



**Aalto University  
School of Business**

# **PROJECT REPORT**

## **Capstone: Future-proofing Supply Chain**

Case company: Reima®

**Group 3**



Submission date: 13 February 2023

## **TABLE OF CONTENTS**

1. INTRODUCTION	1
2. GOALS & DELIVERABLES	1
3. EXPLORATORY ANALYSIS	2
4. FUTURE DEMAND FORECAST	7
5. CENTER GRAVITY ANALYSIS	10
6. INTERPRETATION OF THE RESULTS AND RECOMMENDATIONS	12
7. ASSUMPTIONS, LIMITATIONS & DISCLAIMERS	17
REFERENCES	20
APPENDIX	24

## **1. INTRODUCTION**

Reima, established in 1944, is a company that specializes in creating kid-friendly and functional apparel with a focus on comfort, safety, and practicality. Their product range includes winter jackets, raincoats, boots, and clothes for various activities and occasions. The company is dedicated to sustainability and incorporates eco-friendly elements in their products whenever possible. (Reima, 2023)

Reima's manufacturing mainly takes place in China, with the rest coming from countries like Vietnam, India, Sri Lanka, and Taiwan. The majority of the company's inventory is housed in a central warehouse in Poland, which serves all of its sales channels.

## **2. GOALS & DELIVERABLES**

The objectives of the project are:

- Analyze Reima's current warehouse location in relation to its supply chain and target markets, with an emphasis on reducing carbon footprint and adapting to future growth opportunities.
- Evaluate product categories to retain in warehouse(s) or micro-warehouse(s) to meet market-specific demands.

The project will deliver:

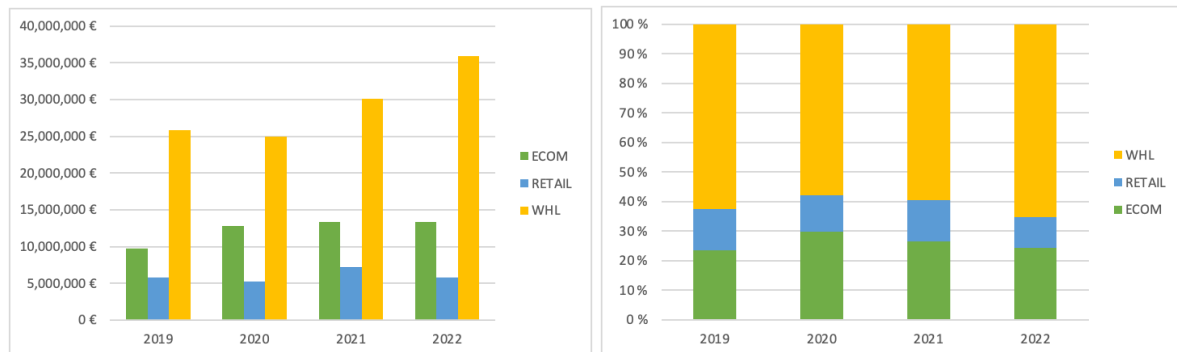
- An evaluation of Reima's current warehouse setup, including its strengths, weaknesses, and opportunities for improvement.
- Recommendations for new or additional warehouse(s) or micro-warehouse(s) locations that will optimize distribution and reduce environmental impact.
- Suggestions for stock levels to meet market-specific demands.
- An analysis of the overall environmental and social impact of the new suggested warehouse setup.

The recommendations are expected to lead to improved supply chain management efficiency and better serve the needs of different markets.

### 3. EXPLORATORY ANALYSIS

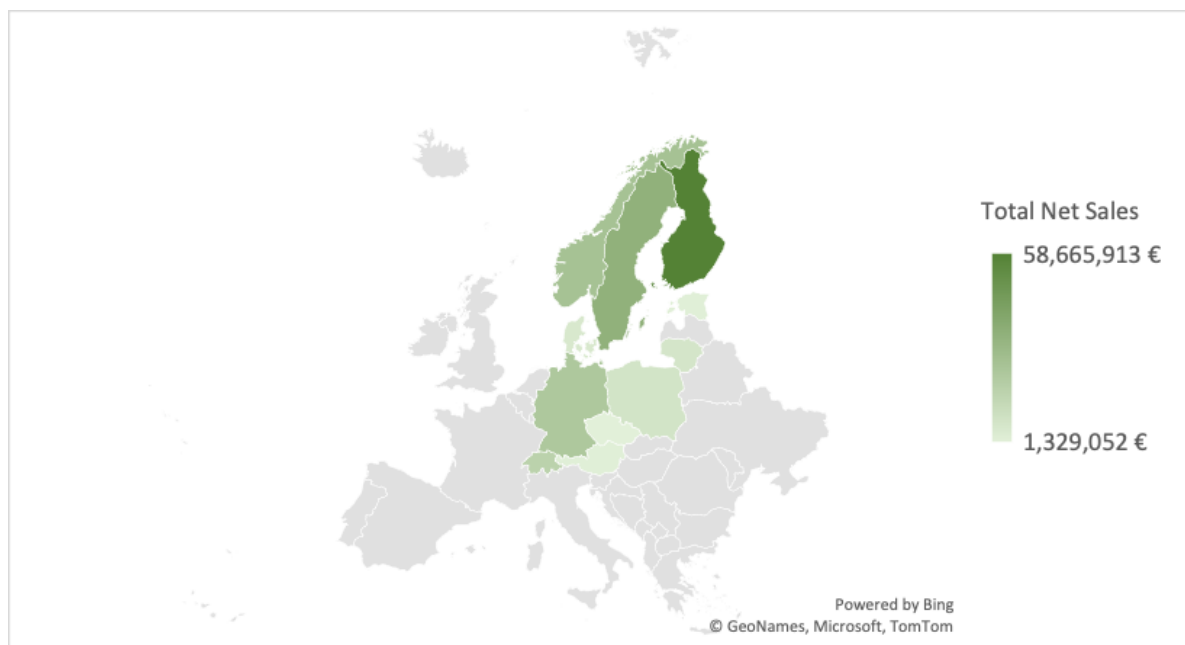
The main goal of this section is to understand Reima's current situation in its operating business environment. The results of the analysis will guide us in choosing the main variables to take into account for future demand forecasting.

Historical sales data shows that the majority of Reima's net revenue comes from wholesale, accounting for an average of 60% of total annual revenue. E-commerce and retail make up 25% and 15% of total revenue, respectively.



**Figure 1.** Reima's total net revenue per channel per year from 2019 to 2022, absolute values on the left and relative values on the right.

The company's most mature markets are Finland, Germany, Norway, Switzerland, Sweden, and Poland, with growing potential in countries such as the Czech Republic, Austria, Lithuania, and Estonia.



**Figure 2.** Reima's top 11 countries, with total net sales surpassing 1M EUR during 2019-2022.

Reima distributes its products through three sales channels: wholesale, retail, e-commerce, and two manufacturing processes. Approximately half of their sales are pre-orders from

wholesale, which are produced on a make-to-order basis. The other half of sales consists of retail, e-commerce, and in-season wholesale orders, which are produced on a make-to-stock basis.

For a better understanding, the analysis looks into the three main distribution channels to intercept trends and comprehend revenue generation by different countries in Europe.

- Wholesale

We divided markets into three different categories based on Annual Generated Revenues (AGR): *mature markets* ( $AGR > €1M$ ), *up-and-coming markets* ( $€100K < AGR < €1M$ ), and *low markets* ( $€10K < AGR < €100K$ ).

Based on **Appendix 1**, Nordic countries (Finland, Sweden, and Norway) generate the highest AGR with a constant trend during the last four years. They represent around 60% of all wholesale revenues compared to the rest of Europe.

Lithuania and Poland present a positive growing trend within the mature markets. Meanwhile, Italy and France could be interesting countries within the up-and-coming markets.

Regarding pre-orders and in-season orders, mature markets sales are driven by pre-orders representing 81% in the wholesale channel. Up-and-coming markets report a significant spike in the case of Iceland (97%) and Austria (91%); the opposite case for Italy with only 36% of pre-orders (**Appendix 2**).

- E-commerce

We divided markets into four different categories based on Annual Generated Revenues (AGR): *mature markets* ( $AGR > €1M$ ), *high markets* ( $€100K < AGR < €1M$ ), *up-and-coming markets* ( $€10K < AGR < €100K$ ), and *low markets* ( $AGR < €10K$ ).

Based on **Appendix 3**, Finland, Germany, and Switzerland are generating the most revenue through the online channel in absolute terms. Covid-19 situation boosted e-commerce sales, especially in the Nordic countries. In addition, it highlighted some good opportunities in growing markets such as Poland, the Czech Republic, Austria, Latvia, and Slovakia.

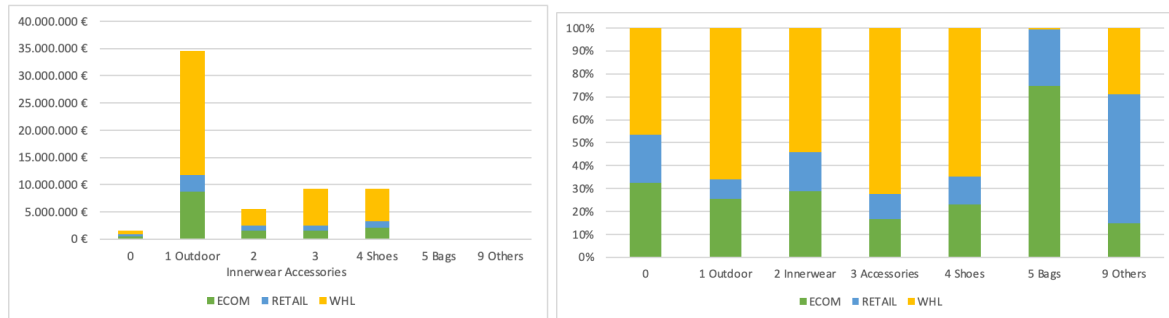
More interesting insights are obtained by combining the previous table with **Appendix 4**. Considering 2022, e-commerce sales' weight over all distribution channels show us the relevance of the online channel. For some European countries, e-commerce has generated more than half of the revenues. For example Poland (51%), Czech Republic (100%), Latvia (96%), and Slovakia (100%).

- Retail

Reima's physical points of sale are currently present only in Finland. During the past four years, revenues generated from the retail channel in Sweden, Norway, and

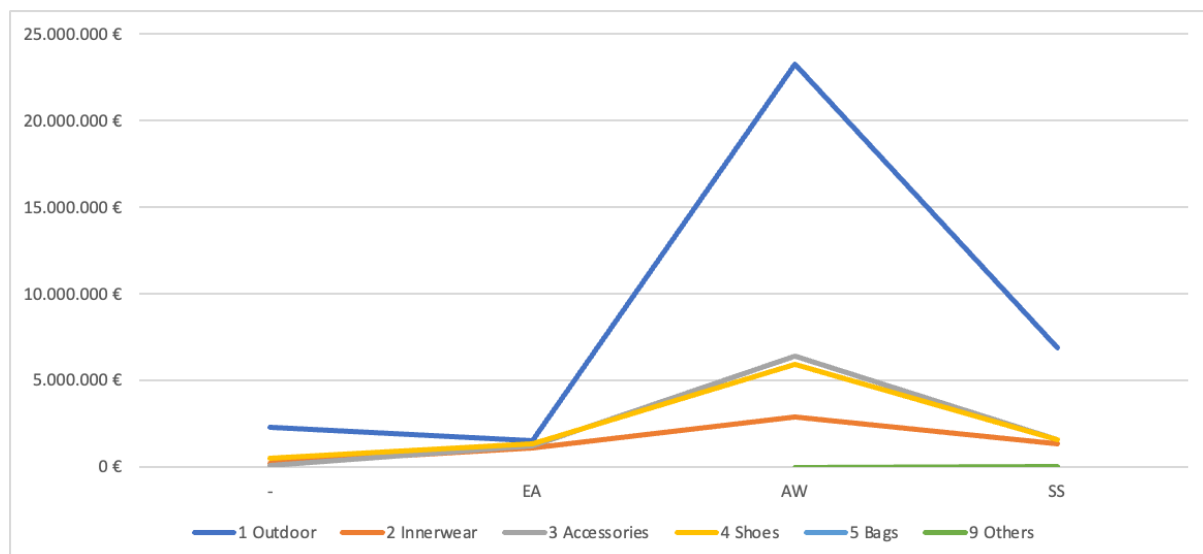
Germany are only a modest percentage compared to Finland. According to **Appendix 5**, that percentage reached its lowest point in 2022 (15.4%).

Finally, the analysis focuses on Reima's product categories. The *Outdoor* category is driving sales. It is mainly distributed through the wholesale channel, but e-commerce is used by customers to purchase outdoor clothing.



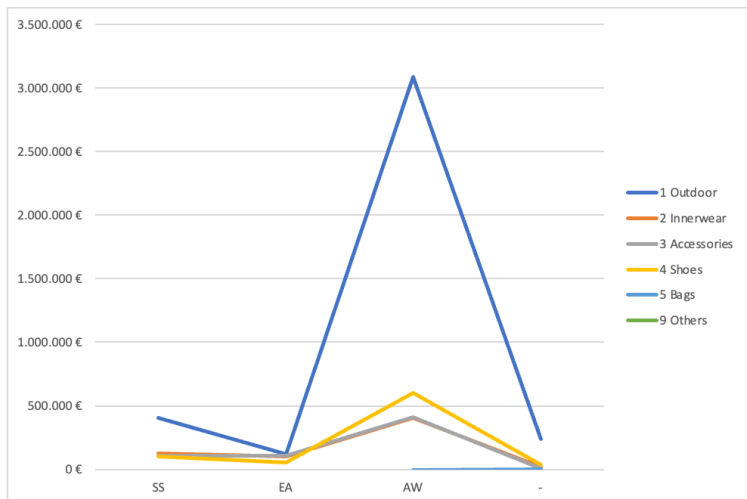
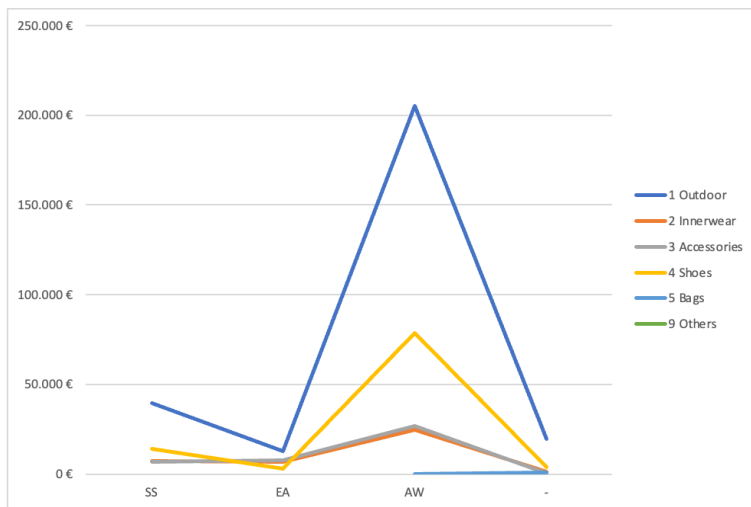
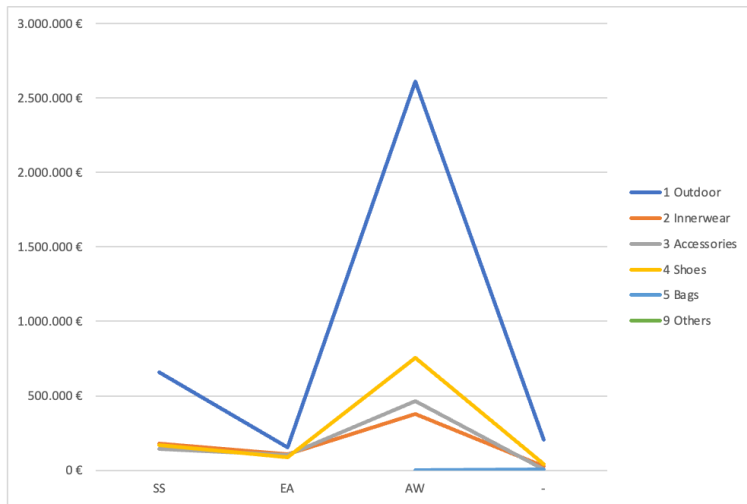
**Figure 3.** Reima product categories' sales generation by distribution channel during 2022, absolute values on the left and relative values on the right.

Seasonality is an extremely relevant variable to be considered in the apparel industry. Reima's product categories and sales trends are definitely affected by seasons. **Figure 4** shows how categories have their sales peak in the Autumn-Winter season, especially the outdoor ones, regardless of the distribution channel.



**Figure 4.** Reima product categories and their seasonality sales trends (2022).

Seasonality is strictly related to weather conditions. Reima's aim to serve European countries should take into account differences between European areas. According to **Figure 5**, Shoes' category seems to be more sensitive to seasonality in Baltics compared to the Nordics and Central Europe. Overall, trends are almost consistent in all three considered areas.



**Figure 5.** Reima product categories and seasonality sales trends by European areas (2022). From top to bottom: Nordics (Finland, Norway, and Sweden), Baltics (Estonia, Latvia, and Lithuania), and Central Europe (Poland, Germany, Switzerland, and Austria).

Main findings:

- **Wholesale** channel and pre-order sales represent the majority of sales. This channel is mature and leaves us little space to change the distribution system.
- **E-commerce** requires a high degree of flexibility in order to serve European markets. Future demand forecasts will be crucial to focus on specific countries (or market areas) in Europe.
- **Retail** channel will have a side role in next considerations due to its minor relevance for revenue generation and its circumscription to Finland.
- **Product seasonality** is a main variable to consider for further analysis. All in all, it seems to report the same trends in all distribution channels and market areas.



## 4. FUTURE DEMAND FORECAST

### a. Methods:

There are multiple methods of time-series analysis and forecasting that are applicable for a case like Reima; however, for the sake of simplicity in the project, we have decided to move forward with the ARIMA method, which stands for "Auto-Regressive Integrated Moving Average".

Simply put, "**Auto-Regressive**" means using historical data as predictors. "**Integrated**" means changing the time series to make it stationary. "**Moving Average**" describes the use of the average of previous mistakes as a predictor in the model. (Munichiello, 2022)

The procedure can be summarized in the following steps:

#### i. Data categorization

Historical sales data summarized into pivot tables shows that there are a total of 9 product categories (column "**Product Group Desc**") which can be divided into 2 categories:

- High-tiered revenue drivers (incl. 0, 1 Outdoor, 2 Innerwear, 3 Accessories, 4 Shoes), generating from approx. 4.2M€ upto 125M€;
- Low-tiered revenue drivers (incl. 5 Bag, 9 Others, Seasonal, Non-seasonal) generating from as low as 26€ upto 333K€

Our decision is to treat the low-performing categories as outliers and remove them from our forecast to reduce noise.

#### ii. Forecast D2C demands and use it to estimate Wholesale demands

As recommended by case company, forecasted ECOM and RETAIL demands will be made on a quarterly basis. ECOM demands will then be used to estimate WHL demands.

#### iii. Forecast eCommerce demands

First, we filter out the top 15 countries with the highest eCommerce sales, including the *mature markets* with annual revenue over 1M€ (Finland, Germany, Norway, Switzerland, Sweden, Poland) and *high markets* with annual revenue between 100K€-1M€ (Denmark, Czech Republic, Austria, Latvia, Lithuania, Great Britain, Estonia, France, Netherlands).

Next, the ARIMA model from the **statsmodels** package on Python will be used, which requires the input of 3 parameters below (Perktold et al., 2019):

- p: The lag order, commonly known as the number of lag observations contained in the model.

- d: The degree of differencing, also known as the number of times the raw observations are differenced.
- q: The moving average window size, commonly known as the moving average order.

To fully evaluate the best **(p,d,q)** combination, we will conduct grid analysis of certain pre-determined values of **p**, **d**, and **q** - meaning we will fit all possible combinations of (p,d,q) into the model and calculate the corresponding **Mean Squared Error (MSE)** score (Brownlee, 2017). The **(p,d,q)** combination with the lowest MSE score will be applied to the model to make a forecast of the next 8 quarters (2 years).

The MSE score is calculated by (Brownlee, 2017):

- Create training and test sets from the dataset (70% train, 30% test)
- Walk the test dataset's time steps to train the ARIMA model.
- Make a one-step forecast.
- Store the observations and predictions.
- Determine the prediction's error score in relation to the expected values.

#### iv. Estimate Wholesale demands

A multiplier ("m") is calculated by dividing historical wholesale revenue and eCommerce revenue for each country and product category. Additionally, we assume a 20% reduction buffer of wholesale revenue from the forecast **only in mature markets** as the increase in eCommerce sales might self-cannibalize its wholesale demands.

$$\text{Multiplier } m = \frac{\text{Historical Wholesale Revenue}}{\text{Historical eCommerce Revenue}}$$

$$\text{Adjusted Multiplier } m' = m * (1 - 0.2) \text{ only for } \mathbf{mature\ markets}$$

$$\text{Forecasted Wholesale Demands} = \text{Forecasted eCommerce Demands} * m'$$

#### b. Assumptions:

- Pre-determined parameters for the ARIMA model:
  - $p=\{0, 1, 2, 4, 6, 8, 10\}$
  - $d=\{0, 1, 2\}$
  - $q=\{0, 1, 2\}$
- A 20% reduction buffer is applied to wholesales revenue from the forecast in **mature markets** as the increase in eCommerce sales might self-cannibalize its wholesale demands.

**c. Results:**

- The forecasted demands chart can be found in Appendix 6
- **Reference file:** Python notebook ("ARIMA\_model.ipynb")
- **Reference file:** Excel file ("Sales Forecast.xlsx" → Tab: "FORECAST")

## 5. CENTER GRAVITY ANALYSIS

### a. Method:

#### i. ECOM/WHL weight

From the provided information regarding the last-mile freight cost of eCommerce and Wholesale, we can calculate that shipping for eCommerce is approximately 3.39 times higher than that of wholesale. This means, for example, shipping 1 ECOM item from the warehouse (e.g Poland) to the demand destination (e.g Finland) is 3.39 times more expensive than shipping 1 WHL item.

#### ii. Weighted Total Demand

Combined with the demand forecast from section 5, we can calculate the total adjusted demand volume in the next 2 years for each country.

$$\begin{aligned} \text{Weighted Total Demand} &= \text{ECOM demands} * 3.39 \\ &+ \text{WHL demands} + \text{RETAIL demands} \end{aligned}$$

#### iii. Distance between 2 locations

Let's denote  $X1$  and  $Y1$  the latitude and longitude of the Optimal Location of the warehouse. Additionally, let's denote  $X2$  and  $Y2$  the latitude and longitude of the demand location. The bird-view distance between two locations can be calculated using the following formula (ExcelDemy, 2022):

$$\begin{aligned} d &= \text{ArcCos}(\text{Cos}(\text{Radian}(90 - X2)) * \text{Cos}(\text{Radian}(90 - X1)) \\ &+ \text{Sin}(\text{Radian}(90 - X2)) * \text{Sin}(\text{Radian}(90 - X1)) * \text{Cos}(\text{Radian}(Y2 - Y1))) \\ \text{Distance } D &= d * 6371 \end{aligned}$$

#### Notes:

- 6371 is the median radius in kilometers of the Earth (Moritz 1980, 128).
- Keep in mind that the Earth is not a perfect sphere, therefore, the Distance is only approximate.

#### iv. Optimization

The center of gravity optimization problem can be formulated as below.

- We number the countries from 1 to 15.
- We call  $V1, V2, \dots, V15$  is the total adjusted volume of demands for country 1,...,15

- D1, ..., D15 is the distance in km between the optimal location of the warehouse and the demand locations
- The objective function OF can be formulated as below:

$$\text{Minimize } OF = \sum_{i=1}^{15} V_i * D_i$$

For the sake of simplicity for the optimization, we introduce the following constraints:

- $X1 \geq 0$  and  $Y1 \geq 0$  (the warehouse should be on the northern and eastern hemisphere)
- $Y1 \leq 62$  (the highest longitude is limited to Jyväskylä)
- $X1 \leq 35$  (the most eastern longitude is limited to Russian border)

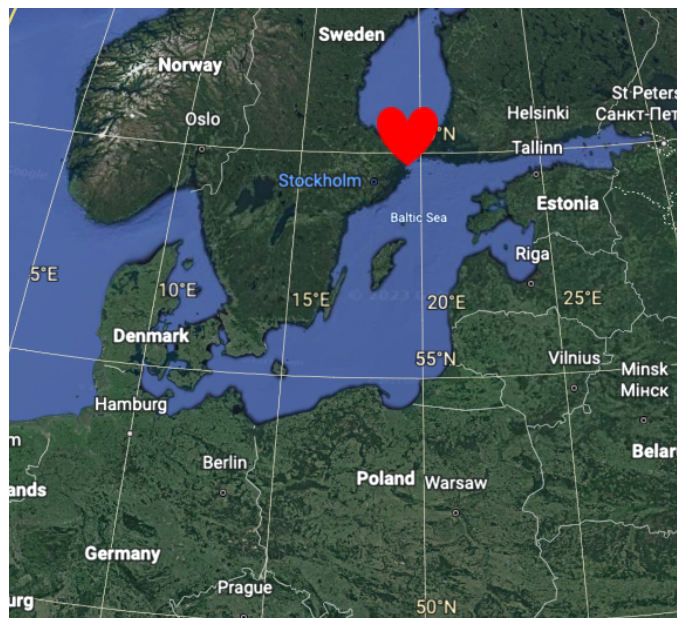
The optimization is done via Excel Solver, using the method "Revolutionary".

#### b. Assumptions:

- Location of demands is set to be the capital city of that country, with its estimated longitude and latitude obtained from Google Earth.
- Optimization of warehouse location only takes into account the bird-view distance between the warehouse and demand location, which can be improved by using some sort of Google Maps API.
- Assume that the Earth is a perfect sphere with its radius being 6371km.
- The shipping costs for WHL and RETAIL per product are the same.

#### c. Results:

The optimization claims that the optimal location of the warehouse is  $X1 = 56.14$  and  $Y1 = 18.92$ , corresponding to the red circle in the picture below, which is in the middle of the Baltic Sea.



**Reference file:** Excel file ("Sales Forecast.xlsx" → Tab: "COG")

**Figure 6 (left).** Optimal location for the warehouse according to the center of gravity.

## 6. INTERPRETATION OF THE RESULTS AND RECOMMENDATIONS

### a. Warehouse and micro-warehouse Locations

The result from the Center of Gravity in *section 6* shows that the warehouse location in Poland is already relatively close to the optimal location. **Our suggestion is to maintain the central warehouse in Poland** which in reality is close to the optimal center-of-gravity location while still being relatively inexpensive to operate compared to other neighboring areas.

Next, we examine the potential of having a micro-warehouse closer to the Nordics and Baltics markets by filtering corresponding demand forecast and run the center of gravity on the filtered data.

**Reference file:** *Sales Forecast.xlsx* → Tab: "*COG (Baltics+Nordics)*".

The result shows the optimal location (60.17, 25.94) which is corresponding to the coordinate of Helsinki. Therefore, we consider Helsinki and nearby cities (Tallinn, Estonia, and Riga, Latvia) as our candidates for the micro-warehouse location.

Using DHL's non-business shipping rate (DHL 2022) and transit time estimator from Finland, Estonia and Latvia (DHL, 2023) as a reference, we summarize the data in the table below.

	To Finland (00100)	To Norway (0010)	To Sweden (11115)	To Denmark (1050)
<b>From Finland (00100)</b>	Zone 1 1-2 days or same day	Zone 5 125EUR 3-4 days	Zone 1 104EUR 1-2 days	Zone 1 104EUR 3-4 days
<b>From Estonia (10001)</b>	Zone 1 70 EUR 1-2 days	Zone 6 99.5EUR 4-5 days	Zone 2 87EUR 2-3 days	Zone 2 87EUR 2-3 days
<b>From Latvia (1004)</b>	Zone 1 94.5EUR 2-3 days	Zone 4 113EUR 5-6 days	Zone 1 94.5EUR 4-5 days	Zone 1 94.5EUR 4-5 days

**Figure 7.** *Estimations of Shipping Costs and Shipping Time from DHL*

Since shipping costs from Estonia to other Nordics countries are approximately 30% cheaper than from Finland and 20% cheaper than from Latvia, with negligible increase in shipping time, together with the fact that warehousing costs (labor costs considering transportation and storage, and renting costs) in Estonia is approximately 30-60% that of Finland, **we recommend establishing the micro-warehouse in Estonia to serve D2C orders from mature Nordics and growing Baltics markets as well as to refill Retail store inventory in Finland.**

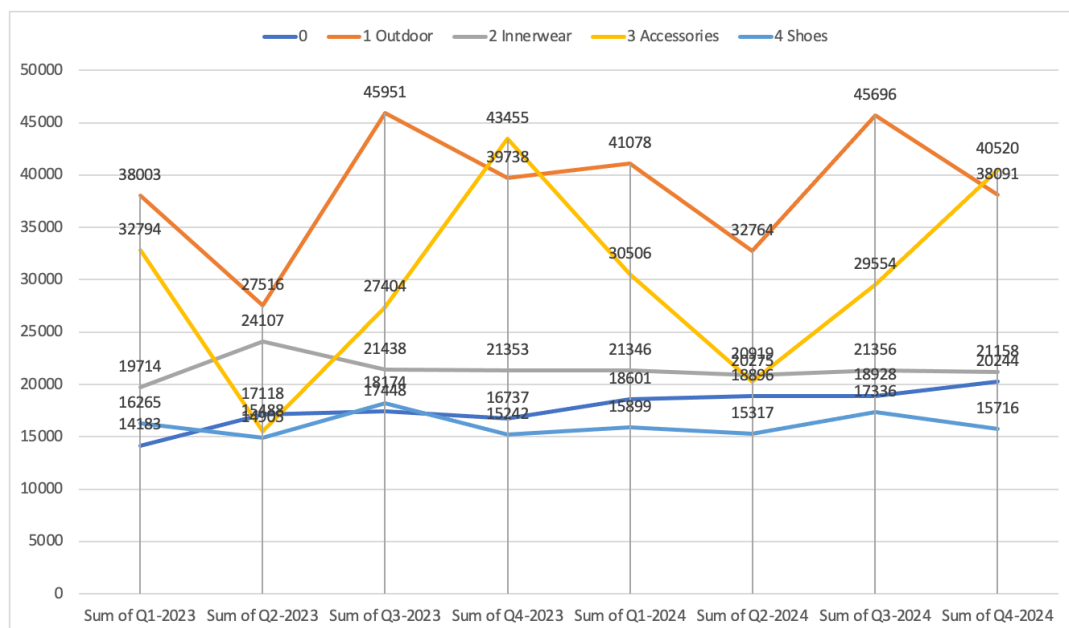
	Finland	Estonia	Latvia
Labor costs (€/h)	30,6	11,1	7,7
Renting cost (€/sm/month) <5,000sm	10,3	4,8	4,7
Renting cost (€/sm/month) >5,000sm	8	4,5	4,1
Size of facilities (1,000sm)	175	8	6
Net prime yields (%)	3,9	6,9	6,9

**Figure 8.** Estimations of warehousing costs of Finland, Estonia, Latvia (Statista Research Department, 2022)

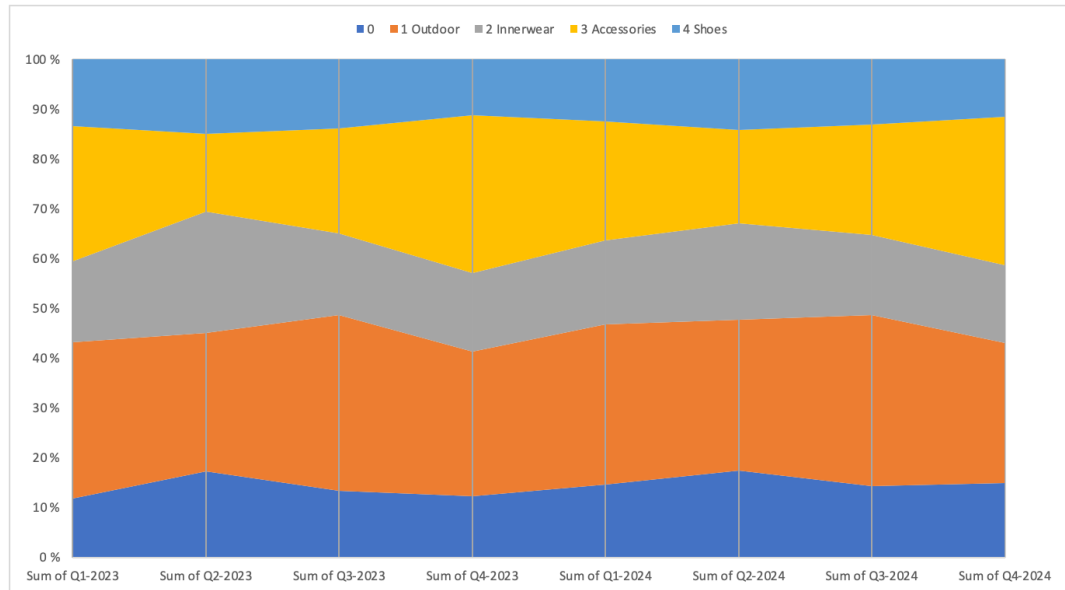
### b. Product Selections in the micro-warehouse

Quarterly forecasted demands from the Nordics and Baltic countries can indicate what kind of products should be kept in the micro-warehouse. For instance:

- **3 Accessories** products should be replenished more in Q4 while its demands drop significantly in Q2.
- **1 Outdoor** products should be replenished more in Q3
- **4 Shoes** products have rather stable demands, with some increase in Q3.



**Figure 9:** Quarterly demands of different product categories in the Nordics and Baltics



**Figure 10:** Quarterly relative demands of different product categories in the Nordics and Baltics

### c. Investment plan

In summary, our recommendation for the investment plan is as follows:

- Reima to invest in opening a micro-warehouse in Estonia (e.g., Tallinn) which will be used to fulfill all D2C orders from Nordics and Baltics as well as to operate as a backup buffer for Retail stores in Finland.
- Reima to maintain the central warehouse in Poland to fulfill all wholesales orders as well as all D2C orders from other regions besides Nordics and Baltics. This warehouse can also serve as a backup warehouse in case stock in the micro-warehouse runs out.

The impacts we foresee is as follows:

- Reima can serve the ECOM markets in the Nordics and Baltics better due to reduce of shipping time, which in turns, opens up more opportunity for market growth
- Reima can react faster to changes in demands in Retail stores in Finland thanks to reduced stock replenishment time since the warehouse in Estonia also has lower shipping time.
- Warehousing in Estonia is in the "sweet spot" thanks to its low costs and distance from Reima's major Nordics and Baltics markets.
- The warehouse in Poland can still function to serve the wholesale markets without much disruptions since shipping time is less of a crucial factor.



#### d. Sustainability impact

According to ESG principles, three different areas should be considered: Environment, Society, and Governance.

Due to the lack of other data and information, it is only possible to estimate potential environmental impact. Thanks to Reima's Corporate Sustainability Report (2021) and shared data, generated emissions are about 330 tonnes of CO<sub>2</sub> per year.

Our implementations will probably affect *Scope 2 & 3* emissions because of micro-warehouse's utilities and transportation. The total related emissions account for 5% of total Reima's declared emissions (5% of 330 tonnes = 16.5 tonnes of CO<sub>2</sub>).

Comparing Reima's current situation with our suggested solution, we can consider the two scenarios below:

- **Scenario 1:** Maintain the central warehouse in Poland, without additional micro-warehouse (*Reima's current setup*)
- **Scenario 2:** Maintain the central warehouse in Poland, with additional micro-warehouse in Estonia (*our recommendation*)

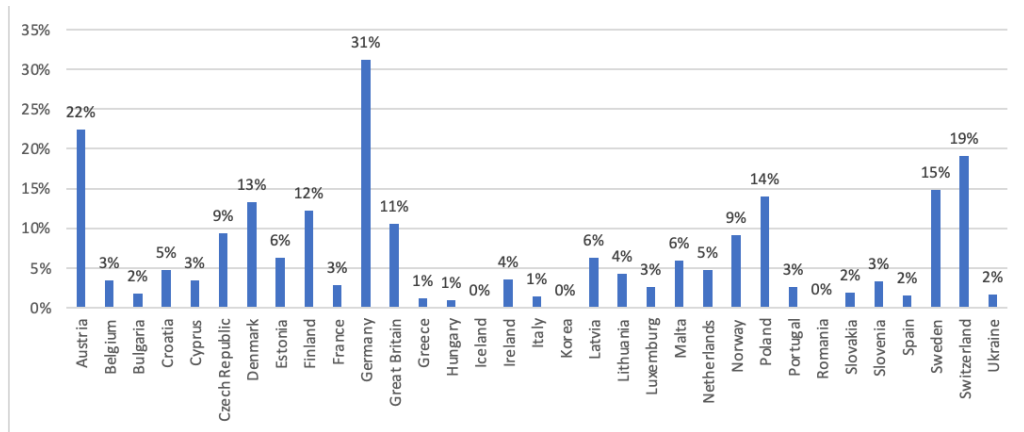
We can calculate the total travel distance (of ECOM orders only) by multiplying the number of shipments with the distance. We can estimate that

- **Scenario 1:** total distance travel is **752 693 249 km**
- **Scenario 2:** total distance travel is **541 226 823 km**

Assuming that the carbon footprint of last-mile shipping of ECOM orders increases incrementally to the increase in distance between the warehouse and demand destination, we can conclude that Scenario 2 has **28% less** CO<sub>2</sub> footprint from last-mile shipping than Scenario 1.

The calculation is available in File: *Sales Forecast.xlsx* → Tab: *Sustainability Impacts*.

The new micro-warehouse will have a positive impact also in the case of **product returns**. Nordics and Baltic countries, which have a relatively high return rate, will be served by the Estonian micro-warehouse. This will shorten the shipments and therefore emissions. In addition, Reima could benefit from synergies in the return allocation into outlets and stores in Finland.



**Figure 11.** Average return rate per country about the ECOM orders.

## 7. ASSUMPTIONS, LIMITATIONS & DISCLAIMERS

### a. Assumptions

To simplify the analysis, the following assumptions below were made:

- The focus of the analysis will be more on improving D2C in-season sales while still taking into account the wholesale demands to locate the best central warehouse location.
- The center of gravity analysis will only look into the Outbound shipping process, more specifically last-mile shipping.
- Reima will continue to actively pursue sales and marketing efforts, allowing us to base our demand forecast on historical data.
- Given Reima's significant size and shipping volume, we assume that they have a high level of bargaining power when negotiating shipping costs with logistics vendors. We will use online data as an estimation and apply a certain percentage as an allowance for potential discounts, which will be verified with Reima representatives.
- For mature markets, an increase in D2C sales will add a 20% reduction buffer in wholesale demands ("self-cannibalization") while in growing markets, this will not happen.

### b. Limitations

As stated in the preceding sections, due to certain limitations of the project's implementation, the results are only indicative given the available information and manpower resources. Below is a summary of the limitations of this project:

- Only 15 countries with the highest ECOM revenue were selected for the project. Even though this gives a good indication of the majority of Reima's main markets, all countries could have been included.
- Due to time-management reasons, we decided to look into **Product Group Desc** instead of **Product Group** which could be more intuitive to the case company.
- The WHL demands are estimated from the forecasted ECOM demands, by multiplying it with the corresponding "multiplier", the calculation of which is quite "naïve".
- The method of grid searching for the "best performing" combination of (p, d, q) is quite simple and performance is measured by the MSE score of 1 step forecast which is quite limited.
- The pre-determined set of parameters for the ARIMA model was quite limited.

- The method of calculating the distance between 2 locations in the center-of-gravity analysis is subject to certain deviations. It would have been better to be able to use e.g Google Maps API.
- We assume that a company with Reima's size will be able to negotiate warehouse and shipping costs. We do not have access to this information and had to rely on DHL rates as an example.

### c. PESTE analysis

The qualitative approach is based on a PESTE analysis based on market research considering both Reima's current situation and industry-specific macro trends.

#### i. Political

- **Production in China during Covid-19 outbreaks.** European businesses have to adapt to the new "living with COVID" strategy which takes place in China. Infection waves prediction, multiple suppliers management, and relocation to Vietnam are possible solutions.
- **EU response to Russia's invasion of Ukraine.** Managing operations in the related territories is to avoid and supply chain decisions can be affected. In addition, providing services to Russia could cause sanctions in several cases.

#### ii. Economical

- **Children's apparel sales in Europe will increase at a CAGR of 2.8%.** Children's apparel market will represent 13.5% of the whole apparel market in the next 3 years. Its absolute value will be around 74 US billion dollars in 2026.
- **E-commerce will represent almost 50% of total apparel sales in Europe by 2025.** Due to Covid-19 boost, e-commerce seems to be the final step in the customer journey.
- **Sustainable apparel share will account for 8.4% by 2026.** European customers are looking for sustainable products and the European Commission is pushing for a sustainable transition. This reflects in the growing trend about sustainable apparel.
- **Harmonized index of consumer prices (HICP) inflation rate of the European Union reached its peak in Oct 2022 (11.5%).** Even if European demand came back quite quickly after the COVID-19 situation, global supply chains are yet to catch up. In particular, energy

and food prices have increased due to this bottleneck, especially after Russia's invasion of Ukraine in February 2022. During March 2022, the inflation rate for energy was 40.2% in the EU.

### iii. Social

- **Average fertility rate is 1.55 children per woman in Europe.** France (1.79), Ireland (1.76) and Romania (1.74) have the highest rate. Italy (1.29), Spain (1.29) and Ukraine (1.27) cover the bottom positions. Nordic countries (1.50) stand in the middle positions.
- **Consumers' growing attention towards recycled materials.** When it comes to clothes shopping, consumers are looking for products which have a percentage of recycled materials. In Europe, the most attentive countries are the United Kingdom (15%), Spain (12%) and France (11%).

### iv. Technological

- **Digitalisation and data management.** Process integration and sharing data all along the supply chain is key to achieve both flexibility and sustainability. Reima is currently working with *amfori* which provides tracking and monitoring services.
- **AI applications to supply chain management.** Artificial Intelligence and Machine Learning are able to predict trends and help predict the demand. On the one hand to mitigate the bullwhip effect. On the other hand, to add value to the supply chain by the implementation of chatbots and intelligent kiosks for customer service and logistics complaints sorting.
- **Consumer demands are changing last-mile delivery.** Maximum delivery time in Europe should not be higher than 3 days. Fast and free delivery have become the norm to operate in the e-commerce channel. Reima's delivery times are on average 7 days to e-com customers at the moment.

### v. Environmental

- **EU Strategy for Sustainable and Circular Textiles.** The apparel industry and clothing consumption is ranked at the fourth place for its environmental impact in Europe. Horizon Europe's European Partnerships, the LIFE programme, and the Digital Europe Programme are some of the financial initiatives available to support the textile sector's transition.
- **Reima commitment to Science-Based Targets.** SBTs and the World Resources Institute provide tools and guidelines for each specific

industry. Reima set its own sustainable goals about Scope 1, 2 & 3. This means a strict commitment and responsibility for its own and stakeholders' emissions.

## REFERENCES

- Brownlee, J. (2017, January 9). *How to Create an ARIMA Model for Time Series Forecasting in Python - MachineLearningMastery.com*. Machine Learning Mastery. Retrieved February 11, 2023, from <https://machinelearningmastery.com/arima-for-time-series-forecasting-with-python/>
- Brownlee, J. (2017, January 18). *How to Grid Search ARIMA Model Hyperparameters with Python - MachineLearningMastery.com*. Machine Learning Mastery. Retrieved February 11, 2023, from <https://machinelearningmastery.com/grid-search-arima-hyperparameters-with-python/>
- Chevalier, S. (2022). *E-commerce as percentage of total apparel sales in Europe from 2018 to 2025*. Statista Research Department. <https://www.statista.com/statistics/1277311/e-commerce-share-apparel-sales-europe/>
- DHL. (2022). *DHL Express Service and Rate Guide 2022*. DHL Express Service and Rate Guide 2022. Retrieved February 11, 2023, from [https://mydhl.express.dhl/content/dam/downloads/fi/en/rate-guide/service\\_and\\_rate\\_guide\\_fi\\_en\\_2022.pdf.coredownload.pdf](https://mydhl.express.dhl/content/dam/downloads/fi/en/rate-guide/service_and_rate_guide_fi_en_2022.pdf.coredownload.pdf)
- DHL. (2022). *DHL Service & Rate Guide 2023: Estonia*. MyDHL. Retrieved February 11, 2023, from [https://mydhl.express.dhl/content/dam/downloads/ee/en/rate-guide/service\\_and\\_rate\\_guide\\_ee\\_en\\_2023.pdf.coredownload.pdf](https://mydhl.express.dhl/content/dam/downloads/ee/en/rate-guide/service_and_rate_guide_ee_en_2023.pdf.coredownload.pdf)
- DHL. (2023). *Transit Time Calculator*. DHL. Retrieved February 11, 2023, from <https://www.dhl.com/fi-en/home/our-divisions/freight/transit-time-road-freight.html>
- DHL. (2023, January 1). *DHL Service & Rate Guide 2023: Latvia*. MyDHL. Retrieved February 11, 2023, from

[https://mydhl.express.dhl/content/dam/downloads/lv/en/rate-guide/service\\_and\\_rate\\_guide\\_lv\\_en\\_2023.pdf.coredownload.pdf](https://mydhl.express.dhl/content/dam/downloads/lv/en/rate-guide/service_and_rate_guide_lv_en_2023.pdf.coredownload.pdf)

European Commission. (2022, March 30). *Textiles strategy*. Language selection |

Environment. Retrieved February 11, 2023, from

[https://environment.ec.europa.eu/strategy/textiles-strategy\\_en](https://environment.ec.europa.eu/strategy/textiles-strategy_en)

ExcelDemy. (2022, November 23). *How to Calculate Distance between Two GPS*

*Coordinates in Excel*. ExcelDemy. Retrieved February 11, 2023, from

<https://www.exceldemy.com/calculate-distance-between-two-gps-coordinates-excel/>

Interesse, G. (2022, December 21). *Managing China Manufacturing & Supply Chains*

*During COVID Outbreaks*. China Briefing. Retrieved February 11, 2023, from

<https://www.china-briefing.com/news/managing-china-manufacturing-supply-chains-during-covid-outbreaks/>

Moritz, H. (1980). GEODETIC REFERENCE SYSTEM 1980. *Resolution of the XVII General Assembly of the IUGG*, 128.

<https://geodesy.geology.ohio-state.edu/course/refpapers/00740128.pdf>

Munichiello, K. Á. (2022). *Autoregressive Integrated Moving Average (ARIMA)*

*Prediction Model*. Investopedia. Retrieved February 11, 2023, from

<https://www.investopedia.com/terms/a/autoregressive-integrated-moving-average-arma.asp>

Perktold, J., Seabold, S., & Taylor, J. (2019). *statsmodels.tsa.arima.model.ARIMA* —

*statsmodels*. Statsmodels. Retrieved February 11, 2023, from

<https://www.statsmodels.org/dev/generated/statsmodels.tsa.arima.model.ARIMA.html>

Placek, M. (2022, September 13). *EU: labor costs for transportation and storage*

*2015*. Statista. Retrieved February 11, 2023, from



<https://www.statista.com/statistics/939986/eu-labor-costs-for-transportation-and-storage/>

Reima. (2021, December 15). *Corporate Responsibility Report*. CORPORATE RESPONSIBILITY REPORT. Retrieved February 11, 2023, from [https://assets.ctfassets.net/u9gy9w9wtdqj/6009FHw4P8X8FnIP9kY2z2/d8f53f420c32be12fb4eae00aa8d7f18/Reima\\_CSR\\_Report\\_2021.pdf](https://assets.ctfassets.net/u9gy9w9wtdqj/6009FHw4P8X8FnIP9kY2z2/d8f53f420c32be12fb4eae00aa8d7f18/Reima_CSR_Report_2021.pdf)

Reima. (2022, April 28). *Update on Reima's operations in Russia*. Reima Company Website. Retrieved February 11, 2023, from <https://company.reima.com/news/update-on-reimas-operations-in-russia>

Reima. (2023). *Our Story*. Reima. Retrieved February 11, 2023, from <https://www.reima.com/int/our-story>

Smith, P. (2021). *Share of consumers who think it's important that the clothing they buy used recycled materials in selected European countries as of 2020*. Statista Research Department.

<https://www.statista.com/statistics/1238839/eu-consumer-opinions-buying-clothing-that-uses-recycled-materials/>

Statista Research Department. (n.d.). *Children's Apparel - Europe*. Statista. Retrieved February 11, 2023, from

<https://www.statista.com/outlook/cmo/apparel/children-s-apparel/europe>

Statista Research Department. (2022, January 17). *Net prime yields for warehouses over 5,000 square meters in Europe from 2020 to 2021, by country*. Statista. Retrieved February 11, 2023, from

<https://www.statista.com/statistics/986966/net-prime-yields-by-country-warehouses-in-europe>

Statista Research Department. (2022, June 7). *Warehouse properties: prime rents in Europe H1 2021*. Statista. Retrieved February 11, 2023, from <https://www.statista.com/statistics/976174/prime-headline-rents-warehouses-real-estate-europe/>

Statista Research Department. (2022, June 8). *Logistic properties: prime rents in Europe H1 2021*. Statista. Retrieved February 11, 2023, from <https://www.statista.com/statistics/976207/prime-headline-rents-logistics-distribution-real-estate-europe/>

Statista Research Department. (2022, September 20). *Total fertility rate in Europe in 2022, by country*. Total fertility rate in Europe in 2022, by country. <https://www.statista.com/statistics/612074/fertility-rates-in-european-countries/>

Statista Research Department. (2022, October 20). *Self storage - unit size in European countries 2022*. Statista. Retrieved February 11, 2023, from <https://www.statista.com/statistics/482587/self-storage-size-in-europe/>

Statista Research Department. (2023, January 10). *Harmonized index of consumer prices (HICP) inflation rate of the European Union in December 2022, by country*.









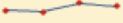

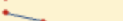

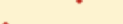
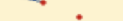

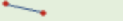
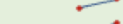


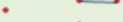
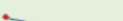
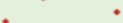
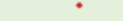
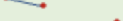
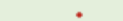
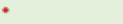
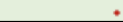








Harmonized index of consumer prices (HICP) inflation rate of the European Union in December 2022, by country.

<https://www.statista.com/statistics/225698/monthly-inflation-rate-in-eu-countries/>

World Resources Institute. (2019, June 25). *Apparel and Footwear sector*. Science Based Targets Guidance. <https://sciencebasedtargets.org/sectors/apparel-and-footwear>

## APPENDIX

### Appendix 1 - WHL revenues generation per country

		MATURE MARKETS	Annual > 1M				
		UP AND COMING	1M > X > 100k				
		LOW	100k > X > 10k				
	WHL				WHL Total		Trend
Row Labels	2019	2020	2021	2022			
Finland	7.271.645 €	6.561.705 €	7.925.145 €	8.467.317 €	30.225.813 €		
Sweden	5.499.099 €	5.570.101 €	7.531.274 €	9.739.335 €	28.339.808 €		
Norway	4.189.910 €	3.401.324 €	4.807.120 €	4.869.948 €	17.268.302 €		
Germany	3.543.559 €	3.784.234 €	3.688.040 €	4.626.044 €	15.641.877 €		
Switzerland	2.958.085 €	2.379.833 €	3.043.453 €	3.469.686 €	11.851.057 €		
Lithuania	782.602 €	1.163.813 €	1.865.313 €	3.310.550 €	7.122.278 €		Growing
Poland	599.705 €	1.062.910 €	978.778 €	1.562.137 €	4.203.529 €		Growing
Denmark	1.466.577 €	837.902 €	1.123.960 €	747.489 €	4.175.928 €		Declining
Estonia	392.856 €	481.988 €	657.206 €	448.461 €	1.980.511 €		Declining
Austria	326.832 €	268.708 €	235.884 €	343.734 €	1.175.158 €		
Iceland	198.565 €	177.014 €	305.456 €	258.048 €	939.082 €		
Italy	26.605 €	5.897 €	8.913 €	769.209 €	810.625 €		Growing
France	87.011 €	147.092 €	162.893 €	263.863 €	660.859 €		Growing
United Kingdom	238.694 €	144.541 €			383.235 €		
Greenland	66.561 €	36.126 €	99.867 €	133.435 €	335.990 €		
Great Britain			241.576 €		241.576 €		
Czech Republic	132.906 €	80.670 €			213.576 €		
Czech			185.978 €		185.978 €		
Ukraine	2.311 €	9.963 €	46.163 €	106.164 €	164.601 €		Growing
Luxembourg	78.801 €	76.548 €			155.349 €		
Romania			44.106 €	86.677 €	130.783 €		
Serbia	16.896 €	21.173 €	25.241 €	44.937 €	108.246 €		
Netherlands		13.255 €	28.007 €	54.810 €	96.072 €		
Latvia	17.809 €	10.756 €	28.842 €	8.446 €	65.853 €		
Georgia	6.847 €		17.245 €	16.629 €	40.721 €		
Luxemburg			36.527 €		36.527 €		
Moldova, Republic of	17.892 €	8.749 €			26.641 €		
Bulgaria	11.804 €			12.353 €	24.158 €		
Moldova			10.213 €		10.213 €		
Belgium	8.295 €	-74 €			8.221 €		
Australia				7.050 €	7.050 €		
All Other Countries			5.185 €		5.185 €		
Faroe Islands	461 €				461 €		
Ireland				-44 €	-44 €		
Grand Total	27.942.329 €	26.244.228 €	33.102.383 €	39.346.280 €	126.635.220 €		

## Appendix 2 - WHL In-Season and Pre-Order comparison per country

Row Labels	2019			2020			2021			2022			AVERAGE % OF PRE-ORDER
	IN-SEASON	PRE-ORDER	%	IN-SEASON	PRE-ORDER	%	IN-SEASON	PRE-ORDER	%	IN-SEASON	PRE-ORDER	%	
Finland	687.244 €	6.584.401 €	91%	507.125 €	6.054.580 €	92%	724.895 €	7.200.249 €	91%	472.861 €	7.994.456 €	94%	92%
Sweden	499.501 €	4.999.598 €	91%	537.715 €	5.032.386 €	90%	745.916 €	6.785.357 €	90%	982.287 €	8.757.049 €	90%	90%
Norway	1.023.763 €	3.166.147 €	76%	855.296 €	2.546.028 €	75%	897.168 €	3.909.952 €	81%	260.617 €	4.609.331 €	95%	82%
Germany	1.704.329 €	1.839.230 €	52%	1.589.818 €	2.194.416 €	58%	1.325.053 €	2.362.987 €	64%	997.966 €	3.628.078 €	78%	63%
Switzerland	369.646 €	2.588.439 €	88%	443.518 €	1.936.315 €	81%	551.610 €	2.491.843 €	82%	396.772 €	3.072.915 €	89%	85%
Lithuania	54.054 €	728.548 €	93%	40.783 €	1.123.030 €	96%	345.671 €	1.519.642 €	81%	48.117 €	3.262.433 €	99%	92%
Poland	101.766 €	497.939 €	83%	185.709 €	877.201 €	83%	427.916 €	550.862 €	56%	352.539 €	1.209.598 €	77%	75%
Denmark	609.837 €	856.740 €	58%	247.627 €	590.276 €	70%	275.579 €	848.381 €	75%	104.848 €	642.641 €	86%	73%
Estonia	389.699 €	3.157 €	1%	472.998 €	8.990 €	2%	639.622 €	17.584 €	3%	448.461 €		0%	1%
Austria	45.614 €	281.218 €	86%	18.817 €	249.891 €	93%	29.609 €	206.275 €	87%	9.770 €	333.964 €	97%	91%
Iceland	3.964 €	194.601 €	98%	16.773 €	160.241 €	91%	5.457 €	299.999 €	98%	1.530 €	256.518 €	99%	97%
Italy	5.786 €	20.820 €	78%	2.060 €	3.837 €	65%	8.913 €		0%	762.853 €	6.356 €	1%	36%
France	11.902 €	75.109 €	86%	49.668 €	97.424 €	66%	23.906 €	138.987 €	85%	40.980 €	222.883 €	84%	81%
United Kingdom	58.933 €	179.762 €	75%	58.383 €	86.158 €	60%							34%
Greenland	9.869 €	56.692 €	85%	4.066 €	32.061 €	89%	5.188 €	94.679 €	95%	5.893 €	127.542 €	96%	91%
Great Britain							111.499 €	130.077 €	54%				13%
Czech Republic	109.076 €	23.830 €	18%	68.949 €	11.721 €	15%							8%
Czech							151.165 €	34.813 €	19%				5%
Ukraine	154 €	2.157 €	93%	8.543 €	1.420 €	14%	30.533 €	15.631 €	34%	54.035 €	52.128 €	49%	48%
Luxembourg	14.924 €	63.877 €	81%		76.548 €	100%							45%
Romania							20.800 €	23.306 €	53%	22.219 €	64.458 €	74%	32%
Serbia		16.896 €	100%		21.173 €	100%		25.241 €	100%		44.937 €	100%	100%
Netherlands				5.437 €	7.818 €	59%	9.645 €	18.362 €	66%		54.810 €	100%	56%
Latvia	16.832 €	977 €	5%	9.685 €	1.071 €	10%	26.926 €	1.917 €	7%	8.446 €		0%	6%
Georgia		6.847 €	100%				6.623 €	10.622 €	62%	9.509 €	7.120 €	43%	51%
Luxemburg								36.527 €	100%				25%
Moldova, Republic of	5.609 €	12.283 €	69%	289 €	8.461 €	97%							41%
Bulgaria		11.804 €	100%								12.353 €	100%	50%
Moldova							1.537 €	8.676 €	85%				21%
Belgium	2.418 €	5.877 €	71%		-74 €	100%							43%
Australia										7.050 €		0%	0%
All Other Countries								5.185 €	100%				25%
Faroe Islands		461 €	100%										25%
Ireland										-44 €		100%	25%
<b>Grand Total</b>	<b>5.724.917 €</b>	<b>22.217.411 €</b>	<b>80%</b>	<b>5.123.260 €</b>	<b>21.120.968 €</b>	<b>80%</b>	<b>6.365.231 €</b>	<b>26.737.152 €</b>	<b>81%</b>	<b>4.986.754 €</b>	<b>34.359.526 €</b>	<b>87%</b>	

### Appendix 3 - ECOM revenues generation per country






	MATURE MARKETS	Annual > 1M
	HIGH MARKETS	1M > X > 100k
	UP AND COMING MARKETS	100k > X > 10k
	LOW MARKETS	<10k

Row Labels	ECOM				ECOM Total	Trend
	2019	2020	2021	2022		
Finland	3.924.906 €	4.525.287 €	3.633.275 €	3.657.231 €	15.740.699 €	
Germany	1.547.791 €	1.889.133 €	2.356.328 €	2.242.701 €	8.035.952 €	
Norway	1.928.045 €	2.257.026 €	1.829.789 €	1.461.048 €	7.475.907 €	
Switzerland	571.540 €	1.745.480 €	2.002.228 €	1.991.689 €	6.310.937 €	
Sweden	1.106.285 €	1.382.341 €	1.331.580 €	1.225.947 €	5.046.154 €	
Poland	549.195 €	725.409 €	1.214.751 €	1.595.626 €	4.084.981 €	
Denmark	345.459 €	478.340 €	462.984 €	336.786 €	1.623.569 €	
Czech Republic	178.912 €	263.152 €	378.799 €	441.006 €	1.261.869 €	
Austria	136.670 €	204.430 €	275.565 €	286.680 €	903.346 €	
Latvia	107.234 €	157.262 €	211.947 €	190.736 €	667.178 €	
Lithuania	54.388 €	68.710 €	132.333 €	138.759 €	394.189 €	
Great Britain	81.404 €	111.467 €	79.041 €	111.752 €	383.663 €	
Estonia	55.533 €	79.572 €	95.220 €	144.110 €	374.434 €	
France	36.044 €	53.477 €	80.859 €	123.415 €	293.795 €	
Netherlands	30.219 €	48.551 €	80.497 €	102.669 €	261.938 €	
Slovakia			109.875 €	136.528 €	246.404 €	
Luxembourg	28.826 €	52.797 €	79.588 €	83.874 €	245.085 €	
Belgium	24.011 €	39.184 €	61.253 €	76.958 €	201.405 €	
Ukraine	45.745 €	34.692 €	36.350 €	12.621 €	129.408 €	
Slovakiahlid	45.693 €	82.912 €			128.605 €	
Italy	19.338 €	21.953 €	28.009 €	44.890 €	114.190 €	
Spain	13.851 €	15.474 €	22.359 €	44.411 €	96.095 €	
Romania	6.773 €	13.153 €	19.782 €	33.540 €	73.249 €	
Ireland	6.230 €	13.946 €	16.625 €	27.855 €	64.656 €	
Canada	29.405 €	9.270 €			38.675 €	
USA	36.248 €				36.248 €	
Hungary	6.162 €	5.800 €	9.164 €	13.460 €	34.586 €	
Slovenia	5.186 €	7.614 €	8.592 €	11.614 €	33.006 €	
Greece	3.024 €	7.808 €	8.955 €	10.788 €	30.574 €	
Bulgaria	1.775 €	4.709 €	5.943 €	13.623 €	26.050 €	
Cyprus	1.356 €	1.922 €	6.232 €	12.865 €	22.376 €	
Croatia	3.793 €	2.185 €	4.129 €	11.415 €	21.521 €	
Iceland	3.555 €	6.659 €	4.460 €	6.361 €	21.036 €	
Portugal	1.564 €	2.531 €	3.253 €	11.646 €	18.993 €	
Korea	1.418 €	831 €	3.500 €	1.457 €	7.207 €	
Malta	711 €	601 €	1.372 €	2.702 €	5.386 €	
Japan	1.256 €	1.924 €			3.180 €	
<b>Grand Total</b>	<b>10.939.545 €</b>	<b>14.315.600 €</b>	<b>14.594.635 €</b>	<b>14.606.764 €</b>	<b>54.456.545 €</b>	

#### Appendix 4 - ECOM sales weight over other channels per country (2022)

Country	ECOM	Total	ECOM%
Finland	3.657.231 €	17.598.747 €	21%
Germany	2.242.701 €	6.888.195 €	33%
Switzerland	1.991.689 €	5.461.375 €	36%
<b>Poland</b>	<b>1.595.626 €</b>	<b>3.157.763 €</b>	<b>51%</b>
Norway	1.461.048 €	6.863.752 €	21%
Sweden	1.225.947 €	11.411.526 €	11%
<b>Czech Republic</b>	<b>441.006 €</b>	<b>441.006 €</b>	<b>100%</b>
Denmark	336.786 €	1.084.274 €	31%
<b>Austria</b>	<b>286.680 €</b>	<b>630.414 €</b>	<b>45%</b>
<b>Latvia</b>	<b>190.736 €</b>	<b>199.182 €</b>	<b>96%</b>
Estonia	144.110 €	592.571 €	24%
Lithuania	138.759 €	3.449.309 €	4%
<b>Slovakia</b>	<b>136.528 €</b>	<b>136.528 €</b>	<b>100%</b>
France	123.415 €	387.278 €	32%
Great Britain	111.752 €	111.752 €	100%
Netherlands	102.669 €	157.480 €	65%
<b>Luxemburg</b>	<b>83.874 €</b>	<b>83.874 €</b>	<b>100%</b>
<b>Belgium</b>	<b>76.958 €</b>	<b>76.958 €</b>	<b>100%</b>
Italy	44.890 €	814.099 €	6%
Spain	44.411 €	44.411 €	100%
Romania	33.540 €	120.217 €	28%
Ireland	27.855 €	27.812 €	100%
Bulgaria	13.623 €	25.976 €	52%
Hungary	13.460 €	13.460 €	100%
Cyprus	12.865 €	12.865 €	100%
Ukraine	12.621 €	118.785 €	11%
Portugal	11.646 €	11.646 €	100%
Slovenia	11.614 €	11.614 €	100%
Croatia	11.415 €	11.415 €	100%
Greece	10.788 €	10.788 €	100%
Iceland	6.361 €	264.409 €	2%
Malta	2.702 €	2.702 €	100%
Korea	1.457 €	1.457 €	100%

## Appendix 5 - RETAIL revenues generation per country

Sum of Sum of Net Sales	Column Labels								
	RETAIL					RETAIL Total	Grand Total	Trend	
Row Labels	2019	2020	2021	2022	2022%				
Finland	5.764.468 €	4.599.589 €	5.577.841 €	5.474.198 €	84,57%	21.416.097 €	21.416.097 €		
Sweden	554.229 €	680.936 €	1.240.415 €	446.243 €	6,89%	2.921.824 €	2.921.824 €	 Loss market	
Norway	199.679 €	596.488 €	1.032.511 €	532.755 €	8,23%	2.361.433 €	2.361.433 €	 Loss market	
Germany	161.784 €	185.200 €	209.342 €	19.451 €	0,30%	575.777 €	575.777 €	 Loss market	
Grand Total	6.680.160 €	6.062.213 €	8.060.110 €	6.472.648 €	100%	27.275.131 €	27.275.131 €		



## Appendix 6 - Demand forecast in the upcoming 8 quarters

		ECOMMERCE											WHOLESALE														
		Q1-2023	Q2-2023	Q3-2023	Q4-2023	2023	Q1-2024	Q2-2024	Q3-2024	Q4-2024	2024	TOTAL	Multipliers (WHL/ECOM)	Reduction buffer	Adjusted multiplier	Q1-2023	Q2-2023	Q3-2023	Q4-2023	2023	Q1-2024	Q2-2024	Q3-2024	Q4-2024	2024	TOTAL	
Finland	0	731	771	738	658	2898	566	496	467	481	2011	4909	15.99	20 %	12.79	9352	9862	9444	8418	37076	7246	6349	5977	6152	25724	62800	
Finland	1 Outdoor	13470	8955	13470	8955	44850	13470	8955	13469	8956	44850	89700	3.31	20 %	2.65	35691	23727	35690	23728	573774	35689	23729	35689	23729	573774	1147547	
Finland	2 Innerwear	4878	5466	4637	4649	19629	4877	4755	5056	4856	19543	39172	0.74	20 %	0.59	2892	3240	2749	2756	251117	2891	2819	2997	2879	250021	501138	
Finland	3 Accessories	10079	6500	6276	8448	31302	9316	8245	7340	7709	32610	63912	5.97	20 %	4.78	48145	31049	29981	40354	400454	44504	39385	35063	36826	417188	817642	
Finland	4 Shoes	4983	4523	4642	4611	18760	4619	4617	4618	4618	18472	37232	2.49	20 %	1.99	9936	9017	9256	9194	239998	9210	9206	9207	9206	236316	476314	
Germany	0	359	321	347	329	1355	341	333	338	334	1346	2701	0.42	20 %	0.33	120	107	116	110	17330	114	111	113	112	17225	34595	
Germany	1 Outdoor	4913	3474	6182	7599	22167	4975	3581	6122	7494	22172	44339	4.20	20 %	3.36	14688	11659	20748	25503	283697	16998	12018	20546	25153	263851	567237	
Germany	2 Innerwear	2525	2378	2296	2260	9456	2248	2246	2249	2252	8996	19452	3.45	20 %	2.76	6988	6555	6335	6236	120974	6202	6199	6207	6215	115083	236956	
Germany	3 Accessories	2535	787	4417	6221	13960	3179	1306	4719	6532	15736	29695	2.69	20 %	2.15	5445	1691	9487	13363	178588	6829	2805	10137	14032	201309	379897	
Germany	4 Shoes	2012	1262	2203	1723	7199	3009	941	2793	2077	8819	16019	4.57	20 %	3.65	7349	4608	8045	6292	92104	10990	3437	10200	7585	112828	204932	
Norway	0	574	295	311	324	1504	334	341	347	352	1375	2879	1.22	20 %	0.98	560	288	304	316	19241	325	333	339	343	17586	36827	
Norway	1 Outdoor	6863	5278	6900	9006	28047	9812	7839	7280	7895	32826	60874	3.35	20 %	2.68	18397	14147	18496	24141	358811	26302	21013	19515	21163	419954	778766	
Norway	2 Innerwear	1035	2893	2690	2321	8938	2139	2027	2121	1964	8250	17188	2.60	20 %	2.08	2150	6009	5587	4820	114347	4442	4211	4405	4079	105545	218992	
Norway	3 Accessories	3680	2489	3530	5298	14098	4767	3246	3538	4522	16073	31071	7.87	20 %	6.30	23180	15679	22235	33370	191873	30024	20442	22286	28483	205627	397500	
Norway	4 Shoes	1450	1450	1450	1450	5801	1450	1450	1450	1450	5801	11602	2.02	20 %	1.62	2346	2346	2346	2346	74210	2346	2346	2346	2346	74210	148420	
Switzerland	0	481	481	481	481	1924	481	481	481	481	1924	3848	2.28	20 %	1.83	878	878	878	878	24614	878	878	878	878	24614	49228	
Switzerland	1 Outdoor	3477	2441	4041	4097	14056	3000	3401	3977	3478	13857	27913	3.75	20 %	3.00	10435	7324	12127	12295	179827	9003	10207	11936	10436	177269	357096	
Switzerland	2 Innerwear	1661	1288	1288	1288	5524	1288	1288	1288	1288	5515	10974	2.73	20 %	2.19	3630	2815	2815	2815	70664	2815	2815	2815	2815	70664	136560	
Switzerland	3 Accessories	709	981	2016	3788	7494	178	1464	2204	3082	8908	14401	6.87	20 %	5.34	3786	5238	10766	20224	99687	948	7819	11770	16348	88371	164338	
Switzerland	4 Shoes	1101	665	1135	1444	4345	1101	806	1203	1403	4512	8857	3.54	20 %	2.83	3121	1885	3216	4093	55599	3120	2285	3408	3977	57722	113314	
Sweden	0	573	278	252	354	1456	373	338	328	340	1378	2834	2.34	20 %	1.87	1073	520	471	683	18627	688	633	615	636	17629	36255	
Sweden	1 Outdoor	3501	1628	3795	3897	12821	3670	2052	3887	3848	13457	26278	8.31	20 %	6.65	23277	10821	25234	25907	164019	24401	13646	25844	25580	172162	336180	
Sweden	2 Innerwear	1903	1703	1794	1753	7152	1772	1762	1767	1765	7086	14219	5.08	20 %	4.06	7732	6921	7291	7122	91501	7199	7164	7180	7173	90400	181901	
Sweden	3 Accessories	1738	393	2204	4204	8539	1718	320	2373	4043	8455	16994	9.45	20 %	7.56	13136	2970	16660	31776	108235	12989	9421	17938	30564	108169	217404	
Sweden	4 Shoes	1311	1311	1311	1311	5245	1311	1311	1311	1311	5245	10490	8.63	20 %	6.90	9053	9053	9053	9053	67097	9053	9053	9053	9053	67097	134194	
Poland	0	1033	1483	1933	2383	6832	2833	3283	3733	4183	14032	20864	0.77	20 %	0.61	633	909	1185	1460	87403	1736	2012	2288	2564	179514	266917	
Poland	1 Outdoor	3579	1694	6463	8263	20000	3833	2893	7983	8702	23411	43410	1.35	20 %	1.08	3874	1834	6994	8942	255858	4149	3131	8639	9417	299495	555353	
Poland	2 Innerwear	3540	1975	1864	2891	10271	3027	2357	2226	2661	10272	20542	1.29	20 %	1.03	3652	2038	1923	2983	131394	3123	2432	2297	2745	131409	262803	
Poland	3 Accessories	2410	1542	3327	7794	15073	2996	2253	4311	7943	17503	32576	1.54	20 %	1.23	2981	1895	4087	9576	192833	3681	2768	5296	9760	223916	416749	
Poland	4 Shoes	2301	1977	2996	3824	11098	3404	3174	4100	4864	15543	26841	2.58	20 %	2.06	4746	4077	6180	7887	141983	7020	6547	8456	10032	198839	340822	
Denmark	0	159	86	107	120	472	111	110	112	112	447	915	0.09	0 %	0.08	14	8	9	9	6033	10	10	10	10	5714	11746	
Denmark	1 Outdoor	644	311	841	797	2593	707	402	817	743	2533	5126	4.65	0 %	4.65	2996	1447	3909	3705	33176	2652	1868	3799	3456	32402	65578	
Denmark	2 Innerwear	279	265	251	237	1032	224	210	196	182	811	1843	0.91	0 %	0.91	253	241	228	216	13201	203	191	178	166	10389	23581	
Denmark	3 Accessories	488	285	595	808	2176	591	385	528	716	2220	4396	3.63	0 %	3.63	1769	1035	2161	2931	27935	2143	1397	1916	2600	28399	56234	
Denmark	4 Shoes	330	330	330	330	1320	330	330	330	330	1320	2640	2.52	0 %	2.52	832	832	832	832	16884	832	832	832	832	16884	33768	
Czech Republic	0	64	22	46	79	212	56	31	53	72	211	423	0.16	0 %	0.16	10	3	7	7	12	2708	9	5	8	11	2701	5408
Czech Republic	1 Outdoor	2016	520	982	1860	5377	2055	733	1164	2006	5958	11335	0.68	0 %	0.68	1380	356	672	1273	68791	1407	502	796	1373	76221	145012	
Czech Republic	2 Innerwear	363	315	373	525	1776	578	533	483	478	2072	3847	0.53	0 %	0.53	300	168	199	279	22714	308	284	257	255	26505	49220	
Czech Republic	3 Accessories	922	250	469	1386	3027	1064	349	514	1434	3361	6388	0.54	0 %	0.54	495	134	252	745	38727	572	188	276	771	42996	81724	
Czech Republic	4 Shoes	401	223	345	281	1250	390	209	264	254	1118	2366	0.98	0 %	0.98	394	219	338	275	15995	382	205	259	249	14278	30273	
Austria	0	86	33	76	120	315	93	72	103	125	393	708	1.11	0 %	1.11	95	37	85	133	4035	103	79	115	138	9024	9059	
Austria	1 Outdoor	587	33	728	1129	2447	475	142	709	1140	2485	4813	2.12	0 %	2.12	1182	709	1543	2394	31306	1008	301	1500	2417	31553	62982	
Austria	2 Innerwear	254	254	254	254	1016	254	254	254	254	1016	2932	3.62	0 %	3.62	920	920	920	920	12998	920	920	920	920	12998	25996	
Austria	3 Accessories	97	55	358	950	1460	102	54	371	871	1398	2858	2.62	0 %	2.62	255	145	940	2492	18678	269	141	974	2285	17885	36562	
Austria	4 Shoes	156	150	216	218	741	168	171	207	203	749	1490	1.81	0 %	1.81	284	272	392	396	9479	305	310	376	368	9582	19061	
Latvia	0	20	20	20	20	80	20	20	20	20	80	160	0.35	0 %	0.35	7	7	7	7	1023	7	7	7	7	1023	2047	
Latvia	1 Outdoor	615	399	622	405	2041	626	408	628	410	2071	4112	0.21	0 %	0.21	128	83	129	84	26107	130	85	130	85	26495	52602	
Latvia	2 Innerwear	221	163	170	172	726	173	173	173	173	692	1418	0.24	0 %	0.24	53	39	40	41	9285	41	41	41	41	8850	18135	
Latvia	3 Accessories	417	105	254	691	1468	462	146	240	630	1478	2945	0.50	0 %	0.50	207	52	126	343	18777	229	73					