**European Cooperation**

**in Science and Technology**

**- COST -**

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**Secretariat**

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**Brussels, 8 December 2011**

**COST 4173/11**

MEMORANDUM OF UNDERSTANDING

Subject :        Memorandum of Understanding for the implementation of a European Concerted Research Action designated as COST Action FP1104: New possibilities for print media and packaging – combining print with digital

Delegations will find attached the Memorandum of Understanding for COST Action as approved by the COST Committee of Senior Officials (CSO) at its 183rd meeting on 30 November 2011

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**MEMORANDUM OF UNDERSTANDING**
**For the implementation of a European Concerted Research Action designated as**

**COST Action FP1104**
**NEW POSSIBILITIES FOR PRINT MEDIA AND PACKAGING - COMBINING PRINT WITH DIGITAL**

The Parties to this Memorandum of Understanding, declaring their common intention to participate in the concerted Action referred to above and described in the technical Annex to the Memorandum, have reached the following understanding:

1. The Action will be carried out in accordance with the provisions of document COST 4154/11 "Rules and Procedures for Implementing COST Actions", or in any new document amending or replacing it, the contents of which the Parties are fully aware of.

2. The main objective of the Action is to support the paper and printing industry in utilizing technological and user-based information in creating new innovations in the areas of print media and fiber based packaging that fulfill the customers and consumers expectations and needs and brings a competitive edge.

3. The economic dimension of the activities carried out under the Action has been estimated, on the basis of information available during the planning of the Action, at EUR 64 million in 2011 prices.

4. The Memorandum of Understanding will take effect on being accepted by at least five Parties.

5. The Memorandum of Understanding will remain in force for a period of 4 years, calculated from the date of the first meeting of the Management Committee, unless the duration of the Action is modified according to the provisions of Chapter V of the document referred to in Point 1 above.

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## A. ABSTRACT AND KEYWORDS

The goal of this Action is to promote discussion on the benefits that may be achieved from novel combinations of print and digital. It will also be used to enhance innovations that will make use of the benefits of both print and electronic media as well as innovations where print and electronic media are combined. Several examples exist where successful combinations have been achieved e.g. through the use of image recognition, augmented reality or printed electronics to bring interactivity into fiber based products. To give the forest industry a competitive edge this Action will focus on new innovations by combining knowledge of the end users with most recent technological achievements. New models of ongoing change in social interaction and in the cultural products of paper and electronic media will be elaborated and proposed. The results will promote critical and theoretical discussion on the changing meanings of contemporary media culture. The Action will explore new business opportunities for the fiber based products and the value chains of print media and packaging through novel, innovative uses. It will also serve as a channel for communication between industry and academia, thus contributing to the development of new commercial applications.

**Keywords**: print media, packaging, digital media, social interaction, printed electronics

## B. BACKGROUND

### B.1 General background

In many ways, media industry and especially print media is at crossroads. One important change occurring in the use of different media is that the younger generation, the so-called digital natives, uses less print media than the older ones. Traditionally the younger generations have turned into active readers of newspapers as they have matured, and in general the older generations still are very accustomed and satisfied with traditional media. However, the digital natives have grown up in a world where the most central channel for media content is the internet. Hence, there is no reason to believe that these people at some point will "grow up" and take a daily routine from reading traditional newspapers. The position of magazines and books appears somewhat stronger than that of newspaper in their way of providing consumers a "slow" element into their lives. Their role is more in relaxing and being offline, but it is by no means certain that the digital natives see this as a strength of magazines and books.

Even though the effect of Kindle, iPad and other tablets and eReading devices on print media consumption is not yet fully known, it is clear that they have an effect. Amazon announced that it was selling more Kindle books than hardback editions in the end of 2010. Similarly, Barnes & Noble also recently said it sold three times as many digital books through its website compared to physical books. Furthermore, in 2010, Apple sold 15 million iPads in just nine months—more than any other tablet computer ever sold.

There are currently major developments taking place in the area of online social media and digital games. The most popular services such as Facebook, Twitter or YouTube attract millions of people to share, comment and collaborate on text, image and video materials. Digital games also attract millions of subscribers into social chat environments or role-playing game services. Such content is also attracting more casual users and simultaneously the boundaries between media are becoming blurred, as recent developments in cross-media, mobile games, interactive television content and pervasive gaming prove. All these changes present major opportunities and challenges for the media industry and research alike. Research into the use and design of games and social media has the benefit of advancing our understanding into the roles and significance of emerging new media forms and user behavior, as well as into the operations of communities that function as major content creators in these new settings.

Even the packaging market has undergone a transformation in recent years. The average supermarket has thousands of brands and products vying for consumers' attention. The effectiveness of their packaging varies enormously. Packaging is printed communication and often offers much more than "just" words and images. In addition to its protection, transport, and storage functions, packaging makes a direct statement about the product inside. It communicates, transfers knowledge, and is often the decisive factor in a customer's decision to purchase at the point of sale.

"What does the packaging market need?" The vision of today can become the reality of tomorrow, and one of a manufacturer's key tasks it to identify the right trends at the right time.

The majority of trends in this sector are being set by producers of branded goods, who use design and materials to strengthen and enhance their brand image. Manufacturers of luxury lifestyle products are using more and more distinctive printing materials and effects. Even low-cost product manufacturers are increasingly turning to finishing methods to ensure their packaging stands out in the highly competitive environment of the discount sector. Multiple coatings, embossing, and lenticular films all demonstrate how far this technology has progressed.

Smart packaging with different additional functions is also enjoying growth. This does not mean cans of soup that heat themselves or a wine bottle with a temperature display, even though convenience is still one of the decisive trends in packaging. What it does refer to are innovations such as temperature-sensitive colred strips that are applied to packaging for frozen products using flexographic printing. If the product spends a certain amount of time above a specified temperature during transport or storage, the colour of the strip changes, indicating that the product is no longer fit for consumption. RFID-Technology on packaging for traceability and logistic issues is another need in the industry and another step ahead to smart packaging. Furthermore, the demand for safety and integrity in the area of medical packaging is getting more and more important.

COST provides ideal means for active discussion between the industry and the academia and in forming a cross-disciplinary network of European scientists. In both print media and packaging it is important to involve several players from the value chains into the discussion. COST is very suitable for the proposed Action also due to the possibility to network on a wide scale as well as flexibility in allowing the addition of partners during the Action. From the viewpoint of the future of forest and printing industry, also the possibility to offer training courses and Short-Term Scientific Missions to young scientist is extremely important.

**B.2 Current state of knowledge**

Possibilities for accessing digital information from fiber-based products (print media or packages) have been studied by several groups, and there exists a range of technologies enabling this connection. Some of the technologies are fairly easily utilized (e.g. optical codes or digital pens), but others require further development (e.g. solutions in which electronic components are directly printed on paper). However, from the viewpoint of ordinary consumers it is irrelevant how challenging a certain technology is in manufacturing. Price, usability and sustainability of the product or the service play a considerably more important role for a consumer. Therefore, it is of utmost importance to take into consideration not only what is possible with new technology, but also what are the needs and expectations of the consumers for printed products such as newspapers, magazines, books and packaging in the future. As the forest and printing industry is facing very difficult times at the moment, it is crucial to find new solutions, both products and services that are widely accepted within the European continent and have good possibilities to succeed also outside Europe.

The Action will gather the best researchers and capabilities into one cross-scientific network. That way it is possible to achieve important synergies and innovative solutions for future fiber-based products. Surveys have shown that although cultural differences in media use exist there are also common trends that can be identified. In most countries the media environment is much more diverse than before and new technologies have had an impact on people's free time, the ways we communicate, use information, entertain and educate ourselves. Based on the findings of a study conducted in three European countries it appeared that the internet, as a global medium, is also experienced more universally by different nationalities than magazines. It appeared that cultural factors had a more significant role in the attitudes towards the print media, and therefore the strengths of magazines were also experienced differently in different cultures. This is very important to take into account when designing new products and services. Combining social media, i.e. online content created by people to be shared with public or private communities, with print media is not a largely discussed topic, even though some commercial applications are available. Considering the number of active users of different social media services (e.g. Facebook, more than 500 million active users), the potential in this area is tremendous, and large groups of people may be reached. The emphasis here is on consumers being able to achieve physical products from online services, this way staying accustomed with having print products they find valuable around them.

In addition to social media, recent years have also shown growing interest in games, including educational games. Games are considered to be efficient tools for learning, as they have been found to motivate the learner. Research in combining printed school books with mobile phones to bring game like features into the book showed that in addition to children being excited of the combination also teachers and parents found the application interesting. One of the most important conclusions from this study was that the idea of extending the use of printed books by adding digital content to it appeared to be very motivating for the teachers. This is a very important issue when bringing new technology into the school environment.

When combining print and electronic media into any new product or service, it is essential that the ecological footprint is considered and communicated in a way that is understandable to the consumers. Sustainability of fiber-based products is an issue that has been studied for several years, and tools for assessing the most important environmental indicators of a product, technology or value chain exist. However, very few publications are available where the sustainability of print and digital are compared, let alone publications considering new products where these two are combined.

**B.3 Reasons for the Action**

For a decade now, the graphic and printing industry has been shaken by a considerable structural upheaval. The growth of digital media has upset the operating environment of the printing industry, driving businesses to merge and to cut capacity. The worldwide financial crisis that unfolded in 2008 hit European printers hard, and although the worst is now behind, the industry is not expected to recover its former volume. While digital media are chipping away the demand for traditional printed matter, raw material costs are also rising, and cost-effective Asian competitors are putting pressure on the market.

In a recent study, the present situation of the European printing industry was evaluated and means for future survival were explored. The study shows that in order to survive, the European printing industry must either increase production efficiency and flexibility, increase the value of printed products or launch new applications and services exploiting printing competence. These are the ways in which the industry can survive in a situation where print runs are shrinking but the range of printed products is expanding.

Interactive media combining digital and printed media enables product and service applications, where the user experience is extended. Applications where mobile phones are used as an intermediate link between these two media are already on the market, and Augmented Reality as well as NFC (Near Field Communication RFID) applications prove to be a source of added value for printed products. In the future, we may also see independent, interactive printed products that do not need an intermediate device such as a mobile phone.

Sustainability is an issue the industry needs to take into focus both in product development but also in marketing. There are different, not necessarily fact-based opinions on the sustainability of printed media. In order to stay alive and prosper, the European printing industry must conform to the expectations of consumers and corporate media users in terms of the sustainability and usability of its products. The renewal requires the entire value chains to work together. Although the whole industry is challenged, pro-activity is needed especially from the major enterprises, so that the change could be effected smoothly and throughout the sector.

The aim of this Action is to encourage international co-operation between researchers from different fields of sciences and the industry to compare results and insights from national studies in order to create new, innovative opportunities for fiber-based products. The Action will thus strengthen the European state-of-the-art knowledge and hence also the economic dimension in the areas of print media and packaging. The European forest and printing industry will benefit from the Action through the innovative combinations of methodology and experience from technology-based and human-based sciences. The ultimate outcome will include novel and sustainable products and services, in which paper-based materials play an important role.

**B.4 Complementarity with other research programmes**

There are two COST Actions that are relevant for this Action: 1) Impact of renewable materials in packaging for sustainability – development of renewable fibre and biobased materials for new packaging applications FP1003 takes a raw material perspective, but is relevant for this Action in the way of approaching novel, sustainable packaging materials. 2) Transforming audiences, transforming societies ISO906 takes the perspective of media users.

The main objective of this Action is to advance state-of-the-art knowledge of the key transformations of European audiences within a changing media and communication environment, identifying their interrelationships with the social, cultural and political areas of European societies. Several interesting questions are raised in this Action that are interesting also for this Action: Why and in what ways do people use different media? How are experiences and meanings in the daily uses of media evolving? What is happening to practices of use along with digitalization and the increasing popularity of personalized, networked and mobile media forms? Cooperation with these Actions will be beneficial in order to be able to consider the sustainability issues related to both print media and packaging and in order to learn from audience research and take this information into the context of the use of print and digital content. Several research projects funded by the seventh framework programme deal with topics related to this Action, but none of them are taking a similar cross-scientific approach. For example, RFID experience and privacy in the retail environment. Indications for in-store consumer research (REXPIRE) and in Augmented reality supported adaptive and personalized experience in a museum based on processing real-time sensor events (ARtSENSE) fiber-based products are not in the main focus, even though the user-centric approach is very interesting. On the other hand Printable memory solutions for sensor, ID and media applications (PriMeBits) deals with innovations that could be utilized in fiber-based products, but the project focuses merely on the technological solutions.

## C. OBJECTIVES AND BENEFITS
### C.1 Main/primary objectives

The Action aims at increasing understanding on how new innovations may be created by taking into account the users and the technological possibilities. According to the principles of Human-Technology Interaction research, collaboration with the users during the design process of new products or services is essential for succeeding with the new concept. The user is involved as an essential part of the design and innovation processes. In addition, several studies indicate that the most important single factor in the success of business is the understanding of the needs and circumstances of customers. The ability of industrial companies to add new innovative services to their offering is dependent on their client companies' acceptance of these new modes of doing business and willingness to purchase the new services.

Involving customers not only ensures the proper planning of offerings, but also enables systemic changes in value chains and increases the loyalty and commitment of customers. Thorough understanding of the users and the customers, their needs and expectations lays an excellent foundation for new innovations and makes co-creation possible. The main achievement of the Action will be to synthesize, clarify and disseminate results from related, completed and ongoing research. The Action will strive for a knowledge based platform for interactive fiber-based media and packaging products that utilize different combinations of print and digital. The main deliverables include publications from the seminars and innovation workshops arranged resulting in visibility towards the scientific communities in the different fields, the paper, board and printing industry as well as the European consumers. In addition, recommendations on how the paper, board and printing industry can take advantage and exploit recent technological developments in combining print with digital and in printed functionality will be made in the form of roadmaps identifying the routes for interactive fiber-based products in the future. The Action also aims at several new projects based on the discussion and networking during this Action.

## C.2 Secondary objectives

The secondary objectives make it possible to reach the main objective and give clarity and direction for the different activities. The secondary objectives are:

- To create new models and scenarios of ongoing change in social interaction and cultural products of paper and electronic media
- To strengthen the user-centric mindset in product development in paper, board and printing industries through product development process description based on several hands-on examples
- To present possibilities for renewal in the forest and printing sector through innovative services in the value chains of print media and packaging
- Via conferences, innovation workshops and researcher exchange pull together European scientific expertise and industry relevant for the Action and create a cooperation network
- Form strong coordinated European research activities offering new possibilities for print media and packaging through combining print with digital.

**C.3 How will the objectives be achieved?**

The objectives of this Action will be achieved within a framework of four working groups (WGs) with specific tasks. As a way to proceed, research roadmaps will be established to define and initiate the tasks. The roadmap will define in more detail the state-of-the-art in the specific areas of the WGs, and they will be used to clarify the direction of the research. Each WG will contribute to knowledge build-up and be focused on particular scientific issues. They will also take responsibility for arranging Short-Term Scientific Missions (STSMs) and training courses, both internally in each WG as well as together to provide a larger overview. The final roadmaps aim at providing strategic guidelines for future academic research in close cooperation with the industry.

The dissemination of the results to the stakeholders and cooperation with the paper and printing industries is of great importance. The Action will bring the academic researchers and industry representatives together and thus broaden the views of the researchers and improve the possibilities of taking the ideas into practice. As a way to engage the industry, Innovation Workshops will be arranged. The Innovation Workshops will be facilitated forums for co-creation with the different players in the print media and packaging value chains. They will be partly arranged as face-to-face workshops and partly as online discussions using Owela (Open Web Lab). Owela is an innovative Web-based research environment that extends the role of users from passive research objects by taking them as co-designers that discuss online with technology developers as well as other users about design decisions. Owela offers a flexible and efficient research environment where users can meet regardless of the geographical or time-related limitations.

The different needs of the industrial and academic communities are recognized in the two committees that are responsible for promoting the knowledge exchange. The Editorial Board (EB) will have the responsibility of organizing and overseeing the dissemination activities including conferences, website and newsletters. These activities are utilized for the active communication between the industry and the academia. In addition, The Knowledge Transfer Committee (KTC) will be established to function as a key element from the industrial perspective. The KTC will deal with the coordination and organization of the Innovation Workshops.

## C.4 Benefits of the Action

Different forms of media are converging both in terms of technological infrastructure and in terms of uses and contents. Thus, one form of media cannot be properly understood without seeing the various evolving relations between different forms of media. Analyzing this is important when trying to encourage new innovations and solutions. The network will look into what kind of solutions, services or products could emerge when different use contexts such as learning or entertainment, interactive use of magazines and packages or pervasive gaming are combined with the technological possibilities given by the combination of print and digital and by printed functionality. At the same time, the network offers an excellent ground for ideas related to the opportunities people have for sharing their media in social contacts. Thus there may be new technological solutions and innovations in this novel domain in which print and digital contents become increasingly mixed.

Strong collaboration with high-quality interdisciplinary orientation will strengthen the opportunities of European scholars in both theory and practice to contribute to the international discussion on the changing meanings of contemporary media culture. The network will bring together the best conceptual models from different disciplines to analyze and redefine the changes in technological infrastructure, and in media uses and contents.

The network will enhance innovations and solutions that will make use of the benefits of both paper and electronic media as well as packaging media. The network will rethink the role of print and electronic media and will provide European stakeholders with a competitive edge. Close co-operation between the industry and academia will enhance the possibilities for fast commercialization of the ideas. New innovations may also be created in paper-based printed functionalities such as printed nano chromic displays, printed sensors and printed RFID-applications. The European printing industry can utilize the information to offer their clients value-added printed products.

**C.5 Target groups/end users**

The target group of the Action is the European forest and printing industry. The European forest and printing industry will benefit from the Action through the development of novel and sustainable uses of print media based on a cross-disciplinary approach. The forest industry is facing serious problems as digitalization is affecting the use of print products. In order to succeed in the competition with digital media, the forest industry must thoroughly examine the whole value chain and the different roles in it to find out new possibilities for services. In bringing new possibilities for fiber-based products and services, the Action will have a positive effect on employment and regeneration in the fields of forest and printing industry.

**D. SCIENTIFIC PROGRAMME**

**D.1 Scientific focus**

The cross-disciplinary approach taken in this Action focuses on the future developments of interactive print media and packages in which print and digital are combined. The primary scientific focus is in developing novel innovations in this area. Two levels of combining print and digital are considered: media connected by technology (e.g. image recognition or augmented reality as technological tools) and embedded combinations of print and digital (printed electronics).

Radical changes are taking place in the paper and printing industries as a result of increasing digitalization and changes in the use of media. Sales figures decline both in print advertising, as well as in newspaper, magazine and commercial printing. The graphic printing industry needs to develop their business and find new opportunities and applications to gain new markets and to remain competitive. Even though the internet has affected the media use habits of consumers, many still value the reading experience and the physical features of printed products.

From the packaging viewpoint, packages are expected to carry ever more information in a limited space. One solution to this problem is automatic identification, i.e. adding elements to the package that can be linked to electronic information systems. Automatic identification can give benefits in the form of cost savings, new business opportunities, additional value to existing business and increased customer loyalty to all players in the value chain. Pilot tests and user studies have shown that additional services offered via automatic identification should include detailed product data, recipes, nutrient needs and user instructions and should match user demand. Obstacles to use are costs, time consumption and complexity.

Both print media and fiber-based packaging value chains benefit from improved knowledge of user and customer needs, technological possibilities for combining print with digital, innovative approaches from other fields and active discussion between the industry and academia.

The Action will be in compliance with the general rules of the COST Framework and will include:

- Conferences and seminars
- Innovation workshops
- Training courses
- Exchange of experts and Short-Term Scientific Missions
- Exchange of reports and publications

The scientific areas will focus on getting a good understanding of the different approaches arising from bringing together scientists from very different fields, and utilizing this opportunity to the fullest to achieve good grounds for novel innovations in the area of print media and packaging. Young scientists will be provided with excellent cross-disciplinary knowledge that can give better possibilities for students from other fields of sciences to become aware of the potential of print media and fiber-based products. At the same time a better general understanding of the current state of the European media environment will be achieved and ways to improve the possibilities of print media in the future will be obtained.

**D.2 Scientific work plan methods and means**

Four working groups will be established that will support and complement each other.

WG1: Customers and users – Effect of the changing media use habits on traditional media This working group aims at combining information from several national studies on how the internet has affected the use of traditional media. There are several studies looking at the implications from very different viewpoint and from very different fields of science. Some studies are concentrating on well-defined and narrow areas (e.g. user generated content in newspapers) whereas others are looking at the whole media use environment with respect to the behaviour of the consumers. The seminars and workshops will be designed to attract researchers and representatives from the industry to share their experiences, comment on the results and combine their viewpoints Different players from the value chains of print media and packages will be invited to join the discussion on future possibilities in this working group. Depending on the readiness of the technology for industrial applications, the seminars and workshops organized by this working group will be designed to enhance the possibilities for novel innovative products and services both in the short and long term. Better understanding of the customer needs will also offer excellent grounds for creating ideas for service business.

Method and means:

Task 1.1 The WG will start by collecting all available national information regarding the changing media use in the participating countries. The results will be reported at the first internal seminar of the WG.

Task 1.2 An internal WG will be nominated to make the disposition of a report about the collected information. The subchapters of the report will be written by the partners.

Task 1.3 Next step will be to arrange an international open seminar about the subject. The report will be used as documentation for this seminar and will be generally available after this.

Task 1.4 A new internal WG will be established to analyse the effects of the changing media use. This includes the impact on journalism, media business, changes in the value chain of media and the new roles of the players. The outcome of the work will be documented in a report.

Task 1.5 A new international seminar will be held regarding the effects of the changing media use habits on traditional media. The report will be the documentation for this seminar and will be generally available after the seminar.

Task 1.6 Roadmap will be formed to create a vision of development in the areas of print media and packaging from the viewpoint of this particular WG

Anticipated results:

D1.1 Survey report on the changes in media use in the different countries

D1.2 International seminar on changes in media use

D1.3 Report on the impact of changes in media use

D1.4 International seminar on the impact of the changes in media use

D1.5 Roadmap

WG2: Technology – Novel ways of combining print with digital and using printed functionality The main objective in this working group is to provide most recent technological knowledge in relation with future use of print media and packages. Separate seminars and workshops will be arranged for discussing the possibilities provided by different ways of combining print with digital and by printed functionality. Special emphasis will be but on case studies, pilots and demonstrations with practical experience of utilizing novel technological possibilities. The aim is in seeking for new application areas for demonstrated solutions.

Method and means:

Task 2.1 The WG will start by arranging an international seminar about combining print with digital and using printed functionality. This will result in documentation about the technical status of printed functionality both on scientific level and in practical applications. The outcome of the seminar is a survey of the state of the art.

Task 2.2 An internal WG will be nominated to innovate new applications of printed functionality and combining print with digital. The ideas and innovation embryos will be documented.

Task 2.3.1-2.3.N Based on the innovation embryos a number of industrial case studies, pilots and demonstrations might be planned and realised by clusters of participating companies.

Task 2.4 An international seminar will be arranged on new application and business models for printed functionality. Examples of successful pilots will be presented.

Task 2.5 Roadmap will be formed to create a vision of development in the areas of print media and packaging from the viewpoint of this particular WG

Anticipated results:

D2.1 International seminar on Printed Functionality today including seminar documentation

D2.2 Documented new ideas and innovation embryos on combining print and digital

D2.3 A number of documented case studies, pilots and demonstrators on printed functionality

D2.4 International seminar on new applications of printed functionality in media and packages

D2.5 Roadmap

WG3: Content – Ideas for additional elements Mapping of the research in areas such as games, learning and social studies will be included in this working group to promote discussion on innovative uses of technology. The research in the other areas does not necessarily have to be closely connected to print media or packaging, as the researchers in these areas will be invited to join the network with the expectation to enrich the discussion and to provide fresh ideas on using the print media and packaging on completely new settings and use contexts.

Method and means:

Task 3.1 An international seminar will be arranged about games, learning and social media with an open focus. The seminar shall present the state of the art of research and business models in these areas. The outcome shall be documented.

Task 3.2 Based on the outcome of the seminar the WG will arrange meetings and Innovation Workshops to promote new ideas for the integration and utilisation of the most promising applications in print and digital media and in their combination (hybrid media). The outcome will be reported in a survey.

Task 3.3 Roadmap will be formed to create a vision of development in the areas of print media and packaging from the viewpoint of this particular WG

Anticipated results:

D3.1 International seminar on social media applications including documentation

D3.2 Survey on new applications in media on games, learning and social knowledge

D3.3 Roadmap

WG4: Implications for the European paper and board industry In this working group the main emphasis is in the discussion between the industry and academia on how the European paper and board industry and could benefit the most from the possibilities provided by combining print with digital and by printed functionality. Experiences and inputs from all the previous working groups will be collected and the main results will be discussed by researchers and representatives of the industry to provide viewpoints on how print media and packaging could be developed, how they will be used in the future and how the industry can utilize the information for the benefit of their customers and the consumers.

Method and means:

Task 4.1 An internal seminar is arranged to discuss the new role of the European paper and board industry and how it can benefit from the printed functionality. The input for the seminar is the deliverables from the three other WGs.

Task 4.2 During the seminar internal WGs are nominated to evaluate the following themes: 1) How can the paper and board industry support publishers and packaging in applying printed functionality, 2) How can the paper and board industry support publishers, printers and packaging in developing new service forms for the readers and end users, 3) What will be the new role of the paper and board industry in the value chain of intelligent media and packages. Each internal WG shall deliver documentation over their main results and recommendations.

Task 4.3 An international seminar will be held presenting the outcome of the internal WGs. The documentation for the seminar and the outcome of the final discussion will be documented in a final report.

Task 4.4 Roadmap will be formed to create a vision of development in the areas of print media and packaging from the viewpoint of this particular WG. Information from the other WGs will be utilized.

Anticipated results:

D4.1 WG Report on contribution to applied printed functionality

D4.2 WG Report on contribution to new service forms

D4.3 WG Report on the future value chain of print media and packaging

D4.4 International seminar on service to media and packaging with final report

D 4.5 Roadmap

## E. ORGANISATION
### E.1 Coordination and organisation

The Action will be led by a Management Committee (MC) which will be responsible for the effective interaction and coordination among all working groups (WGs). A Steering Group (SG) will support the MC. The SG will consist of the chair and vice chair of the Action, the Working Group Leaders (WGL) and two industrial members from the Knowledge Transfer Committee. The SG will prepare MC meetings and monitor the activities of the WGs. The SG will, if endorsed by the MC, also act as the assessment panel for the STSMs.

An Editorial Board will be established to take the responsibility of setting up, implementing and distributing the newsletters and publications of all expected milestones. The Editorial Board will also be responsible for coordination of all dissemination activities including the website, conferences and seminars. The Action will also establish a Knowledge Transfer Committee (KTC), to be responsible for the Innovation Workshops (IWs) and for the coordination and delivery of all activities in which the target audience is in the industrial sector. The KTC will have strong industrial input.

The effective interaction of the Action with the national and international research programmes and networks will be ensured by pro-active promotion of the conferences, seminars, STSMs and training courses described above. The principal publicity tool for dissemination will be the website of the Action. This will be updated regularly as a responsibility of the Editorial Board, in order to serve the needs of the participants and to ensure effective dissemination of the results and their exploitation as well as visibility of the Action outside the network.

Contacts will be established with other COST Actions, related initiatives (e.g. Organic Electronics Association (OE-A), European Periodical Publishers' Associations, World Association of Newspapers and PrintCity) and Technology Platforms. This Action will be implemented through a concerted action providing the necessary coordination of research activities, so that the research in WG1 to 4 will be carried out and financed by the participating countries. In that frame, Marie Curie Actions will be considered in order to complement the COST funding and create tangible, cross-centre research projects which address the emerging future research themes arising out of this Action, and promoting the participation of young/early stage researchers.

The Action will proceed as follows:

1. Election of Chair, Vice-Chair, Working Group Chairs, members of the Editorial Board and the Knowledge Transfer Committee at the first meeting of the Action
2. Management Committee meetings (twice a year)
3. Steering Group meetings (twice a year)
4. Action Website established, with regular maintenance and updating
5. Working Group meetings (twice a year)
6. Outcomes of conferences, seminars and Innovation Workshops
7. Outcomes of knowledge sharing activities between researchers: training courses and STSMs
8. Review of completed and ongoing research projects (Conference proceedings)
9. Output of the Research Roadmap results – future direction of research in each WG and integrated, overall vision.

**E.2 Working Groups**

The work of the Action is organized in four Work Groups, each of them taking a different viewpoint on the value chain of print media and packaging – WG1: Customers and users, WG2: Technology, WG3: Content and WG4: Implications on the European paper and printing industry. Each technical WG will produce a Roadmap which will be reviewed annually by an expert panel which will incorporate new information and generate a version which will be published on the website and via the newsletters. These individual Roadmaps will then be incorporated into an overarching Roadmap which will be updated annually.

The management of the Action will be distributed among the partners who serve as members of the Management Committee, Steering Group, Editorial Board or Knowledge Transfer Committee. All four Working Groups will have a role in the dissemination activities required for a successful outcome of the Action. The structure will be utilized to provide an important opportunity for younger scientists in the network to gain experience of committee work and learn the appropriate skills under the mentorship of more experienced partners.

**E.3 Liaison and interaction with other research programmes**

Several COST and FP7 projects have been identified as relevant for this Action. There is a stepwise plan for interaction with these projects. In the first year of the Action each WG will pull together a comprehensive database of current and completed research projects of relevant interest. The database will be analysed and summarised in technical papers which will be used to disseminate the results and identify gaps in current knowledge that need to be addressed by focussed research.

In the following three years seminars will be arranged to address important topics and the participating researchers will be invited to present and discuss their results. These seminars will be opened up to other research groups who can contribute to the success of the Action. This will be a way to constantly involve the wider research community in the Action thus keeping it open, flexible and responsive.

**E.4 Gender balance and involvement of early-stage researchers**

This Action will respect an appropriate gender balance in all its activities. European policies will be supported and promoted on gender mainstreaming and equal opportunities for women and men will be clearly incorporated in the Action. The Management Committee will be responsible for monitoring that the Action is carried out on an 'equality for men and women' basis. The objective is to have a gender balance in the Management Committee, in the leading of the Working Groups and the Steering Group as well as on the Editorial Board and the Knowledge Transfer Committee. Gender balance will also be taken into account in choosing researchers for STSMs. The Action will also be committed to considerably involve early-stage researchers. The group of experts that has been active in the preparation of this Action has included both female and male members as well as both early-stage and experienced researchers.

**F. TIMETABLE**

The total duration of the Action will be four years, calculated from the date of the first meeting of the Management Committee. The Action website will be built as the Action starts, and it will be active from the beginning of the second quarter of year one. After that also the publications database will be set up and actively updated. The website will be used as the main information and communication platform to all researchers and members of the general public interested in the activities occurring as a result of the Action. MC meetings, SG meetings and Working Group meetings will be held twice a year. The Working Groups are planned to run in parallel over the four years of the Action. Each WGs outputs will be released at the end of each year and they will also be presented in the Action Conference. Also the Editorial Board will meet twice a year and The Action newsletter will be circulated twice a year. Innovation workshops will be held once a year, partly as face-to-face workshops and partly online using Owela Open Web Lab. Knowledge Transfer Committee will meet prior to the Innovation Workshops. Seminars will be arranged according to the plans of each WG. Joint seminars with relevant connections to ongoing COST Actions and EU projects will be arranged in conjunction with the WG seminars in cases where the topic is common with them. Action Conferences combining the outcomes of all WGs and hence, with specific results of this Action will be arranged in year 2 and 4. Training courses and exchange visits including STSMs will be scheduled separately, as appropriate.

**G. ECONOMIC DIMENSION**

The following COST countries have actively participated in the preparation of the Action or otherwise indicated their interest: AT, BE, CH, CZ, DE, ES, FI, FR, HR, IE, IT, NL, PT, SE,SI, UK. On the basis of national estimates, the economic dimension of the activities to be carried out under the Action has been estimated at 64 Million €for the total duration of the Action. This estimate is valid under the assumption that all the countries mentioned above but no other countries will participate in the Action. Any departure from this will change the total cost accordingly.

**H. DISSEMINATION PLAN**

**H.1 Who?**

The most important results from this Action will be novel paper-based products and services based on cross-scientific knowledge on the technological possibilities as well as consumer needs and expectations in Europe.

Main target groups for dissemination of information of the results from this Action are the forest and printing industries. With the close connection between industry and academia, the possibility of taking the results into practice will also affect the general public as new print media products and services may be offered to them.

**H.2 What?**

The participating partners will distribute interim and state-of-the-art reports, as well as proceedings and presentations from the COST Action to the national industry. These papers will also be available through the public Action website. Industry representatives will be invited to participate in the conferences, seminars and Innovation Workshops of the Action.

The Action will encourage researchers to publish their findings and the most outstanding results from the final report in peer-reviewed scientific and technical journals. Efforts will also be put to publish selected results in non-technical publications to reach outside the scientific community. The results of this Action are expected to be of interest to ordinary European consumers, and hence the non-technical and non-scientific publications are of very high value.

The MC contact to the Domain FPS will be maintained by:

- Establishing close contact with the appointed liaison officer of the Domain Committee
- Via the appointed rapporteur, by inviting him/her to the events organized by the Action and providing him/her all relevant reports and memorandums
- Via attendance of the Chairperson or his/her representative at the meetings of the FPS DC when appropriate
- Via annual progress reports

## H.3 How?

The dissemination methods listed in part H.2 aims at reaching as wide an audience as possible concerning the European Scientific Community, the forest and printing industries, students on different educational levels as well as the general public. This will be possible though several different channels of publications.

The Action also aims at raising the awareness of the industry and the general European Community of the wide variety of possibilities that may be utilized in paper-based products and services in the future. Especially young researchers will benefit from strengthening their future networks as well as their scientific capabilities. The Short Term Scientific Missions and training courses offered within the Action will certainly contribute to this.

The dissemination plans will be evaluated by the MC on a yearly basis and revised at the end of the penultimate year of operations. The MC will also take into account any novel sufficient means of dissemination that may occur during the course of the Action.

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