Raising Public Awareness of Nanotechnology

A Comunication Concept

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INTRODUCTION

Nanocosm. Do Nano-Noses, iPod Nano, Nanoelectronics on Gigascale Systems and Nano-Robots indicate the dawn of a sixth Kondratieff-Cycle for basic innovations? Or does it reflect the confusion and turbulence in a Nanocosm of an alleged key technology, which is prone to vanish into black holes?

It is too early to expect an answer from the insiders, scientists, engineers, institutional and private investors, but nanoscience and nanotechnologies do not attract a great deal of attention in the public debate. This low public visibility of nanotechnologies affords still an opportunity to instigate positive public attitudes by avoiding mistakes being made during the evolution of new technologies in the past leading in the end to detrimental public aversion.

CASE A

Atom. A key technology, which did not succeed over the years to be perceived in the public as overall beneficial advances of mankind, is the field of nuclear technology. One could argue a "femtotechnology" was ahead of times and premature for the public to relate to under the consideration we are now addressing nanotechnologies. However a formative factor for the prevalent attitude towards nuclear technology has a great deal to do with one of its early large-scale application, the development of very powerful weaponry for the race to supremacy among nations. For this reason a communication with the public was prohibited. Not until the confrontation with the mushroom clouds the public became aware of the technology itself and certain aspects of its immediate and long-term impact. Against this background governments and the scientific community fought an uphill battle promoting the peaceful use of nuclear energy in times of limited fossil fuel resources.

In the public the word atom adopted a connotation of nuclear decay and radiation alluding to high risks. The attempt of the technical community to turn this attitude by referring to the rationale of MCA (GAU in German) worked in the wrong direction. Media picked this specific detail of publicly available risk studies for nuclear power plants to explain, what can go wrong, and augmented the public concern not least by fictions like "Super MCA" or "Super GAU". These experiences dampened inversely the enthusiasm of the scientific community to reinforce the public dialog on a highly complex technology.

CASE B

Telephone. A more positive public perception over time was seen with telephony, the outset of the still evolving key technology telecommunication. Following a highly competitive race for the patent rights on the "electrical speech machine" in the US the prototype was awarded by the technical community at the centennial exhibition in Philadelphia. Although commercialization of telephones started one year later, 1877, in the US and Europe the general public remained sceptical toward this new technology labelling the first printed directory in Germany as a "book of fools". This early aversion, a common phenomenon with new technologies, can be attributed to the intellectual challenge of comprehending the complex electro acoustics of a phone and to the emotional challenge to imagine the potential and personal benefit of a toy without the cable network and connectivity we take for granted today.

With growing infrastructure and accessibility through public phone booths, official and commercial service points this technical device was readily adopted and turned into a necessity of life. The inevitable misuse of this technology like fraud, violation of privacy and totalitarian ambitions could not tarnish the positive public attitude since the dissociation of the perpetrators responsibility and their tool in this case the phone is obvious. As the fruitful public dialogue progressed the telecommunication industry felt encouraged to developed the next generation device, the mobile phone, a huge success.

NANOTECHNOLOGIES CHALLENGES

Fuzzy Subject. Considering the diverse public approach to the previous key technologies one can conclude an early dialog with the general public has better prospects. This concurs with experience of change management, where it is well accepted that a communication "blitz" after the fact is inefficient and will be contradicted by reality in many cases. But opting for a public dialog right from the start nanotechnology community faces an immediate challenge e.g. the exercise to describe or define the subject nanotechnology. Taken into account the wide diversity of publications and labels sailing under a nano flag a survey within the nanotechnology community will not reveal a common understanding, what actually is "nano". Although this situation makes communication attempts with the public difficult it is not surprising for an emerging technology.

Scarce data base. Besides the fuzzy subject a public dialog on nanotechnology has to deal with a wobbly data base e.g. missing studies of research data regarding the prevailing susceptibility of the public to nano topics. One can find a limited number of qualitative surveys on this issue pointing at expected ratios like younger people and males in Western Europe are more likely to adapt new technologies. However they agree in one point, the majority of the public does not know what to make of nanotechnology. Periodic in-depth studies of its public perception foster the dialog due to the evaluation of the feedback communication and due to early signals of special political or social vibrations.

Confusing Messages. The scores of inconsistent news referring to nanotechnology pose another challenge. To date a communication platform or peer group recognized by the nanotechnology circle has not emerged on national or international level. The highly competitive race for private or institutional funds and the fight for the commercial lead forward short-term self-interest on the expense of longer-term common benefits.

Setting communication standards proved already difficult for individual technology fields let alone forming a body with some authority shaping a public dialog with a wide range of scientific disciplines like chemistry and molecular biology converging into nanotechnology. Furthermore media in their advocacy role for average citizens will choose topics of public interest according their own agenda without support of a technological plausibility pattern.

MARKETING MODEL

PIP. The observations from the cases atom and telephone and the current challenges for nanotechnology opening a public dialog are familiar to company marketing departments responsible for launching new products. They know a product or service does not sell solely on its features and profile. Already a simplistic model like the graph, Product Innovation Process (PIP), points to two distinct levels of attention demands in a product launch process, the rational technological aspect and the emotional consumer, market aspect. The needs on both levels have to be served in a coordinated and interactive manner similar to a concurrent engineering project. For the success it does not make a real difference on which level the innovation process started on the technological path e.g. as a market push launch or on the market demand path e.g. as a market pull launch as long as the necessary actions on the complementary path are undertaken. Having identified novel technical features an immediate dialog with certain prospective market participants helps already in the design phase to concentrate on customer-oriented schemes and enables the prospects to accustom themselves to this new technology. As soon as first prototypes in the developing phase are available the exchange with selected prospective users, panels or sample markets gives a valuable indication of vital technical and perceptual issues. The thorough analysis of all feedback facilitates the stop or go decision of the project and the selection of the most effective penetration tactics at a market launch. Certain aspects of this market entry approach can be reflected on the dialog of the nanotechnology community with the public.

IMPROVEMENT PROCESS

CIP. Since real communication takes time especially on a complex subject like nanotechnology a proven process structure can foster the public attention. In light of the goal, a steadily increasing acceptance of the public for nanotechnologies, the iterative loop of the continuous improvement process (CIP) serves the purpose:

→ **MEASURE** → **ANALYSE** → **IMPROVE** → **CONTROL** → **MEASURE ...**

Even the scarce data regarding the actual public awareness of nanotechnology provide a starting point for analysis and one might conclude a multilevel, open and straightforward personal communication campaign about nanotechnologies representing the next improvement step of the public dialog.

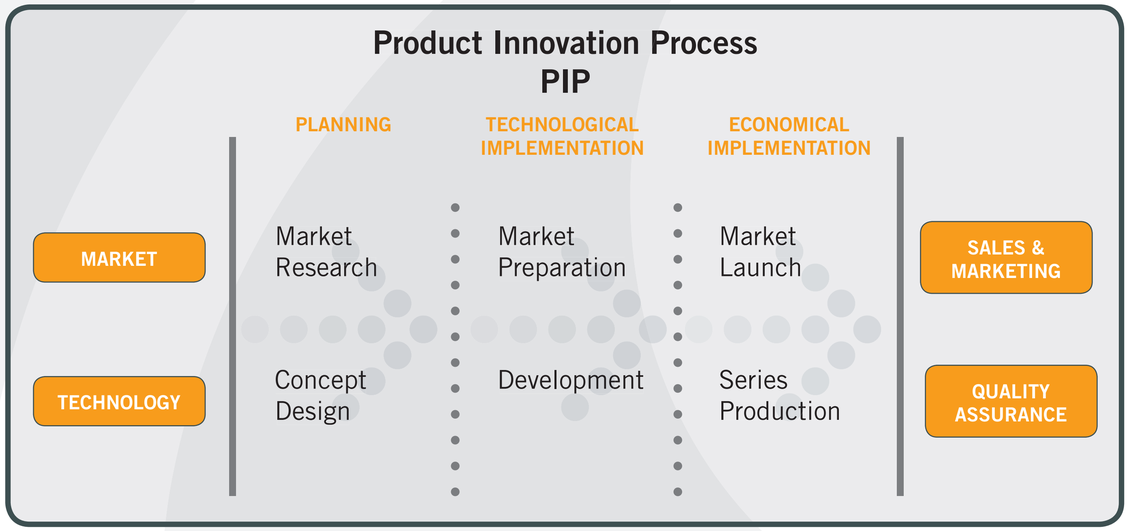

Figure 1: Market Launch Model

COMMUNICATION PROGRAM

What. A sizable amount of information about "nano" is being sent out to the public , but few sources bother to categorize their subject according a broader accepted definition. A recent proposal by The Royal Society & The Royal Academy of Engineering [1] is generally understandable distinguishing between "Nanoscience" covering the nanoscale basic research and "Nanotechnologies" covering applications of nanometre scale structures. There is an general agreement that the size range spans 100 and 0.1 nanometre. The term Nanotechnologies affords an opportunity to break down the wide interdisciplinary field of "nano" into every day uses like automotive or life science applications. It also helps to mark out futuristic scenarios portrayed as near term reality.

Who. In general everybody of the nanotechnology community is obliged to inform and communicate with the public according his individual or collective judgement. On the other hand certain standards and known communication channels are imperative to make it easier for the average citizen to digest and to benefit from feedback of others. Setting communication standards and channelling feedback communication seems a natural role of the German Association of Engineers (VDI) since its engineers operate in almost all scientific disciplines and the association is rather independent from government and special industrial interest. Taking the communication lead the VDI is then authorized to seek actively the broad dialog with the media and the general public on nanoscience and nanotechnologies [2]. An important aspect is the global reach of the VDI being able to draw on European and international cooperation e.g. with the ASME, USA or IES, Singapore. Considering the market launch model it is critical for the positive perception of nanoscience and nanotechnologies to assess periodically the public attitude as thoroughly as possible in order to shape the next improvement step of the public dialog.

How. Every individual as well as a authorized body have the responsibility to inform the public clear, fair, consistent and authentic. Covering up risks and uncertainties will tarnish the trusting relationship with the public. Although a challenge for scientists simplicity of presentation and models is a rewarding tool for positive feedback. The croquet construction kit of the chemist A.W. Hofmann [3] to demonstrate 1865 water and acid molecules can serve as a benchmark.

CONCLUSION

Time is ripe for nanoscience and nanotechnologies to reach out into the general public increasing the chances for a positive attitude. An open and structured communication process with the general public enhances the sustainability of this promising and powerful technology field in the long run.

References
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