

# THE VALUE OF DESIGN RESEARCH

## MANAGING DESIGN DRIVEN INNOVATION THROUGH THE USE OF DESIGN SCORECARDS

11TH EUROPEAN ACADEMY OF  
DESIGN CONFERENCE

APRIL 22-24 2015

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### ABSTRACT

*As our world has become flatter and competition hotter, design has grown increasingly international to better leverage resources across markets, creating and capturing value. Gone are the days when design was merely about continuously creating differentiation through form, function and cost cutting. Today's design driven organizations apply design as a differentiator, as well as in development of procedures, coordination of stakeholder activities and as strategies in their quest for creating new markets and profit. This paper first proposes a new framework, the Market - Technology Risk Matrix (MTR matrix) and a Design Balanced Scorecard method based on Design Quality Criteria, a set of nine criteria derived from auditing design awards and design briefs worldwide (Philosophy, Structure, Innovation, Social/human, Environmental, Process, Function and Expression) for matching an organizations culture and its strategic environment to innovation type (Disruptive and Sustainable). By following a five-step process the connection between an organization's culture, strategic environment, innovation strategy and design metrics can be established and communicated through Design Balanced Scorecards. We then outline the design opportunities available corresponding to Sustainable and Disruptive Innovation strategies as well as relevant metrics for managing their implementation. Finally we illustrate both types of innovation strategies with examples from two culturally contrasting corporations. In conclusion, a culture's risk-attitude is at the core of building competitive advantages and informs the relevant design metrics for managing innovation performance. The thus contributes to the domain of decision-making and in particular to decision-support literature.*

*Keywords: Design Management, Innovation Management, Design metrics, Design Quantification, Balanced Scorecards*

### 1 INTRODUCTION

Identifying business opportunities by matching an organization's internal capabilities with its external environment is to a large extent about applying the right framework to risk and return. Design research at Stanford, The Technical University of Denmark, Copenhagen Business School and Hanyang University has produced the Market - Technology Risk Matrix (MTR matrix) (Petersen 2015), which aids organizations in the quest for new offerings, it being products, services, experiences or hedonic symbols. Figure 1 illustrates what office task chair could look like in the nine quadrants of the design MTR matrix. The MTR matrix frames business opportunities as an Expected Return (Projected return x Market risk x Technology risk, def. risk ISO 31000: the effect of uncertainty on objectives definition of risk) grounded in coordination and balancing of market risk and technology risk. The two situations, low market risk – low technology risk and high market risk – high technology risk lends themselves to two core strategies, an incremental innovation and a breakthrough innovation strategy.

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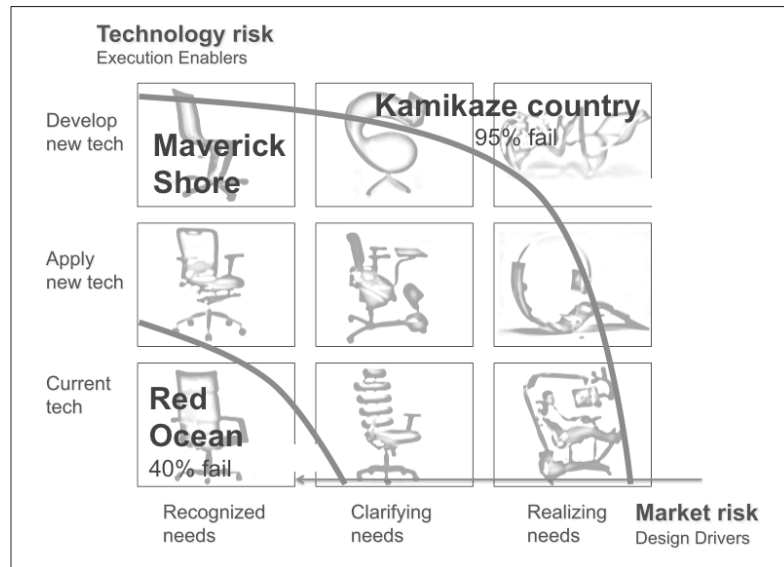


Figure 1. Examples of Market - Technology Risk Matrix

### 1.1 OVERVIEW INNOVATION AND MARKET – TECHNOLOGY RISK THINKING

The thinking and attitude most constructive for addressing these two extremes are that of investment (commit resources to a mainly predictable outcome) for incremental and betting (committing resources to an inherently unpredictable outcome) for breakthrough strategy. As a consequence, it is essential to appropriately match any decision-making approach with the selected strategy. When markets and technologies are associated with relative low-risk (market x technology risk less than 40%) return can to a large degree be estimated, risk can be assessed and mitigated and thus expected return evaluated. When markets and technologies are associated with relative high-risk (market x technology risk greater than 95%) the unknowns of return and risk are associated with massive uncertainties making useful calculations of expected returns nonsensical. Here systematic validation through rapid prototyping, testing and learning provides the best approach to establish opportunities and making bets. See Figure 2.

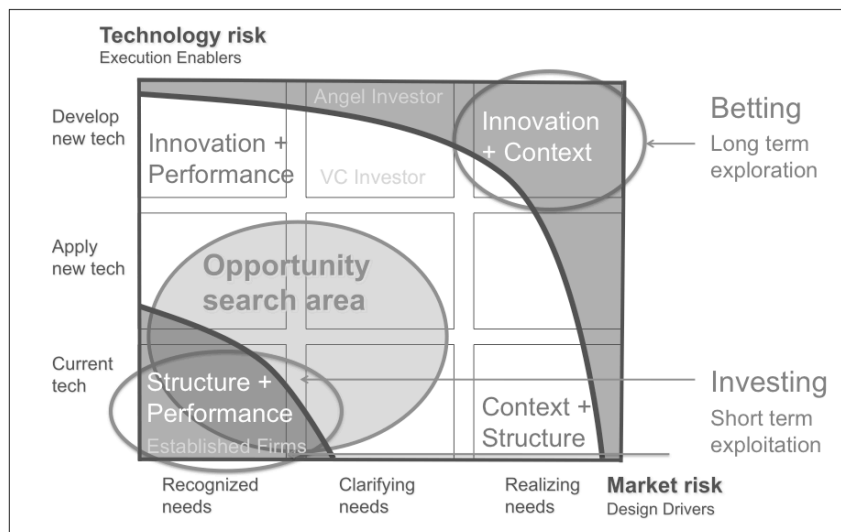


Figure 2. Opportunity area in the Market - Technology Risk Matrix

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The MTR matrix divided the Market risk – Technology Risk space into the following areas.

**Red Ocean:** The first area is the concentrated lower left corner contains 80-90% of new products. This area is populated by established organizations applying investment thinking, such as HP and Dell, driven to provide stockholders with sustainable, stable and predictable returns. Innovation investments in this area differ between and within industries and for consumer products this represent between two and six percent of revenues (annual report.)

**Kamikaze country:** The third area is a wider upper right corner populated by bootstrapped, self-financed and Angel Investor financed startups. These startups explore an area of high return and even, higher risk, resulting in a suicidal low expected return. With relative low investment phases (Pre seed, Early Seed and Follow-on Second Stage) they focus on limiting their betting losses, not on making an investment calculated return. These startups quickly and repeatedly get in and stay/out, in their hope of discovering and establishing the next big game changing opportunities, such as Google, Facebook, Tesla, Air BnB and Uber. To survive in this area, single bets should be in the order of 0.5 to 1 percent of available capital for investments (assuming similar risk magnitude as in soccer match predictions) (Palsvig 2014).

**Maverick Shore:** The middle area is the area sandwiched in between investment and betting, where risk-willing organizations and Venture Capital backed firms explore opportunities (Heebøll 2014). The thinking here is a mix of investment and betting, managed as a balanced portfolio of low-risk and high-risk projects. Low risk projects are primarily selected for their high Net Present Value (NPV), while high-risk projects are selected based on their fit with strategic direction.

## 2 METHODOLOGY

Traditional success metrics for strategies are: Achievement of strategic goal, building of Brand Value and increased stock performance. However, these metrics are of little value for guiding the design phase, since they are all lagging indicators/post-fact metrics. Metrics acting as early indicators of success are needed and here Design Quantification offer nine Design Quality Criteria (DQC). Design Quality Criteria is a set of nine criteria derived from auditing design awards and design briefs worldwide (Petersen 2009). These criteria comprehensively describe how the design community evaluates design, as well as how they form the content of design briefs. In addition, they are lead indicators of investors' evaluation of a new product (Petersen 2007a) as well as the products trendsetting ability (Petersen 2007b). The DQC align with the earlier established design maturity model the "Design Ladder" where the Process criteria correspond to level 2 (integration with process), and the Strategic criteria correspond to level 3 (integration with business). The nine criteria, grouped under strategy, context and performance, are (Petersen, 2009).

Strategic criteria

**Corporate Philosophy:** What are the company's history, values, belief, vision, mission, and strategic intent? How is the brand communicated?

**Structural Position:** In which business and category does the firm operate? What is its business model? How is it vertically and horizontally integrated, and what are its competitive advantages?

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**Innovation Type/Level:** What is the business's innovation area (that is, technical, financial, process, offering, or delivery)? Is the innovation type Sustainable or Disruptive? What is the organization's level of ambition?

**Contextual criteria**

**Social/human:** What are the users' and other stakeholders' cultural connection, identity, needs, behaviour, and activities?

**Environmental:** What are the environmental requirements and expectations?

**Viability:** What are the expectations regarding market share, ROI, and so forth, as related to the time horizons?

**Performance criteria**

**Process:** What are the project's budget, schedule, and deliverables? How are these aligned and coordinated with other projects?

**Function:** What is the nature of the deliverables: platform, modular, or custom product? What are the unique selling points and required number of SKUs? What are their technical requirements?

**Expression:** What are the brand's attributes, design language, and design principles (proportion, surface and details)?

Managing design for innovation effectively require applying the appropriate metrics for the selected innovation strategy. To accomplish this we have developed a Design Scorecard method leveraging the Designence™ model (Mozota,2003) and Environmental Strategy model (Reeves, Love, and Tillmanns, 2012). The four steps for formulating a Design Scorecard are (See Figure 3):

**Design Balanced Scorecard process**

**Step 1:** Establishing the organizations position in the Environment – Strategy, with its four strategies to the combinations of low/high Malleability and high/low Predictability: Classic, Adaptive, Shaping and Visionary.

**Step 2:** Select a Sustainable or Disruptive Innovation approach, depending on the organization's culture, financial situation, its risk-attitude, competitive situation and its portfolio of products (Christensen 2003).

**Step 3:** Determine the level at which design can and will contribute, at a Differentiator level (technology, product architecture, features, proportions, surface, materials, textures, color, details, etc.), Procedure level (rules and guidelines for how to take action), Coordinator level (configuration of decision-making, activities, etc.) and/or at a Strategic level (Sustainable, Disruptive, market-pull, technology push, etc.) (Mozota 2003).

**Step 4:** Formulate Design Scorecards for Differentiator level, Procedure level, Coordinator level and Strategic level.

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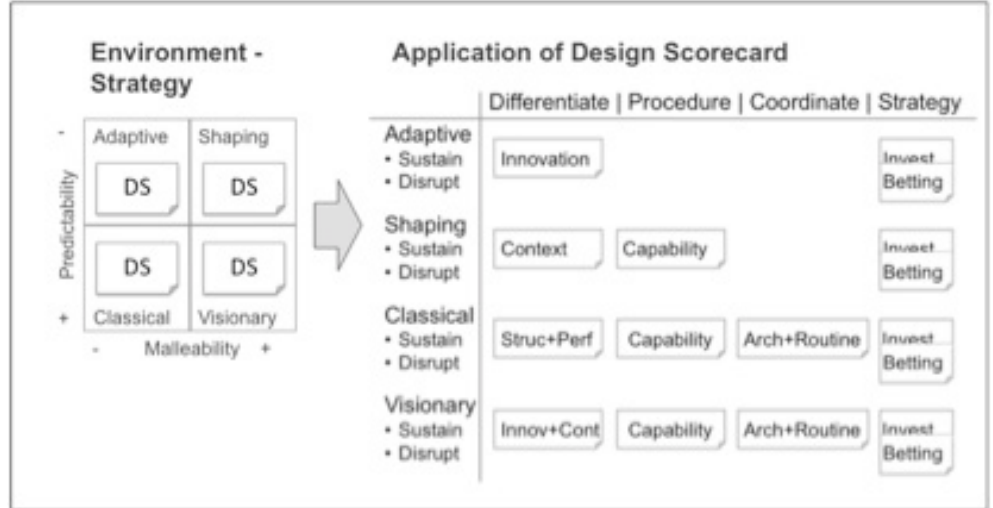
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Figure 3. Connecting Environmental Strategy to Design Scorecard



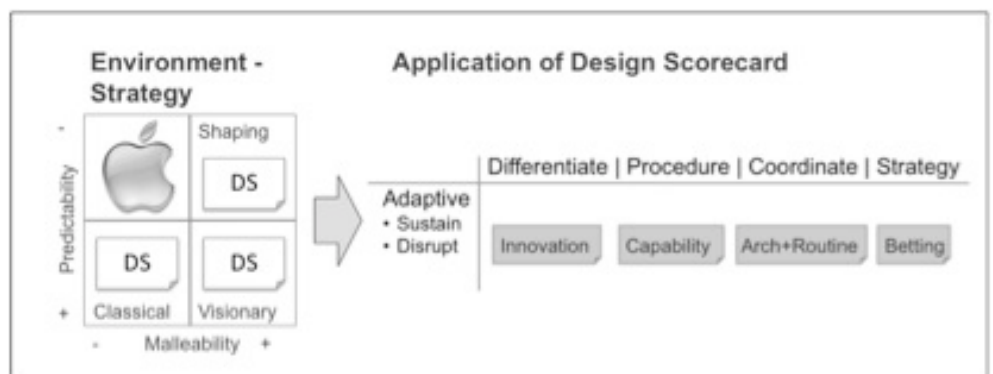
When completed the Design Scorecards provide clear direction as well as facilitate responsibility and accountability for the design deliverables. It informs the content of each individual design brief, effectively aligning design effort with business objectives.

### 3 A CASE STUDY: BETTING OR INVESTIGATING STRATEGIES

To illustrate the various strategic options and their associated Design Balanced Scorecards we look at the difference in approaches of Apple Computer and Samsung Electronics.

#### 3.1 APPLE

Figure 4. Apple's Design Scorecard



When Apple Computers (hereinafter referred to as Apple) decided to develop the iPhone, the firm was entering a fiercely competitive and Adaptive market with low malleability and low predictability. Plenty of marketing data was available for traditional cell phones and Apples selected touch screen concept was rooted in a mature and proven technology. Apple had gained some experience by launching a short-lived phone together with Motorola in 2005 and felt that compromising with a non-Apple designer was hurting the offering.

What then CEO Steve Jobs did, was to pursue a strategic Disruptive Innovation direction. He envisioned Apple leveraging its ability to provide excellent

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synchronization software by betting on cell phones becoming essential devices for portable information access. When launched in July 2007, the iPhone disrupted the entire cell phone market, driving Nokia, which then had close to fifty percent market share, out of the business.

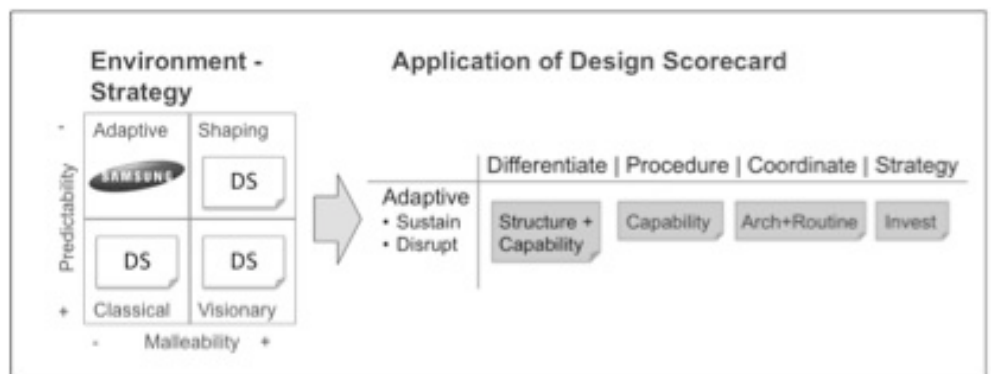
Conventional metrics for strategy implementation are achieving strategic goals in sales, brand value and stock performance. According to these lagging metrics, Apple has done extremely well along all three metrics. The new category Smartphone, enjoyed explosive growth and Apple successfully positioned itself in synchronization software. The firm's brand value (according to Interbrand) went up by 790% from 2007 to 2013 (130% average per year) and its share price grew by 530% from January 2007 to October 2013 (82% average per year).

These metrics measure design's impact through sales and brand perception but do not speak to the design strategy used in managing the innovation to achieve these results. We need the Strategic Design Quality Criteria: Philosophy, Structure and Innovation to address this (See Figure 4). We have reliable information on these metrics through the official autobiography on Apple's founder, Steve Jobs, by Walter Isaacson, which describes Job's philosophy of dedication to making users activities easier (Philosophy). Developing a structure by building a preferred partnering with the phone service provider AT&T (Structure) and using Apple Stores and Website for distribution (Structure). Finally securing an innovative internally developed software combined with exclusivity agreement with external hardware partners (Innovation).

The Apple case shows that the company apply a Betting Strategy to Disruptive Innovation. Design Balanced Scorecards also included Breakthrough Innovation as a differentiator, Procedure building in Smartphone design, Coordination in Architecture and Routines building in outsourcing Smartphone manufacturing.

Figure 5. Samsung's Design Scorecard

### 3.2 SAMSUNG



Samsung Electronics (hereinafter referred to as Samsung) had experience in the cell-phone market since 1988, with a great success of "Anycall" which was the first analogue mobile in South Korea. Since that time, the company is competing in Adaptive market with high predictability but low malleability, as Apple is doing. Samsung has rather pursuit Sustainable Innovation Strategy in a support of a huge amount of R&D investment and a high technological power. This is where Apple and Samsung differ – how competent they are at this new innovation. Samsung lays out a vertical integration of the firm and has an independent force of delivering main hardware and modular – batteries, HD

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super AMOLED, Camera, which are core capability of the Smartphone market at the beginning (Structure), but for software power Samsung highly relies on Google Android, whereas Apple has developed its own OS software solution. Developing this Structural position as a strategy makes Samsung competitive advantages in supply chain. Samsung has found success designing and manufacturing phones quickly, releasing dozens of new models each year ranging from high-end to budget devices- Galaxy S2, Galaxy Note, Galaxy Nexus, Galaxy S3, Galaxy Note2. This diverse portfolio in a short period helps to satisfy a variety of user needs (Social/human and Function). Most importantly, their Structural power can manage this short-lived schedule of production, and deliverables. In addition, Samsung is capable of providing a customized mobile for network providers – especially in the U.S. and China, due to their wide palette of offerings (Differentiated Innovation?). Needless to say, Samsung has been a runaway hit in sales; they claim Galaxy S4 is on track for 20 million sales in two months, which is the fastest selling in Android's short history.

Yet, Samsung find it hard to compete with Apple's original brand power and Design Philosophy and are being squeeze between high-end Apple and inexpensive Chinese brands. However, Samsung has being investing heavily in marketing - Won13 trillion (US\$ 9,5 billion), which is approximately 7.2% of sales in 2012 and this figure is more than the marketing budget of Apple (ca. 2%), HP (ca. 6%), MS, Dell, and Coca-Cola. In 2013, Samsung are leading, ahead of Sony, HP and Apple in Technology Brand Preference (published in Strategy analytics). The outcome of these investments remains to be seen.

As illustrated with the Apple and Samsung examples, metrics differ with the nature of innovation. If the firm is pursuing an Incremental Innovation (investing and exploiting mode) standard financial and brand metrics are useful for Structure Design Quality and the Execution Design Quality Criteria (Process, Function and Expression.) On the other hand, if the firm is engaged in Breakthrough Innovation (betting and exploring mode) these have to be substituted with Innovation and Context metrics as unique inimitable capabilities are built.

The Samsung case shows that the company apply an Investment Strategy to Sustainable Innovation. Design Balanced Scorecards also included Capability and Structure building in design and functional differentiation, Capability building in Smartphone design, Coordination in Architecture and Routines building in designing Smartphones.

#### **4 CONCLUSION: A CASE STUDY: BETTING OR INVESTIGATING STRATEGIES**

The Apple and Samsung Smartphone cases described show that when it comes to New Product Development it ultimately, it comes down to how the organization's Culture, Organizational Architecture, Procedures and Assets form the organization's strategy. Is the organization comfortable with high risk, looking at design a Disruptive and Breakthrough Innovative competitive advantage in the market, or, is the organization adopting a more risk-averse attitude and applying a Sustainable competitive advantage through design as a core competency in Differentiation? The first translates into a "design you cannot see" capability building, which is difficult to imitate even when publicly available. A coherent design strategy developed and communicated though the application of Design Balanced Scorecard can help organizations to effectively navigate these options.

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