

Pre-Workshop Activity

Prompt:

You have been chosen to lead a new product development team at DEFAULT Power Tools. The product you will be making is a contractor-grade, cordless drill intended for use by professional craftsmen and tradesmen. As an expert in power tools, you are aware that battery design constrains many of the product decisions of a cordless drill (e.g., weight, cost, power, duration of charge).

What key information is needed to make a good decision for your organization regarding battery design? Why is this information important?

Potential responses:

Technical:

- What level of power is needed? Battery chemistries/topologies have different maximum discharge rates.
- What duration of charge is needed? A longer duration requires a larger battery for a given battery chemistry.
- What are the spatial limitations of the battery?

Project:

- What is the timeline for the new product launch? Is this enough time to redesign the battery? Or should I just use a battery from a previous product?
- Do I have budget and human resources to redesign the battery?

Product:

- What do the users want and expect from such a product in terms of function, interaction, and character?
- How will a user charge the battery, generally? How long does this take? Is this a pain-point of the experience of using the drill? If so, is there an opportunity to reduce the pain-point?
- What are users willing to pay for the product? The battery drives a significant portion of the cost of the drill. I may need to make trade-offs for a lower battery cost.
- What is the lifetime of different batteries given the users' use habits? If the batteries fail quickly, the users may dislike the product, especially if replacement batteries are expensive.
- What products or services will the DEFAULT drill compete against in the marketplace? What is its differentiation?
- What is the market size of the product?
- Who sells battery replacements? How much will the battery replacements cost?
- What is the most likely cause of the product no longer working? When the drill breaks, is the defect generally something that would be cheap and easy to fix?
- Are there any existing products which the new product will need to be compatible with? Previous versions of the drill that may have shaped user expectations? Are there any standards for such drills that I need to be aware of?

Strategic:

- How are the batteries manufactured? Does any human or environmental damage result from the manufacturing conditions? Are there other manufacturer options available with better human and environmental practices?
- How are the materials for the batteries sourced? Does any human or environmental damage result from the material sourcing? Are the materials substitutable, and at what cost? How will supply of the materials change over time? Can the same material be supplied in less human and environmentally damaging ways? If so, can the supplier be pressured to change practices, or the manufacturer pressured to change sources?
- How are the drills, and particularly the batteries, disposed of when they are no longer in use? What are the human and environmental risks associated with this method of disposal?
- Is there any legislation regarding batteries that I need to be aware of in the product's target market?
- Is there precedent for legislation regarding batteries? For a similar product in any market (e.g., electrical and electronic waste in the EU with WEEE legislation)? For batteries in other markets? This represents a potential risk for future legislation in the product's target market.

Post Workshop Activity

Prompt:

You have been chosen to assist in the development of a new automobile chassis at Specific Motors—a global automotive manufacturer. The new chassis design will be the basis for several upcoming automotive lines.

What key information is needed to make a good decision for your organization regarding the design of the new automobile chassis? Why is this information important?

Recall the classification of specifications from the workshop:

- Technical: Can we solve the problem? Is it possible? (e.g., power, speed)
- Project: How do I solve the problem with my resources and constraints? (e.g., budget, deadlines)
- Product: Am I solving the right problem? (e.g., target market, differentiation)
- Strategic: Am I solving the right problem *the right way*? (company -> supporting environment and supporting environment -> company)

Potential responses:

(Note: only strategic considerations that differ from those in the pre-workshop are described below)

Strategic:

- Are there any emerging materials that could be a source of competitive advantage (e.g., carbon fiber)? What are the risks to development of knowledge regarding use of said materials in our company (e.g., time, money, social, legal, environmental)?
- Is there an opportunity to improve the reputation of the company by the design of the chassis? For example, can the chassis be made significantly safer?

- Are there any legal trends which might affect the chassis design? For example, the emergence of a carbon tax could drive up the cost of materials such as aluminum which are energy-intensive to process. Can this risk be mitigated somehow? A different material could be chosen, or the company could find a way to reclaim materials from their vehicles at the end of life (e.g., take-back / trade-in / recycling program).
- Are there any emerging social or economic trends that might affect the chassis design? For example, if energy efficiency is likely to be a concern in the future, the development of a light, aerodynamic, and safe chassis should be a high priority.
- The chassis consumes uses a large amount of material in production. Are there any risks associated with the supply chain of this material (e.g., social, environmental, sustainability)?

There are likely other strategic concerns. This is not meant to be an exhaustive list, but an indication of the types of responses that I would be looking for resulting from a successful session.