

Designed to Surprise

Towards a Strategic Roadmap for Research and Innovation in the European Design-based Consumer Goods Sectors

February 2010

Supporting Projects



Consumer Markets and Societal Trends

Every EU or indeed global citizen is ultimately a consumer and final consumption is the largest component of the European economy, representing 56.4% of EU GDP¹. While consumer spending can fluctuate both in absolute and relative (as percentage of GDP) terms, its long term general trend is positive, growing broadly in parallel with GDP. However, hidden below this general growth trajectory are a multitude of consumption and consumer trends driven by economic, political, societal, cultural, environmental and other factors. Some of these trends, usually referred to as fashions or fads, can be very erratic and often short-lived whereas others can be understood as truly secular long term trends fed by powerful durable drivers based on global political, economic or demographic developments.

Three such broad long-term societal trends which clearly have a wide impact on consumer behaviour and consumption patterns world-wide and which create enormous opportunities and challenges for the consumer goods industry have been singled out

These are:

1. **Safety and sustainability in production and consumption:** powered by long-term economic (rising resources utilisation costs), political (combat of climate change and improved consumer safety) and cultural (responsible producer and consumer behaviour) drivers;
2. **Health, well-being and activity of an aging and individualising population:** powered by long-term demographic (ageing population) and cultural (more diverse and self-assertive lifestyles) drivers;
3. **Satisfying needs and desires of a growing global consumer class:** powered by long-term political (globalisation and market liberalisation), economic (growing middle class in emerging economies) and cultural (aspiration to status and recognition through material goods) drivers;

All these trends are further influenced by an ever greater availability and ease of access to deep information and knowledge about products leading to a “smarting up” of the consumer turning into a professional or even productive consumer who has increasing influence on product development, production or product-service processes – a concept embodied in the term “prosumer”.

The Design-based Consumer Goods Industry in Europe

The European design-based Consumer Goods sector (incl. design, product development, manufacturing & distribution operations) represent a substantial and vibrant part of the European economy. While the borders between primarily design-driven versus primarily functionality driven consumer goods categories are not clearly demarcated, for the purpose of this project and the wider research collaboration initiative the following sectors are considered:

Textiles, clothing, leather and footwear products, sports goods, games and toys, interior products made of different materials such as furniture, sanitary products, floor, wall and window coverings, table and kitchen ware, glassware and spectacles, watches, jewellery, bags & accessories and various cosmetic and beauty products as well as the design-oriented packaging of these and other products.

¹ Consumers in Europe, 2009 Edition, EUROSTAT, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-DY-09-001/EN/KS-DY-09-001-EN.PDF

Not considered will be primarily function-driven consumer goods categories such as motor vehicles, consumer electronics or white goods, although these also increasingly turn to design and emotion to add products value and achieve competitive differentiation.

The targeted industrial sectors represent a total annual turnover of approx. € 500 billion and economic value added of € 150 billion while employing some 5 million people in more than 500,000 companies across the EU-27.

These sectors combined are also an enormous business driver to supplier sectors such as the chemical and basic material industries as well as the machine, mechanical engineering and IT sectors. In addition they feed a huge logistics, distribution, retail and after sales consumer services sector and a broad range of business service sectors depend on a continued well-being of the consumer goods manufacturing sectors in Europe. These sectors are also very broadly distributed across the EU with particularly strong industry presences in Southern European and the New Member States in which they often constitute dominating business and employment drivers in local and regional settings with an otherwise limited diversity of industrial & service activities. The design-based consumer goods sectors are also characterised by a significantly above-average female employment in both product development and manufacturing operations. For example 80% of employees in textiles, clothing, leather and footwear companies in the New Member States are women and more than 75% of graduates of Europe's fashion and design colleges are female.

Stakeholders of the European Consumer Goods Research Initiative

The Consumer Goods sector and its related research communities are highly diverse and fragmented and despite a significant number of initiatives for better structuring and coordination at EU, national and regional level mostly within individual sectors/communities **the need for a better coordination across sectors and communities at EU level is evident.**

Three European Technology Platforms have initiated this process since January 2009, namely:

The European Technology Platform for the Future of Textiles and Clothing, covering fashion and functional clothing as well as home textiles and interior design products as well as materials for a further range of consumer goods such as footwear, furniture, toys, bags & accessories etc.

The European Footwear Products & Processes Technology Platform, covering a wide range of fashion and functional footwear and the related materials and manufacturing processes

The European Platform for Sport & Innovation, covering the complete range of sports goods, sports wear and sport and play infrastructures.

Two further European Technology Platforms with an important stake in the consumer goods industry have joined the collaborative process in early 2010, namely:

The European Forest-based Technology Platform covering, among other areas, forest-based consumer products such as furniture & other interior products, toys as well as paper-based consumer products for educative, informative, entertainment and hygienic uses as well packaging materials and products

The ManuFuture Technology Platform, covering manufacturing-enabling technologies from tools and devices to machinery to entire production lines and factories for all manufacturing sectors including those dealing with consumer goods.

All these ETP's have since their establishment undertaken large-scale efforts to better coordinate their respective research and industry communities and have collected and elaborated a wealth of documentation about research needs and priorities, innovation drivers and market trends as well as research, innovation and education structures and capacities across Europe which will be analysed for areas of common interest and on this basis combined into a coherent structure and strategy covering the design-based consumer goods sector as a whole.

Current European Research Activities

During FP6 and the early part of FP7 significant research efforts and related European collaborative projects have been undertaken in the field of Consumer Goods Research.

In FP6 two flagship Integrated Projects in the textile and clothing and the footwear sectors have been carried out:

- LEAPFROG "Leadership for European Apparel Production from Research along Original Guidelines"
- CEC-MADE-SHOE, "Custom, Environment and Comfort Made Shoe"

leading not only to significant scientific-technological results but also energizing and better connecting the respective European research and industry communities.

Within the 7th Framework Programme – NMP theme, up to date two topics more generically addressed the consumer goods area, namely:

- ***NMP-2007-3.1-2 New added-value user-centred products and product services***
- ***NMP-2008-4.0-7 Integration of new technologies and materials for differentiated consumer-centred product capability***

These two calls resulted in a diverse portfolio of research projects covering several strategic research and innovation priorities across a range of consumer goods sectors, including:

- **SERVIVE "Service oriented intelligent value adding network for clothing-SMEs embarking in mass-customisation"** (Project N°: TP-214455) focusing on the development of mass customisation business to business solutions for the fashion industry.
- **OPEN GARMENTS "Consumer Open Innovation and Open Manufacturing Interaction for Individual Garments"** (Project N°: TP-213461) focusing on the development of web-based business to consumer solutions facilitating mass customised clothing.
- **FIT4U " Framework of Integrated Technologies for User Centred Products"** (Project N° CP-TP 229336-2) aims to develop a new engineering framework for both products & processes integrating new design and production technologies, new functional high-tech micro devices and new materials in the sectors of footwear and sporting goods. Pilot applications are planned on shoes and gloves for professional use.

A Collaboration of the European Textile, Footwear and Sports Technology Platforms

- **SSHOES "Special Shoe Movement"** (Project N° CP-TP 229261-2) addresses the development and demonstration of new sustainable production capabilities for diabetic feet and fashion high added value consumer-centred product concepts, such as footwear and insoles
- **ENVIRO-TEX-DESIGN** (Project N° TP 213903) development of a collaborative virtual design and prototyping platform for textile and leather products in full compliance with specified environmental, health and safety requirements.
- **MADE4U "Business Models for User Centred Products"** (Project N°: TP-212002) addressing the development of personalised spectacles with Progressive Addition lenses (PALs) whose geometry has to be fully adapted to a person's visual map.
- **A-FOOTPRINT "Ankle and Foot Orthotic Personalisation via Rapid Manufacturing"** (Project N° CP-TP 228893-2) aims to develop novel ankle and foot orthoses for common disabling conditions which are cost-effective, high-speed to market, and personalised for form (geometry for fit, comfort and pleasing aesthetics) and function (biomechanics to prevent, treat and restore optimal function).
- **NANOBOND " Integration of emerging soft nanotechnology into the functionalisation of textiles"** (Project N° CP-TP 228490-2) aims to develop a sustainable surface activation technology based on the self-assembly power of a "soft nano-technology" for the development of versatile, highly functional textile products adapted to the needs of consumers. Pilot applications will be implemented on shoes, pillows, patient gowns, bed protectors as well as in the medical care sector.

Further projects relating to:

- **the forest-based sector** including FP7 projects FORBIOPLAST, FLEXPARENEW, BIOSTRUCT, WOODY, SUSTAINCOMP, SUNPAP & HORTIOBIOPACK as well as ERA-NET projects: wood composites, PAPRIQUA, SOTIPA, BIOPACK and FUNFIREBIC, and
- **the manufacturing technology sector** such as NetChallenge or DIGITEX

are in the process of being analysed for their relevance for the consumer goods sector.

Objectives of the European Consumer Goods Research Initiative

The objectives and expected benefits of this initiative for the industrial and academic research communities connected to the design-based consumer goods sector are manifold and can be clustered into 2 main stages: (1) building a European-wide network and agreeing on a common priorities and (2) implementing joint action.

The first stage – networking and roadmapping - comprises:

- Creating mutual awareness and facilitating contacts, building trust
- Collecting and generating data and knowledge valuable for the entire community at EU level
- Encouraging and organising knowledge exchange and other forms of community interaction
- Joint priority setting, roadmapping and action plan development

The second stage – joint implementation actions – include

- Building and testing joint structures and services
- Developing content, procedures and channels for joint communication/interaction with external stakeholders
- Ensuring sustainability of collaboration initiative over a long period of time

The current partners of the initiative are fully committed to the implementation of both stages, although the results of stage 1 clearly impact the ability of implanting stage 2.

Research Challenges and Innovation Trends

While design and other aesthetic product features represent a significant and sometimes dominant value adding component to the consumer goods in question and crucial competitive asset to the companies providing them, many research and technology-related challenges are also important drives of business success in these sectors. In a preliminary analysis carried out by the Textile, Footwear and Sports Technology Platforms **four such key challenges/trends have been identified which indeed constitute Strategic Research Themes (SRT) believed to apply to all consumer goods sectors:**

- 1. Advanced (multi)functionality of products for specific end applications and use scenarios**
- 2. Intelligent manufacturing and the smart value chain**
- 3. New design & product life cycle concepts**
- 4. Customisation, personalisation and consumer empowerment**

These challenges require substantial innovation efforts by the industry and provide formidable research opportunities for the scientific community and technology and service providers.

Preconditions for the industry to carry out and succeed in these research and innovation efforts are:

- The **preservation and enhancement of specialised knowledge and skills** of company staff and external service providers
- The **access to sufficient financial resources** to make the necessary research and innovation investments
- A generally **business-friendly and innovation-conducive economic, regulatory and legal framework** to rapidly market and effectively protect innovative products and services

An overview of these key research themes and innovation conditions completed with concrete topics and possible action points is provided in the following table.

Overview of Strategic Research and Innovation Themes

| Strategic Research Themes (SRT) for Consumer Goods | SRT1 (Multi)functional products for specific applications and uses | SRT2 Intelligent manufacturing & the smart value chain | SRT3 New design and product life-cycle concepts | SRT4 Customisation, Personalisation & Consumer Empowerment |
|---|---|--|---|--|
| Major socio-economic drivers & challenges | Specific conceptual and technological elements | | | |
| Safety & sustainability in production and consumption | <ul style="list-style-type: none"> - Bio-based, renewable materials - Durable & recyclable products | <ul style="list-style-type: none"> - Resource-efficient, sustainable production - Track & trace - On-demand manufacturing | <ul style="list-style-type: none"> - Ecology & safety by design - Cradle-to-cradle concepts | <ul style="list-style-type: none"> - Product ergonomics - Individualised product-service concepts |
| Health, well-being & activity of an aging & individualising population | <ul style="list-style-type: none"> - Products with smart adaptive properties - Easy-to-use, intuitive functionalities | <ul style="list-style-type: none"> - Small series production for special needs - knowledge management in the value chain | <ul style="list-style-type: none"> - User-driven design - Easy customisation for specific needs | <ul style="list-style-type: none"> - Individualised product functionalisation - Made-to-measure/made-to-fit concepts - Product ergonomics |
| Satisfying needs & desires of a growing global consumer class | <ul style="list-style-type: none"> - Multifunctional, high-quality materials - Product variety/choice - Product performance tailored to geographic & cultural needs | <ul style="list-style-type: none"> - Adaptive manufacturing - Globally networked production & supply chain | <ul style="list-style-type: none"> - Rapid design & fast global market launches - Virtual prototyping & market testing - European creativity & value-driven products for the global market | <ul style="list-style-type: none"> - Market segmentation - cultural product adaptations - Direct 2-way consumer communication - Individualised advice/training |
| Innovation-related issues | Possible Action Points | | | |
| EDUCATION Preserving & enhancing knowledge & skills | <ul style="list-style-type: none"> ➤ Analysing the status of education provision, current industry needs and expected future trends across all relevant consumer goods sectors ➤ Promoting multidisciplinary higher education programmes including material, manufacturing, design and management components ➤ Improving the collaboration between industry and education providers across Europe and promoting mobility of researcher across Europe and across the industry-academia divide ➤ Preservation and generational transfer of unique highly specialised design and manufacturing skills covering an extremely diversified material, product and market spectrum across all consumer goods sectors ➤ Promotion of the use of advanced IT and web-based tools for knowledge preservation and structuring and flexible education provision | | | |
| OPERATIONAL FRAMEWORK Regulation, standardisation & best practises | <ul style="list-style-type: none"> ➤ Identifying knowledge and tools for ensuring full compliance of consumer goods with evolving environmental, consumer health and safety and other regulation ➤ Promoting best practices in crucial innovation-related areas for consumer goods such as IPR protection, advanced IT adoption, innovation clustering and networking, consumer communication and information ➤ Identifying emerging or unmet standardisation needs resulting from material or technology innovations, new regulatory requirements or emerging market trends | | | |
| FINANCE Access to research and innovation funding incl. fiscal measures | <ul style="list-style-type: none"> ➤ Identifying and categorising relevant public RDI funding sources relevant for consumer goods ➤ Setting-up support structures and activities to facilitate access to funding for the consumer goods industrial and academic research community ➤ Identifying best practises and promoting stronger use of indirect support measures such as fiscal incentives, guarantees etc. ➤ Analysing the situation of private sector funding through seed, venture capital and various debt-based funding sources including EIB-related schemes | | | |

Information on the three founder European Technology Platforms

About the Textile ETP:

The European Technology Platform for the Future of Textiles and Clothing launched in December 2004 is an industry-led initiative which brings together all interested stakeholders: the textile and clothing industry, related industrial and service sectors, the research and education community and public authorities at all levels. The platform's main goal is the development and implementation out of a common long term vision and related strategic research agenda to support the transformation of this industry into a more knowledge – intensive and innovation driven sector.



www.textile-platform.eu

About the Footwear P&P ETP

The **Footwear Products and Processes European Technology Platform**, an industry-led initiative bringing together all footwear sector stakeholders: SME and large companies, material and component suppliers, ICT and technology providers, shoe and accessory retailers, sector confederations, research centres, education centres and service providers. Objective of the platform is to promote networking and to drive research and innovation towards business success in footwear, and to secure the transformation of European footwear in a sustainable knowledge intensive industry.



www.eu-footwear.eu

About EPSI

EPSI is a networking organisation within a triangle approach Business, Sport Knowledge, aimed at assisting the sporting goods movement in the elaboration of their research agendas and aimed at creating a durable innovation-friendly and innovation stimulating environment for the EU Sporting good Industry



Its identified mission covers important aspects and reads: *“To be the recognised organisation by EU Institutions and other relevant stakeholders for the stimulation and coordination of innovation in the sports sector”*

www.epsi.eu

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