Business Growth Hub

33 Factsheet

Concept Selection using Matrix Analysis

You would use this approach as part of the design process to select the best concepts that meet the Product Design Specification

Projected performance gains

Increased

- The best product concepts that meet the Product Design Specification.

Improved

- Team consensus to back the best product concepts
- Likelihood of creating a new product that will sell and meet profit margin targets
- Speed of design process, by accelerating decision making.

What investment is needed to understand the concept?

DIFFICULTY

Medium

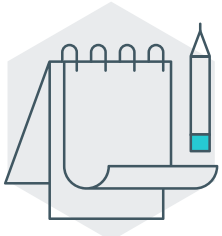
Requires some reading around the subject on the internet and a structured approach

ACTIVITY

Team

Best results come from a team including sales, marketing, design engineers, procurement, process engineers and assembly operators

EQUIPMENT



None

No equipment needed

For more advice, case studies and additional factsheets visit: www.businessgrowthhub.com/manufacturing

Explanation of the concept

Concept Selection is an element of the design process. It enables you to pick the idea(s) which best satisfy the Product Design Specification (PDS).

The design process should begin by firstly understanding the customer need, developing a PDS and then generating a range of concepts to consider.

Detailed design won't take place until after the Concept Selection process is complete.

In other words, before detailed design begins.

Concept Selection using Matrix Analysis

Benchmark	Camera with facial recognition	Digital scrapbook	Photo scavenger app	Live feed party projector	POV camera with straps
Am I personally interested?	S	+	+	S	+
Does the idea have competitive advantage?	S	+	S	+	S
Is there a clear need?	S	+	+	+	S
Are there good market opportunities?	S	+	S	S	+
How big is the impact of idea?	S	+	S	S	S
Can I communicate it clearly?	S	+	+	S	S

Steps to Construct / Design Pugh Matrix

One well known Concept Selection technique is the Pugh Matrix. An example is shown above.

The Pugh Matrix is an ideal approach to take with a team of people involved in the design process as it allows for several concepts to be evaluated by a team. There are four stages to this technique:

1. Choose or Develop the Criteria for Comparison

List the customer requirements, engineering requirements and targets. Examples of these criteria could include weight, power, time-to-market, cost, comfort or whether it is patentable.

2. Select the Alternatives to be Compared

The alternatives are the different ideas developed during concept generation. All concepts should be compared at the same level of generalization and in similar language.

3. Generate Scores

Usually designers will have a favourite design by the time it comes to pick one. This product concept can be used as datum, with all the others being compared to it as measured by each of the customer requirements. If the problem is to redesign an existing product, then the existing product can be used as the datum.

For each comparison the product should be evaluated. One way to do this is to give people 3 green sticky dots that they can put onto the concepts that they favour. Alternatively, you can score each concept as being better (+), the same (S), or worse (-), you can use a spreadsheet like Excel, by using +1, 0, and -1 for the ratings. If it is impossible to make a comparison, more information should be developed.

4. Compute the Total Score

a. Four scores will be generated, the number of plus scores, minus scores, the overall total and the weighted total.

b. The overall total is the number of minus scores subtracted from the number of plus scores.

c. The weighted total is the scores times their respective weighting factors, added up.

d. The totals should not be treated as absolute in the decision-making process but as guidance only.

e. If the two top scores are very close or very similar, then they should be examined more closely to make a more informed decision.

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What action should I take?

1.

Gather together a team.

2.

Explain the principles behind Concept Selection.

3.

Agree the key decision criteria to meet the PDS.

4.

Make sure that each concept is documented the same way (or the most polished will win)!!

5.

Allow people to vote.

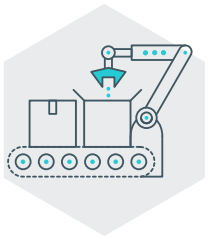
6.

If the two top scores are close the group should rexamine these concepts closely.

7.

Using the data, agree which concept to progress.

Recommended resources



Decision Matrix in Plain English, Lauren S:
https://www.youtube.com/watch?v=UAXiKVjaz1o

Glossary

Product Design Specification (PDS): A statement of how a design is made, what it is intended to do, and how far it complies with the customer's requirements.

Datum: The base level concept which all other concepts will be measured against.

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