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Creativity and Technology in the Netherlands

INDUSTRIAL DESIGN, TEXTILE, MULTIMEDIA AND ARCHITECTURE

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STATE-OF-THE ART IN THE NETHERLANDS ON
INDUSTRIAL DESIGN, TEXTILE, MULTIMEDIA AND ARCHITECTURE

Creativity is hot today. The Ministry of Economic Affairs refers to creativity in the Industry Letter to Parliament. The Innovation Platform considers it to be a key area. Even a policy document on culture and economics is being prepared by the Ministry of Economic Affairs. The actual size of the 'creative class' depends on the definition used – Richard Florida, in his book 'The Rise of the Creative Class' claims that one third of the American working population belongs to the creative class. Gerald Marlet adopts a stricter definition. Using that definition means that 19% of the Dutch population belongs to this category. This article does not go into economic aspects of the creative industry but rather its activities. We look at four separate areas of the broad domain of this industry, namely: Industrial Design, Textile, Multimedia and Architecture.

The creative industry is by definition very diverse. Individual fields are also wide. It is impossible to present a complete overview of the entire theme. This article does not intend to give an exhaustive overview. It deals with the most important trends for the four individual fields and also present a breakdown of relevant organisations. By doing this it enables you to get a fairly good impression of: Industrial Design, Textile, Multimedia and Architecture in the Netherlands.

Industrial Design

Industrial Design is a broad field of study. It concerns design, development and styling of products in the broadest sense, whereby relevant aspects before, during and after use are taken into account. Traditionally there is tension between 'design' and 'technology'. Persons engaged in this field of study range from artists to engineers and to inventors. Intrinsic to this field of study is that it relates to 'innovation' and 'creativity'. Reference is often made to 'integral product development'. Industrial design plays a key role in this far-reaching collaboration between marketing, technical R&D and production technology. Ease of use, functionality, marketability and manufacturability are after all integrated in the product that is being designed.

Looking at present-day industrial design it is characterised by, among other things, the combination of technology and design, miniaturisation, and styling a look and feel of products. This look and feel is becoming increasingly more important for products in order to set them aside from competitive products. Wider international competitiveness – a direct consequence of the increased level of globalisation – leads to shorter product life cycles, lower prices, etc. Consumers apparently also focus more and more on the look and feel of a product. Optimisation in the field of technological possibilities means that products in many segments fail to distinguish themselves in terms of functionality. Individualisation and the higher level of prosperity in large areas of the world has resulted in a greater demand for high-quality products. The outcome of this trend is that businesses now innovate more quickly and market high-quality products that meet the demands of the customers. Product development on the basis of technologies, in combination with the actual positioning of those products by creating the right look and feel (design), has become an essential part of innovative economic practice.

Product development in the Netherlands

Compared to other countries, the Netherlands has a number of advantages in terms of product development. The education level is high and the detailed knowledge in the field of product development available at universities and hogescholen, is of a very high standard. The Netherlands is an internationally oriented country. It is home to several leading multinational companies and internationally-operating SMEs. This position has earned the Netherlands an international reputation in the field of consumer and professional goods design. Dutch products are often characterised by aspiring to achieve a high level of user-friendliness, the use of new technologies, sustainability, distinctive design and a far-reaching commitment to (the perception of) the end user. Dutch designs and styles are marketed throughout the entire world and are also included in museum collections: the chairs designed by Gispen, for instance, or the Dutch banknotes, the success of Senseo Crema, the Bugaboo Frog, the work of Marcel Wanders/Moooi, DAF trucks, Philips medical equipment. Dutch

designers are consequently in great demand by foreign multinationals such as those operating in the automotive industry (Harm Lagaay of Porsche, Adriaan van Hooydonk of BMW, Jan Hendriks of Johnson Controls). Dutch Design is described as being innovative, modern, experimental and having a sense of humour.

Philips

At Philips, design is far more than simply creating good-looking products. Design at Philips is a key element in the innovation process and is applied throughout the Philips Group companies as a business method. And this year Philips celebrates 80 years of design in the company. Every detail that makes up a product experience is carefully looked at, from the purchase up to the actual use. Even the nostalgia - the fond memory the consumer has of the product after he/she has stopped using it - is taken into account during the product design process. At Philips, the traditional design disciplines are integrated with expertise from the human sciences and technology through a multi-disciplinary, research-based approach that makes it possible to create new solutions that satisfy and anticipate people's needs and aspirations. We call this new, enriched type of design High Design. High Design is both a philosophy and a concrete process, and it is seamlessly integrated in the Business and in the Product Creation Processes. The mission of the design professionals at Philips is to design solutions that humanize technology. Philips' design expertise in all fields is kept up-to-the-minute through research programmes that investigate the latest developments - and takes them several steps further.
www.design.philips.com

Overview of industrial design in the Netherlands

This section sets out the most important organisations in the field of industrial design. This list is not exhaustive but gives a good overview of who's who.

The knowledge (infrastructure) in the Netherlands

Research of relevance for product development is concentrated around the cities of Delft ('human-centred product design'), Eindhoven (intelligence in products), and Enschede (mechatronic products). The quality of the available knowledge is high and relates to both the process of product development (methods, computer-aided technology), the management and organisation of product development, and the design of innovative products geared to humans in terms of their abilities (ergonomics, 'design for all') and their cultural and emotional needs (design, look and feel, lifestyle, 'user-centred design'). The latter field of human-oriented knowledge is the basis of a spearhead under establishment at Delft University of Technology (Human-Oriented Design). Several leading research groups

4 have also earned themselves international reputation. In addition to the universities of technology, Schools of Higher Vocational Education are also able to boast a great deal of applied knowledge that can be implemented directly in the field of product development. And last of all, a great deal of knowledge in the field of design processes and associated technological support is also available in the Netherlands.

Universities and higher professional education

- Delft University of Technology, Faculty of Industrial Design (www.io.tudelft.nl)
- Eindhoven University of Technology, Faculty of Industrial Design (w3.id.tue.nl)
- University of Twente, Industrial Design Studies (www.io.utwente.nl)

Schools of Higher Vocational Education (HBO)

- The Eindhoven Design Academy (www.designacademy.nl)
- Haagse Hogeschool, Industrial Product Design (www.haagsehogeschool.nl)
- TNO Work and Employment (www.arbeid.tno.nl)
- TNO Science and Industry (www.tno.nl/industrie_en_techniek)

Businesses

There are several prominent multinationals operating in the field of product development established in the Netherlands (including Philips, Batavus, Gazelle, Daf Design, Gispén, Ahrend) and Dutch Design Agencies of international repute (including Bureau Mijksenaar, NPK, FLEX, Waacs, Moooi, Droog).

Batavus

What does Creativity and Technology mean for Batavus? Creativity at Batavus is of the essence to enable the company to bring its annual bicycle collection to the market on time and in sufficient volumes. Batavus was originally a metal-using company which over the years has manufactured a variety of different products. The company started manufacturing bicycles in 1904. This was followed by the manufacture of sewing machines, skates, furniture, mopeds and motorbikes. Over the past two decades, however, Batavus has focused entirely on bicycles. This means that today the thought process is no longer based on the production process but on the market. Whereas Quality used to be the most important element, today it is also Comfort and Design. The consumer is the one who decides what we bring to the high street, not the production process. For Batavus this means that the wishes of the consumer must be taken good heed of and, among other things, creativity ensures that we are able to retain our lead on the competition. This creativity is obviously reflected in researching the technical possibilities of materials and techniques. For example, the bicycle industry has switched over almost completely to using aluminium as opposed to steel frames and also carbon plays a more important role over the last few years. At Batavus we are currently monitoring the different aluminium processing processes in order to reap the benefits in the field of sustainability or design. One example in this respect being the hydro forming of bicycle frames. Nevertheless, creativity goes much further than technology alone. Partly because Batavus has many suppliers in the Far East, as an organisation we must be well versed in this respect. This implies that various members of staff have to tap their creativity on a regular basis. Also the styling of a bicycle is important, because the looks define it. This styling asks for creativity and a feeling for trends and what the consumer like. Marketing is also done in a way which is completely typical of Batavus so that the company is very much aware of how it positions itself in the market. Creativity is thus not only the domain of industrial and graphic designers who take care of the design and the right technology, but is completely interwoven in the entire industrial process and therefore has an intense effect in the actual realisation of the Batavus range of products. (www.Batavus.com)

Marcel Wanders

The challenge of Industrial Design was to create products which could be produced by machines and create welfare, equality and a political foundation for democracy. Designers and architects created a style that followed the rules of the machinery for industrial production. Today design is not as it seems, just a style!! It makes little sense if we still follow the rules of ancient machinery. Today the industry is able to follow humanity and make its most exciting dreams reality. We, as designers, have to represent our public and their dreams instead of the machine and the anachronistic political dogmas it represents. We have to challenge the industry so it will learn to follow instead of lead. It is upon humanity that the design of the future can only be built. With love, passion and poetry we will take design to new heights. (www.marcelwanders.com)

Interest groups and network organisations

Beroepsvereniging Nederlandse Ontwerpers (BNO)
(www.bno.nl)

BNO (the Association of Dutch Designers) is the trade association of professional designers and design agencies in the Netherlands. They are active in a variety of disciplines: graphic design, interactive design, industrial design, packaging design, spatial design, fashion and styling, and illustration. BNO represents more than 2,300 individual designers and 200 design agencies and is a non-profit organisation which is funded entirely from membership fees.

Premsele, Stichting voor Nederlandse vormgeving
(www.premsele.org)

The mission of the Premsele Stichting is to boost Dutch design in the social, economic and international dimension. It establishes links between design, society and trade and the business community, between culture and commerce. In association with a variety of partners it organises seminars, lectures and discussions and suchlike. It also initiates research projects and publications.

Design.nl is an initiative of the Premsele organisation. This site provides information about design and is intended as the homepage for professionals, customers, Dutch and foreign students and foreign visitors. The site contains numerous links and references to existing initiatives in the Netherlands and abroad.

Designlink (www.designlink.nl)

Designlink is an independent network for businesses and organisations on the demand side of industrial design. Designlink is a platform for knowledge transfer and promotion.

Koninklijk Instituut voor Ingenieurs (www.kivi.nl/io)

KIVI NIRIA is the Dutch association of engineers trained at universities and hogescholen. It is a high-quality network

of knowledge and associates. KIVI's Industrial Design department (IO) promotes wide-scale appreciation of the field of industrial design. The department also supports individual engineers with their professional conduct.

Nationaal Platform Productontwikkeling (NPP)

This group brings together the interests of eight trade and professional associations and promotes product development in the Netherlands. Members are: Beroepsorganisatie Nederlandse Ontwerpers (BNO), the Koninklijk Instituut van Ingenieurs (KIVI), Centrale Bond van Meubel- en Kunststof Industry (NRK), Metaalunie, Nederlandse Vereniging van Algemene Toeleveranciers (NEVAT) and Syntens.

O2 (www.O2.org)

O2 is an international network challenging designers to engage in sustainable design. O2 started in 1998 as a collaborative project between the Netherlands Design Institute and the international O2 network. The website supports information exchange among designers and entrepreneurs engaged in the development of sustainable products and services.

Mikrocentrum (www.mikrocentrum.nl)

The Mikrocentrum is an independent knowledge centre helping businesses to improve knowledge in a wide range of technical and organisational fields.

Stichting Innovatie Alliantie (www.innovatie-alliantie.nl)

The organisation promotes knowledge transfer to increase the innovation capabilities of SMEs. By improving collaboration between hogescholen, intermediary organisations and knowledge institutes, requests for specific knowledge from SMEs can be channelled through more effectively, leading to faster application in the SMEs.

Regional initiatives

In the field of product development activities concentrate around the three universities of technology in Delft, Eindhoven and Twente. Eindhoven in particular presents itself as a technology and design hub with a concentration of activities in design. The local authorities present Eindhoven as an innovative cultural city. Just to mention the faculty of Industrial Design of the local university, the Design Academy, TNO Science and Industry, last but not least Philips, Daf, ASML, Toolec, Simac and Newdays. Furthermore platforms such as DPE (Designers' Platform Eindhoven - www.dpe.nl) and Stichting Alice (www.alice-eindhoven.nl). The local economic development company NV REDE (www.rede.nl) assists young designers to get started via its Design Incubator.

The main platforms in Twente are: NetlabTwente (www.netlab-twente.nl), Technology Xchange Cell and Industrial Design Centre (www.idcentre.nl). In Arnhem: Ontwerp Platform Arnhem (www.o-p-a.nl).

Textile

There is hardly any other material imaginable with more versatile applications than textile. Textile sparked the industrial revolution and is still a useful source for many innovations. The nature, the production and manufacturing of textile laid the basis for many applications and new trends in clothing and interior design, in the carpeting industry, in architecture but even in road construction, hydraulic engineering, the medical sector, the automotive and aerospace industry. In addition, a great deal of technology is supplied to the textile industry by e.g. engineering, chemical and graphics industry; materials research and application also play a significant role. The textile industry itself can be broken down into spinning, weaving, knitting, non-woven and other textile finishing techniques. However, this breakdown does not relate to many new interesting trends associated, e.g. developing multifunctional textile materials, combining textile and electronics, environment-friendly production methods, waste water management, energy saving, waste processing and recycling.

The traditional textile industry

'Patterns' and 'design' are important in the traditional textile industry. The focus is on the fabrics for clothing, curtains and upholstery. The consumer has become very critical. Mass individualisation plays a major role. More flexible production methods to suit different tastes are needed. The technology of the future is digital printing and coating methods. Technology can be used to realise a wide range of product properties such as fire and water-resistance. Further development in digital printing technology will lead to major changes in the textile finishing industry. This brings integration of textile and clothing industries into the picture once again. European research on automation of manufacturing garments (<http://www.leapfrog-eu.org/>) is carried out. Versatility and flexibility of inkjet printing is of major significance.

The Netherlands is the largest carpet manufacturing country in the world after the US and Belgium. Besides manufacturing carpets for the domestic market, various Dutch carpet manufacturers also finish carpets for third parties both in the Netherlands and abroad. This relates mainly to tufting, dyeing and backing carpets.

Technical textiles

The term 'technical' textile refers to the development of new textiles and applications that have absolutely no connection with traditional clothing, bed and interior fabrics. New combinations of fibres and fibre materials and manufacturing technologies offer a number of new products and improved product performance. Examples are semi-manufactured products or textile components for car and aircraft interiors, the cable strap and conveyor belts, healthcare textiles, sports gear, paper, carpets and packaging, construction, even road building and hydraulics.

Smart textiles

A unique development in the textile branch is 'smart textiles'. Smart textiles can be divided into textiles with dynamic features and textiles combined with electronics. Dynamic textiles are, for instance, textiles for active thermo-regulation (www.outlast.com), the controlled release of encapsulated substances (www.devan.net), and active bactericidal textile (www.x-static.com). The combination of textile and electronics will give an entirely new dimension to the concept of multifunctionality. Textile not only protects but also communicates with its surroundings. It enables people to monitor vital body functions continuously. Smart textiles will lead to new entrants to the textiles market. Philips is a major player in this area and is leading a large-scale European research project in this field: MyHeart (<http://www.hitech-projects.com/euprojects/myheart/>). Smart textiles are intelligent products that provide for increased level of customer convenience, improved product performance and improved user performance.

The textile industry in the Netherlands

The Dutch textile industry is a modern business sector which provides employment for thousands of people (http://www.rabobank.nl/info/execute/node?node_id=291018). In the past, the Dutch textile industry focused mainly on production of textiles for technical applications. Consequently, many textile businesses are niche market players. Specialist textile products are manufactured with high added value. As far as innovative textile applications are concerned, the Dutch textile industry has a leading position in terms of both engineering and creativity. Ten Cate is a top manufacturer in the field of fire-resistant textiles for industrial garments. Ammeraal (Gamma Holding) is one of the major players in the field of conveyor belts, and Verosol in the field of aluminised sheeting for use on windows.

The European textile industry is engaged in setting up a strategic research agenda for the future. Nine study groups assembled in the European Technology Platform (ETP) for the Future of Textiles and Clothing have set out a technology roadmap for the European textile industry critical to maintaining its leading position. Stakeholders in industry and research have joined forces in this ETP. Outcomes of the strategic dialogue will influence the allocation of European research funds. (http://www.euratex.org/download/research/publications/euratex-broch-technology_platform.pdf)

Visco (www.vlisco)

The Dutch company Visco holds a strong position in the design and production of fashion fabrics for the African 'exotic fabrics' market and is a division of Gamma Holding. (not to be confused with a DIY supermarket chain of the same name), <http://www.gammaholding.nl>, a world-wide player in the textiles sector.

Ten Cate Thiolon
(www.thiolon-grass.com)

Ten Cate Thiolon is known for the development of artificial grass. Artificial grass can be used for sports grounds. There is less maintenance than with natural grass. The advantages are obvious: fewer game cancellations, training on the competition field, longer outdoor-season for many popular sports in a cold climate, plus the opportunity to use sports grounds for different functions without damaging the turf. Artificial grass gives a football pitch uniform playing properties, irrespective of location or climate. Artificial grass creates equal conditions in professional football, nationally and worldwide.

Overview

Below is an overview of important education organisations in the field of textile. Although not fully complete, the list does give a good overview.

Education

The number of courses on offer for the 'textile industry' is somewhat limited. On the one hand there are fashion courses and a management-oriented course on offer at the Saxion Hogeschool at Enschede. It is evident that developments take place at the crossroads of different fields of technology. New applications emerge from multidisciplinary approaches. This means that materials science, mechanical engineering or industrial designer courses can also be offered in this department. The trade associations also offer numerous specific further training courses as learning trajectories.

Amsterdam Fashion Institute (www.amfi.hva.nl)

The AMFI offers three full-time studies: Fashion Management, Design & Styling and Concepts & Brands. A complete English-language course is also offered for the three specialisations: AMFI International.

Academie voor Beeldende Kunst en Vormgeving Arnhem, fashion design course (www.artez.nl/nl/opleidingen)

The Fashion Design course trains fashion designers in a unique style which is recognisable both at home and abroad. Fashion designers graduating from Arnhem are highly qualified and equipped with a wide range of opportunities for manifesting themselves in the world of fashion.

Saxion Hogeschool Enschede
(www.saxion.nl/tct/voltijd/enschede/opleiding)

With establishments in Deventer, Enschede and Apeldoorn, and almost 18,000 students, Saxion is one of the largest hogescholen in the Eastern part of the Netherlands. It offers a wide range of courses, including Technical and Commercial Textile Science (also: Textile Management 'De Maere'), offering studies for managerial positions in the textiles and clothing sector.

Miscellaneous

LIFT group (www.liftgroup.nl)

LIFT group is a consultancy and knowledge centre for the textile, carpet, ready-made and bespoke clothing sector. We contribute significantly to the sector by giving relevant advice and offering expertise to solve bottlenecks in management and also by supervising the process of implementing innovations.

Vereniging Textielindustrie Nederland (VTN)
(www.textielnet.nl/intro)

Dutch textile businesses are associated in the Vereniging Textielindustrie Nederland (VTN). This association promotes the individual and collective social and economic interests. The association acts as the spokesman when communicating with governments, the two sides of industry and other employers' organisations. The Dutch textile industry is represented by the VTN at the European level. The VTN also organises informative gatherings, workshops and conferences. The members thus have the opportunity to exchange knowledge and share their experiences.

Expertex, (www.expertex.nl)

A general expertise centre for the textile industry with three core activities: education, research and implementation, and services and facilities.

TNO Textiel (www.tno.nl/industrie_en_techneik/intelligente_materialen/textieltechnologie)

TNO Textile is a research institute for the textile industry engaged in, inter alia, research in the field of: Cleaning Technology, CO₂ Cleaning. Coating and Laminating, Enzyme Technology, Carpet Research, Textile Finishing and Water and Energy Management.

MODINET (www.modint.nl)

Modinet is the employers' organisation for fashion, interior design and textile. On 1 January 2005 this association amalgamated with the Vereniging voor de Nederlandse Tapijtindustrie (VNTF, www.tapijtnet.nl)

EURATEX (www.euratex.org)

EURATEX is a European trade association for the textile and clothing industry.

CRIET (www.criet.org)

CRIET is the European organisation for the textile finishing industry.

Multimedia

Multimedia is an outstanding example of creative activity in which technology, innovation and creativity converge. The Netherlands specialises in customer-oriented software, games and publications. This strength combines well-developed technological knowledge in the fields of open-source software and embedded systems with the purely creative arts.

Amsterdam is the multimedia centre of the Netherlands and functions as the main port; trends are latched onto quickly here. Amsterdam is on a par with Berlin, Vancouver and Milan. The overview here focuses only on the gaming industry.

Overview

The expertise is explained in this section, as well as the two most relevant technologies for gaming – open source software and embedded systems. These technologies are well represented in the Netherlands.

Knowledge (infrastructure) in the Netherlands

The three universities of technology are important where multimedia is concerned. Delft University of Technology offers a course in the field of Media and Knowledge Technology in Technical Informatics (www.tudelft.nl; www.tue.nl; www.utwente.nl). Most important are the Universiteit van Amsterdam (www.uva.nl), the Vrije Universiteit Amsterdam (www.vu.nl) and Utrecht University (www.uu.nl).

Other professional academies offer special courses and Leiden University (www.leidenuniv.nl) has an educational programme on New Media. The arts faculties of the universities also offer interesting curricula.

Commanding respect is the CWI (National Research Institute for Mathematics and Computer Science in the Netherlands, www.cwi.nl). It is a leading Dutch research centre for mathematics and computer science. Another important one is the Telematica Instituut (www.telin.nl). Funded and governed by the business community it has obtained support from government as well. It is an organisation that concentrates the strength of large national companies, knowledge institutes and government. The mission of this institute is to rapidly transform fundamental research into market-oriented applications in the field of telematics. The Telematica Instituut specialises in telecommunications and broadband.

For interfaces, design and gaming you can apply to the Utrecht School of the Arts (www.hku.nl), in The Hague: the Hogeschool InHolland (www.inholland.nl) and the The Hague University (Haagse Hogeschool) (www.haagsehogeschool.nl). The Rietveld Academy (www.rietveld-academie.nl), located in Amsterdam, is obviously a very well-established name for the artistic side of multimedia.

(Serious) games

The games industry can be divided roughly into four segments: console and PC games, high-quality and complex computer games; internet games, generally simple, smaller games on the Internet; Mobile Games, simple games for mobile telephones, and Serious Games, especially culturally-informative, educational or enlightening. The console and PC games sector has developed into a mature, international media and entertainment industry over the past thirty years. Sales in the US in 2004 totalled more than seven billion dollars and has been growing since 1996 by an average of half a billion per year. The global market reached \$23.2 billion in 2003. For many years this market consisted of young consumers. Today the average age of gamers is 29 years. Developers of console and PC games are found mainly in the US (40%), Japan (30%) and the UK (14%). The consequence of up-scaling is that a constantly expanding number of titles are developed, published and distributed by a mere handful of large-scale game development studios. In 2002 the ten largest game development studios in the US were responsible for 65% of the total number of games sales. These studios include Sony, Nintendo, Microsoft and Electronic Arts. The latter is the undisputed market leader, with a turnover of \$2.9 billion in 2004. The rapid increase of broadband internet connections since 2003 has resulted in longer and more frequent online gaming sessions by consumers. Since 2003 there has been strong growth in online games. The driver behind recent growth in this segment are women above thirty.

The first game developers in the Netherlands only started in the second half of the nineteen-nineties. They did not focus on console and PC games but on niches in the market. At present there are more than a dozen businesses engaged specifically in development of games and occasionally in distribution. Approximately 200 to 300 people are employed by game developers or distributors in the Netherlands. The largest game development studio is Guerrilla, a company with more than 100 employees. This company is currently working on three games for, inter alia, Playstation 3. Other parties are Davilex (10 employees) and Playlogic (55 employees) which has meanwhile marketed one game. In the Internet games segment Zylom (35 employees) is a successful developer and distributor in the European casual Internet games market. There are dozens of Internet, communications and multimedia agencies active in the serious games segment, i.e. Simagine, Espelon, Simenco, Business Simulation. Obviously, the objective of these games is not entertainment alone (e.g. strategic communication, information, education, training, etc.).

Digital Games Research Association (DiGRA) (www.digra.org)

DiGRA is an international association for academics and professionals researching digital games and associated phenomena. It encourages high-quality research on games, and promotes collaboration and the dissemination of work by its members.

Saganet (www.saganet.nl)

Saganet's mission is to 'promote the use of game simulation in all sections of society' and intends to achieve that goal by 'developing and disseminating knowledge and skills in the field of game simulation'. Saganet focuses on the Netherlands and the Dutch-speaking part of Belgium, communicating mainly in the Dutch language. Saganet is affiliated with the International Simulation and Gaming Association (ISAGA).

SURFnet (www.surfnet.nl)

SURF, SURFnet and Kennisnet wish to research and encourage educational applications of (online) computer games. They hope to achieve this by establishing and facilitating a community of direct stakeholders: developers and users (teachers) of teaching materials. An initial meeting was held on 25 May, 2005, which was attended by 25 persons from this target group.

Game Maker (www.gamemaker.nl)

This site is for people wishing to make their own computer games. Game Maker is a program which allows people to make exciting computer games without the need to write a single line of code. Making games with Game Maker is a lot of fun. Using easy to learn drag-and-drop actions, everybody can create professional looking games within very little time. This site is supported by the University of Utrecht.

Initiatives

Below is a list of several important initiatives and platforms in the field of multimedia.

Virtual platform (www.virtueelplatform.nl)

Virtual Platform (VP) is a network for policy and cooperation in the field of new media and 'living culture' in the Netherlands. Its aim is to further the free development and application of ICT and free access to ICT in the cultural sector in general and the arts in particular. The role of Virtual Platform is to establish a link between partners in the cultural/creative sector and between culture and other sectors (education, social organisations, media, commerce). The VP has access to information on new media culture in the Netherlands, stimulates the setting up of joint projects, coordinates dialogue, profiles new media culture in the Netherlands and abroad, advises the government and other sectors on policy, and presents new developments in new media to a wide audience.

MultimediaN (www.multimedien.nl)

MultimediaN is an organisation for public-private collaboration between the scientific community and industrial and societal institutions. The MultimediaN partners are engaged in work on the development of multimedia information technology for use in high-quality applications, particularly in media and information-intensive businesses as well as in societal institutions in the field of security, safety and culture.

Freeband (www.freeband.nl)

Freeband's perspective for the year 2010 is that communication and the provision of information will not be regarded from the point of view of the supplier but from the point of view of the user. The communications infrastructure will be transparent and of a high density. More than 30 institutions and businesses participate in Freeband, including the major ICT companies and representative end-user organisations. The Freeband Communication programme offers the opportunity to upgrade and anchor ideas, knowledge and concepts, such as those developed within the Freeband Knowledge Incentive programme, in society.

This programme centres on three topics:

- The development of technologies focussing on new trends in materials and technology
- Middleware solutions for communication, applications and user interaction focussing on developing platforms to make new multimedia services possible.
- Society, users and applications. How can networks, terminals, services and service providers be of service to the user in his own particular field of application.

Amsterdam New Media Institute (www.anmi.nl)

The Amsterdam New Media Institute combines knowledge about new media in various sectors and institutions and enables the transfer of information among knowledge institutions, businesses and governments and between professionals, researchers and students. The first activity undertaken by the ANMI was the ANMI Summer School, held between the 23rd and 27th of August 2004. The goal of this Summer School was the reciprocal transfer of knowledge between the business community and knowledge institutions. The institutes involved with the organisation of this ANMI Summer School are the Vrije Universiteit, the Universiteit van Amsterdam, Hogeschool van Amsterdam, Hogeschool InHolland, Waag Society, Mediamatic, Virtual Platform and Syntens.

Waag Society (www.waag.org)

Waag Society is a media lab for research and development on the basis of new media and communications technologies; a media lab specialised in social and cultural applications of technology. De Waag is a place where knowledge about the effects of technology on society is accumulated, and where that knowledge is subsequently converted into projects. Waag society is established in Amsterdam.

V2 (www.v2.nl)

Dutch and foreign artists, scientists and technicians work together in V2's interdisciplinary workshop on the development of electronic art projects and technical research projects, e.g. hardware and open source software. The –generally long-term– projects are focused on the use of new technological possibilities for artistic objectives, research into the cultural and societal implications of those technologies and the development of technically innovative (web) applications. Software tools have been developed

here, as also have mixed-media applications and interactive installations in public space. V2 also organises workshops and meetings of experts for the purpose of transferring knowledge and sharing experiences. V2 is established in Rotterdam.

Open source software

Open source software has two specific features:

- The source code is freely available.
- Intellectual property and (re)use of the software and the associated source code are regulated in such a way in the licensing model that the licensee is able to view, use, improve, append and distribute the source code.

This freedom to modify software has resulted in stakeholders joining forces to improve or develop the software without property issues standing in the way. This new form of collaboration, in which persons from different organisations, countries, or in a personal capacity, together develop the software further, is referred to as the open source development method.

The OSOSS program (open standards and open source software) of the Ministry of the Interior (www.minbzk.nl/ict_en_de_overheid/verbetering; thema: Open standaarden en open source software)

The government will start to use open standards for both internal and external data exchange. Open ICT standards relate to the opportunity to exchange data between ICT systems. Promoting the use of open standards and open source should reduce supplier dependency and increase the possibilities for data exchange among governments. The OSOSS program (open standards and open source software) was set up for this purpose. OSOSS encourages governmental organisations to use open standards (ICT) in their data systems and informs them about the possibilities offered by open source software.

Xs4all (www.xs4all.nl)

In 1993 Xs4all was one of the first free Internet providers. Xs4all has its roots in a tightly-knit international Internet community that was closely involved in the actual genesis of the Internet. This implies that they now make out a strong case for the original merits of the Internet: a worldwide computer network that made free and uncensored exchange of data, information and ideas possible for all. Xs4all consequently regards further development of the Internet as one of its particular responsibilities. It still prefers to use open source software in which the source code is public domain. By pursuing its open source policy Xs4all is not dependent on suppliers.

Vereniging Open Source Nederland (VOSN) (www.vosn.nl)

Vereniging Open Source Nederland (VOSN) is an association founded for the purpose of encouraging the professional use of Open Source. The VOSN committee consists of representatives of the Dutch open source market. Committee members work on a daily basis for open source suppliers, are actively involved in open source development trajectories or have an extensive network, and are active within government agencies.

Embedded systems

Embedded systems originally meant: ingrained software systems. It is also referred to as software-intensive systems and services. This software makes 'seamless communication' possible; ensuring that different hardware platforms (computer, telephone, mobiles) can be connected to form a single system; the separate pieces of apparatus communicate seamlessly. Embedded systems and universal networking form the path to the digital community; software is the crucial driver to actively make that community possible. Some of the main Dutch companies in the field of embedded systems are ASML, LogicaCMG, Océ technologies, Philips, Bosch, Thales and Chess.

Embedded Software Institute in Eindhoven (www.esi.nl)

The Embedded Systems Institute (ESI) is an establishment that is committed to expanding knowledge about embedded systems. It has the explicit aim of making this knowledge publicly available. The ESI is one of the few research institutes in the world that address embedded systems design at the multidisciplinary systems level. The ESI distinguishes itself through its positioning between academia and industry and through the strong industrial role in its research projects. The ambition of the institute is to become a leading expertise centre for embedded systems.

Progress (www.stw.nl/progress).

The STW programme 'Progress' (9 million EUR) is the national 'Programme for Embedded Software and Systems'. NWO, STW and the Dutch Ministry of Economic Affairs work together with the industry on increasing knowledge and expertise in the field of ES in the Netherlands in order to reinforce the competitiveness of Dutch industry.

Itea (www.itea-office.org)

ITEA is a strategic programme which has been set up to stimulate pre-competitive research and development. ITEA's vision is to give Europe a leading edge in embedded and distributed software and to use this advantage to secure Europe's future in an increasingly competitive world. ITEA's industry-driven research is already having a considerable impact on government, research, business and consumers. ITEA is located in Eindhoven.

Architecture

The Netherlands has a reputation abroad as a country of good architecture. Many people even regard the Dutchman Rem Koolhaas as one of the world's best architects. The conceptual approach, which is typical of Koolhaas's work, is imitated by many Dutch architect's firms which in turn also build up a good reputation abroad (e.g. MVRDV, Neutelings Riedijk, Meijer & Van Schooten). The views held by this generation of architects has led to numerous typical constructional innovations, such as overhangs of ten metres and folded floors. Alongside the conceptual-oriented school another trend has also developed over the last few years. The economic recession has had repercussions on the architecture business. While architects in the Netherlands already have fewer final responsibilities than their counterparts abroad, they cannot allow their views to dominate their work. Customers have become more important now and in many cases this has led to a more pragmatic type of architecture. This does not mean that fewer innovations are about. Shackles of regulation, limited budgets and customers' wishes keep challenging innovative-minded architects and their pragmatic approach. Combined with an ambition for quality and sustainability integrated may well lead to new schools within the Dutch architectural community.

Main trends in the Netherlands

Recent architectural innovations are the outcome of a number of typical Dutch trends. For instance, the economic constraints, the scarcity of space, the demands of eco-sustainability, the increasing level of consumer influence, the current housing stock, the water problem, shifts in population composition, changes in the traditional building style and the emergence of new media are all impulses for innovation.

Economic constraints

Dutch architects are used to deliver on a tight budget. The quality of council housing is well known outside the Netherlands. One of the most talked-about aspects is the unorthodox use of cladding materials such as paving stones, roofing tiles, lacquered eternite sheeting, black-stained timber, steel cassette systems, PVC elements and galvanized sheeting. Standard cladding material, such as Trespa, also contributes to a much talked about architecture thanks to the utilisation of an unorthodox connecting and jointing structure. Rough concrete, wood and supporting glass (developed by design and construction offices such as ABT and Octatube for instance) are also examples of this architectonic style.

Lack of space

The much talked about MVRDV Dutch pavilion at the world fair in Germany, a stack of landscapes, symbolises the influence of the lack of space in the Netherlands. But other things are also stacked; living accommodation above shops is normal, as also are combinations with a parking function. Work is also underway on more unusual

combinations such as glasshouses on industrial sites, a skating rink on top of studios, a basketball field above a bar... Building on top of existing houses, so-called 'optoppen' and what architect Erik Vreedenburgh calls 'rooftop architecture', are increasing in popularity. And in consequence, the development of lightweight modules. The innovative character in these cases often consists of integrating materials developed in other lines of business (aluminium foam for example) in a building project. Within the framework of 'multiple utilization of space' building underground is also becoming fashionable.

The scarcity of space (plus stricter environmental regulations) also leads to new building structures and techniques that make it possible to build on locations where it would normally be out of the question. Housing accommodation built into noise-protection dams are a good example, as also is the much talked-about cinema incorporated in a noise protection dam on the A12 designed by DP6 Architectenstudio. Another result of the lack of space is the development of 'light urban development' (a term used by MVRDV) and 'scharrelstendbouw' (a term used by (the former) Scie 2.0). By building without effecting the subsoil, i.e. no mains and fully self-supporting, it becomes in principle possible to live in areas that were previously considered unsuitable. The poor accessibility of construction sites, also a consequence of lack of space, is increasingly leading to prefabrication and the associated innovations (the aspect of cost also plays a significant role in this respect).

More attention to sustainability

Sustainability in construction was actively promoted by the Dutch Government in the nineteen-nineties. This led to stricter regulation. Over the past few years, however, the government has discontinued its policy somewhat. Sustainability is integrated quality aspect which does not need specific attention. Architects continue to have an interest. Various young, innovative architects incorporate the aspect of environmental awareness into their designs. Architect Paul de Ruiter (see also the box text) is a good example, but also newly established agencies such as 20-12-architects (specialised in re-use) and Lofvers/van Bergen/Kopla Architecten are well known in this field. However, there are many young architects who show very little interest in the environment.

Following the sustainability debate, the principle of lifespan building arose; designing a building in such a way that it can be brought back to the basic elements after a limited lifespan. The XX Office, designed by architect Jouke Post (formerly of XX-architecten) in Delft, is the most manifest in this trend. Increasing popularity of detachable construction is another consequence.

Many innovative technologies are the outcome of the sustainability ambition. For instance the growing popularity of climatic facades, or cold and heat storage in the soil, and concrete core activation. New materials have emerged from the notion of sustainability, such as double glazing using aerogel (originating from the aviation industry) and modified soft wood.

The increasing level of consumer influence

Consumer-oriented building is a prominent new development in the Netherlands. Among other things, this is leading to an increase in catalogue construction (this is normal in other countries), i.e. a basic structure that can be added to and modified in accordance with the customer's wishes. Government resolutely promotes this method of working through its so-called IFD programme (industrial, flexible and detachable building). Another development in this respect is the linking of services to the 'housing' product. Varying from the delivery of a product to be finished by the customer, to linking the construction of a house to new financial constructions and maintenance for years on end. The increasing amount of attention is also a consequence of the more central position taken up by the consumer. Apart from attention given to indoor climate, this also leads to the aim of achieving more daylight indoors.

The current housing stock

The current housing stock is faced with an enormous challenge. Although the technical state of the housing stock is generally adequate, it often fails to meet modern-day requirements. Hence a great deal of demolition work is carried out. However, renovation work is also on the increase. This has resulted in the development of a large number of technical innovations. In addition to the previously mentioned 'optoppen' there is also 'uitplinten' in which the ground floor, usually an area previously used for storage, is made habitable and attractive. An increasing amount of attention is given to potential re-use when demolishing buildings, and 'selective demolition' is sometimes the case.

Water problems

The Netherlands is marshland and as such is faced with water problems that vary from drying out to imminent flooding. This has consequences for both urban development and architecture. With regard to urban development, which is generally more elaborate in the Netherlands than in most other countries, this leads to a great deal of attention for water management (water buffer and wadi). This also has an considerable influence on architecture. Floating homes are designed (yet few are actually built), and new technologies are implemented to recycle water for home consumption and use.

Shifts in population composition

As a result of the ageing population and individualisation, the number of single-person households is rapidly increasing in the Netherlands. This has many consequences for the construction industry: dwellings are converted into studios, 'assisted living' is also becoming an aspect demanding the special attention of architects, and the concept of 'levensbestendig wonen' is also starting to play a significant role. The latter being a dwelling which is designed in a such a way that it can easily be adapted to meet changed living circumstances. This gives rise to numerous technological innovations. The IFD programme plays a major role in this respect too. Another trend, the

secularisation of the Netherlands, has led to a remarkably large number of conversion projects. There is no other country in which so many churches are being converted into housing accommodation, office accommodation, etc. A similar change in function is also taking place on a large scale in other sorts of commercial and industrial buildings. And yet another shift in the composition of the population, towards a more multicultural society, has led to very few consequences in terms of architecture.

Changes in traditional procedures

The traditional call for tenders loses ground in the Netherlands. A variety of new organisational forms are emerging which increase the opportunities for innovation. Some architects, for instance, take upon themselves more responsibility so that the costs can be reduced even further (Cepezed is one example in this respect), some architects also assume the role of project developer and the number of PPS projects is consequently rising strongly. However, the main trend in this respect is 'integral working'. By collaborating from an early stage with the various disciplines involved, an accumulation of separate solutions arise and the success of collectively developed innovation increases. Innovative-oriented firms of architects, such as Kristinsson and Atelier PRO, were among the first to take this approach; an approach which is now becoming more commonplace. A similar trend is observed in the industry where working collectively is becoming more prevalent, also among architects, and this leads to integral building products such as the Infra+ floor concept. This increasing level of collaboration is partly thanks to initiatives such as BOOSTING and 'Slim Bouwen' [Smart Building]. Shifting attention in the design stage from the investment to the development stage is also a remarkable change seen in working methods.

The emergence of new media

We are now seeing an upsurge in the role of new media in architecture. Computer technology is being used more often and for a growing number of different objectives. For instance the ArchiNed website, which has been an intensive discussion platform for ten years now, and virtually all architectural firms have their own website. One significant development in this field is the opportunity for consumers to design their own home for a specific location on the web (such as www.ultimulti.nl for IJburg). This is a (digital) elaboration of so-called Welstandsvrij 'deregulated' building which virtually renders architects powerless. This 'deregulated' building is currently the subject of much debate because of the uncontrollability of the technical and aesthetic quality of buildings.

Architects Lars Spuybroek and Kas Oosterhuis also use modern technologies in a quite remarkable fashion. Partly thanks to Spuybroek, Doetinchem became home to a building that changes colour every day on the basis of the emotions the Doetinchem population makes known via the Internet, and Oosterhuis is engaged in work on a house that moves and reacts to its occupants.

Overview

This section gives an overview of information sources in the field of architecture. While the list is by no means complete it does give a good impression of the state of affairs in the Netherlands.

Education

Two universities and six academies in the Netherlands offer courses in architecture.

Delft University of Technology (www.bk.tudelft.nl) and Eindhoven University of Technology (www.bwk.tue.nl)

Academie van Bouwkunst: Amsterdam (www.academie-vanbouwkunst.nl), Rotterdam (www.misc.hro.nl/avba), Tilburg, Arnhem (www.avb-arnhem.nl), Groningen, Maastricht (www.academievanbouwkunst.com)

News, links, and debate

All aspects of architecture can be found on the daily architectural news website ArchiNed www.archined.nl. This site also contains hundreds of links in the field of Dutch architecture ('Sites')

Organisations - general

BNA (www.bna.nl)

The Bond van Nederlandse Architecten (BNA) (Royal Institute of Dutch Architects) is the general professional association of architects. The BNA site not only lists architects but also contains several links.

SBR (www.sbr.nl)

SBR (Stichting Bouw Research) (Building Research Association) gathers knowledge and information required by building partners in their daily work and disseminates it by way of reports, manuals and information pamphlets, on CD-ROM and the Internet and at seminars.

TNO-Bouw (www.bouw.tno.nl)

TNO is an independent knowledge organisation that forms a link in the knowledge chain between the scientific community on the one hand and businesses and organisations on the other. TNO-Bouw (TNO Building and Construction Research) focuses on the construction industry.

SEV (www.sev.nl)

SEV (Steering Committee for Experiments in Public Housing) is engaged in finding innovative solutions for social housing issues which can be applied in practice. These are developed and proven in practice. This is done in the form of preliminary studies, experiments, model projects and consultancy. SEV collaborates with partners in the field.

Bouwweb (www.bouwweb.nl)

Bouwweb is a portal site for builders by builders. It offers relevant news with innovative news items about processes, products and materials, plus the Bouwindex which contains relevant information about businesses, organisations and products.

Organisations - specific

Materia (www.materia.nl)

This site includes the Material Explorer, a free search engine with hundreds of innovative materials gathered and selected by Materia from around the world on the basis of their unique sensory and technical properties. The Explorer is intended for architects, designers, producers and developers who are looking for and offering materials. (see the box).

Bovenstad (www.bovenstad.nl)

Stichting Bovenstad is a knowledge network that was set up to develop and disseminate knowledge of importance for the project development of rooftop space and high-rise buildings.

IPSV (www.vrom.nl/ipsv)

The Innovation Programme Stedelijke Vernieuwing (IPSV) was brought into operation between 2001 and 2004 for the purpose of accelerating urban development and to promote quality. Several examples of 'optoppen' and 'uitplinten' can be found under the heading 'projects'.

IFD (www.ifd.nl)

IFD Bouwen is a design, development and construction method in which, by adopting an integrated approach, industrial, flexible and detachable aspects play a collective role. This is not only geared to the physical building itself, but also to the building process and the associated organisation thereof. Among other aspects, IFD Bouwen is, inter alia, the modernisation of elements such as technology, design tools, how construction parties collaborate, different types of contracts and concepts.

Boosting

Boosting was established in 1988 as the outcome of an initiative taken by the industry, architects, consultants and industrial designers. The movement was a reaction to the traditionally-organised construction community and wanted to show that higher quality could be achieved in the building industry if the various groups worked together differently. It was also decided to initiate and implement specific product developments. Many of the initiatives taken by Boosting members have had a major impact, such as Project XX (building for 20 years) and the Infra+ floor (an 'intelligent' conduit floor). www.boosting.nl

Gezondbinnen (www.gezondbinnen.nl)

2004 was the year of the indoor environment. A great deal of information about the relationship between health and indoor climate can be found on this site which was started for 'the year of the indoor environment'.

SlimBouwen (www.slimbouwen.nl)

This site, [Smart Building] which is also the name of a building strategy, has the goal of giving coherence to development at building component level.

Living daylight (www.livingdaylights.nl)

Stichting Living Daylights promotes the high-quality application of daylight in built-up areas. To achieve its goal this organisation initiates and supervises research into both new urban development and architectonic concepts as well as new technical possibilities. It acts as a knowledge network and a knowledge intermediary. By making designers, principals and users aware of the importance of good use of daylight, the organisation aims to achieve a healthy and sustainable environment with an exceptional architectonic quality.

Smartarchitecture (www.smartarchitecture.org)

This is a discussion site which has the goal of increasing the level of environmental friendliness of buildings by using smart technologies.

Innovative parties

Almost all persons that were interviewed mentioned the name Paul de Ruiter as an example of the new generation of Dutch architects. Among his designs are the Mercator2 building in Nijmegen for which he designed a climatic facade in association with Eindhoven University of Technology. The Rijkswaterstaat Zeeland office in Middelburg, in which he used active concrete and heat and cold storage in the soil, was recently completed. Villa Deys, a privately owned luxury bungalow, has also commanded a great deal of attention because of the energy-saving technologies that were used in combination with ICT and an innovative lamella façade construction. Reference is made to De Ruiter because of the personal approach he takes in which he regards the comfort of the users as the main aspect, how he uses innovative technologies to achieve that goal, and by giving consistent attention to aspects of health and the environment. (www.paulderuiter.nl)

Information about other innovative parties referred to in the foregoing: Rem Koolhaas (www.oma.nl), MVRDV (www.mvrdv.nl), Neutelings Riedijk (info@neutelingsriedijk.nl), Meijer & Van Schooten (www.meyervanschooten.nl), Ben van Berkel (www.unstudio.com), ABT (www.abt-consult.nl), Octatube (www.octatube.nl), Erik Vreedenburgh (www.archipelontwerpers.nl), DP6 (www.dp6.nl), 2012architecten (www.2012architecten.nl), Lofvers/van Bergen/Kopla Architecten (www.lvbk.nl), Kristinsson (www.kristinsson.nl), Atelier PRO (www.atelierpro.nl), Lars Spuybroek (www.noxarch.nl) and Kas Oosterhuis.

Material Skills

"Material Skills, evolution of materials" is an international touring exhibition of hundreds of fascinating samples of materials. These materials can be viewed, felt and experienced.

Materials exhibited include Litracon, a light transmitting concrete, which is not only constructive but also translucent, glass manufactured from reflective, intelligent material, an insulating material developed by NASA, translucent natural stone, a synthetic material with a colour effect, and many other innovative materials.

The materials on show at this exhibition are also contained in a book of the same name. The exhibition was compiled by Materia and can be brought to a specific (foreign) location upon request.

www.materia.nl

Sources and acknowledgements

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Contributions

Otto Bernsen (SenterNovem), Annemieke Fröger (Philips), Atto Harsta (Aldus Bouwinnovatie), Louis Hiddes (Panagro), Egbert Koster (architecture critic/journalist), Caroline Kruyt (DAX-magazine), Jos Lichtenberg (TUE Building Innovation), Anton Luiken (TNO Science and Industry), Andre Naberman (Batavus), Frido van Nieuwamerongen (Arconico), Eric Paardekooper Overman (OIII-architecten), Jelle Persoon (Bouwhulp), Jouke Post (TUE Building Design), Katinka van Sliedregt (SenterNovem) Jacqu, Vink (Ruimtelab), Piet Vollaard (ArchiNed), Femke de Wild (Marcel Wanders Studio) and Els Zijlstra (Materia).

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