Design Engineering

(1) Aims

The purpose of design engineering is supporting, guaranteeing, and creating product development. We believe that it is one of missions of design engineering to predict the future as correctly as possible based on the past changes of product development in the latter half of the 20th century, though we know that it is difficult to predict products in the future (in 2025, for example).

(2) Social and technical needs

When we consider how product development has changed from the latter half of the 20th century and how it will change in order to predict the design engineering in 2025, needs-oriented innovative portable audio products were produced and propagation of semiconductors since then changed their quality further, for example. Notebook PCs were produced following word processors and have had wide applications in industries and homes. Automobiles aim at low fuel consumption and hybrid systems to reduce influences upon environment. It is possible to develop hybrid systems by utilizing existing motor technology relatively early. Like this, epoch-making products were produced timely in the portable audio and car industries. On the other hand, home electric appliances are lack in remarkable products, though they show continuous progress toward higher performances, higher efficiency, and advanced functions. We must say that elements (technologies) and concept for leading product development is insufficient.

(3) Future directions for determining key mechanisms and parameters

We try to classify designs to clarify the direction in which design should progress by 2025. We correlate designs with the Kano model and classify them into I, II and III as shown below:

I. Must design (corresponding to the “Must-be quality” in the Kano model)
   Design must provide a design warranty. Many trouble occur if Must design is ignored. This is the basis of design, though it can hardly be evaluated and coped with properly.

II. Better design (corresponding to the “One-dimensional quality” in the Kano model)
   This can be coped with easily, since it may be evaluated clearly. It finally results in cost competition. This is the design for improving efficiency.

III. Delight design (corresponding to the “Attractive quality” in the Kano model)
   Design in which design concept is the most important. Many hit products were produced in this field. The point is anticipating the technological and customer needs, though they are likely to consider this as creative design.

(4) Contributions to society

Three products and design technologies correspond to three designs: Better products that support mass production and mass consumption will be sorted, Must products providing a design warranty will be the main stream in the near future, and Delight products that make us happy will be needed in the future. To achieve such development, the design technologies must change from the traditional individual technologies into unification technologies (true computer-aided design and true system engineering).

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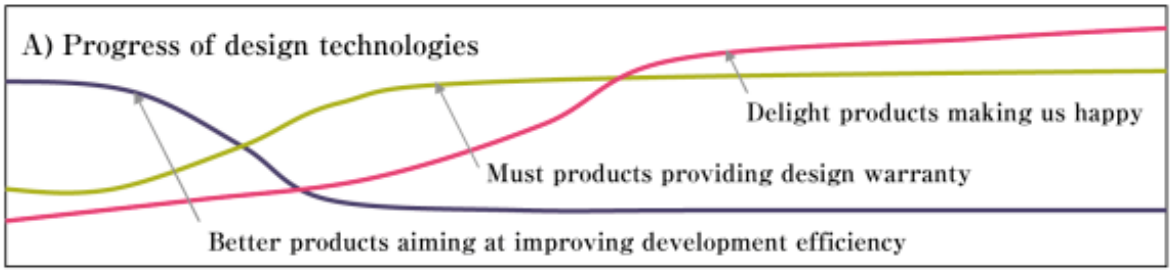
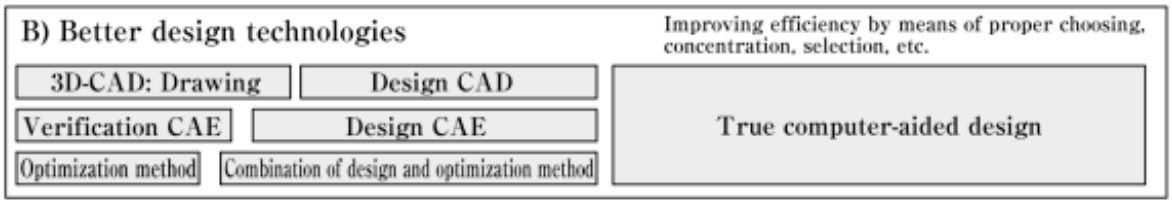
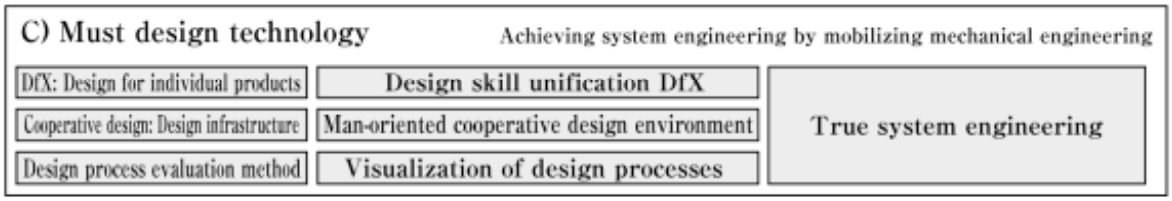
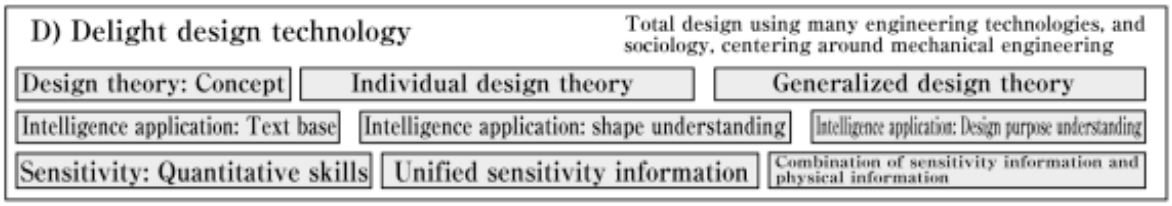
Social & Technical Needs

・Improving development efficiency by means of proper choosing, concentration, selection, etc.	・Achieving design warranty	・Concept that makes us happy is important.	
2005年	2010年	2015年	2030年～









Technical Breakthrough

2005	・Propagation of mobile environment ・Text searching technology ・Fixation of Internet
2010	・High-speed Internet ・PCs rivaling super computers
2015	・Image searching technology ・High-speed mobile environment
2030 and later	・True 3D display

Changes in Society and Markets

2005	・Age of diversification ・From traditional design for mass production to design for individual products pursuant to diversification of customers' needs ・Number of PCs used in the world exceeds 1 billion. ・Japanese original software technology for production enabling autonomy, multi-type and small-quantity manufacturing in short terms was developed.
2010	・Age of individualism ・Diversification of customer needs accelerates and product development for individuals is needed. ・Dishwasher robots are completed. (Next-generation robot made in industrial and academic cooperation) ・Combination of opto-electronics, micro-electronics and micro-machines enables very small (several _m) mounting technology.
2015	・Aging society ・New concept further advanced from current barrier free design will be needed.
2030 and later	・Age of mind ・Products appealing human mind will be needed finally and design technology for such products will be needed. ・Compact machine translation machine will be put into practice (through Innovation 25 Strategy). ・Super high vision (33 million pixels) will be developed. ・Space solar light utilization system (SSPS) will be developed.

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