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Pushing innovation and cost effectiveness through Design-to-Cost

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Traditional product and service development tends to miss the boat. Cost-plus pricing is no longer possible and even when it comes to value based pricing there typically needs to be a substantial element of cost reduction involved. New products and services need to be developed with simultaneous focus on value, cost and innovation, and these need to be accounted for across the lifecycle.

While approaches such as target costing, value engineering, and more holistically, Design-to-Cost (DTC) have been around already for decades, it is surprising how little attention they are getting in everyday product and service development work. This is even more surprising given that some strategy books, such as Blue Ocean Strategy (by Kim and Mauborgne, 2005), have more recently repackaged this thinking into messages relevant to top management. Solve the customers’ problem in a completely new way, so that they get more value while you deliver the solution for less cost is the basic element for competitive advantage. Addressing this puzzle requires broad-based insight and innovation.

Design-to-Cost offers a framework for profitable customer focused innovation

Design-to-Cost, or DTC as we shall call it, switches the thinking immediately to allowed cost (or target cost). Once the allowed cost is known for something of certain value (usefulness), the task is then to find a way to design the delivery of this value so that the target cost is not exceeded (thus leaving room for some profit). Obviously neither step is easy – understanding what something is allowed to cost is challenging by itself, not to speak of finding a way to deliver at that cost! Further, the objective for this type of exercise is often not evolutionary, but rather revolutionary – a major breakthrough is sought. This implies that the target cost often is several ten percent below currently known levels, making the design element substantial.

While this article does not seek to give a comprehensive view of all the available tools used in a DTC process (there is a reference list at the end for this purpose), it is useful to provide a basic overview of the general approach. The principal element is that DTC starts from defining the allowed cost for something, based on what the customer is willing to pay and how much profit is sought. The challenge is then to find a way to deliver the solution (product or service with a certain value to the customer) at this cost. This is obviously quite the opposite from traditional cost-plus (design product, determine cost, set price); in DTC customers are involved before anything else is done, and they set the (target) price. Another key element is that both the cost and value are addressed holistically, that is, the entire value chain (for example, design, sourcing, manufacturing, logistics, service, recycling) and life cycle are analyzed. For this to be possible, the process leverages cross-functional teams so that the big picture is seen clearly. DTC is quite a resource and analysis heavy approach, and front-loaded, as it mobilizes a lot of people early on. Indeed, to achieve the target cost it is usually necessary to design (or re-engineer) the product (or service), the manufacturing process and the delivery and service processes. In DTC, this all happens simultaneously. Everything affects everything, and the approach tries to create an environment with enough cognitive capacity to address these connections. The actual work can involve a range of analytical tools and approaches, and usually includes workshops and even a war-room for the team. However, the rationale in putting all these resources to the task up front is that in most cases 70-90% of the costs are committed at the design stage. Thus, although DTC can be perceived as resource heavy up front, the cost of these resources is abysmal compared to the cost savings that can be achieved.

Case examples: From automotive engines to offshore wind farms

DTC has been applied to a range of cases, from automotive engines to offshore wind farm turn-key delivery and O&M (operations and maintenance). Consider the case of automotive engines; this element is typically a considerable cost driver for automakers, and requires specialized plants and tools. A lot of expensive precision components are required, and many parts are made by complicated manufacturing processes including casting, machining and special surface treatments. The engine also has a big impact on the value perceived by the car buyer; higher performance has traditionally received a higher price. In the automotive industry, features, performance and value are quite well known. Car manufacturers have a long experience and lots of data regarding the customer behavior and preferences. Expected price levels and value can be estimated quite accurately. In this case, the challenge is not so much to achieve a target cost, but rather overcoming the boundary conditions set by a very complicated and asset intensive manufacturing process. In some cases also conservatism limits new solutions. It took a long time for high performance engine manufacturers to accept that for example the inlet manifold can be made of other materials than casted metal, despite the significant cost savings potential. In the case of automotive engines, taking a full value chain perspective, and perhaps more importantly, a lifecycle view, has opened up new ways of designing a cost effective yet high performing solutions.

While automotive industry is the traditional home for DTC efforts, the approach can also be applied in new environments. Consider the case of Baltic offshore wind farms. Offshore wind farms, based on the experiences from the North Sea, are notoriously expensive and require some of the most advanced technology for all phases across logistics, installation, operations, maintenance and decommissioning. While the countries around the North Sea have chosen to address these issues with higher tariffs and subsidies, the Baltic Sea countries have been more conservative. Here the tariffs are lower, and many people perceive the tariffs to be so low that offshore wind farms are not economically feasible. Indeed such arguments have a solid foundation, given that the Baltic Sea suffers from severe ice conditions and requires a faster installation process due to the very short installation window (a few summer months). However, looking carefully at the engineering challenge there are also benefits in this environment; winds are less fierce, waves are smaller, the water less salty and depths more moderate than in the North Sea. Another interesting feature, especially for Finland, is that the tariff structure chosen defines the price for wind energy quite clearly. Given that a DTC effort addressing the turnkey delivery and lifecycle operations of a complete wind farm requires both wind farm owners/developers and suppliers to participate, this is a big benefit. All participants can see the value creation of the wind farm (given a certain average wind speed), and thus defining a target cost is quite easy. The revenue is known, and each of the parties can see the costs involved; the process of cost determination can thus be made transparent and reliable. This opens up the opportunity for both the customer and the supplier to sit down and work together on the DTC challenge. Such a DTC effort has recently been completed, and it resulted in cost savings on the order of 25% from initial estimates.

The next step: Take the challenge with an open mind

The need to provide more value for less cost affects all industries in today’s global marketplace. Industries are being redefined, value chains are merging and disintegrating at an increasing pace, and products are morphing into ecosystem-driven service experiences. As companies seek for entries into new markets, for ways to strengthen their competitive advantage, and for developing completely new value proposals to their customers, they increasingly need a holistic and customer-driven approach for offering and new business development. The message of this article is that there are good tools available, but that they may need to be applied in somewhat novel ways. The matter is not about reinventing the wheel, rather knowing what is out there and applying this to the issue at hand.

The world of the business builder is increasingly becoming that of an engineer – leveraging powerful tools that have been proven time and again, but finding new ways of using those tools, and most importantly attacking new problems. DTC is one of those tools, and it can be very powerful as we seek to find new ways to deliver value and creating novel sources of competitive advantage.

References

Design-to-cost is a well proven methodology. There are several good books for design-to-cost, target costing and value engineering. Below we list some references related to this topic.

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