

# EXAM

## Product Planning – Needs and Opportunities

Course code: PPU085

**Wednesday 2023-01-11 at 14.00-18.00**

**Examiner:** Professor Johan Malmqvist.

**Questions:** Professor Johan Malmqvist, 031 – 772 1382, [johan.malmqvist@chalmers.se](mailto:johan.malmqvist@chalmers.se). Prof Malmqvist will visit the exam rooms at approximately 14.30 and 15.45.

**Department:** Industrial and Materials Science.

**Solutions:** Will be posted on the course’s Canvas page on Thursday 2023-01-12.

*Note that the posted answers may be copied from the lecture notes or the book, but that does not mean that verbatim answers are required or even expected for full points on an exam question.*

**Results:** Will be announced no later than Wednesday 2023-02-01.

**Exam review:** In Inspira, you will be able to access your own answers also after the exam. Requests for correction of the marking should be sent by e-mail to Lena Bendrioua ([lena.bendrioua@chalmers.se](mailto:lena.bendrioua@chalmers.se)) using the “Request for correction review of grade.pdf” form that is available in Canvas under Templates.

**Grades:** The maximum score on the exam is 20 points. 8 points are required for passing the exam and a “3” grade. For grades “4” and “5”, 12 and 16 points are required, respectively.

## Tools

The exam is run in the Inspira digital exam system. In addition, pen, paper and dictionaries and “Chalmers approved calculators” are permitted.

NB! Solutions should be documented with text and drawings. Equations should be motivated. Also partially solved problems will be assessed. If some details are missing in the problem statement, introduce suitable parameters and assume, if necessary (reasonable) numbers.

It is recommended that graphics are drawn using the functionality available in Inspira. However, you may also draw them on paper and hand them into to the exam staff. Ask the exam staff for assistance in the matter.

## 1 Product development project types (1 p)

Identify and briefly describe at least three different types of product development projects.

### Solution

Different types of product development projects include:

- ***Fundamentally new products*** – products that are based on radically different technology and may address new and for the company unfamiliar market.
- ***New platform projects*** – the project aims to develop a common platform from which many derivatives or variants can be developed while main sharing some common subsystems or technologies.
- ***Derivatives of an existing platform*** – the development of single product variants/derivatives from a platform, for example by developing different performance version of a certain subsystem.
- ***Incremental improvement of an existing product*** – for example by addressing a quality issue or improving energy efficiency.

## **2 Data science-based methods for product planning (2 p)**

Explain what is meant by an unsupervised learning algorithm in data science.

Explain with the help of an example what an unsupervised learning algorithm can be used for in product planning.

### **Solution**

Unsupervised learning algorithms take a set of data that contains only inputs, and find structure in the data, like grouping or clustering of data points.

In a dataset, an unsupervised learning algorithm can be used to find clusters in the data.

Example: After applying a clustering algorithm (for example K-means), to the made purchases with customer loyalty cards in a supermarket, we could identify customer clusters such as, for example, “vegetarians”, “bargain seekers” or “pensioners” and use that to compile targeted commercial offers, distributed through physical mail, e-mail, sms text messages etc to customers identified as belonging to the cluster.

### 3 Pivots (2 p)

Significant changes in direction during the development of a start-up company are known as “pivots”.

Identify, describe and exemplify at least two types of pivots.

#### Solution

The table below lists and exemplifies some common types of pivots:

<b>Pivot type</b>	<b>Description. The pivot is needed because the ...</b>	<b>Example. The start-up decides to ...</b>
Zoom in	start-up can only be competitive if focusing on a sub-system or feature of the intended product	zoom in from a whole bicycle solution to bicycle brakes
Zoom out	customer is interested in a broader offer than the currently intended product	zoom out from bicycle brakes to whole bicycles
Channel	intended sales channel proved to be ineffective or unattractive	offer subscriptions of their product rather than selling at single point in time
Technology	technology of the start-up's products is not competitive	change from NiMH to Li-Ion battery technology
Market segment	intended market segment is not attracted by their product	address the professional rather than the do-it-yourself market

#### 4 Purposes and tools for documentation of customer needs (2 p)

The list below shows two typical purposes of tools for communication of customer needs.

For each of the purposes, identify at least one suitable tool and explain how it would provide support for the given purpose.

- a) Support to maintain user/customer focus
- b) Support idea generation

##### **Solution**

- a) Support to maintain user/customer focus

This could be achieved by development of *Personas* – they identify typical users and their main product uses and needs

- b) Support idea generation

This can be achieved with the help of *Image boards (e.g. Mood boards)* – they provide associations or analogies that may be transferred to a new context, e.g. from movies (Blade Runner) to automotive design (Tesla Cybertruck)

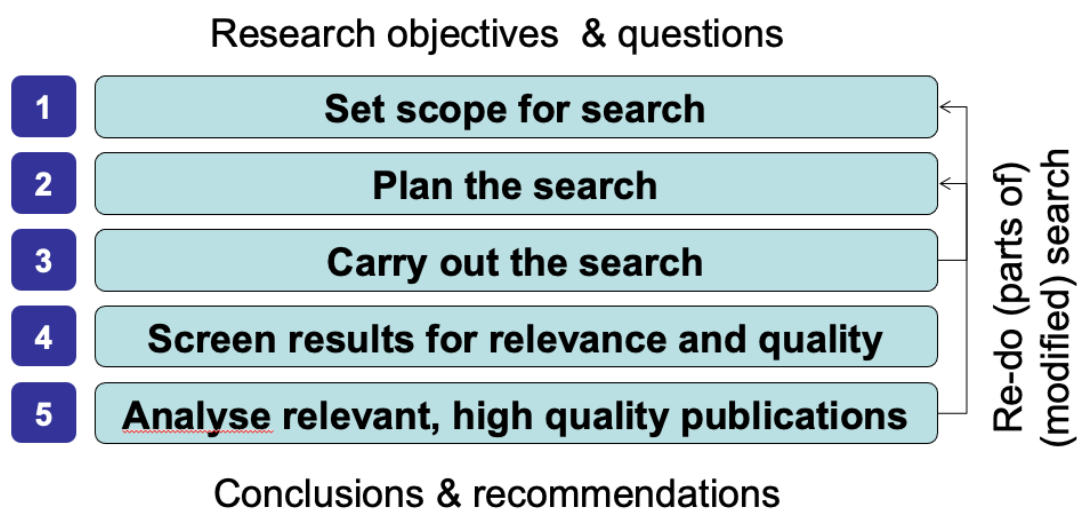
## 5 Information search and analysis process (3 p)

Outline the steps of a systematic information search and analysis process.

For each step, describe how it was carried out in your project.

### Solution

The main steps of a systematic information search and analysis are shown in the figure below, i.e., starting from stated research objectives and questions and in the end producing specific conclusions and recommendation.



### 1. Set scope for research

The first step is to establish the context of your search (for example what product, technology, market). Research questions may be revised here. You should also have established criteria for when to stop the search (for example: how many papers to review, how much time to spending searching etc).

### 2. Plan the search

Planning information search includes

- identifying relevant sources/databases (scopus, google scholar ...)
- carrying out preliminary searches (“scoping search”)
- formulating search terms (keywords, authors, free text wordings)
- creating a literature data extraction or similar to store metadata for search results
- establishing a publication folder or similar to store full publications

### **3. Carry out the search**

- search the databases by applying the search terms
- continually add search results to literature data extraction sheet and to publication folder

### **4. Screen results for relevance and quality**

- read (superficially) papers and assess them with regards to relevance and quality
- select papers which are both relevant and of high relevant

### **5. Analyse relevant, high-quality publications**

- categorise the selected papers
- read (in detailed way) selected papers
- summarise findings in a structured way.
  - find answers to your research questions
  - identify research gaps
  - compile recommendations
  - carry out bibliometric analyses
  - ...

For each of the steps, you are expected to comment on what your team did in the project. For example: what keywords (examples of), how did you store found papers, how did you select high quality papers and how were they analysed.

## 6 Personas (3 p)

A **persona** depicts an envisioned (faked) user or customer. What kinds of information are typically included in persona descriptions? Further, identify at least three personas that may be useful for a sewing machine manufacturer and elaborate a persona description for one of them.

Examples of sewing machines:



<https://www.europeana.eu/es/blog/singer-sewing-machines>



<https://www.jacksew.com/extra-heavy-duty-sewing-machines/>

## **Solution**

Persona descriptions typically include a photo, an illustrative quote, a background summary with facts about the user/customer, attributes and list of customer needs.

Personas relevant for a sewing machine might be “Malou, sailmaker”, “Larry, dress designer” and “Ronald, environmental activist”.

### **Persona for ”Malou, sailmaker”.**

Photo: <http://raasegel.se>



### ***Background***

Malou is a 38-year female, Swedish native. She runs her own sailmaking firm that specializes in racing sails. The customers are elite competitive sailors from across the world. They demand the best, and Malou gives them the unique sails that they need to win. She is married with two children. In her spare time, Malou enjoys maintaining and sailing her own 1930's wooden sailboat.

### ***Quote***

“For a competitive sailor, the sails can be the difference between first and second place”

### ***Attributes***

Practical  
Competitive  
Quality conscious  
Development-oriented  
Technology-interested

### ***Customer needs***

The sewing machine is robust  
The sewing machine has high perforative strength  
The sewing machine enables sewing very large workpieces (sails)  
The sewing machine is reliable

## Persona for "Karl, the dress designer".

**Photo:** <https://www.news.ro/entertainment/update-creatorul-de-moda-karl-lagerfeld-a-murit-1922404519002019021318886514>



### *Background*

Karl is a 63-year old, German native. Karl is an haute couture designer resident in Paris. Famous and very rich women wear Karl's dresses when attending glamorous galas in major metropolis. Karl likes to spend free time on his yacht. Karl lives alone.

### *Quote*

"A dress is a piece of art"

### *Attributes*

Creative  
Curious  
Aesthetic  
Customer-oriented  
Interested in arts

### *Customer needs*

The sewing machine can sew with multiple kind of thread  
The sewing machine can sew multiple thread patterns  
The sewing machine can sew with multiple types of cloth

**Persona for "Ronald, the environmental activist".**

*Photo <https://nobelprizemuseum.se/>*



### ***Background***

Ronald is a 45 year old male. He is an American and works as a researcher at a Californian university, focusing on global warning. Ronald is passionate about recycling, including repairing, resizing and restyling used clothes. In his free time, Ronald is an enthusiastic cyclist and vegan food foodie. Ronald lives with his with and four children.

### ***Quote***

“We need to change our lifestyle, before it is too late”

### ***Attributes***

Environmentally-conscious  
Health freak  
Atheist  
Spartan

### ***Customer needs***

The sewing machine is easy to use  
The sewing machine is easy to maintain  
The sewing machine is energy-efficient  
The sewing machine is cost-efficient  
The sewing machine is built from sustainable materials

## 7 Benchmarking (3 p)

Imagine that you are working for a manufacturing firm that partly relies on engineering consultants for providing services related to design, analysis, prototyping & test, project management etc. Identify at least 10 requirements (demands and wishes) that you may use to benchmark alternative suppliers of such services.

### Solution

Requirements that should be posed on the consultant firm could include:

- **Value proposition**, i.e. the consultant's claim of how its services will benefit (be valuable to you) (wish)
- **Competence, such as**
  - **Engineering tool competence**, i.e. corresponding to the CAD, CAM, CAE tools that the firm uses (demand)
  - **Industry competence**, related to the firm's (i.e. automotive, electronics, energy ...) (wish)
  - **Project management competence** (competence to take on larger assignments, e.g. involving other consultant firms) (wish)
  - **Communication competence** (to communicate in the preferred language or your organization) (demand)
- **Facilities and equipment**, if the consultancy will provide simulation, prototyping or testing services) (demand)
- **Resource capability**, i.e., number of staff that may be employed to carry out basic service (demand)
- **Expert capability**, i.e. the number of highly qualified staff that may solve expert assignment (e.g. consultants with PhD degree) (wish)
- **Flexible availability**, e.g. number of staff available at short notice (wish)
- **Cost** (per hour) (wish)
- **References/track record** (of successful collaboration with our organization) (wish)

## **8 Course learning outcomes (4 p)**

Account for in text and graphics for what you know about the following course learning outcome:

*“Identify potential market segments, and screen and select the most promising market segments for a defined product”*

### **Solution**

As this question can be answered in many ways, no single solution is presented. However, the underlying contents is mainly found in lectures notes 19.