

## Design Tool Guide: House of Quality

**1. LEFT - Weighted Customer Needs:**

Insert an updated version of your weighted customer needs summary from customer needs analysis.

**2. RIGHT - Customer Perceptions (of products and concepts):**

Benchmark at least 3 alternatives. One should be one of your previously proposed solution concepts and the other two should be existing products. Estimate how well each alternative fulfills each customer need on a scale of 1-5 (disgusted to delighted.)

**3. CEILING – Metrics (measuring customer need fulfillment):**

Identify engineering specification *metrics* to measure customer need fulfillment, keeping in mind the following metric guidelines:

- 3.1. Measure satisfaction of customer need as directly as possible (using a single metric, if possible)
- 3.2. Measure overall performance;  
avoid implying solutions such as “oil viscosity” or “spring constant”
- 3.3. Practical to measure – can be measured on functionally similar products
- 3.4. Quantifiable – include physical units if possible (e.g. kg, m/s), otherwise use scales for subjective metrics (e.g. aesthetics rated 1-5, or % satisfaction)
- 3.5. Show direction of improvement (e.g. ↓Cost, ↑Efficiency)

**4. CENTER – Metrics vs. Customer Needs (relationship matrix):**

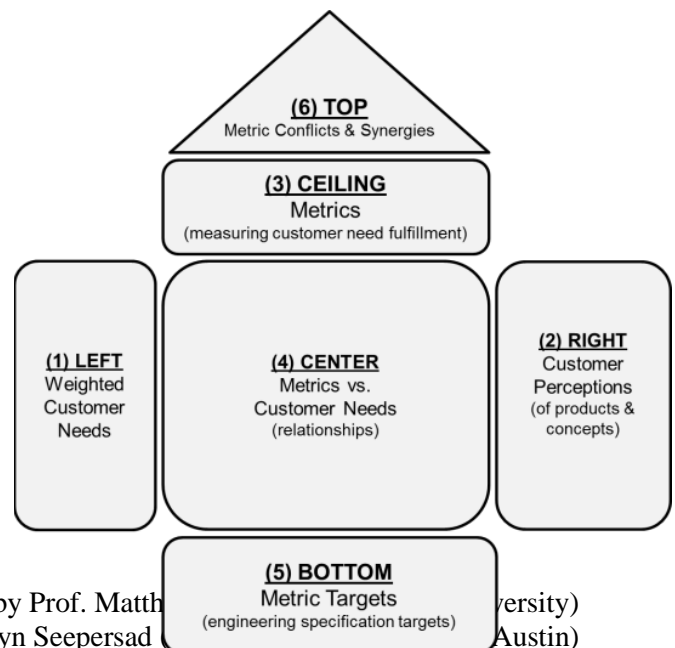
Show which metric(s) measure fulfillment of which customer needs with ● (strong relationship) and optionally ○ (weak relationship.) This matrix should be less than 25% full, and have a predominately diagonal pattern.

**5. BOTTOM – Metric Targets (engineering specification targets):**

- 5.1. For each metric establish a target (goal) for final design performance.  
Targets may be values (=98C), ranges (=95-100C), thresholds (≥ 95C), or lists (¼ in., ½ in., ¾ in.)
- 5.2. Optional: benchmark metric values of several existing products closely related to the design concept. Indicate whether these benchmark values are: measured, researched, and/or estimated.

**6. TOP – Metric Conflicts and Synergies (correlation matrix):**

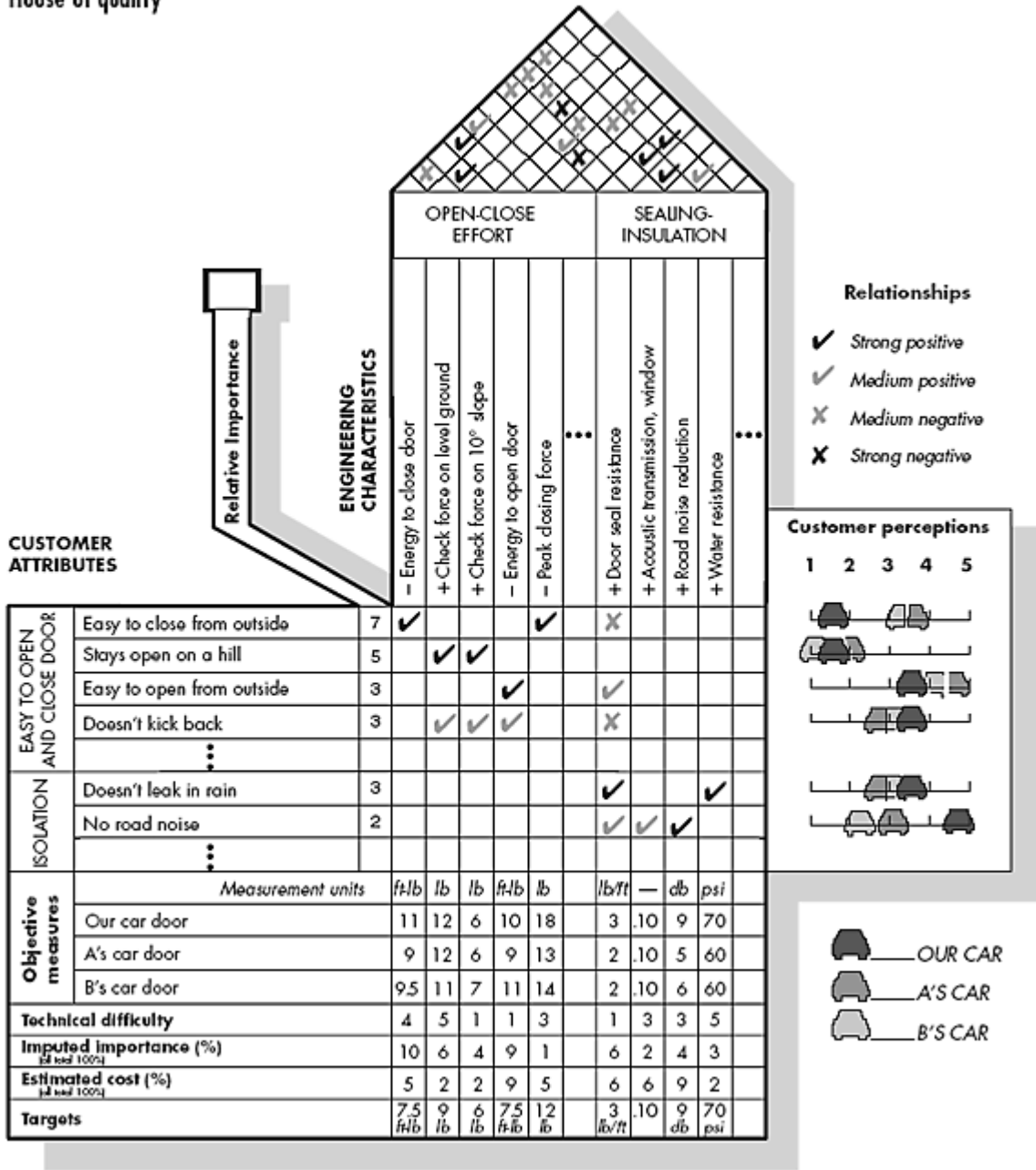
- 6.1. √ or + indicates synergy – improving one metric improves the other (e.g. efficiency and run-time)
- 6.2. X or – indicates conflict – improving one metric worsens the other (e.g. brightness and run-time)
- 6.3. Think in terms of “improves” and “worsens” not “increase” and “decrease”, because the directions of improvement can be opposite (e.g. ↓Cost, ↑Efficiency.)
- 6.4. This matrix should only focus on the most significant relationships.



→ PARTIAL HOQ EXAMPLE (Car Design):

EXHIBIT X

House of quality



From: Hauser, JR, and D Clausing. 1988. "The House of Quality." *Harvard Business Review*.

Available: <https://hbr.org/1988/05/the-house-of-quality>

