

Design—a Strategic Business Tool

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OVERVIEW: The designer as the “consumer advocate” has to mediate between manufacturing engineering and the cultural context of the target group as defined by the marketing department, and is expected to design a product offering value through easy interaction and a satisfying experience to the user. In the following article the reader will gain an insight into the designers complex work on line design development. Further through scenario techniques and interaction design methods, the designer is able to constructively support corporate innovation processes. In this report a sample of the development process will be given for a gesture interaction solution ready to be applied on king size displays. The article will close with the proposal, that the design process is of value for the corporate brand management. Design will lead to positive “brand experiences” essential to compete in a diversified European market.

INTRODUCTION

Definition of Design

WHAT is the definition of the rather young discipline “Design”? According to the ICSID (International Council of Societies of Industrial Design), design is a creative activity whose aim is to establish the multi-faceted qualities of objects, processes, services and their systems in whole life-cycles. Therefore, design is the central factor of innovative humanisation of technologies and the crucial factor of cultural and economic exchange⁽¹⁾.

Design has its roots around 1870. Influenced by the arts and crafts movements in U.K., the Vienna

Secession, the German Werkbund and the first design university the Bauhaus founded in Weimar, Germany. The industrialisation of consumer products created the need for a specialist in charge of functional-, ergonomic- and aesthetic aspects of the product as part of the complex automated manufacturing process. Over time, the design discipline has diversified due to the complexity of tasks. Today the Design Division of Hitachi, Ltd. and its satellites portfolio is covering a range of design expertise from industrial graphic, Web, interaction, information, usability, public, capital equipment, interior and exhibition design.

INDUSTRIAL DESIGN

Digital DVD Camera of Hitachi

Consumer electronic companies competing globally in mature markets, have a need to differentiate their consumer products through technical innovation realised in shorter innovation circles from one product generation to the next.

Consumers themselves are living in highly diversified social cultural contexts and seek sophisticated designed product/service solutions that will satisfy their need for emotional enhancement.

Hitachi’s development of the world’s first DVD (digital versatile disc) camcorder initiated a shift from tape-based camera design towards DVD-based cameras. The new DVD format had a broad impact on the overall camera design due to the new functionality and form factor. In this article, the author hopes to



*Fig. 1—DVD Camera 2nd Generation.
New DVD format has a broad impact on the overall camera design due to the new functionality and form factor.*



Fig. 2—Working Environment. Designers are involved from the start of the product development process. Once engaged, they have their own internal project initiation activities.

offer a brief insight into the design process of the 2nd generation DVD camera that was realised in close collaboration with the Hitachi Design Centre Europe (HDCE), Milan (see Fig. 2).

Design Process

The term “fuzzy front end” describes the process before the actual product development process. It is the nature of that phase that it takes time to setup a development team with the right scope of skills, introduce milestones, and deadlines. Industrial designers are involved from the start of the product development process. Once engaged, the design team has its own internal project initiation activities (see Fig. 2). The design teams goal at this stage is to become familiar with the new technology, understand the potential impact on the user, and introduce broader social knowledge.

Benchmark and Market Research

Benchmarking is the analysis and expression of the differences of a local European market in comparison with the market in Japan, or the United States (see Fig 3). This focuses on user-technology interaction, and in particular, the user perception of the various facets of a product, from the value of the interface and the quality of materials to the real world performance of mechanical details. The emotional and commercial values the camera is offering to the user are as important as the weight, sound, and tactile feel, the look of a camera.

Reflection of the Design Brief in Order to Optimize Technical Layout

To analyse the original brief in order to optimise the product requires an interdisciplinary review process between engineers, marketing and industrial designers. Ergonomics, technical specifications, services,



Fig. 3—Documents of Colour Material and Finish Benchmark and Market Research.

Benchmarking is the analysis and expression for understanding differences between local markets.



Fig. 4—Joystick as Navigation Interface Applied for DVD Camera for First Time.

Designers found it useful to express the simplicity of the disk navigation and new editing features of DVD technology.

software and the camera’s user interface are key criteria’s to be addressed.

Design Concept Proposals

The challenge to create the best expression and modes of use for a new technology is the product soul. The aim of design concept proposals is to find the right aesthetic expression and harmony of materials that will meet the customers’ needs and develop a clear differentiation between tape and DVD format camcorders. Within this scope, the strength of designer is often to bring analogies from other disciplines and technologies. At HDCE we realised the joystick solution. We found it useful to express the simplicity of the disc navigation and new editing features of DVD technology. Designers in the Milan office observed the trends towards an androgynous design expression of technology to challenge the traditional masculine camera design expression. This trend was used to guide the concept design process (see Fig. 4).

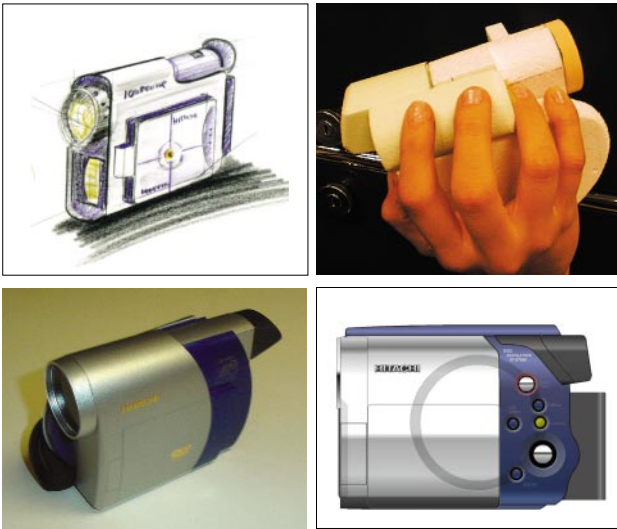


Fig. 5—Top left to right: Sample of Hand Sketches. Rough Foam Model 1st Volume Study and 2D Rendering on PC. Some ideas will be taken into 3D renderings and physical foam mock-ups to study design details and simulate modes of operation.



Fig. 6—Virtual 3D Rendering and Animation on PC. Real 3D Model for Final Evaluation. Designers will deliver 3D technical drawing to the engineering department for physical 3D models realization to be applied for engineering moulds in various materials.

Design Evaluation

Design evaluation is founded on the criteria of cost/performance, ergonomics, usability and an attractive design that matches the overall brief. PC- and hand-made sketches are clustered in groups for evaluation. Some ideas will be taken further into 3D renderings and semi-finals as physical foam mock-ups to study design details and simulate modes of operation (see Fig. 5). In the final design evaluation phase, the design team will deliver 3D technical drawings to the engineering department for physical 3D (see Fig. 6) model realization to be applied for engineering moulds

in various materials such as plastic, aluminum, etc. Design models will be presented to marketing and sales divisions for their specific market evaluation.

Design Realisation

This is the most complex phase, as late changes in technology or design details may effect the overall concept delivery. For the designer, it is important to stay at least one year ahead of the product development process, forecasting technology and design trends. The lead in concept development enables the designer to create a pool of pre-developed ideas, ready to serve the concept development. During that short and intensive process, it is too difficult to reflect and build a pool of ideas to serve the process efficiently.

Hitachi meets that challenge with social cultural research on a global scale through a network of design satellites in US, EU, Asia and Japan.

INTERACTION DESIGN

Unique Gesture Based on Man-machine Interaction Scenarios

The Hitachi Design Centre Europe (HDCE) in Milan has access to the evolution of the state-of-the-art Hitachi technology, as our team is linked to the organisation of R&D (research and development) in Europe's CTG (corporate technology group). Here HDCE successfully supports the development of future man-machine interfaces with interaction design scenarios to forecast technology's impact on Europe's future networked society. The unique location of the design team being in central Europe, enables us to keep the research divisions in Japan informed of the latest European trends.

User observation in an social science approach is a technique further applied to build design scenarios. Sensitivity modelling techniques and casual mapping inspired by the Shell Think Tank methodology (Peter Schwartz, *The Art of the Long View* Currency Doubleday)^{(2), (3)} has been modified for our Design process needs completes our list of development tools.

Concept Phase

The methodology in interaction design is different from line design as the product/solution may not exist yet and needs to be defined conceptually, technically and aesthetically. About four years ago we realised some remarkable changes in the advertising industry. New HDD (hard disk drive)-based recorders have been equipped with advertising skip features, ready to delete unwanted material. As TV commercials count for huge

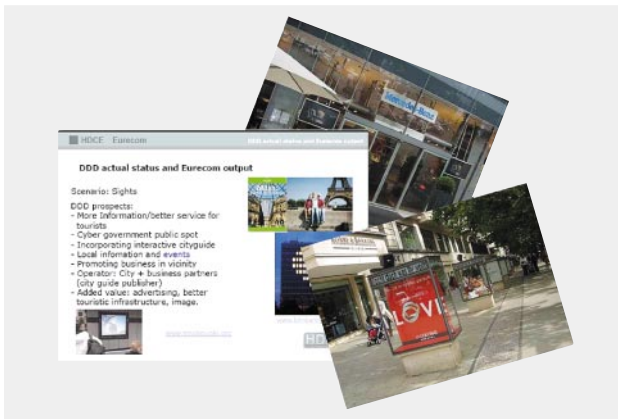


Fig. 7—Field Search, Man-machine Interfaces in Public Space. Hitachi Europe Ltd. has been selling FPDs (flat panel displays) into public areas, like shops, markets etc., but hadn't pursued the potential for interactivity as added value.



Fig. 8—King Size Displays in Public Space Vision Chart and Technical Principle Sketches. Ideas for alternative technologies to enable interactivity for people on the move.

turnover, advert companies had been searching for additional value for advertising in public space, which is also called out of home media consumption.

Hitachi Europe at that time has been selling FPDs (flat panel displays) into public areas, like shops, markets, etc., but hadn't pursued the potential for interactivity as added value. Inspired by that trend, Design team in Europe started to investigate man-machine interactions in public spaces (see Fig. 7). The impact of digital technologies on media consumption in the EU states, as well as the high uncertainties of media access in public space, have urged to make a comprehensive SWOT (strength, weakness, opportunities, threats) analysis. The team was able to gain valuable insights from our network of trend scouts as well from our Internet based research. In Japan we realised that people experience a different socio-cultural as well as technical-context when it comes to public media consumption. Back in Europe, we had to adjust our ideas to the actual 2.5 G (generation)



Fig. 9—Macro Scenario Settings, Gesture Interaction at Cinema, Airport, etc. Flash Based Scenario Animation. Designers added information on potential stakeholder companies behind that scenario and same for potential content providers.



Fig. 10—Micro Scenario, Detail Narratives, 1st Realised as Sketch, Later Computer Animated Video Sequences. Micro scenarios require a set of narratives, written by designers with characters constructed around the user research result.

European standards for mobile phone environment. We investigated many up and coming technologies including the then fledgling Bluetooth* technology as part of our EU focussed research. Our vision was to take king size displays into public spaces, but as touch screens for large scale displays were far too expensive, three years ago we researched alternative technologies to enable interactivity for people on the move (see Fig. 8). Our scenarios focused on multiplex cinemas as media magnets for young people where public media displays could serve as extension of the interactive radius around a multiplex theater. Our findings were then paired with actual business information for a series of user scenarios.

Scenario Creation

We employed scenario as a development tool to simulate future services and technology applications. The meta or overview level for our case was to show the potential for king size display applications in public

* Bluetooth is a trademark of Bluetooth SIG, Inc.

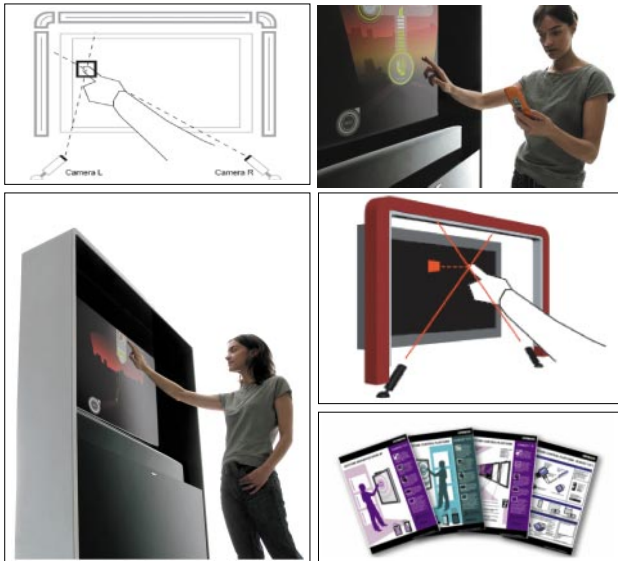


Fig. 11—Working Prototype and Real Working Interface for Gesture—and BT Mobile Phone Screen Interaction. Realised in 2004.

A Working prototype realized by customized technologies will close the circle of experience in a presentation.

spaces, e.g. airports, shopping malls, E-governments, tourist highlights, major stations of public transportation and multiplex cinemas (see Fig. 9). We added information on potential stakeholder companies behind that scenario and the same for potential content providers. We designed the product interface to provide interactive samples at potential customers finger tips.

Micro scenarios require a set of narratives, written by the design team with characters constructed around the user research results (see Fig. 10). While observing fictional characters the viewer can have a valuable glance into the future.

Powerful PC applications help the designer to create multimedia experiences around the developed narratives. Short video clips with real or animated persons, interactive cartoon presentations—there is no limit when it comes to scenario story presentation.

A tangible scenario experience completes the advanced design process. In collaboration with software designers and electronics engineers, the team in Milan is able to craft a real experience. A working prototype realised by customised technologies will close the circle of experience in a presentation (see Fig. 11). After the IP (intellectual property) related administrative work, the prototypes are ready for further man-machine interaction investigations by placing the prototype in real location or customers environments. The information provided by user testing will feed high resolution information into the

business and production environments. Today the system embedded within a network and situated in places within an urban environment will be ready to provide interactive push-pull marketing solutions.

The user is able to interact with specifically designed content for the very location simply by a hand gesture, Bluetooth mobile phones or RFID (radio frequency identification) embedded print material.

FUTURE PROSPECTS

Comprehensive Experience Design through Interaction Design Scenarios

The European market is varied, and it is nearly impossible to predict and cluster customer habits into a target group schemata. It is essential for brands to stand out of the crowd, offering solutions on a holistic consideration of a users experience. Experience design focuses on the single moments of interaction between the people and the brand through product/service solution. A customer that receives more positive memories or feedback in experiencing the brand is far more likely to become a personal promoter of this positive experience to other people. For companies today it is essential to adapt a more holistic and customer-centric relationship model built upon dialogue and interaction between brands with products, services, solutions and consumers. The designer as part of an interdisciplinary expert team is able to add value to the “total” brand experience.

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FURTHER LITERATURE

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ABOUT THE AUTHOR



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Joined Hitachi Europe GmbH, Duesseldorf in 1992, and now works at the Design Centre Europe, Milan Hitachi Europe S.r.l. as the manager. He is currently engaged in the field of European line design, product-scenario development, advanced man-machine interfaces and personal-mobile computing.