic by Lysons & Farrington (2012, 368-372):

Finance – Include the turnover, profitability and asset structure of last three years, the amount of debt and the debt to assets ratio.

Insurance – Which types of insurances the supplier has and what is the cover value of these insurances?

Productive capacity and service support capability – What is the maximum capacity in a specific period? To what extent the supplier is already committed to in capacity? Can the supplier extend its capacity? Is the supplier dependent on just a few buyers? Has the supplier all the machines for the needed products and how are the machines maintained?

Quality – Has the quality of the products been measured by any certificates, which? What are the steps for inspecting and testing of materials? How does the supplier test their product quality? Does quality control include quality assessment phase? Can the buyer be assured to skip the inspection phase or ready products (in JIT production)?

Health and Safety – What kind of health and safety policies the supplier has? Are there safety and health audits? Are the first aid and welfare provision in place? Who is in charge for the employee's safety?

Environment management – Which standards per environmental policies are followed? Is there a certain person responsible for the environment management? How are the production materials sourced? What kind of materials? And where from? What kind of a lifecycle management there is for the produced products? What is the waste management policy? Is there procedures for energy saving, recycling etc?

Performance per existing contracts – The names of the clients, and features of the client companies. What is the extent of contract per client (duration, capacity requirements etc.)?

Organizational structure – What kind of structure the supplier company has? Who are the key personnel in the company?

Sub-contracting – Will subcontracting be involved in buying the suppliers services? What is the extent of the sub-contracting? What are the contract terms and the extent? How are the sub-contractors chosen and approved?

Supply chain management – Is there a well-established purchasing team? How is the function of purchasing arranged? Who is responsible for supply chain management? What are the risks involved in the purchasing on the supplier side?

The Dr Carter introduced the Seven C's of Supplier Evaluation in 1995 for the first time, and added three more to the list. The list makes it easier for businesses to evaluate if a prospective supplier is suitable for them (Emerald Works Ltd 2020a).

The topics of assessment include competency, capacity, commitment, control, cash, cost, consistency, culture, clean and communication. If trying to find excellence in all of the ten aspects of operations in the supplier, it might be that every supplier will be eliminated at the end. Moreover, it is more important to prioritize and choose the most important categories to assess. A Decision Matrix Analysis will help to score the potential supplier by prioritizing the most important topics. (Emerald Works Ltd 2020a.)

Below, the ten aspects to evaluate are presented in a priority order (Emerald Works Ltd 2020a).

Competency – Make an assessment of the capabilities of the supplier and measure them against the needs in outsourcing and find out the references from customers.

Capacity – How fast the supplier can deliver needed services or products per order? Including requirements in staff, equipment, storage and materials.

Commitment – Evidence in committing to high quality standards, such as ISO certificates.

Control – How much the supplier has control over their operations and supply chain? How the resources and delivering services or products are ensured per agreement? Also, take into account compliance with GDPR etc.

Cash – What is the cash balance like in the supplier side? What kind of information can the supplier offer for manifesting their financial stability?

Cost – What is the price of the services or products offered like? And how does it compare to the other possible suppliers?

Consistency – Look at the track record of the supplier. How the supplier ensures consistency in quality deliveries? Get prototypes of the needed products.

Culture – Do the values of the supplier company meet the buyer's values? What the supplier company communicates about their culture?

Clean – How the supplier company commits to environmental practices and how they demonstrate sustainability? Ask for green certificates or evidence of sustainable practices.

Communication – What are the communication methods used between the supplier and customers? Do they match with the buyer company? The communications become even more important to excel when it's about outsourcing key services or products.

According to Hodakel (2020), the important factors in choosing a manufacturing supplier in fashion, includes steps like determining the business goals and researching factory options and asking questions from them. Some questions to think about assessing a apparel manufacturer are

- Has the supplier company worked with similar products or clients?
- Does the supplier specialize in the products procured?
- What are the minimum order quantities (MOQ's)?
- What kind of services does the supplier provide in addition to manufacturing?
- Can the supplier answer to growing manufacturing demand?
- Does the brand match with the buyers brand values and ethics?

Hodakel (2020) emphasizes taking a careful look at the samples the manufacturer provides. Details to evaluate are for example, the quality of stitching, consistency and secure embroidery, consistency in measurements of different parts of the garment (such as sleeves of same length), inside seams and their quality (should match to the quality of top visible seams) and if the garment resist gentle pulling of seams.

2.1.3 Supplier classification

A Decision Matrix Analysis introduced by Emerald Works Ltd (2020b) is a way to make a decision on which supplier to choose for the best possible outcome. The matrix is also referred as Grid Analysis, Pugh Matrix Analysis and Multiple-Attribute Utility Theory. The tool is great to use in a scenario where there are many options and variances that weigh into the decision-making.

The Decision Matrix Analysis can be done using MS Excel for instance. The tool includes all the desired Criteria as the first row, then the Weight per Criteria is marked in importance from 1 to 5 as the second row and after that the potential suppliers are listed with an own row for each. In the columns, all the criteria are marked as their own column. The tool is used by multiplying the rating of each criteria per supplier by the weight of the criteria itself. Last, the total amounts are calculated and the supplier with the highest number of points is considered the best option. (Emerald Works 2020b.)

2.2 The cost of apparel manufacturing

Myers-McDevitt introduces four different phases of apparel production costing. The phases include preliminary costing, cost estimating, detailed costing and actual costs. Preliminary costing is made before even the sampling of production pieces, therefore the product price estimates are made referencing to previously produced similar products. The purpose of this preliminary costing is to ensure that the products will not be too costly to produce, in other words the profitability and mark-up are ensured. (Myers-McDevitt 2011, 14.)

The second phase is called cost estimating, which is formed after the sampling processing and just before the production line adoption. A cost sheet is used to combine all known costs together; different garment materials and components, labor and manufacturing overhead, administration costs and the expected profits added. The estimates made with using the cost sheet is known as budget cost. (Myers-McDevitt 2011, 14.)

The third phase, detailed costing is put together when the production of certain products is agreed but before the production starts. The estimated costs are more detailed than during sampling stage, because the costs are estimated using the real production sizes and markers. Every detailed costs are included that might have not been included in the costing estimate. The alterations to production, for instance, specific sewing techniques and measurements are specified to the as the final decisions before the actual production begins. The production materials might be modified to different materials to make the mass production more affordable in greater quantities. (Myers-McDevitt 2011, 15.)

After the production has taken place, the actual costs are defined. In this stage, all the information is collected regarding the production; actual material costs, labor, manufacturing etc. In this stage, it can actually be seen which products are the most profitable and which should be dropped from the line, due to for example too high manufacturing costs resulted as difficulties in production. (Myers-McDevitt 2011, 15.)



Figure 1. Phases of costing estimate in production

During the preliminary costing stage, the products are ensured to be attainable, producible, commercial and marketable or competitive, yet profitable. The last phase, actual costing also determines whether to purchase new equipment, acquire new employees or talent, expand or downsize production or other facilities. (Myers-McDevitt 2011, 1.)

The costing methods in apparel production:

Three different main costing methods are used in apparel production; variable costing, absorption costing and activity-based costing. Variable costing includes only production costs. Direct materials, direct labor and variable manufacturing overhead are accounted as a product cost in this method. In line with this method, fixed manufacturing costs are treated as a period costs. As the manufacturing overhead is not included in this costing method, the markup is higher as it includes the fixed overhead costs. (Myers-McDevitt 2011, 16.)

Absorption costing as another costing method includes all costs related to the production; variable and fixed costs. A certain amount of fixed manufacturing overhead is allocated to each unit sold. This method is somewhat faulty, because the labor costs and overhead are estimated which can lead to biased profit estimates. The markup used in absorption costing is less than in variable costing, because of the included labor and overhead costs. (Myers-McDevitt 2011, 16.)

An activity-based costing method can be relevant method to use when aiming for reducing labor or manufacturing overhead costs in production or other process improvement needs. This costing method though do not include the specific material costs of the product. In apparel production, the material costs can be up to 50% of the costs of the production. (Myers-McDevitt 2011, 16.).

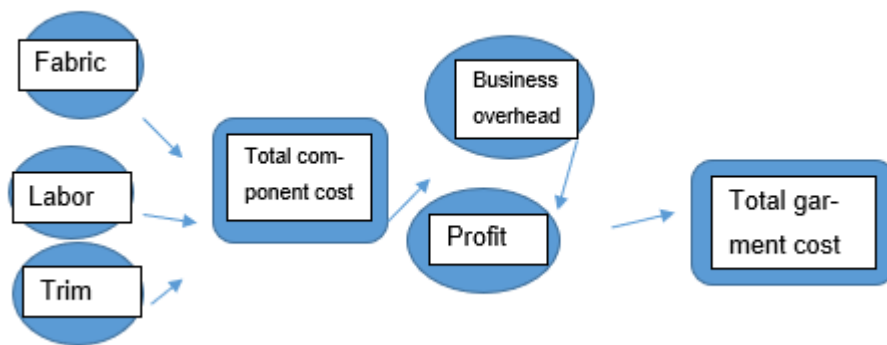


Figure 2. Product cost break down (Myers-Devitt 2011, 20).

The figure 2 explains the cost components of an apparel in product manufacturing. The materials include fabric and trim, also the labor that goes into manufacturing the certain product is included in the component cost. In addition to the total component cost, the business overhead and profit are calculated to the total garment costs.

To conclude, the cost of the apparel consists of different costs along the process of assessing the suitable manufacturer and the actual manufacturing of the products to have on sale.

2.2.1 Cost-Volume-Profit analysis

The cost-volume-profit analysis can be conducted for the company if certain presumptions are met regarding the company. The following needed metrics are that the volume is the only factor that affects costs, each cost can be classified to be either variable or fixed cost,

income is linear within the relevant range of volume in sales, inventory levels will not change, and the product mix does not change. (Braun & Tietz 2015, 402.)

2.2.2 Unit contribution margin

In the first step of the CVP analysis is to calculate the unit contribution margin per product. The contribution margin per unit refers to the profit made per unit before taking into account the fixed costs. The unit contribution margin can be displayed as a percentage also, being the unit contribution margin over the sales price. When each unit is sold, the contribution margin generated increases the operating income of the company by the contribution margin amount. (Braun & Tietz 2015, 403.)

The formula for the unit contribution margin then follows as:

$$\text{Unit contribution margin} = \text{Sales price per unit} - \text{Variable costs per unit}$$

Figure 3. Formula for Unit contribution margin

2.2.3 Break-even point

The next phase is to calculate break-even point which means that at the break-even level of sales the operating income is zero. There is no profit nor loss. Different calculating methods can be used to find the break-even point which can result to either units of sales or euros of sales. (Braun & Tietz 2015, 405.)

To calculate the break-even point, there are different approaches to it. Approaches presented by Braun & Tietz (2015, 406-407) are income statement approach or shortcut approach using the unit contribution margin.

The approach chosen to use for the break-even point calculation is the shortcut method, because it uses the contribution margin per unit, already calculated in the first section of the CVP analysis and then continues to use the following formula (Braun & Tietz 2015, 407):

$$\text{Sales in units} = \frac{\text{Fixed expenses} + \text{Operating income}}{\text{Contribution margin per unit}}$$

Figure 4. Formula for Sales in units

With this formula, it is possible to find out the sales in units to break even. As the operating income we input 0 (Braun & Tietz 2015, 407).

To find out the sales needed to reach a certain target profit, the target profit amount is simply put into the place of the operating income in the formula of sales in unit in break-even point calculation (Braun & Tietz 2015, 409).

2.2.4 Sales mix break-even point

For multiproduct companies, the sales mix needs to be considered to get reliable results. Instead of using the contribution margin per unit, the weighted-average contribution margin of all products is used for making the CVP analysis. To get realistic results, the weight of each units' sale volume is also considered. (Braun & Tietz 2015, 421).

$$\text{Sales in total (units)} = \frac{\text{Fixed expenses} + \text{Operating income}}{\text{Weighted-average CM per unit}}$$

Figure 5. Formula for Sales in total (units)

As the formula above showcases, the weighted-average contribution margin per unit in the sales mix is used for the sales in total in units for a new break-even point.

Continuing, the amount of each product to sell, the weight of each product in the sales mix is needed. For example, if product A has sales volume of five items and product B sales volume is 10, the total is 15 items sold. The weights are 5/15 and 10/15. The following formula is used for finding out the actual sales amounts for reaching the break-even point in units. (Braun & Tietz 2015, 422).

Break-even sales of product A= total break even amount of sales mix X 5/15
Break-even sales of product B= total break even amount of sales mix X 10/15

Figure 6. Formula for break-even for each product of sales mix

2.2.5 Sensitivity analysis

After the break-even point has been calculated, the cost-volume profit analysis includes the sensitivity analysis to find out how different sales prices or costs effect the break-even point (Braun & Tietz 2015, 416). Therefore, the sensitivity analysis can be conducted to input different values to the before mentioned formulas and then compare the results between scenarios.

3 Project management methods

The project management methods used in this thesis consist both managing supplier data and financial data to conclude them into supplier analysis and CVP analysis in outsourcing. The supplier analysis and classification part of the project utilizes qualitative and quantitative methods as analysing the individual suppliers by features and using tool with numerical grades for classifying the suppliers.

The figure 7 showcases the project design as follows. The suppliers are analysed separately from each other before concluding the supplier classification. In the supplier analysis, the 10 C's-tool is used for analysing the suppliers individually and weigh the supplier information against the selection criteria of the case company.

In the phase after the supplier analysis, the suppliers are classified based on the supplier selection criteria presented in the chapter 4.2. and the tool "Decision Matrix Analysis" uses numerical grades and weighs per criteria to help formulate the outsourcing decision.

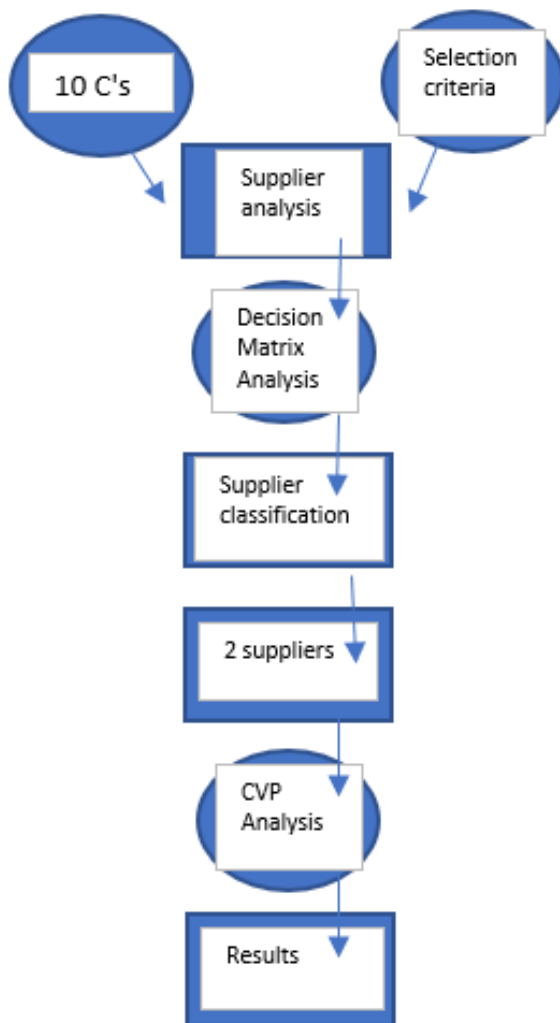


Figure 7. Project design

After the two most suitable suppliers based on individual analyses and classification, the Cost-volume-profit analysis is made by calculating the unit contribution margins per product and the break-even point, conducting a sensitivity analysis with three different variables and the sales mix break-even point. In addition, as a part of the CVP analysis, the projected Profit and Loss statement is configured for finding out the profit/loss for the next two financial years.

4 Establishing supplier selection criteria

The purpose of this chapter is to elaborate the commissioning company's needs in terms of the supplier relationship and product manufacturing.

4.1 Introduction to supplier selection criteria

The supplier selection criteria is introduced, because then it is easier to justify first, why the company chose the certain supplier(s), second to base on the supplier analysis and classification based on how the importance of different categories are emphasised on the selection criteria (Table 3.).

4.2 Supplier selection criteria of the case company and justifications

The case company has supplier selection criteria in different categories. These categories include multiple criteria per category. Categories are divided to outsourcing process, contracting and communication, supplier capacity and features, sustainability and ethics, product and quality and additional services. The case company has chosen following criteria based on their product features, sustainable business goals, business model, business values and strategy, financial resources and development needs in terms of product quality.

Table 2. Supplier selection criteria by the case company

Criteria	Importance (Low, Medium, High)	Category
The manufacturer is located in Finland or Estonia	High	2
Payment terms include close to 25/50/25 or 30/70 payments	Medium/High	1
Budget range of 10-40 EUR manufacturing price per piece	Medium	1
Communicating language is Finnish/English	Medium	1
Minimum order quantity is 15-30 pieces per product, not specific	Medium	4
Pattern designing and modification as a service	High	5
Warehousing as a service in an accessible location, can also arrange warehouse by themselves	Medium	5
Cost and time effective sample processing and developing	High	1
Product development as a service	High	5
Offering their range of sustainable suppliers in product and packaging materials	Medium	3
The capacity and assured quality levels to manufacture women's clothing	High	2, 4
Financial stability and dependence of the supplier in manufacturing	Medium	2
Customer references	Medium	4
Transparency and sustainability practices of the supplier, including visits, certificates etc.	High	3
Labor standards and ethical government	High	3
Provides effective logistics services	Low/Medium	5
Is reliable related to intellectual property rights	High	1
Desire to build long-lasting supplier relations	High	1

- 1. Outsourcing process, contracting and communication** includes criteria of payment terms, communication language required being Finnish or English, cost and time effective sample processing and development, respecting intellectual property rights and urge to build long-lasting supplier relations.

The payment terms which the case company would prefer, are 25% paid upfront before the production starts, 50% payment when the production has started and 25% when the goods are shipped to the case company's desired location. Another preferred option is 30% payment before the production starts and 70% payment after receiving the produced goods.

The communication language would naturally be Finnish or English language because these are the languages the case company founders' are fluent at.

The sample processing, before starting the production and making a contract on production, needs to be effective and the manufacturer needs to understand the case company's needs and concerns in product development. The communication should be seamless to ensure a mutual trust between the parties.

The case company is looking for a manufacturer to build a long-lasting relationship with considering that the case company want to develop new product on a constant sequence. Therefore, the supplier should be able to manufacture different kind of products in apparel from different materials.

- 2. Supplier capacity and features** include supplier location in Finland or Estonia, the right capacity and manufacturing quality levels and supplier's financial stability and dependence.

The manufacturing supplier has to be located in Finland or Estonia in respect to the criteria mentioned in the first category or criteria. And being close to the supplier(s), it adds value to the sustainable values which are a high priority to the case company, for example, considering the logistics and environmental impact logistics have.

The right capacity in manufacturing in the early stages of the case company means small minimum quantities in production which is elaborated in the fourth category together with the quality standards set for the supplier(s).

- 3. Sustainability and ethics** include offering range of sustainable suppliers in product and packaging materials, supplier transparency and ethical labor standards and government.

It is a positive advantage if the supplier has connections to suppliers that offer sustainably sourced materials for the production. The case company already has materials supplier connections to produce the currently sold products, but within the next few years, it is mandatory to source new materials for different kind of products.

Supplier transparency can be obtained easier when the supplier is located within a reasonable distance, so that the case company representatives can visit the factory regularly. Transparency of the supplier is also related to the supplier's presence online and all the public information it offers on its business practices and efforts in sustainability.

The ethical labor standards should not be the biggest concern when outsourcing manufacturing in Finland or Estonia compared to further destinations in the world of apparel manufacturing. Moreover, it is highly respected that the supplier has set its own standards regarding ethics and labor concerns.

- 4. Product and quality** include minimum order quantity around 15-30 pieces per product, ensured high quality in manufacturing and customer references.

The minimum order quantity in production should be around 15 to 30 pieces per product. This is a flexible estimate, because among the journey in finding a supplier, the case company has to adapt to the manufacturers in some extent and their demands.

The high quality in production is related to the effective sample processing and communicating with the supplier.

Customer references from the supplier are important in gaining the perspective whether the supplier would fit the case company's needs or not. The references should especially include manufacturing the type of products the case company produces.

- 5. Additional services** include pattern designing and modification, warehousing services, product development and effective logistics and transportation arranged by the supplier.

As the case company consists of a small team of entrepreneurs, the additional services provided by the supplier can add a lot of value to the case company.

The most important additional services after manufacturing are product development and sourcing sustainable materials from Europe. The product development done together with the manufacturer can have enormous impact on the product quality and therefore strengthen the value proposition of the case company even more when perfecting the product fit, materials, production techniques and style finishes and details. Altogether this will bring a lot more value to the customers of the case company in long-term.

These supplier selection criteria are thought out by the case company management in line with the company goals. The objectives also emphasize highly improving the competitive edge of the company. The improved competitive edge is gained through product quality development, faster product development and manufacturing. The manufacturing outsourcing also enables scaling the business faster to the next target markets.

4.3 Recommendations

The case company could consider additional criteria as following. These suggested, additional criteria include assessing the track record of the possible supplier and selecting common statement of work (SOW). Also, emphasizing that the qualities to look for in a sustainable and profitable supplier relationship are trust, confidence and innovation. It would also be worth it to look into the management structure of the supplier company to understand the responsibilities and be careful with service-level agreement to be sure what is promised to deliver. (Patel & Aram 2005, 93-109.)

After a discussion with the case company about the selection criteria and the recommendations, we came into the conclusion that the services and practices of the supplier selected can also change practices in the case company. All in all, flexibility and open communication is required from both parties. The criteria can change alongside the process of pre-production stages, but always keeping in mind the objectives of outsourcing the product manufacturing.

5 Creating supplier analysis and classification

5.1 Background of creating supplier analysis and classification

To implement the supplier analysis and classification, there are crucial information needed related to the possible suppliers. The information includes the basic information of the suppliers; location, capacity and other factors mentioned in the table 2 related to the supplier selection criteria.

Also needed for the supplier analysis are information gathered from the quotations on manufacturing specific products, including price, payment terms, lead times, quality management methods, contract information and so on.

The goal of creating first, the analysis per supplier is to analyse the specific qualities of the supplier to perform the manufacturing of the case company's products. Second, the supplier classification will compare and analyse the suppliers to find the most suitable ones based on the supplier selection criteria set by the case company and by the results of the individual analyses.

5.2 Supplier analysis per potential supplier

The supplier analysis per each potential supplier, total of four suppliers assessed individually, includes the 10C's (Emerald Works Ltd 2020a) model for supplier analysis and weighing the supplier information against the case company selection criteria.

Introductions of the suppliers:

The "Supplier 1" to evaluate is a clothing and accessories manufacturing company located in Finland. The case company has visited the facilities and received a quotation from the production manager. The supplier manufactures clothing and accessories from materials like woven and textiles, leather and other materials. The company has mainly Finnish clients varying from individual fashion designers to larger companies with mass production. This company has a "Key Flag Symbol" in Finland which represents for example that the minimum 50% of the break-even cost of the product is from domestic sources, the company has a significant part of ownership in Finland (The Association for Finnish Work 2021).

The "Supplier 2" is located in Estonia and has its own studio where they produce smaller quantities of apparel and accessories up to 200 pieces per model. The supplier uses subcontracting when the client needs larger quantity than 200 pieces or when the studio facility does not have needed machinery for production. The supplier has additional services; consulting in pattern or technical designing and pattern making and digitizing. The typical customers are women's and childrenswear designers with varying needs in services. This supplier is willing to source fabrics and trims for their clients due to their large networks. In addition, the supplier company is a member of Estonian Chamber of Commerce and Industry and Estonian Textile Association.

The "Supplier 3" is in Finland, producing mainly apparel for women or textiles for interior decoration. The company has a lot of experience in making women's apparel especially from woven fabrics. The production quantities vary from fifty up to thousands of pieces. The supplier has services for pattern making and product development. The clients of this company vary from SME companies to larger companies.

5.2.1 10 C's and the case company criteria

Each supplier was assessed with the 10C's model for supplier analysis and these suppliers were compared with each other in each category. In addition, the suppliers' features were weighted against the case company's supplier selection criteria.

Competency

The best performed supplier in the area of competency is definitely the supplier #2, because the supplier is specialized in manufacturing apparel with the certain materials the case company uses their products and has the broadest service offering in pattern making and product development. The reference list of customers includes brands that match with the profile of the case company.

Supplier #1 and #3 (suppliers from Finland) are quite even what comes to their competency, although the supplier #1 has more experience in manufacturing apparel and accessories with wide range of materials like leather, wood, thick woven materials etc. but these are not relevant for the case company now. Supplier #3 lacks a machine that would be needed to manufacture the products per original tech packs, but the company has suggested modification to the product manufacturing, and this seems to lead almost into a same quality outcome as in the original plan.

Capacity

The estimated delivery time per order would depend on variety of variables (assuming that all the needed materials, fabric and trim, would already be in stock) such as; the current employee capacity at place, the adjustments needed to make for the manufacturing machines, the free manufacturing capacity and the duration of the quality assessment process.

If assumed that the order quantity per product is 200 pieces (total of 800 pieces), the estimated lead time (time from order date to delivery date) could vary from 4-8 weeks depending on which logistics provider is used for delivering the finished products from the factory in Finland or Estonia to Helsinki.

None of the factories have given estimated lead time for production, because the process is in the product testing (sample making) phase.

Control & Commitment

The supplier 1# and #3 have a simple and very transparent supply chain, both located in Finland and all operations are within one facility. It is easy for the case company to visit the factories with a short notice in Finland. Due to the pandemic situation, it could be more difficult to visit the Estonian suppliers frequently.

The supplier #2 has its own facilities including manufacturing and logistics in Estonia, but they also use subcontracting in manufacturing larger quantities. Therefore, from the perspective of the case company, the supply chain and its transparency are not as easy to track as the companies in Finland.

The factories use incoterms as DAP (delivered at place) or EXW (the buyer is responsible for delivering the goods from the supplier's facility). With the EXW, the case company can have more control over the delivery of the finished goods, but the incoterm DAP could decrease costs of the delivery since the factories have their own logistic provider agreements and the delivery could be delivered at the same patch as other clients' orders to the same destination city.

All suppliers have a GDPR (general data protection regulation) compliance agreements active.

Cash & Cost

As the case company has requested quotations per two different styles, the price of a one set (top and bottom in apparel) is compared when the order quantity is 200 pieces/style. The set price (VAT0) with the supplier #1 is 50€, supplier #2 offers 27,6€ and the supplier #3: 35,83€.

The supplier #2, Estonian supplier, is the most affordable one. Comparing the Finnish suppliers #1 and #3, there is a major difference in prices. The supplier #3 is 88% more expensive than the supplier #1 in Finland. The difference is hard to explain, because the factories have very similar capacities and capabilities in manufacturing according to the needs of the case company.

Culture & Clean

The supplier #1 values highly craftsmanship, domesticity and enhancing manufacturing of apparel and accessories products in Finland. This correlates the values of the case company, since they want to keep the manufacturing as close to Finland as possible and where the craftsmanship and quality are highly important. The supplier #1 is a family-owned company and it is relatable for the case company as it is a small business as well. This supplier has communicated that sustainability, especially recycling is a very important matter for them, and sustainability is a must have quality in the supplier in this case.

There are also similarities found in between the supplier #2 and the case company. This supplier's team consists of a small, dynamic team and the contact person for the case company has provided a personal and effective service from the beginning. The supplier wants to emphasize and cherish the craftsmanship at their own studio in Estonia. Sustainable values shown in their work as using sustainable materials, making sure the manufacturing process is effective in reducing waste and offer low MOQ's. This supplier is a really good match for the case company what comes to the values.

The third supplier located in Finland makes effort into maintaining the Finnish craftsmanship and sewing skills. Also, one goal for the case company is to enhance the manufacturing and product development in Finland in the textile industry. Minimizing the waste in manufacturing and recycling are self-evident for the supplier #3.

Commitment

Communication with the first supplier has appeared to be rather inefficient. It takes weeks for the supplier to answer emails and does not always answer to phone. The supplier #1

does not provide broad information on their service packages and pricing, so the case company had had to ask about details several times yet left unanswered.

Supplier #2 is the most effective communicator among all the suppliers contacted. The supplier answers to emails within a day or two, provides tips and service for product development already in the early stage of asking for quotation. They also provide picture material of their manufacturing facilities and machines, showcasing the professionalism of the supplier. The pricing is also communicated with a detailed information.

Communicating with the supplier #3 is rather easy and the representative answers emails and phone effectively. The supplier also provides improvements and ideas for the product development in early stages and communicated the prices fast and precisely.

10 C's	Supplier 1	Supplier 2	Supplier 3
1: Competency	4	5	3
2: Capacity	4	3	4
3: Commitment	2	3	3
4: Control	5	3	5
5: Cash	0	0	0
6: Cost	2	5	3
7: Consistency	2	4	4
8: Culture	4	3	3
9: Clean	4	3	4
10: Communication	2	5	3
average	2,9	3,4	3,2

Figure 8. 10 C's Analysis per supplier

Grades in table represent a grade between 0 to 5 (5 being excellent). The grades are given by analysing the 10 C's individually above supplier by supplier and weighing the information on the supplier selection criteria by the case company referring to table 2. The supplier with the most points is supplier #2 with the average grade of 3,4. The supplier #2 earns the most points in competency, cost efficiency and communication. This particular supplier has the capacity, skills, affordable prices and is the most effective in communication.

The supplier criteria by the Commissioning Company

Criteria	Importance (Low, Medium, High)	1	2	3
Cost and time effective sample processing and developing	High	3	4	2
Is reliable related to intellectual property rights	High	3	3	3
Desire to build long-lasting supplier relations	High	3	5	5
The manufacturer is located in Finland or Estonia	High	5	5	5
Transparency and sustainability practices of the supplier; visits, certificates etc.	High	5	4	5
Labor standards and ethical government	High	4	4	4
Pattern designing and modification as a service	High	2	5	3
Product development as a service	High	2	5	4
The capacity and assured quality levels to manufacture women's clothing	High	5	5	4
Payment terms include close to 25/50/25 or 30/70 payments	Medium/High			
Budget range of 10-40 EUR manufacturing price per piece	Medium	4	5	5
Communicating language is Finnish/English	Medium	5	5	5
Financial stability and dependence of the supplier in manufacturing	Medium			
Offering their range of sustainable suppliers in product and packaging materials	Medium	2	3	2
Minimum order quantity is 15-30 pieces per product	Medium	5	5	4
Customer references	Medium	2	5	3
Warehousing as a service in an accessible location	Medium			
Provides effective logistics services	Low/Medium			
average points		3,6	4,5	3,9

Figure 9. Supplier selection criteria and supplier comparison and grading

In addition to the 10 C's compared, the suppliers are also compared in the table including the case company's selection criteria. The table shows the grade given for each supplier per criteria (from 0 to 5, where 5 being excellent).

The supplier #2 has the best average points (4,5) within the supplier selection criteria. Supplier #3 is the second in this comparison with average points of 3,9.

There are few criteria where the information has not been provided yet, which are “provides effective logistics services”, “financial stability and the dependence of the supplier in manufacturing”, “warehousing as a service” and “payment terms close to 25/50/25 or 30/70”.

5.3 Supplier Classification

The supplier classification includes the Decision Matrix Analysis by Emerald Works Ltd (2020b) to calculate the total points for each supplier based on the most important selection criteria set by the case company

Decision Matrix Analysis

The Decision Matrix Analysis was chosen because it takes into account a wide list of factors that the case company has listed as a criteria to help the outsourcing decision-making.

Decision Matrix Analysis

Criteria	Payment terms	price	language	MOQ	pattern services	logistic services	sample process	prod. Development	sust. Sourcing	capacity	financial stab.	customer ref.	sustainability	labor & ethics	IPR	Relation ship building	Total
Weight (1-3)	2	2	2	2	3	2	3	3	2	3	2	2	3	3	3	3	
Supplier 1	0	8	10	10	6	0	9	6	4	15	0	4	15	12	9	9	117
Supplier 2	0	10	10	10	15	0	12	15	6	15	0	10	12	12	9	15	151
Supplier 3	0	10	10	8	9	0	6	12	4	12	0	6	15	12	9	15	128

Figure 10. Decision Matrix Analysis

The Decision Matrix Analysis shows that the supplier #2 is the most suitable for the case company with the total points of 151. And the second most suitable is the supplier #3 with points of 128. The matrix multiplies the grade (0-5) given for each criteria per supplier by the weight (scale 1-3). The grade per criteria is based on the grades given in the Figure 9. “Supplier selection criteria and supplier comparison and grading”, indicating how well the supplier responds to the needs of the case company. The grades per each supplier and criteria are then multiplied by the weight being 1,2 or 3 multiplier.

5.4 Results

After conducting the individual supplier analysis using the 10C's method, comparing the suppliers against the case company selection criteria and using the Decision Matrix Analysis to classify the possible supplier partners, the most attractive partners are supplier #2 and supplier #3. These results were consistent throughout all of the methods used for supplier analysis and classification.

As described in the 10C's analysis, the supplier #2 provides the largest selection of services, is specialized in the same materials as the case company, is effective in communication and has a list of relevant customer references. The supplier #2 is also cost effective, which is a very important criteria alongside the quality of the manufacturing.

Supplier #3 has its benefits as well, being a supplier in Finland, offering pattern and product development combined with effective communications and affordable prices. The most significant difference between the best performing supplier, #2 and the supplier #3 is the customer references and competence. Supplier #3 has a very few relevant customer references and the manufacturer lacks a certain machine that would ensure the best possible quality in manufacturing well finished seams and structures.

To conclude, the suppliers #2 and #3 are chosen for the cost-volume-profit analysis to lead to a profitability analysis of outsourcing manufacturing.

6 Creating CVP analysis as result of outsourcing product manufacturing to selected suppliers

6.1 Background of creating Cost-Volume-Profit analysis

The cost analyses will be built with the information obtained from the case company's current budgets and pricing, including different cost categories and the information of the cost of manufacturing per certain suppliers. The CVP analysis is conducted with two of the most suitable suppliers; suppliers #2 and #3.

The cost-volume-profit analysis is chosen because it is a tool which gives the insights needed for this multiproduct company, where there are many different variances in costs, pricing, business model options and mixing different factors for desired outcome for profitable sales mix.

6.2 Cost-Volume-Profit analysis

Referring back to the theory of cost-volume-profit analysis, the CVP analysis made will give estimated results due to the fact that the reassumptions for the analysis are not met perfectly. The case company has certain sales offers that affect the linearity of revenues in the relevant range of volume, inventory levels will change across the financial year, season to season and the profits differ per product in the product mix. These factors will lead to the results being estimates rather than precise numbers (Braun & Tietz 2015, 402).

Also, after the relevant range of volume, the case company might have to employ new personnel to serve the customers, handle shipping and other tasks that increase as the sales increase.

The information used for the analysis calculations are taken from the cash budgets of the case company to find out the amount of fixed costs on average per month and the material, shipping and other variable costs per product are numbers from the pricing tables of the case company. All the numbers in this CVP analyses are multiplied by a certain number to keep the confidentiality of the real amounts.

6.2.1 Unit contribution margin

The unit contribution margins are calculated for each product of the sales-mix. The sales-mix consists of four different products, each having their unique price and variable costs.

Production prices per piece		VATO			
Supplier #2	Product 1	product 2	product 3	product 4	
20pc	19,20 €	19,20 €	17,40 €	17,40 €	
200	14,40 €	14,40 €	13,20 €	13,20 €	
Supplier #3	Product 1	product 2	product 3	product 4	
30-49pc	16,69 €	16,69 €	27,90 €	27,90 €	
50-99	14,59 €	14,59 €	25,39 €	25,39 €	
100-	12,70 €	12,70 €	23,14 €	23,14 €	

Figure 11. Production prices per each product

This table displays the production prices per supplier according to the production volume range (column one). The prices do not include value added tax and are prices per one product produced, including the cutting, sewing and finishing of the apparel.

The further steps of the CVP analysis are conducted using the prices referring to the prices when production volume is 200 pieces per product at a time.

Unit contribution margin per product

1.1.	The unit contribution margin supplier #2		VATO	
	product 1	product 2	product 3	product 4
Price VATO	100,80 €	110,40 €	110,40 €	117,60 €
Variable costs:				
Materials	6,86 €	15,98 €	7,94 €	18,89 €
Cut&Sew	14,40 €	14,40 €	13,20 €	13,20 €
Shipping (average)	13,95 €	13,95 €	13,95 €	13,95 €
Var. Costs total	35,21 €	44,33 €	35,09 €	46,04 €
CM	65,59 €	66,07 €	75,31 €	71,56 €
CM ratio	65,1 %	59,8 %	68,2 %	60,9 %

1.1.	The unit contribution margin supplier #3		VATO	
	product 1	product 2	product 3	product 4
Price VATO	100,80 €	110,40 €	110,40 €	117,60 €
Variable costs:				
Materials	6,86 €	15,98 €	7,94 €	18,89 €
Cut&Sew	12,70 €	12,70 €	23,14 €	23,14 €
Shipping (average)	13,95 €	13,95 €	13,95 €	13,95 €
Var. Costs total	33,51 €	42,63 €	45,03 €	55,98 €
CM	67,29 €	67,77 €	65,37 €	61,62 €
CM ratio	66,8 %	61,4 %	59,2 %	52,4 %

Figure 12. Unit contribution margin per product

Figure 12 addresses the sales price (VAT0) of the product, variable costs including materials and production cost of the item. The material costs include items like main fabric, lining, packaging, labels, tags and trim. The shipping cost (average EU) refers to the shipping cost of delivering the product ordered online to the consumer. The shipping price of 13,95€ is an average shipping cost calculated from different shipping rates depending on the destination country.

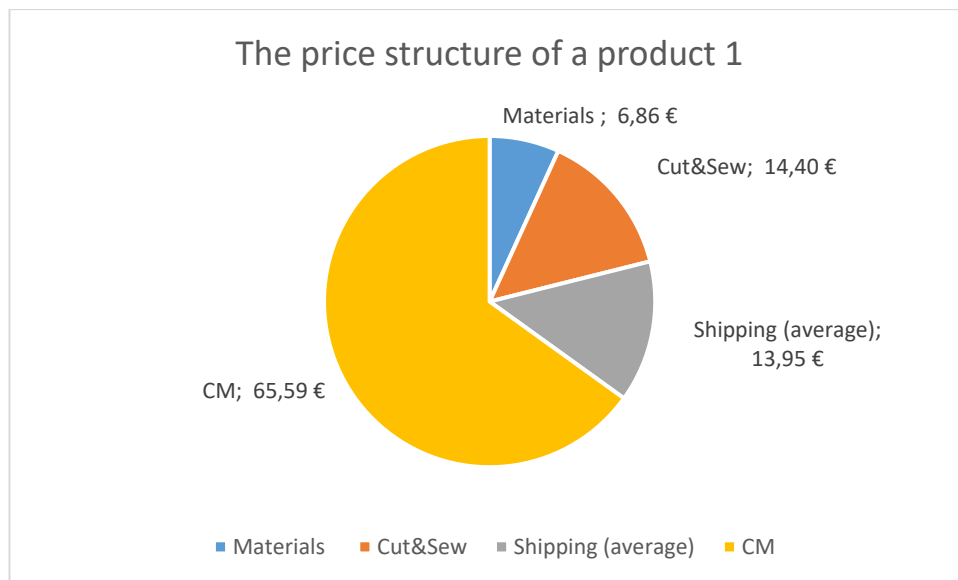


Figure 13. The cost structure of a product 1

The Figure 13 showcases the price structure of an example product, product 1 from the case company product mix of total four products.

The unit contribution margin per unit is calculated as excluding all variable costs from the VAT0 price. The average unit CM per quote from the supplier #2 is 69,63€ and for per the supplier #3 it is 65,51€. The difference therefore is 4,12€. The CM ratio varies between 52,4% and 68,2%.

The variable costing is used for calculating the contribution margins for each product. The variable costing results to higher markup which includes the fixed costs for the business. Variable costing includes items like materials, direct labor and variable manufacturing overhead. This leads to more accurate results than in absorption costing, where the fixed costs related to production are allocated to the cost of each item.

6.2.2 Break-even point

The break even-point at this stage is calculated as all the products were sold with full sales price. In the BEP calculation, as the operating income the input is 0 resulting to the break-even amount in units.

To understand the break-even point analysis and its results, it is important to recognize the fixed costs incurring yearly.

FIXED COSTS SUPPLIER #2 VATO		FIXED COSTS SUPPLIER #3 VATO	
	monthly expense		monthly expense
Office rent	312,00 €	Office rent	312,00 €
Electricity	18,24 €	Electricity	18,24 €
Bank fees	16,80 €	Bank fees	16,80 €
E-commerce license	30,00 €	E-commerce license	30,00 €
Website hosting	24,00 €	Website hosting	24,00 €
Insurances	29,17 €	Insurances	29,17 €
Marketing tool	11,40 €	Marketing tool	11,40 €
Payment services	58,80 €	Payment services	58,80 €
Marketing	480,00 €	Marketing	480,00 €
Accounting fee	40,80 €	Accounting fee	40,80 €
Equipment	96,00 €	Equipment	96,00 €
Pattern services	60,00 €	Pattern services	60,00 €
Salaries	9 600,00 €	Salaries	9 600,00 €
Care label license	15,00 €	Care label license	15,00 €
Photographing	72,00 €	Photographing	72,00 €
total	10 864,21 €	total	10 864,21 €
*12 mnths	130 370,54 €	*12 mnths	130 370,54 €

Fixed costs related to production			
Sample costs	165,60 €	Production starting cost	180,00 €
Materials per yearly production	12 000,00 €	Materials per yearly production	12 000,00 €
Pattern services 45h	1 260,00 €	Transportation	600,00 €
Transportation	890,00 €	Services	950,00 €
=	14 315,60 €	=	12 780,00 €
Total FC'S	144 686,14 €	Total FC'S	143 150,54 €

Figure 14. Fixed costs of the case company, supplier scenarios

Figure 14 includes all fixed costs for the case company per financial year, 12 months. In the first section of the fixed costs, there are general costs like office rent, electricity, fees

related to e-commerce and payments. Expenses pattern services and part of the equipment are related to continuous product development. The second section “Fixed costs related to production” are costs that incur only when the apparel manufacturing is outsourced. All expenses are presented excluding VAT.

The figure includes two scenarios of fixed costs, because depending on the supplier chosen, the additional costs to start and run the production are different. In addition, the transportation costs vary, because supplier #2 is located in Estonia and supplier #3 in Finland.

As the costing method is chosen to be variable costing, fixed manufacturing costs are treated as a period cost. Therefore, the sample processing costs, pattern alterations and transportation costs are labelled as fixed.

$$\text{Sales in units} = \frac{\text{Fixed expenses} + \text{Operating income}}{\text{Contribution margin per unit}}$$

Figure 15. Break-even point in units, formula

To calculate two different break-even points for each supplier, the fixed expenses 144 686,14€ is used for the supplier #2 and amount of 143 150,54€ for the supplier #3. As an operating income, the input is zero.

Contribution margin is a result of an average contribution margin per unit of the four different products. With the manufacturing prices of supplier #2, the average CM is 69,63€. The average CM of products manufactured by the supplier #3 is 65,51€.

In the scenario with supplier #2 the average unit CM is higher than with supplier #3, but the fixed costs are higher for the supplier #2.

Break-even point in units

using average CM/unit

Supplier #2	
BEP in units	2078

Supplier #3	
BEP in units	2185

Difference (units) 107

Figure 16. The final break-even point in units for the suppliers #2 and #3
Break-even point in units for the supplier #2 is 2078 and for the #3, 2185. The difference is 107 units.

The shortcut method is applied to this BEP calculation because it uses the contribution margin per unit, already calculated in the first section of the CVP analysis.

The break-even point then requires manufacturing and selling 2078 or 2185 products to cover all fixed costs for the period.

Break-even point in EUR

Supplier #2	
BEP in units	227 877,44 €

Supplier #3	
BEP in units	238 840,77 €

Difference (euros) 10 963,33 €

Figure 17. Break-even point in euros for the suppliers #2 and #3

The break-even point in euros for the supplier #2 is 227 877,44€ and 238 840,88€ for the supplier #3. The difference in euros is 10 963,33.

The break-even point in euros is calculated by dividing the fixed costs for the year by the average contribution margin ratio. The average contribution margin ratio for supplier #2 is 63,5% and for the supplier #3 it is 59,9%. This difference in average contribution margin ratio drives the difference of about 10 thousand euros in sales in BEP.

6.2.3 Sales mix break-even point

The sales mix break-even point analysis uses the fixed costs calculated for the previous analysis of break-even point, fixed costs are shown in the Figure 13. As the operating income, once again the input is 0.

$$\text{Sales in total (units)} = \frac{\text{Fixed expenses} + \text{Operating income}}{\text{Weighted-average CM per unit}}$$

Figure 18. Formula for BEP sales in unit for sales mix

Referring to the formula 18, to calculate the sales mix BEP correctly, the weighted average contribution margin per unit is needed. Weighted average CM is calculated by dividing the total CM per sales mix (shown in Figure 20.) by the total units sold (see Figure 20.). The weighted average CM's are calculated per each supplier being 62,22€ for supplier #2 and 65,54€ for supplier #3.

Supplier #2	
Total unit sold	2286
Total CM	158 225,92 €
Weighted average CM	69,22
Sales Mix BEP units	2090

Supplier #3	
Total unit sold	2286
Total CM	149 820,28 €
Weighted average CM	65,54
Sales Mix BEP units	2184

Figure 19. Sales mix BEP per supplier

After figuring out the weighted average CM per unit, the sales mix BEP is ready to be calculated. The results are shown in the Figure 19. With the supplier #2 the BEP in units is 2090 and for supplier #3 in units; 2184. Difference being 94 units.

Supplier #2			
Total CM per product mix			
Contribution margin:	pc sold	CM per unit	Total CM
product 1	650	65,59	42630,90
product 2	580	66,07	38318,28
product 3	456	75,31	34339,54
product 4	600	71,56	42937,20
total sum of products	2286		
total CM per mix			158 225,92 €
Less: Fixed costs			144 686,14 €
Operating income			13 539,77 €

Supplier #3			
Total CM per product mix			
Contribution margin:	pc sold	CM per unit	Total CM
product 1	650	67,29	43735,90
product 2	580	67,77	39304,28
product 3	456	65,37	29806,90
product 4	600	61,62	36973,20
total sum of products	2286		
total CM per mix			149 820,28 €
Less: Fixed costs			143 150,54 €
Operating income			6 669,73 €

Figure 20. Total CM per product mix

When calculating the total contribution margin for the sales mix of four different products with unique contribution margins, the results show that the supplier #2 leads to higher operating income. The operating income is calculated by subtracting the fixed costs for the year from the total contribution margin of the sales mix. In the sales mix, the same amounts are sold per product to ensure that the results are comparable.

Partnering with the supplier #2 in manufacturing, would lead the operating income to be 13 539,77€ and with the supplier #3 operating income being 6 669,73€.

6.2.4 Sensitivity analysis

The cost sensitivity analysis was decided to make because the operations and sales have many different variances effecting the revenue, contribution margin and therefore the operating income.

The different variances analysed with both suppliers are:

1. Assume that on average, 45% of orders are returned
2. On average, 60% of the products are sold with normal price, and 40% are sold with average of 20% discount price
3. Mixing the scenarios; 32% rate in returned products and 60% of the products are sold with normal price, and 40% with 20% discount price

And these are a few examples of the endless variants the case company can have effecting the profitability of the company. The sensitivity analysis is developed using the results from the sales mix BEP calculations.

The first scenario, “Assume that on average, 45% of online orders are returned” results to showing the impact of 45% return rate on e-commerce sales. The average price per shipment, 13,95€, is used for calculating the total costs of the shipments.

The results will indicate how many products more the company needs to sell in order to break even, after 45% of the orders are returned. Originally 2286 products are sold within the sales mix of four different products. 45% of this amount is 1028 returned products. The returns increase the fixed costs (shipping costs) by 14 350,37€ if the case company offers delivery return free of charge for the customers.

Supplier #2			
Total CM per product mix (45% returns)			
Contribution margin:	pc sold	CM per unit	Total CM
product 1	358	65,59 €	23 447,00 €
product 2	319	66,07 €	21 075,05 €
product 3	251	75,31 €	18 886,74 €
product 4	330	71,56 €	23 615,46 €
total sum of products	1257		
total CM per mix			87 024,25 €
Less: Fixed costs			159 036,51 €
Operating income		-	72 012,26 €

Supplier #3			
Total CM per product mix (45% returns)			
Contribution margin:	pc sold	CM per unit	Total CM
product 1	358	67,29 €	24 054,75 €
product 2	319	67,77 €	21 617,35 €
product 3	251	65,37 €	16 393,79 €
product 4	330	61,62 €	20 335,26 €
total sum of products	1257		
total CM per mix			82 401,15 €
Less: Fixed costs			157 500,91 €
Operating income		-	75 099,76 €

Figure 21. The effect returns have on operating income

In the supplier #2 scenario, the fixed costs will increase from original 144 686,14€ to 159 036,51€. With the supplier #3, fixed costs increase from 143 150,54€ to 157 500,91€. The operating income therefore is -72 012,26€ with the supplier #2 and -75 099,76€ with the supplier #3.

Sales Mix BEP units

Supplier #2	
Total unit sold	1257
Total CM	87 024,25 €
Weighted average CM	69,22
Sales Mix BEP units	-1040

Supplier #3	
Total unit sold	1257
Total CM	82 401,15 €
Weighted average CM	65,54
Sales Mix BEP units	-1146

Figure 22. Sales Mix BEP for the scenario 1 in sensitivity analysis

When choosing the supplier #2, to break even after the returns, approximately 1040 products more would need to be sold than in the original BEP in units, see Figure 19. With the supplier #3, the same number is 1146 products.

The second scenario, “On average, 60% of the products are sold with normal price, and 40% are sold with average of 20% discount price” indicates the impact of discounted sales on the contribution margins and break-even point.

The sales mix in the section 6.2.3 is used as a basis for making this analysis on discounted products. Therefore, the same number of products, 2286 is sold but 40% of the products are sold with 20% discount resulting to lower contribution margins per product on sale items.

1.1.	The unit contribution margin supplier #2			
	product 1	product 2	product 3	product 4
Price VATO	80,64 €	88,32 €	88,32 €	94,08 €
Variable costs:				
Materials	6,86 €	15,98 €	7,94 €	18,89 €
Cut&Sew	14,40 €	14,40 €	13,20 €	13,20 €
Shipping (average)	13,95 €	13,95 €	13,95 €	13,95 €
Var. Costs total	35,21 €	44,33 €	35,09 €	46,04 €
CM	45,43 €	43,99 €	53,23 €	48,04 €
CM ratio	56,3 %	49,8 %	60,3 %	51,1 %

1.1.	The unit contribution margin supplier #3			
	product 1	product 2	product 3	product 4
Price VATO	80,64 €	88,32 €	88,32 €	94,08 €
Variable costs:				
Materials	6,86 €	15,98 €	7,94 €	18,89 €
Cut&Sew	12,70 €	12,70 €	23,14 €	23,14 €
Shipping (average)	13,95 €	13,95 €	13,95 €	13,95 €
Var. Costs total	33,51 €	42,63 €	45,03 €	55,98 €
CM	47,13 €	45,69 €	43,29 €	38,10 €
CM ratio	58,4 %	51,7 %	49,0 %	40,5 %

Figure 23. The discounted prices and effect on contribution margin per unit

As the discounted prices are calculated (20% discount on each product), the contribution margins decrease as shown in Figure 23. comparing to the original contribution margins in Figure 12.

Sales Mix BEP units

Supplier #2	
Total unit sold	2286
Total CM	139 124,09 €
Weighted average CM	60,85
Sales Mix BEP units	2378

Supplier #3	
Total unit sold	2286
Total CM	129 704,13 €
Weighted average CM	56,73
Sales Mix BEP units	2523

Figure 24. Sales Mix BEP for scenario 2 in sensitivity analysis

As a results of the decreased contribution margins per unit, the break-even point in sales units increases from the original sales mix in section 6.2.3. The contribution margins as a result to partnering with the supplier #2 increased the break even by 288 units from the original 2090 units. With the supplier #3, the units increase by 339 units. The products manufactured by supplier #3 has lower weighted average contribution margin which leads to higher break-even point units.

In the third and last variance, “Mixing the scenarios; 32% rate in returned products and 60% of the products are sold with normal price, and 40% with 20% discount price” the returned products and discounted sale prices are mixed.

In this case, 4000 products are sold (of which 32% are returned) to test the scenario with alternative sales volume. After the returns, the total pieces are 2720 product sold.

Supplier #2			
Total CM per product mix			
Contribution margin:	pc sold	CM per unit	Total CM
product 1	408	65,59	26759,09
product 2	408	66,07	26954,93
product 3	408	75,31	30724,85
product 4	408	71,56	29197,30
product 1 discount	272	45,43	12356,96
product 2 discount	272	43,99	11965,28
product 3 discount	272	53,23	14478,56
product 4 discount	272	48,04	13066,88
total sum of products	2720		
total CM per mix			165 503,84 €
Less: Fixed costs			162 542,14 €
Operating income			2 961,70 €

Supplier #3			
Total CM per product mix			
Contribution margin:	pc sold	CM per unit	Total CM
product 1	408	67,29	27452,69
product 2	408	67,77	27648,53
product 3	408	65,37	26669,33
product 4	408	61,62	25141,78
product 1 discount	272	47,13	12819,36
product 2 discount	272	45,69	12427,68
product 3 discount	272	43,29	11774,88
product 4 discount	272	38,10	10363,20
total sum of products	2720		
total CM per mix			154 297,44 €
Less: Fixed costs			161 006,54 €
Operating income			- 6 709,10 €

Figure 25. Results on sales mix and operating income after returned products and discounts combined.

In this sensitive analysis it is easy to see the difference in operating income between the two suppliers. Choosing to manufacture all the products with supplier #2, the operating income results to 2 961,70€ in profit and with the supplier #3 to -6 709,10€ of loss. Although the fixed costs were increased the same amount of 17 856€ resulting from the increased shipping costs, the total contribution margin per the sales mix is what makes the difference significant.

Sales Mix BEP units

Supplier #2	
Total unit sold	2720
Total CM	165 503,84 €
Weighted average CM	60,85
Sales Mix BEP units	2671

Supplier #3	
Total unit sold	2720
Total CM	154 297,44 €
Weighted average CM	56,73
Sales Mix BEP units	2838

Figure 26. Sales Mix BEP for scenario 3 in sensitivity analysis

Conducting the break-even point in units calculation for the third scenario, the results show that the break-even point increases again comparing to the previous, second scenario. The BEP in units with supplier #2 is 2671 units and with supplier #3, 2838 units.

Break-even point in EUR

Supplier #2	
BEP in eur	275 811,82 €

Supplier #3	
BEP in eur	293 117,63 €

Figure 27. BEP in euros for scenario 3 in sensitivity analysis

The Figure 27 shows the break-even point in euros for the both suppliers in euros. The difference in euros between the suppliers is 17 305,81€.

The third sensitivity analysis is more likely to be closest to the truth since both, returns and discounts, are going to be a reality for the case company.

6.2.5 Projected Profit and Loss statements

To have a broad understanding on the effect on profitability the outsourcing of apparel manufacturing has on the case company, the projected profit and loss statements are prepared for the next two years after the outsourcing has started.

Supplier #2 Budgeted Income Statement			Supplier #3 Budgeted Income Statement		
A Year Ended December 31	2022	2023	A Year Ended December 31	2022	2023
Sales Revenue	274 763,52 €	293 996,97 €	Sales Revenue	274 763,52 €	293 996,97 €
Less: Cost of goods sold	109 262,40 €	116 894,70 €	Less: Cost of goods sold	120 468,80 €	128 883,90 €
Gross profit	<u>165 501,12 €</u>	<u>177 102,27 €</u>	Gross profit	<u>154 294,72 €</u>	<u>165 113,07 €</u>
Less: Operating expenses	162 542,14 €	163 792,06 €	Less: Operating expenses	161 006,54 €	162 256,46 €
Operating income	<u>2 958,98 €</u>	<u>13 310,20 €</u>	Operating income	<u>- 6 711,82 €</u>	<u>2 856,60 €</u>
Less: Interest expense	0	0	Less: Interest expense	0	0
Less: Income tax expense	591,80 €	2 662,04 €	Less: Income tax expense	- 1 342,36 €	571,32 €
Net income	<u><u>2 367,18 €</u></u>	<u><u>10 648,16 €</u></u>	Net income	<u><u>- 5 369,46 €</u></u>	<u><u>2 285,28 €</u></u>

Figure 28. Profit and loss statements for years 2022 and 2023 per supplier

In the Figure 28, the profit and loss statements' data are created using the data in Figure 25. Utilizing the sensitivity analysis scenario 3; returned products and products sold with discount give a realistic glimpse into what the real revenue, costs and profit are. In addition, projected P&L statements for year 2023 considers 4000€ target profit.

Sales revenue for the year 2022 is same for both suppliers, when sold 2720 units, which was a unit sale results in the third sensitivity analysis after 32% of products had been returned. Cost of goods sold for year 2022 is calculated as multiplying the number of units sold (2720) with the weighted manufacturing cost per unit. Operating expenses refer to the fixed costs for the year per supplier, see Figure 25 where the fixed costs are increased due to the shipping costs per returned items.

Sales revenue for year 2023 is derived when the sales increase by 7% from the previous year. The cost of goods sold for year 2023 follows the same formula mentioned for year 2022. The fixed cost increase for year 2023 because of the consistent rate of 32% of returned products; the fixed costs increase in linear proportion with the returned products.

For the both years, the income tax expense is calculated to be 20% of the operating income as the income tax in Finland is 20% for limited liability companies.

6.3 Results

The results of the chapter will give and extensive explanations on which items in the CVP analysis have the greatest impact on the results of the analysis and which structures and decisions in terms of volume and cost are the most beneficial for the case company.

The products with the highest contribution margins are products 3 and 4 manufactured by the supplier #2. Manufactured by the supplier #3, the products with the highest contribution margins are products 1 and 2. The average contribution margin for all products with supplier #2 is 69,63€ and with supplier #3, 65,51€. The difference is not major, but will be emphasized when the sales volumes and sales mix are large-scale.

The break-even point for supplier #2 is 2078 units and 2185 units for supplier #3. In the break-even point analysis, the difference comes from mainly the unit CM, because the fixed costs for the year differ only by 1 535,60€. The fixed costs are higher for the supplier #2.

The sales mix break-even point analysis showcases the difference in operating income when the sales volume increases and the weight each product is different per each product. The sales mix break-even point analysis resulted to the supplier #2 being significantly more profitable than the supplier #3 as the operating income for the supplier #2 is 13 539,77€ and for the supplier #3 only 6 669,73€ within the sales mix of four different products.

The results of the sensitivity analysis are more relevant what comes to the break-even point, because it is closer to the real-life scenario than the first break-even point calculations. The first scenario in sensitivity analysis indicates that the 45% return rate on sold products results to negative operating income as the operating income for supplier #2 in this case is -72 012,26€ and for supplier #3, -75 099,76€. The returns of 45% of sold products therefore leads to unprofitable business if nothing else is enforced to help increase the operating income.

The second scenario in sensitivity analysis, the impact of discount sales on break-even point is analysed. The case results to break-even point accrues from the original units of 2078 and 2185. The increased break-even points followed by the decreased contribution margins are 2378 units for supplier #2 and 2523 units for supplier #3.

After the third scenario in sensitivity analysis, it was clear that partnering with the supplier #2 would lead to more profitable results. Combining the product returns of 32% and adding discounted product prices to the sales mix, the results show that the operating income with supplier #2 is profit of 2 961,70€ and loss of 6 709,10€ with supplier #3.

As results show in net income; chosen to work only with supplier #2, the net income stays positive for both years. Partnering with supplier #3, the net income for year 2022 is loss 5 369,46€ and profit for 2 285,28€ in 2023. The main reason for the differences is the cost of goods sold. For the supplier #2, the COGS is about 39% of the revenue. For supplier #3, the COGS is about 44%. This compounds showing in the net income when the sales volume rises.

To conclude, the supplier #2 shows consistently better results throughout the entire CVP analysis and projected income statements.

7 Conclusions

The conclusions of the thesis consist of key findings from the supplier analysis and classification, plus a profitability analysis including cost-volume-profit analysis. Also, the recommendations are presented to improve the profitability of the case company.

7.1 Key findings

The focus on key findings is to condense the best practises and solutions for increasing product quality and profitability as the case company mentioned to be their objectives in the outsourcing process.

The most important questions answered in the thesis were following:

- Which criteria are the most important to consider when choosing supplier partners?
- How to analyse potential manufacturing suppliers?
- Which are the most effective and profitable supplier partners?
- What are the costs related to the outsourcing of apparel manufacturing?
- How do the different variances in sensitivity analysis effect the profitability?
- What is the net income for the case company for 2022 and 2023 after outsourcing the product manufacturing?

In the supplier analysis, it is crucial to decide carefully the most important selection criteria because these criteria have a major impact of the results of the supplier analysis and classification. Moreover, it is most important for the case company to clarify their vision, mission and objectives in their operations. The objectives then lead to making the supplier selection criteria as well. As the case company wants to remain as sustainable business as possible, the selection criteria also emphasize criteria such as transparency in manufacturing process, labor standards, sustainable material sourcing and waste management. These factors had an essential effect on the supplier analysis. If these criteria were less important, the results would have been different.

The suppliers analysed in the thesis are manufacturers that offer low minimum order quantities, which reduces risks in the sense that if too many products are bought from a supplier, it can lead to increased inventory and generate additional costs if all the products are not sold. At the moment, the case company works with suppliers offering low MOQ's. When the case company can source larger amounts of fabrics in the future for the manufacturing, the material costs per products will decrease, having a positive impact on the contribution margin.

The manufacturer leading to the most profitable results is the supplier #2, located in Estonia.

The variances that have to most impact on the operating income are the number of each product sold due to the products' unique contribution margin, the volume of the products sold with discount price, the number of products returned effecting the overall fixed costs for the year. It is important to carefully consider the projected volume of each product sold to have a realistic result in operating income.

As the outsourcing product manufacturing increases the cost of goods sold and the fixed costs, the effect on net income per year depends highly on the outsourcing partner and the volume of the sales of each product variant. If only one of these considered outsourcing partners would be chosen, the results show that outsourcing to supplier #2 would lead to profitable net income for both years, 2022 and 2033.

7.2 Recommendations

The recommendations for the case company includes considering different options effecting the strategy with suppliers, contribution margin per unit, sales mix BEP, results in sensitivity analysis compounding to results in profit and loss for the next two financial years.

It would be wise to consider having multiple different suppliers in manufacturing. This would reduce risks in outsourcing, so that the case company would not only rely on one supplier, lead to more cost efficient manufacturing and therefore increased total contribution margin and profitability.

Unit contribution margin per product

1.1.	The unit contribution margin supplier #2			
	product 1	product 2	product 3	product 4
Price VATO	100,80 €	110,40 €	110,40 €	117,60 €
Variable costs:				
Materials	6,86 €	15,98 €	7,94 €	18,89 €
Cut&Sew	14,40 €	14,40 €	13,20 €	13,20 €
Shipping (average)	13,95 €	13,95 €	13,95 €	13,95 €
Var. Costs total	35,21 €	44,33 €	35,09 €	46,04 €
CM	65,59 €	66,07 €	75,31 €	71,56 €
CM ratio	65,1 %	59,8 %	68,2 %	60,9 %

1.1.	The unit contribution margin supplier #3			
	product 1	product 2	product 3	product 4
Price VATO	100,80 €	110,40 €	110,40 €	117,60 €
Variable costs:				
Materials	6,86 €	15,98 €	7,94 €	18,89 €
Cut&Sew	12,70 €	12,70 €	23,14 €	23,14 €
Shipping (average)	13,95 €	13,95 €	13,95 €	13,95 €
Var. Costs total	33,51 €	42,63 €	45,03 €	55,98 €
CM	67,29 €	67,77 €	65,37 €	61,62 €
CM ratio	66,8 %	61,4 %	59,2 %	52,4 %

Figure 29. The highest unit contributions margins highlighted for a new manufacturing mix

The Figure 29 highlights the products per supplier with the highest contribution margin. One option would be to outsource manufacturing of products 3 and 4 for supplier #2 and products 1 and 2 for supplier #3. This way the total contribution margin per sales mix could be optimized for increased operating income.

Material costs per product can be reduced by ordering larger amount of fabrics and other materials. With larger order quantities, the price per meter in fabrics decrease.

Another recommendation having a high impact would be manufacturing smaller number of each product at once, for instance 100 pieces per product. This strategy would give more flexibility and efficiency on inventory management. The case company could utilize this strategy to minimize the excess inventory resulting from products that don't sell. On the other hand, this would increase the manufacturing cost with supplier #2.

The volume of each product in the sales mix has a momentous impact on the operating income. And if there is high seasonality in certain products, this should be considered in break-even point on a yearly and monthly basis.

7.3 Further research

The further research recommends which topics to research more for optimized results in profitability.

A factor related to the product sales and contribution margins is the average order value in ecommerce. When more than one item is shipped in one delivery, the contribution margin of the total order increases. The analysis could therefore be conducted using the average order value in ecommerce.

To consider other ways of manufacturing, rather than outsourcing, is to build a joint venture or partner in Finland with local suppliers and establish own manufacturing site. This way the control would remain on the case company and the quality of manufacturing could be assessed and controlled easily and time-effectively.

When sourcing materials for products, it would be advised to look for more options that are more cost effective yet ensure the quality in products. And as mentioned earlier, the sensitivity analysis could be elaborated into various additional scenarios, for example modifying the sales mix, optimizing the fixed and variable costs and making analysis of sales mix BEP per season due to seasonality in sales.

7.4 Reliability and relevance

The reliability depends on the accuracy of the supplier and profitability analyses conducted. The results of cost-volume-profit are reliable as long as the manufacturing prices stay consistent to the reality. The producing costs presented in the thesis are estimated costs and can change during the outsourcing process, for example in the quality assessment phase. The changes would radically effect the results of the calculations.

What comes to the accuracy of the fixed costs related to the outsourcing, after the relevant range of volume in sales, the case company might need to employ more people to handle for example the customer service related to shipping and returns. This would increase the fixed costs impacting the break-even point.

The third scenario in sensitivity analysis is considered to be the most reliable, because the variances are close to the real-life scenario. It could not be reliable analysis if considered that all products that are manufactured are sold without returns or discounts.

The methods used in the thesis are reliable, based on industry specific data and literature provided by industry professionals. The managerial accounting methods used are applicable to the case, because the methods consider all possible cost items and variants needed.

As the sustainability in fashion industry is very much emphasized and important today, the topic and methods result to giving relevant information on the financial impact of modern outsourcing, implemented sustainably.

7.5 Company feedback

According to the case company representative and owner, she plans to use the results in decision making when outsourcing the manufacturing of our products. And that she will definitely use the tools and analyses provided in the thesis.

The thesis was considered to be very useful for the case company to be utilized in their upcoming outsourcing process.

The case company representative thought that the thesis writer provides her more knowledge on the theme and analyses she had no previous experience in. She then gained a lot of insights and knowledge in managerial accounting, pricing, manufacturing costs and the financial analyses based on sales volume.

The project could have also included the impact on profitability when a certain part(s) of the manufacturing (e.g. cutting) is outsourced or when manufacturing some products in-house.

7.6 Reflect of learning

The thesis writer considers having learned to manage a very detail-oriented project and how to derive the most value possible out of the project. The author is very interested in learning more about analytics in profitability and managerial accounting. This analysing part had the most emphasis on the thesis and also provided the most value to the case company.

During the thesis process, the author learned more about the features and business models of different suppliers in Finland and Estonia. Using different tools and methods for analysing suppliers was considered to be efficient way to analyse suppliers, with both qualitative and quantitative data.

What made the thesis writing and analysing process interesting was the endless amount of variances and possibilities in CVP analysis to consider and see the immediate changes in the profitability of the outsourcing.

The thesis author feels that she has succeeded to deliver considerably vast amount of value for the case company including analyses in suppliers and profitability, all applicable to the case company's operations immediately.

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Appendices

Appendix 1. Manufacturing costs per unit

manufacturing costs per unit, total 2720 units

#2	product 1	product 2	product 3	product 4	#3	product 1	product 2	product 3	product 4
	35,21 €	44,33 €	35,09 €	46,04 €		33,51 €	42,63 €	45,03 €	55,98 €
pc	680	680	680	680		680	680	680	680
	23 945,52 €	30 147,12 €	23 863,92 €	31 305,84 €		22 789,52 €	28 991,12 €	30 623,12 €	38 065,04 €

total 109 262,40 €

total 120 468,80 €

manufacturing costs per unit, total 2910 units

#2	product 1	product 2	product 3	product 4	#3	product 1	product 2	product 3	product 4
	35,21 €	44,33 €	35,09 €	46,04 €		33,51 €	42,63 €	45,03 €	55,98 €
pc	728	728	728	728		728	728	728	728
	25 618,19 €	32 252,99 €	25 530,89 €	33 492,65 €		24 381,44 €	31 016,24 €	32 762,24 €	40 724,00 €

total 116 894,70 €

total 128 883,90 €

Appendix 2. Case Company Feedback

Written feedback provided by the case company representative in 6 March 2021.

“I have not yet used the results of the thesis yet, because the thesis was designed to help make decisions in the future and provide tools for upcoming projects and their evaluation.”

“I plan to use the results in decision making when outsourcing the manufacturing of our products. I will definitely use the tools and analyses provided in the thesis.”

“The thesis writer provides me more knowledge on the theme and analyses I had no previous experience in. So I gained a lot of insights and knowledge in managerial accounting, pricing, manufacturing costs and the financial analyses based on sales volume.”

“The thesis writer could have included more information about industry specific standards on contribution margins, manufacturing costs and other cost items.”

“The project proceeded in logical order and provided relevant conclusions to the topic.”

“One thing the thesis could have also included in analysis: the impact on profitability when a certain part(s) of the manufacturing (e.g. cutting) is outsourced or we would manufacture some products in-house. This would have been interesting to know as well.”