

EXAM

Product Planning – Needs and Opportunities

Course code: PPU085

Friday 2019-04-26 at 14.00-18.00

Examiner: Professor Johan Malmqvist.

Questions: Professor Johan Malmqvist, 031 – 772 1382, johan.malmqvist@chalmers.se. Prof Malmqvist will visit the exam rooms at approximately 14.30 and 16.00.

Department: Industrial and Materials Science.

Solutions: Will be posted on the course's PingPong page on Monday 2019-04-29.

Results: Will be announced no later than Friday 2019-05-17.

Exam review: The exam review will take place on Friday 2019-05-17 between 15.00-17.00. The location the conference room Fabriken in the Department of Industrial and Materials Science, M building, 5th floor.

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

No tools except pen, paper and dictionaries 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.

Do not use red ink!

Each sheet should be marked with the anonymous code and should be numbered in ascending order for the entire exam.

One only problem solution should be written on each sheet. This applies also when the solution is very short. Sheets without anonymous code will not be assessed.

1 Sampling (2 p)

The graphic below shows a number of sample strategies and sample frames. Your task is to connect strategies with suitable frames. You get + 0.5 p for each correct connection, but – 0.5 p if you indicate a incorrect connection.

Sampling strategy	Sample frame
Convenience sampling	The national pensioner's association
Optimal sampling	Your friends
Purposive sampling	Experts recommended by other experts
Critical sampling	The phone directory
Snowball sampling	A company's organisation chart
Theoretical representative sampling	The national census

Solution

Sampling strategy	Sample frame
Convenience sampling	The national pensioner's association
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2 Target costing (2 p)

Describe the help of text, graphics and equations the principles of target costing.

Solution

Target costing assumes that a product goes through a number of value-adding steps during its way from manufacturing to the end customer. The steps are the manufacturing itself, transportation, sales to a wholesales store, sales to a customer in the store etc. See example below.

Sports gear



At each step, an entity in the value chain adds its gross profit margin (M) defined as

$$M = \frac{P - C}{P}$$

where P is the price that is charged to the customer of this stage and C is the cost that this stage pays for the product that it sells.

Thus, if we know the manufacturing cost and the margins, we can calculate the market price. On the other hand, if we know the market price, we can calculate the permissible, “target” manufacturing cost as

$$C = P(1 - M)$$

If we have multiple steps in the value chain, there will be multiple $(1-M)$ factors, i.e.,

$$C = P(1 - M_1)(1 - M_2) \dots (1 - M_n)$$

In a generalized way, this can be written as:

$$C = P \prod_i^n (1 - M_i)$$

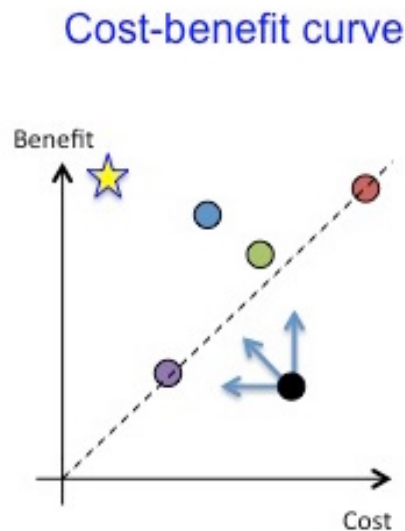
3 Competitive maps (2 p)

Describe at least two charts that can be used to visualize the (technical) competitive landscape for a class of products, and explain how they can be used to identify unique new opportunities or good targets for product positioning.

Solution

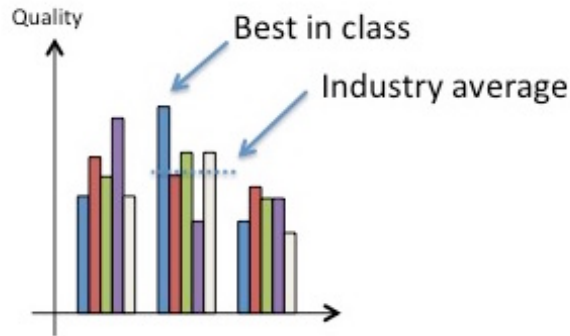
Three charts that support this analysis are:

Cost-benefits curves. The products on the market are positioned in a diagram that has cost as x-axis and some beneficial aspect (or an aggregate of benefits) on the y-axis. Products positioned above the dashed line provide a better value for money than those below the line. The ideal is at the star. If your position is below the dashed line you need to take action; improve quality (benefit), lower costs, or both.



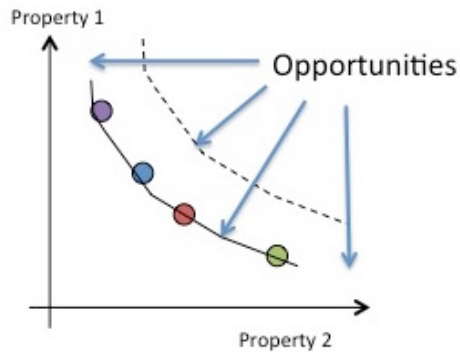
Property profile curves. The values (quality) for a number of product properties are plotted for the products on the market. This enables you to identify what is “best-in-class” for each property as well as industry average, and to set targets for individual properties.

Property profiles



Trade-off curves. The axis for this kind of diagram are related to two properties that are typically involved in a compromise decision (for example between performance and noise). At least after a while, it is common to see that products are positioned along a trade off curve, where they have balanced the two properties differently. However, they may still be gaps along the curves or at its end. There is also the opportunity for breakthrough products, which move way from the current compromise (and possibly generate a new trade off curve)

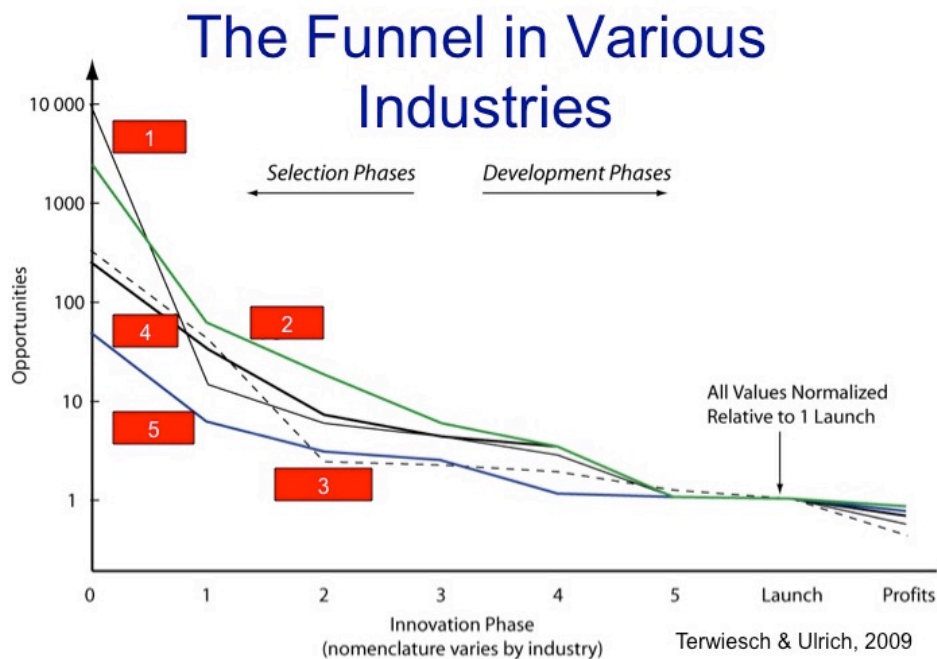
Trade-off curve



4 Opportunity identification funnel (2 p)

The graphic below shows the typical amount of ideas/opportunities that are investigated in different innovation phases in different industries. The curves 1-5 refer to consumer, industry, movie, pharmaceutical and venture capital-funded products, respectively.

Couple at least four of the curves to the correct industry and explain how each particular curve reflects the pre-conditions in the industry.



Solution

The industries that are related to the numbered curves are:

1. Pharmaceutical
2. Venture capital
3. Consumer products
4. Movies
5. Industrial products

The industry related to curve 1 is an industry where very many opportunities are generated and evaluated in the initial phase. This is possible if it is cheap to create many alternative solutions as well as to evaluate them. This is the situation in the **pharmaceutical** industry, where the initial ideas are molecules.

At the opposite end, curve 5, is an industry where idea generation and evaluation is expensive. Hence, relatively fewer opportunities can be investigated. Moreover, the next stages are also expensive, requiring a rather quick narrowing of the number of ideas that are brought forward to the next stage. This is the situation for **industrial** products, where the generation of an idea can require as complex development efforts and its evaluation advanced simulation as well as testing.

Curves 2 and 4 are quite similar and represent industries where ideas are initially described and evaluated in condensed form (“pitches”), and where many ideas can be brought forward (further development by small teams of “experts”). This reflects conditions in the **venture capital** (2) as well as **movie** industries (4). (Shifting these two will also be accepted as a correct answer).

Curve 3, finally, is representative for an industry where relatively many ideas are evaluated, in combination with a quick narrowing of considered alternatives. This corresponds to **consumer products**, which are cheap to prototype, but expensive to prepare for mass production, due to the (likely) need for advancing tooling.

5 Personas (4 p)

The capabilities of robotic pets (example below) as demonstrated by their developers frequently gain significant on-line media attention. Assume now that you would want to market a robotic pet as a product. Then you would need to identify some viable customer segments.

Your task is to create personas for at least three possible customers/users for a new, advanced, robotic pet.

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 robotic pet might be "Adina, tech enthusiast", "Igor, the allergic animal lover" and "Bran, the playful child".

Persona for "Adina, the tech enthusiast".

Photo (csc.kth.se)



Background

Adina is a 42-year female, Italian native. She has a PhD degree in computer science. After a period in industry, she joined returned to academia and is now a robotics professor. A keen inventor, with several patents in her name, she is always on the lookout for new technology solutions. She is married with two children. Choir singing is her main hobby.

Quote

"Look, it's so cool when it jumps!"

Attributes

Enthusiastic

Action-oriented

Impatient
Hands-on

Customer needs

Outstanding technical performance
Original design
Novelty
Programmable

Persona for "Igor, the allergic animal lover".

Photo (therussophile.com)



Background

Igor is a 66-year male, Russian native. He has a law degree and has devoted his career to public service. He is single. He looks forward to his retirement with some anxiety, being not sure what to occupy himself with then.

Quote

“I could never get a dog as a child due to my allergies. But now I can!”

Attributes

Introvert
Detail-oriented
Frugal

Customer needs

Realistic
Value for money
Reliable
Social interaction functions

Persona for "Bran, the playful child".

Photo (Stuart Caie)



Background

Bran is a five year old child who refuses to be categorised as boy or girl. It lives in the North of Sweden at the family castle. As a lonely child, it spends much time exploring the castle and its surroundings. During the long winters, he longs to the warmth of summer.

Quote

“My dog’s name is Summer”

Attributes

Intelligent
Curious
Playful

Customer needs

Easy to learn
Fun
Robust
Safe
Interactive
Cheap

6 Questionnaire design (4 p)

Electric scooters (see picture below) as a service are being launched in many major cities. Now that they have been launched, electric scooter operators need to improve their products in order to stay ahead of the competition. Your task is to create a questionnaire that can be used to prioritize and set targets for the product properties of an electric scooter.

Your questionnaire should include at least eight questions/statements with appropriate answer categories, and include all basic question types (demographic, behavioural, rating).



<https://www.wired.com/story/san-francisco-electric-scooters-bird-limebike/>

Solution

Demographics

- What is your gender? < *male, female* >
- What is your age? < <15, 16-20, 21-30, 31-40, >40 >
- What is your occupation? < *student, employed, self-employed, retired, other* >
- What is your monthly kSEK income including student loans < < 10, 11-20, 21-30, 31-45, > 45 >
- ...

Behaviour

- How often do you use an electric scooter? < *daily, at least once per week, every month, 1-2 times in total, I have never used one* >
- How long is the typical distance for your scooter journey? < <500 m, 501-1000 m, >1000 m >>
- Do you own or rent an electric scooter < *own, rent, N/A* >
- What current brand of electric scooters do you use (multiple answers allowed) < *Voi, Lime, Bird, Xiaomi, Spin, Segway, Rull, other* >

Rating

- It is important that the top speed of the electric scooter is high < *strongly disagree, disagree, neutral, agree, strongly agree* >
- It is important that the cost of the electric scooter (service) is low < *strongly disagree, disagree, neutral, agree, strongly agree* >
- It is important that the electric scooter has a long range < *strongly disagree, disagree, neutral, agree, strongly agree* >
- It is important that the electric scooter is safe < *strongly disagree, disagree, neutral, agree, strongly agree* >
- ...

- My current electric scooter has a sufficient top speed < *strongly disagree, disagree, neutral, agree, strongly agree* >
- My current electric scooter has a sufficient operating range < *strongly disagree, disagree, neutral, agree, strongly agree* >
- I feel safe when travelling with my current electric scooter < *strongly disagree, disagree, neutral, agree, strongly agree* >
- I am likely to buy/rent the same brand of electric scooter the next time < *strongly disagree, disagree, neutral, agree, strongly agree* >
- ...

7 Course learning outcomes (4 p)

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

“Explain what is meant by a product’s (market) lifecycle and its implications for companies product planning”.

Solution

As this question can be answered in multiple ways and formats, a detailed solution will not be presented.