BUSINESS PLANS INFORMED BY DESIGN

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ABSTRACT
Today the value created by applying design at a business model and innovation level as opposed to a design and process level is marginal. Interviews with product developers from academia and industry suggest this is due to a lack of design perspective when formulating and evaluating business plans. To remedy this, we propose including Design Quality Criteria drivers in the formulation of business plans. While auditing entrepreneurial business plans and design briefs content gaps were revealed between them. Strategy and context differences as well as a negative correlation between investors' business plan valuation and the plans process content were found. This suggests that investors prefer plans with strategy and context descriptions to plans with high or unknown execution risk. We also found significant differences in structure and innovation content for the following polar opposite innovation types. These were the design of products based on sustainable and on disruptive technologies. In conclusion, we recommend a procedure to align and translate business plan content into inspirational design briefs for enhancing design concept synthesis performance.

Keywords: business plans, design brief, quantification

1. INTRODUCTION
Managers and industrial designers perceive product development differently. This would be a potential advantage, if the two professions understood each other and communicated effectively. Unfortunately, they attend separate schools, focus on different challenges and are located in different workspaces. As a result, they rarely meet except during formal presentations. Consequently, managers have only a vague idea of what design is able to contribute to the organization's success and what support design might need to fulfill their role.

With a top-view perspective, management focuses their attention on customers, core competencies, competitive advantage, technical feasibility, profitability, impact and business plan strength [1]. These are all issues crucial for designers to understand, when synthesizing design concepts. Regrettably, management neglects to engage in execution and, as a result, pays little attention to industrial design when creating and valuating business plans [2]. When business plans later are translated into design briefs, the task is commonly relegated to engineering or marketing thus exacerbating the disconnect between the two professions. The fact that brief writing is considered grunt work; causes the task to receive hasty and minimal attention, further hindering good definition of the design objectives. Worst case, a meeting, a few hours in length, is all the organization allocates when retaining an external design consultancy [3].

Furthermore, management is unaware of the importance of balancing design briefing content to complement the characteristics of the proposed innovation type. Such as products that are based on sustainable and disruptive technologies [4], which consequently affect team performance. Sustainable technologies are characterized by extending the performance of an existing technology in an existing market, while disruptive is introduction of a new technology into a new market. Management's first feedback from design to their business plan is often at the final concept presentation. Having been disconnected from the briefing and the initial framing process, they now lack understanding of the concept and have little choice but to accept or reject the proposals in front of them. Consequently, there is no feedback; little learning and the process will then begin over again with the next product development project [5].

Comparing best practices in business plan and design brief content, establishes a base level understanding of what information to relay to industrial designers. Mapping business plans to design

briefs according to critical Design Quality Criteria (DQC): Philosophy, Structure, Innovation, Social/Human, Environmental, Viability, Process, Function and Expression [6], provides a structure for the translations. See Table 1. The DQC, are derived from design awards worldwide and capture design's contribution. The DQC content correlates to the concept's trendsetting ability and financial performance [7] & [8]. Furthermore, the content of these criteria affect the risk of budget overrun and influence design concept quality [9].

Previous studies show how early integration of industrial design leads to increased value creation [10] & [11]. However, there is only a one percent difference in revenue generation between corporations including industrial design at a process level with that of corporations including industrial design at an innovation and business level [10]. This suggests that there are sizable financial opportunities for the improvement of design briefing - business plan formulation.

The objective of our research is twofold. First, we seek to establish state-of-the-art translation of business plans into design briefs. This is addressed though a literature study, followed by illustrating how this translation can be realized in practice. Secondly, we seek to determine the balance of content in a design brief for optimal design concept synthesis performance. By auditing business plan content and performance and relating these to design brief content and performance, we establish the content balance of briefs for the design of products based on sustainable and disruptive technologies.

Table 1. Mapping of business plans and design briefs using Design Quality Criteria as framework

			Business Plan Content	Proposal content
Strategy	Philosophy		Background, Mission, Vision, Values	History (business framing, structure, belief, vision, mission, strategy, accomplishments), overall design strategy present/future, niche
			Opportunity, Value proposition (qualified/quantified)	
			Startup strategy, qualification and competencies	Competitive edge strength/weakness (SWOT), Company portfolio
	Structure		Management team, venture specification	Client/consultancy
			Market forces	Business category, competitor benchmarking, legal/ regulatory
				Partners: Production, Marketing, Sales, Vendors
	Innovation		Technology and trends, IPR,	Innovation area financial/process/offering/technology type, (sustainable/disruptive) IPR
Context	Social/Human		Customers, product pain, technical and value creation, decision-maker, jury legal point of view	Identity, needs, behavior, activities, use
				Demographics, geographic, cultural, psychographics
				Perception, recognition, loyalty
				Sustainability goal
ty goal tion/expression		Environmental		Sustainabil system/func
, size, competitors y/amount formance, place, promotion,		Viability	Budget, Capital investment, assets/liabilities, RIO, business system/model, budget, cash flow forecast sales, worst case	Positioning price/qualit Product per price
Design/Development nd, Competitor & Suppliers, tforms & tech rgonomics, Graphics, Material, Detailing	Performance	Process	Business development plan, objectives, activities, milestones, decision criteria, time table	Procedure Direction/D Review Tre Explore pla Branding, E Modeling, I
I, Usability, Feedback, , Architecture breakup odular, custom		Function		Function, U Technology Draft, Part I Platform, m
esthetics, attributes, graphic, connection to user, ate benefits ing, Ideation, Detailing		Expression		Branding, a emotional Communica Understand

2. RESEARCH PROCEDURE AND FINDINGS

2.1 Integrating business plans with design briefs

Based on insights from design consulting experience we conducted a literature study of over 300 books and articles on portfolio management, business strategy, models, plans, design strategy, management, branding and marketing. Informed by the literature study we then conducted open-ended unstructured interviews with eight experts in design research, product development and business management. In subsequent brainstorming sessions we consolidated the best practices in translating business plans into design briefs, structuring these according to the Design Quality Criteria. The alignment provided an overview of how critical information could best be communicated from management to designers.

Secondly, we examined the balance of DQC content in business plans and design briefs for optimal design concept synthesis performance. We audited business plan content and performance and compared these findings with a previous study of design briefs [9]. Combining our business plan – design translation structuring with proper balancing of content we established a best practice for the briefing of design teams.

2.2 Translation of business plans into design briefs

The procedures developed for translating business plans into design briefs are structured according to the Design Quality Criteria: Strategy (Philosophy, Structure, Innovation), Context (Social/human, Environmental, Viability) and Performance (Process, Function, Expression).

2.2.1 Strategy (Philosophy, Structure and Innovation)

Philosophy: Design contributes in formulating, visualizing and communicating the organization's philosophy. Initially the business develops rationalization for its existence, which consists of its beliefs, values, vision and mission. Based on this philosophy, business ideas are formulated which leverage the business' competencies and competitive advantages. Design contributes by formulating, visualizing and communicating the rationalization for the business ideas to all stakeholders. To integrate the rationalization into the concepts, the defining criterion needs to be clearly articulated to the design team through the design brief as well as visually exemplified. It is especially important that Philosophy, Structure, Innovation, Process and Expression criteria are communicated.

This is realized though the formulation of a design philosophy and mapping the meaning of the business and then imbedding this philosophy into the overall design language. One example might be using "Design Briefing for Emotion and Meaning [12] and Framework for Conceiving Aesthetics in Design as the Formulation and Construction of Meaning [13]. From here the design language is structured into its signature elements, design principles, visual positioning and core values. As an example, the BMW signature elements are: The Roundel logo, dual kidney grill, four headlights, five spoke wheels and driver oriented cockpit. The design principles are a bookend-strategy, with the seven series applying architecturally controlled language at one end and sports cars applying flame design surfaces. Visual positioning elements are: Long hood and short trunk proportions, short front overhang, narrow shoulder to wheel distance, alternating concave and convex surfaces, crisp surface intersections. The core values are expressed by the brand attribute words: Joy, circled by dynamic, cultivated and challenging.

Informed by the design language, advanced concepts are created for the planned product offerings. Evaluating the advanced concepts using the Design Quality Criteria structure, the key elements are fine-tuned and refined so the overall language of the brand and potential sub-brands best reflect the company's business priorities. Within the BMW Group, luxury, ultimate driving machine and cute/chick is addressed by the sub-brands: Rolls Royce, BMW and Mini. Each has their own philosophy and expressed in their design.

Structure: Design provides design-related knowledge to the SWOT audit for the Porter's Five Forces analysis, based on knowledge of aesthetic trends. Informed by the findings from the business plan's analysis, a "Strategy Canvas" [14] is constructed, containing the nine Design Quality Criteria.

Under the Social/human criteria, the design language is augmented with insights from users and under the Expression criteria, the design language for brand and sub-brands are displayed in two maps. The first map shows design language, positioning the advanced design concept language in relationship to trends in other fields, such as: Entertainment, fashion, architecture and transportation. The second map shows competitor visual positioning, where the same advanced concept language is positioned in relationship to its competitors' offerings. Together these maps show which design-languages are appropriate for a new family of products. As an example, the BMW design language is inspired by the architectural philosophy of Deconstructivism, practiced by architects such as Frank Gehry, Zaha Hadid and Wolf Prix. The automotive brands BMW would include in their competitor comparisons would be brands such as Audi, Mercedes and Lexus.

Innovation: Design co-creates innovative concepts, visualizing and communicating innovation opportunities. To ensure the design language fits with its innovation position and is flexible enough to accommodate future technological progress, a Market - Technology Innovation Matrix [15] and a Technology Roadmap is constructed. Locating the overall design language, advanced concepts and current products in the Innovation Matrix aids in creating consensus for the development challenges and appropriateness of the design language. As an example, BMW Group would be positioned in medium technological innovation and high on user need discovery, as exemplified by vehicles such as MINI Coup and Clubman and their cross over vehicles BMW XCoupe, X5 and X6.

2.2.2. Context (Social/Human, Environmental and Viability)

Social/Human: Design participates in user-studies, tests conceptual ideas and communicates findings. The initial alignment of the market segment with the design language is accomplished by using user behavior mapping. The design language is compared to the intended users segments: Innovators, Early Adopters, Early Majority, Late Majority or Laggards [16]. These segments require different design approaches, where design facilitates the role of: Curator, Endorser, Integrator, Economizer and Refresher [17]. As an example, at BMW, customers would be considered as an early majority and as active urban professionals.

Secondly, to provide the designers a visual reference of the users for whom the team is designing, the advanced concepts are illustrated in a lifestyle map. This provides a visual check of the appropriateness of the design. As an example, a BMW lifestyle map might include motor sport, sailing, golf and road trip images, also reflected in their corporate sponsorship programs.

Thirdly, the advanced concept is located along a Most Advanced Yet Acceptable (MAYA) timeline, to provide an estimate of how the design language might curtail users in the segment, by being too "out there". As an example, BMW, during the past few years, has been pushing the limit of their traditional target group. The 7 Series rear treatment and Z4 flame design are some of the most disputed designs of the 21st Century.

Environmental: Design explores eco-opportunities and visually communicates the findings. Establishing the portfolio's level of environmental ambition is accomplished by mapping the products environmental lifecycle curve. The products' potential environmental impact improvement is rated and displayed according to: Redesign, drastic redesign, functional improvement and systems innovation [18]. Based on these decisions, the advanced concepts content of eco-communication features are established. As an example, BMW has been addressing systems innovation, pursuing hydrogen as propulsion for more than a decade. This philosophy has fueled concept cars such the BMW Hydrogen and Vision concept car, which tested the market for future design expressions.

Viability: Design provides design related knowledge for development of business models, business strategies and competitive advantages. At a business model level, design can add value within activities, positioning and cost-value [19]. At a business strategy level, design can add value in positioning (brand, customer relationship, government protection, status, distribution, geography, installed base, information gatekeeper) and capabilities [19]. Design also provides business with a competitive advantage within the areas of activities, positioning and cost-value [19].

2.2.3 Performance / Execution (Process, Function and Expression)

Process: Design co-creates the design brief, acquiring tacit understanding of the opportunities (Direction), synthesizing and refining concepts (Design) and supporting implementation of the design, (Development). BMW is a premium brand and in the US market their cars are only available with luxury features such as HVAC, leather interior and larger engines. They deliberately import fewer cars than they can sell to keep prices high and you will never see their products on sale.

Function: Design participates in activity and functional analysis, integrating provider and user aspects into functions and features [6]. BMW is highly feature focused, leading in functions from GPS, roadside assistance tracking, mobile phone and iPod interface to wind deflectors, xenon lights and LED lights.

Expression: Design leads the translating of provider and user aspects into attributes, features and form language (proportion, surface, details, material, texture, color and graphics). Creating a cohesive expressional statement supported by a compelling and comprehensive story. BMW decided to become a design leader and changed their strategy from "one shape in three sizes" to the above-described bookend-strategy. Their entire product range was completely redesigned following a strict proportion – surface – detail approach. From a distance, one can recognize their products from their proportions. From a couple of meters distance one can recognize the finely chiseled concave - convex surfaces and when one interacts with the product one enjoys the fine details. Getting in and starting a BMW provides over a dozen specially designed sensual inputs.

The procedure outlined above is applicable for product and transportation design; however, with modifications the approach can be applied to other design disciplines as well.

2.3 Balancing business plan content for optimal design briefing

To determine if the balance of business plan content related to management evaluation and subsequent performance of design briefs, we auditing twenty (n=20) entrepreneurial business plans, from MS students at the Technical University of Denmark. Professor Heebøll teaches the course and the template used for business plan writing is outlined in his book [20]. The approach is similar to business plans used in Silicon Valley for startups [21]. Each business plan consisted of approximately twenty pages, excluding appendix, which we refrained from analyzing.

The objective of business plans is to concisely describe a business opportunity, so management can evaluate and decide whether or not to proceed. Business plans include lengthy documentation of the reasoning behind the business opportunity. In contrast, design briefs focus on actionable design criteria. Design briefs for concepts are intended to capture the essential criteria for synthesizing concepts. Due to ordinary cognitive capacity, these are normally between one to three pages in length.

Applying Design Quality Criteria segmentation, we compared business plans content balanced with that of design briefs, See Figure 1 as well as business plan content for polar opposite innovation types: The design of products based on sustainable (n=9) and disruptive (n=11) technologies, See Figure 2. Finally, we examined the relationship between content and student grades.

2.3.1 Business plan and design brief content

Comparing the distribution of Design Quality Criteria for business plans and design briefs shows that design briefs have approximately three times more focus on execution related criteria. Business plans on the other hand include minimal content addressing products function and environmental concerns. Regarding expression/styling, the business plan's content barely contains one percent as compared to twenty-five percent for design briefs. The findings confirm our original assumptions that management considers execution a low priority and refrains from considering expression related criteria in earnest.

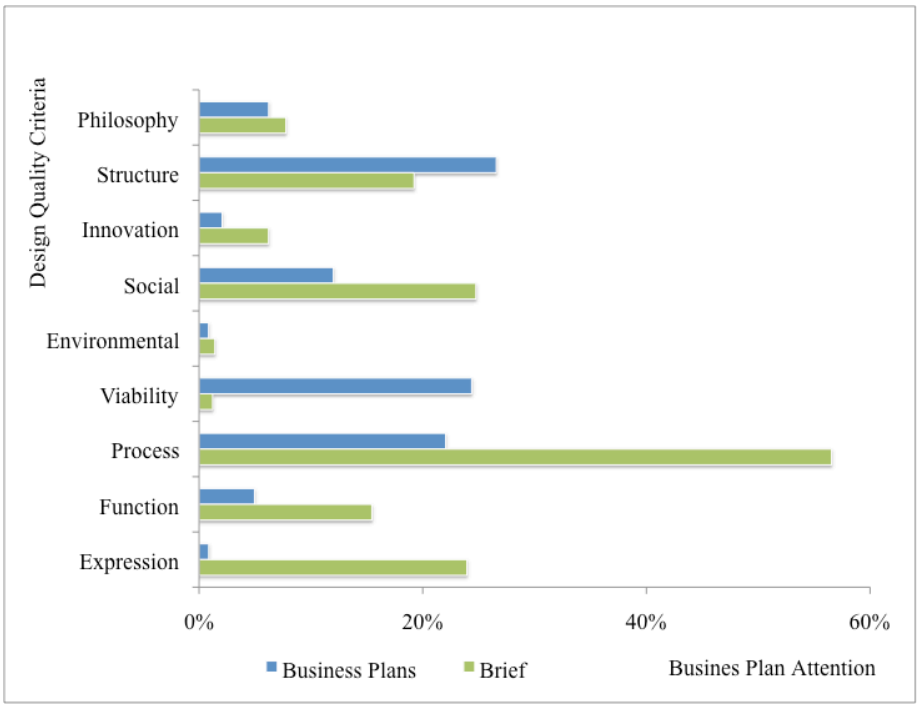

Figure 1. Comparing the distribution of Design Quality Criteria for business plans (n=20) and design briefs (n=51).

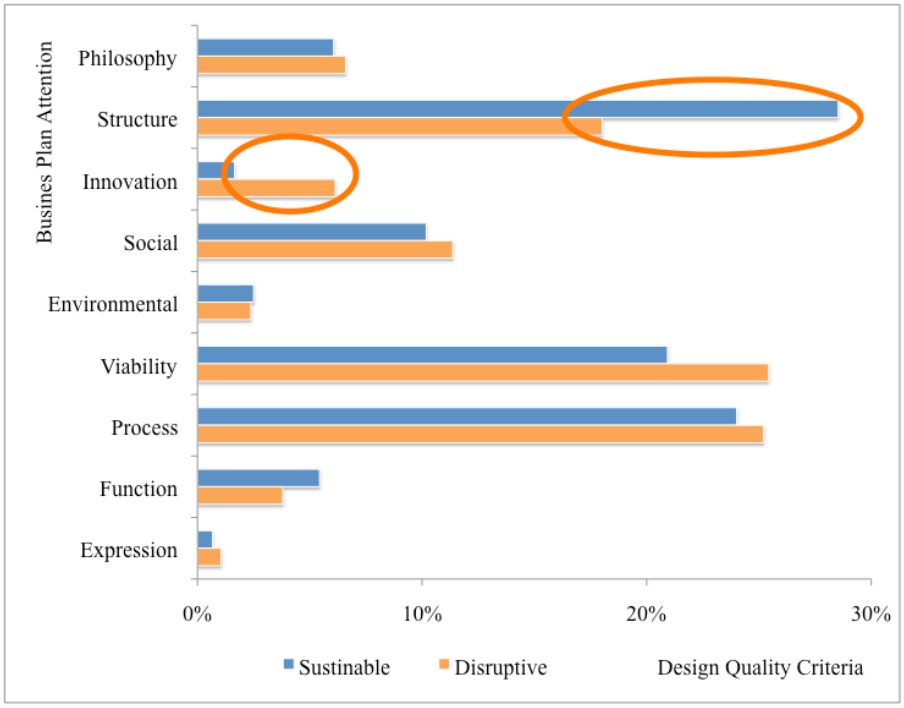

Figure 2. Comparing the distribution of Design Quality Criteria for business plans (n=20), half of which implement sustainable and half of which implement disruptive technologies. Plans for sustainable technologies contain a larger proportion of structure criteria content, while disruptive plans addressing disruptive technologies contain a larger proportion of innovation criteria content ($p<0.05$ level, SPSS ANOVA F-test).

2.3.2 Business plan content for innovation types

Business Plan content for sustainable and disruptive technology implementation shows the former to focus on Structure criteria content and the latter to focus on Innovation criteria content. These findings

correspond well with our expectations for development of products based on sustainable and disruptive technologies, founded on Christensen's definitions of these [4].

2.3.3 Performance relationships

Analysis of the relationship between business plans' DQC content and grades received for the plans, showed medium negative correlation between the plans content of process criteria and the valuation, corr. = 0.45, $p<0.05$ significance level, SPSS Pearson. These findings were unexpected and raise important concerns. They suggest that management is more comfortable with risk associated with criteria addressed by their own expertise, than related to the development process. This lack of confidence in product development will consequently favor projects addressing incremental product improvements.

3. DISCUSSION

3.1 Business plan - design brief translation procedure

Our research establishes a procedure for translating business plans into design briefs, structured according to the Design Quality Criteria framework. The required steps are described and illustrated with examples from industry.

The criteria of Environment, Function and Expression are scarcely included in the business plans. Design leaders such as BMW, Apple, Motorola, Nokia and HP have these criteria established prior to commencing a product development project and their investors' valuations are considerably higher than their peers [6]. To what extent this is a high priority for an entrepreneurial firm is unclear, however the design leaders mentioned here have been known for great design from their initial launch.

3.2 Business and design content influence on execution

Secondly, we established patterns for Design Quality Criteria content related to successful briefing of design teams. These are:

3.2.1Initial framing of business opportunities

Business plan valuation correlates negatively with the content of process description. This suggests management is cautious of execution risk and tends to favor tried and true solutions. Introduction of new products has a failure rate between 35 and 41 percent [23]. However, to what extent are management's concerns reasonable? Is the failure rate primarily due to the execution or is it due to poor business planning? This remains to be examined. An up front inclusion of a Real Option approach to product development together with a Stage-Gate process can limit the cost of execution risk [23]. I suspect that management does not prioritize execution, nor can they articulate their needs and therefore they experience the pain that comes when these issues are not addressed.

3.2.2Business plans and design briefs for sustainable and disruptive technologies

Business plans for sustainable technologies focus on structure, while for disruptive technologies the focus is on innovation. For design briefs the focus for sustainable technologies is on expression and performance and for disruptive technologies on context and social/human [20], see Figure 3.

		Business Plan Content	Briefs content
Sustainable	Strategy	Structure	
	Context		
	Performance		High Performance High Expression
Disruptive	Strategy	Innovation	
	Context		High Context High Social/human
	Performance		Medium Performance, Medium Expression

Figure 3. Comparison of the Design Quality Criteria content for business plans and design briefs for products based on disruptive and sustainable technologies, p<0.05 level, SPSS ANOVA F-test

Comparison of important criteria for business plans and design briefs, when addressing sustainable and disruptive technologies, shows a clear disconnect. The criteria valued in business plans (Structure and Innovation) does not relate to success in the design brief. This observation reflects one of the differences in perspective between managers and designers and the ability to realize and resolve this could provide the seed for improved product development.

3.2.3Who owns the process description?

Customarily the design brief acts as a contract between management and the project manager of the team. If multiple organizations collaborate, each organizations project liaison is responsible for his organization's contribution. The challenge is to reach management for input and feedback, causing delays and frequent ad hoc changes to direction. Design briefs show three times more process content as business plans (60 percent vs. 20 percent), which suggests that the cause of the problem may be in their different priorities.

3.2.4Study limitations

The findings are based on a limited sample of business plans and two professor's valuation. As additional business plan samples are collected, additional relationships between DQCs and external performance metrics may become apparent. There is also a question of how well MS students reflect real life performance. However, from studies done of design briefs at Stanford, we know that the briefing and team performance reflected that of the design-consulting world.

4. SUMMARY AND CONCLUSION

In this paper we have discovered the key causes for the structural disconnect between what management values in a business plan and the design team requirements for a good design brief. Business plan valuation correlates negatively with the content of process description, placing innovative projects at a disadvantage. Furthermore, Environment, Function and Expressional criteria are scarcely included in business plans. Comparison of important criteria for business plans and design briefs, when addressing sustainable and disruptive technologies, shows a clear disconnect. The criteria valued in business plans (Structure and Innovation) does not relate to success in the design brief.

Leaving these criteria undefined at the project outset consequently means they will not be coordinated in product development companywide or even between projects. This leads to unsound creation, translation and communication of business plans criteria, critical for design team performance. Subsequent ad hoc design for these criteria place the design team at a disadvantage and result in an increased risk for budget overrun by up to twenty-five percent or more. Worst case, this potentially jeopardizes development projects for sustainable and disruptive technologies.

A procedure for translating business objectives into design criteria have been aggregated, based on state-of-the-art methodologies and use of the procedure has been illustrated with examples. We recommend management own the responsibility for including design considerations in the plan and translating the plans' content into a design brief. In this manner, a person with authority can ensure that criteria critical to the design team's performance are included in the conceptualization of new products.

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