SUSTAINABLE PRODUCT INFORMATION - STRATEGIES FOR THE NEW DIGITAL NETWORK ECONOMY

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'Quick Feedback Note, Part I' prepared by Colin Davidson, June 20, 2000

Introduction

This Note provides a "stop-press" outline of the main themes discussed at the meeting. A detailed set of proceedings will be prepared over the coming weeks and will be made available - electronically - as soon as possible.

The **context** for the discussions was set by Colin Davidson, who emphasized the challenge posed by the notion of 'sustainability' on Society, on the building industry and, above all, on its information specialists. Mr. Jouni Särkijärvi, Director General, Ministry of the Environment, also described the context where current changes in the administration of building (e.g. in Finland) result in responsibility being decentralized to the industry, so that its expertise is to be exploited. A proper use of information replaces a rule based approach. "We consider itself a defeat", he said, "if we have to rule upon something that the parties concerned might as well have agreed upon themselves".

Promoting R and D

Tekes, the National Technology Agency of Finland, within its mandate to promote the competitiveness of Finnish industry, has established a series of technology programs focusing on key technology sectors. It is recognized that the built environment does not fill all of Society's expectations - which is serious because investment in building is long term. One of these expectations is 'sustainability'; indeed, sustainability quality targets are a precondition for state financing. In this context Tekes is currently funding projects at the level of 400 million Euros, of which 13% concern construction and wood technology. One of the four sectors receiving funding is called Vera, and focuses on IT in construction, net working and life cycle information.

While it is to be hoped that R and D should become an essential part of building professionals' and entreprises' core business, in reality this is not often the case.

Technology watch, like innovation, is an on-going process. While it may be familiar to high-tech industries, it is rare in the building sector, characterized as it is by a multitude of different small and medium enterprises. As result, any concern for R and D and for technology transfer has to be introduced into the industry gradually, since it is tantamount to a cultural change. Consequently, technology watch is best entrusted to neutral third-party organizations who are held in good esteem by the industry because of their intimate understanding of its ways of working. The Building Centers seem well placed. Significantly, technology watch (and its counterpart, IT) should include business and strategic information as well as strictly technological applications.

Building Research Establishment has, in effect, established a **technology watch service**, in an environment where there is too much information, where it is difficult and time-consuming to capture it, and where it may not correspond to what the users want. BRE's service aims to enable research information to be communicated rapidly, using IT to satisfy the need for targeted information, with technology stories and process-related issues - accompanied by comments.

IT and the Internet

At present in the U.K., about $800 is spent, in the building industry on **IT** each year (as compared to a national average of $400 per person per year). Yet executives are known to spend 50% of their time looking for data/information and only 15-20% dealing with it. It is essential to deliver quality information right to the desk-top; its use can be improved if it explicitly fits into business models.

The Building Research Establishment is currently developing I-SEEC (Information Services to Enable European Construction Enterprises); it includes a technical information center, which is to be a **single point of access** for finding high quality technical construction-related publications. It provides direct links for accessing them. I-SEEC also includes an Electronic News Service, using 'push technology' for closely targeting information to specific users in the various sub-domains of construction. The push technology allows the users to be advised that information that is potentially of value to them has been recently posted on an Internet page and can be accessed through a web browser.

In Finland, the level of **Internet connection** is high (architects: 86%, engineers: 90%, contractors: 83%, materials industry: 90% and real estate maintenance: 74%) and is used for e-mail, e-commerce, transferring documents and searching for information. The Building Information Group has an annual turnover of 2.5 million Euros, with a staff of 80 in Finland and 20 overseas. Its

use of IT to provide its services is growing rapidly; for example, 90% of new subscribers select CD-ROM or e-media documents and 15% of all literature sold is sold through the e-bookshop.

CONNET is a **virtual technology park** for the construction industry. Finnish building materials and products (classified according to the Finnish product classification 'Construction 90') are searchable by name of the product or the manufacturer, or by the required properties. It should be noted in this connection that the actual list of appropriate properties is quite short, especially when compared to the CIB Master List. It is expected that by the end of the year 2000, information on 17000 products will be accessible on-line, accompanied by 500 information sheets providing additional information e.g. down-loadable CAD files.

The shift that the web is bringing about seems to be towards the **'just-in-time' reading** of literature, even for researchers. They make a distinction between journals in which they wish to publish and those they wish to read; indeed the role of the paper-based journals is shifting from information exchange towards building the authors' prestige!

There is support for the scenario of **free electronic journals**, where costs would be recovered by the professional associations or the university libraries rather than by traditional subscriptions (remember that the publication and archiving costs will be considerably reduced or even eliminated).

Information for sustainability

Information about the **service life** of building products presents special requirements, because of the interwoven impacts of quality, design, execution, indoor and exterior environments, conditions of use, and maintenance. Currently, a joint project between the Finnish Building Information Institute and with the Finnish Research Institute (VTT) aims at collecting the required information from the manufacturers, and posting and maintaining the resulting declarations on the web.

Within the context of an appreciation of the importance of indoor air quality for **healthy buildings**, for effective energy consumption, and comfort and efficiency at work, a system of classification has been established. This relates to indoor climate (with a scale of levels S1 to S3), construction (P1 to P3) and finishing materials (M1 to M3), where level 1 corresponds to 90% satisfaction and level 3 to the requirements set by the codes. The first and third parts of the

classification are becoming widely accepted in Finland, and the second has run into opposition, because of the constraints it imposes on site organization. The Finnish Building Information Institute is driving the classification of finishing materials; interestingly, manufacturers see that having a classification certificate and label is a form of 'free' publicity.

The model **environmental declarations** have been well developed in Finland for finishing materials. At present 38 have been prepared and can be consulted on .www.rts.fi. The difficulty in preparing them stems partly from the lack of legislation, the lack of enthusiasm by industry and from the complexity of environmental issues, such as service life, consumption of energy and raw materials, emissions to exterior and interior air, and recycling. More information must be made available for designers and decision-makers.

In the context of a new university campus, **ecological urban and building design principles** are being applied. Two competitions (one for the master plan and one for the building designs) required that issues of pollution, natural resources, health, natural biodiversity and food be respected. These issues were approached at three levels, the lowest being basic compliance. In the case of purchased energy, for example, the basic requirement was 105 kWh per square meter (a saving of 34% over current practice). The budget allowed for an overrun of 5% if life cycle savings could be demonstrated. About 70% of the housing are already under construction with an average improvement of 12 points (on a 30-point scale). This project is to be monitored, and the residents will be provided with information on how best to benefit from the ecological design principles.

A center for **sustainable construction** is being developed in an abandoned industrial facility in Belgium. The renovation project itself is being approached as a demonstration of sustainable construction, and the exhibit - with temporary and permanent activities - will bring together groups or 'clusters' of products and assemblies to illustrate situations that one meets in practice. The center will connect with Euregionet and its database on sustainable construction projects.

The performance concept in practice

Regarding the adoption of the **performance approach**, in the context of increasingly complex users expectations and clients requirements, it is hypothesized that it will require new kinds of information: (a) to proceed from the functional requirements to performance criteria, (b) to evaluate the performance *characteristics* of a design in the course of its development, and (c) to specify

materials and products in performance terms. These new kinds of information not only present problems of acquisition, but also they will require new methods of presentation, presupposing new ways to organizing the design decision making processes.

Extending the performance approach to a concern for **life-cycle performance** implies integrating knowledge about such aspects as environmental impact, service life profiles of the different parts of a building (including replacement strategies), embodied energy ratings, assembly methods and 'deconstructability', land fill and CO2 emission. Writing performance specifications will then reflect the short, the medium *and* the long term requirements and will try to take into account a **'life care plan'**.

It would be helpful if the information centers could prepare **templates** for the kinds of information to be provided. When a building's whole life is being considered, it is important to envisage a portfolio of documents to support decisions. To produce appropriate project-specific documents (for project-specific decisions), it is useful to have templates and reference documents. The reference documents serve to validate the decisions being made. Attention must be paid to the fact that a new vocabulary is emerging.

In Japan, trends include the introduction of **performance based codes**, accompanied by 'type approvals' to simplify procedures. There are housing performance indicators, established by law. It is also mandatory to separate different kinds of materials during demolition to facilitate recycling. Interestingly, the support-infill approach to housing is being tried out; this should allow for flexibility in use, which is an aspect of sustainability.

Communication and networking

The whole question of sustainability implies more **specialization** and more problems of **communication**. Networking seems to offer a way to cope with this problem. The networks can be social, project related, product related or informational. It is essential to identify the 'gate keepers' to ensure that they contribute positively to the networks, rather than block or modify the information flows. It is necessary to understand these networks if innovation is to occur; information and knowledge need to be managed in consequence.

In today's competitive environment, organizations are increasingly finding they have to collaborate and form **networks** with others. This draws upon recognition (a) that there is a relationship between a firm's efficiency and its ability to

innovate, and (b) that effective management of knowledge creates market leverage and permits adding value. To benefit from this situation, a firm must develop an integrated approach and develop a supportive organizational context.

Editor's note

These notes have been prepared from the presentations by Bo-Christer Björk, Dave Bloomfield, Colin Davidson, Stephen Emmitt,Christopher Gorse, Tarja Häkkinen, Pekka Helin, Ritta Jalkanen, Jussi Kaskia, Pekko Laatio, Mika Lautanala, Petri Neuvonen, Marko Oinas, Markku Salmi, Oli Seppänen, Berthold Simons, Michael Upshall, David Wyatt and Yasunori Yamanaka. The Editor apologizes to the Authors if their ideas have been betrayed in the interests of speed!