

THE RENOVATION OF THE WORLD OF PRODUCTS, A CHALLENGE FOR THE FUTURE OF EUROPE.

A proposal for an EEC's line of action

1) Problem statement

Technological innovation is considered the key factor to overcome the present European economic stagnation, but it is, in the same time, a detector that helps diagnosing our illness. We live in a period, typical of mature industrial activity, where technological innovation is devoted more to incremental manufacturing process improvement than to product renovation and to new product. In the past, big upsurge from generalized economic depression has been connected with extensive renovation of the existing products and with the appearance of new industrial sectors.

While in the short term European industry has to continue to invest in process innovation to increase its productivity (to face internal as well as external competition), for the longer term development increased investments have to be dedicated to product innovation. A basic question for any planning body at company, governmental or European level., is the following: is it possible to accelerate, by a

proper line of action, the change from the mature phase characterized by process-innovation to a product-innovation development phase of industrial activity ? .

It is suggested here that the slow learning process (which society has to go through to apprehend how, for instance, to make optimal use of new technologies) could be accelerated by increasing the entrepreneurial confidence that future will be different from to-day because of market revitalization due to product renovation and new product development.

This confidence is already starting to develop because of the diffusion of "horizontal" new technologies such as microelectronics, that could pervade and be a determinant of change in the world of products.

Apart from microelectronics, there are other potential determinants of change of to-day products. A program aimed at showing - first through the development of the specifications and then through the actual design and building of prototypes - how the new products of the future could look like, it will help in increasing entrepreneurial confidence in the future.

The specific line of action which is proposed here is to use the instrument of launching a series of contexts for product design, as done in other occasions, but with a somewhat peculiar procedures as it will be indicated below. The Commission of European Community could be the sponsor of such contexts. assuring in this way the maximum "visibility" and attentions to the program.

2) Selection of the determinants for product change

The first problem is to select the themes for the contexts that will serve the purpose to call upon the creativity of scientists, engineers, designers to conceive how to-day's products will be renovated or completely new .products will look like. The exercise, to be worth while, should be based on a real big jump into the future, imagining the effect on the world of products of the cumulated change - from now to the long distance future - of materials, manufacturing technologies, changes in individuals and society.

To avoid fantascientific approaches, the specifications on which the contexts will be based should be as clearly defined as possible.

The task of describing the future scenario should not be left to the fantasy of the designers participating to the contexts, but should be the results of an interdisciplinary

exercise to which scientists, technologists, social scientists, economists, philosophers, bureaucrats and political people should participate.

We suggest, then, a first phase aimed at developing the term of reference and the specification of the contexts. A multiple approach methodology is suggested for such first phase: from brainstorming meeting to professional construction of scenarios. The aim of this exercise should be to produce the specification for three separate contexts. Each one will be based on exploring different determinant of changes in the world of products. We suggest the following the change in the materials with which products are built the change in the interaction among the primary human functions satisfied by the world of products the increased role of services.

Let us analyse in some depth why the listed items could act as major determinants of change in the world of products.

- a) The number of different materials available to build any kind of product's has increased "exponentially". Even a well talented mechanical engineer has difficulties to perceive the relative advantages/disadvantages among a host of engineering plastics, just to make an example ¹
The first wave of industrial revolution was dominated by steel which has been the base material for most of the industrial products. Since then, new materials have been added to the list, with an accelerated pace in the last half century thanks to the chemistry developments. Aren't they too many ? Fibre composite materials, together with new process technology - to be developed to increase the flexibility of application - might not become the new base materials ? In such a case the product design itself (and possibly the way they perform their basic functions) will be changed. The to-day subdivisions between industrial sectors (primary materials producers, transformation industry, component and end products manufacturers) will have to change in such a case. The brainstorming and scenario building exercise should be focused to look not only at what could be done with the new material with to-day's manufacturing process but to forecast the changes in the latter that will permit the optimum of the new material.
- b) Oversimplifying the actual situation, one could say that products can be grouped according to the primary human functions they satisfy: home, transport, food, etc.
The primary needs do, however, interact among them, to a higher or lesser degree case by case. Product specifications should therefore take care of such interactions. The basic design of a product and the way it satisfies the basic need - and take care of the other needs - might have laid, however unchanged by several decades or even centuries (even if the product and its manufacturing technology have been undergone a continuous series of innovation).
In the meantime, from the first appearance of the product, society might have changed a lot and so the way the primary functions interact. Is the base design

¹ Different materials are first adopted and then discarded in new models of a product, to reappear again (often after the development of new manufacturing process) in later version of the same products. The success of applications of new materials in other industrial sectors (e.g. carbon fibre composite in aircraft) is pushing designers to look at the possibility of their use on completely different field (electric motors, cars, etc.). The learning process for an optimal use of the new materials goes through trials and errors and it is very lengthy: it took more than 15 years from the first appearance of thermoplastics in car panel board to its to-day optimal use (both from the point of view of design style, choice of materials, manufacturing process).

of the product (conceived years ago and at that time, hopefully, optimising the satisfaction of human needs) still the optimal response?

As an example, consider the situation for kitchen-ware. The number of them has increased enormously, and often they are stored unused in the kitchen which has become increasingly small, especially in dense urban area.

Food is also changing with an increase in variety (from all over the world) and type of processing (raw, precooked, frozen, etc.). The house lady of to-day is confronted with leaving open all the alternatives (from the grand- mother recipe, to fast micro-wave cooking. to frozen TV dinners). Is it not a too complex situation, and too contrasting with the change in the other primary needs (home. leisure, etc.)?

Revisiting of kitchen-ware to simplify the situation might be needed. This might signify quite a "revolutionary" change in the product world.

As another example, in the same vein, one can take the interaction of automobile with urban traffic. One solution proposed by transport planners years ago, but apparently unsuccessfully, is to induce a shift in the use of the different modes of transport, favouring an increased use of collective public transportation. The resistance of car drivers to abandon their habits, notwithstanding the increasing complexity and reduced efficiency (slow average speed, parking problems, etc.) should point to a new direction, which might lead to a "product revolutionary change". The answer might lay in the possibility to make a higher level use of information management, thanks to the "information technology revolution" ².

- c) The third case comes from the service sectors. An increasing share of the active populations is working in the tertiary sectors, and social scientists have since several years claimed that we are shifting to a post-industrial society. This does not mean, however, that less and less "hard" products will be produced, substituted by "soft" products or services. A recent study by Gershuny of Sussex Science Policy Unit, is illuminating in this respect. The increase in occupation in the service activities merely means that the hard products we buy have a higher content of service activities in their added value. While industries are buying more and more industrial services the reverse seems to be the case for personal services. As a matter of fact, if one looks at the way the personal services are performed one can detect a trend of increasing complexity and reduced efficiency (school, health, social services). Gershuny suggests that new "hard" products are emerging that, together with the availability of more free time (reduced work hours) are increasing the possibilities to substitute so far bought personal services with do-it-yourself work. Examples range from substitution of barber services with safety razor, to magnetic tape substituting for university. lessons (see the case of Open

² The "new car" of the future will be one having the ability to interact actively with a computerized traffic-control system, not only to optimise the operation of traffic lights, but also to change mode of driving (to an automatic mode) on certain properly instrumented lanes.

It might be too limited, though, to look at "revolutionary changes" on automobile considering only the interaction with urban traffic. The interaction with parking, for instance, as well as with other short distance and long distance transportation needs are important and all together might lead to a complete redesign of transportation means and infrastructures.

Hopefully a smarter use of "soft" technology at the car design stage (for instance the length of car to better match parking and car transportation on rail, just to give an example) and for an improved use of existing infrastructure ("intelligent" traffic lights, instrumented lanes, etc.), might do a lot. At the end, a big revolutionary change (a simpler way to manage a dense and highly mobile society) might result.

University) to the use of family computer terminals and special detectors for medical check-ups substituting for doctor's visits (at least for a first screening and for minor illness).³

3) Organization of the product design contexts

The first phase above described will have served the purpose to define the specification for each of the three contexts.

Such specifications, because of the long term approach, will be quite general and leave large spaces to the designers for interpretation. With difference with other contexts it is proposed to divide the operation into three stages.

The first stage will be a series of three design contexts based on the general specification above. Not one winner but several winners will be retained (e.g. one winner for each country). Each designer will in fact have frozen in the specification of his design the personal interpretation of the general specifications, emphasizing -according to his intuition, taste and sensitivity - different aspects of the problematique facing the design, the manufacturing and the use of the product.

The second stage will consist in the detailed comparative analysis of all the retained designs with the scope to make explicit the different angles by which the problem was seen by the designer. The results of this analysis will be to write down a much more detailed specification for each product, taking advantage of the designer's analysis and solutions.

The third stage will be a new series of three design contexts based on the new detailed specifications. This time only a winner will be selected for each context and the design contexts will be followed by actual manufacturing of prototypes of the products.

At the end of the exercise a suitably large efforts should be dedicated to publicize the results with specific conferences and shows and participation to world expositions, to help the large public to appreciate the effort and underlying the role played by the EEC.

³ Enough has been said in these last years on the effect of the informatics revolution. What it is suggested here is that its revolutionary effects, still to be seen, will come about because of the increased complexity of our society due to the success itself of the latest wave of development (affluent society, increased social security and social equality world-wide person-to-person communication and interactions). This increased complexity is showing - firstly in social services - a decrease in efficiency. No matter how much popular might become a "political conservative" approach (dreaming

to go back to the "old good days" when society was less affluent and complicated), the process of progress will find a solution by using at a "higher level of intelligence" the information technology available, simplifying the use of complex knowledge and recuperating a higher role of the individuals, starting possibly in the "service products" itself, by putting to men's disposal new products.