

€ Design | Measuring Design Value



GUIDELINES FOR COLLECTING AND INTERPRETING DESIGN DATA

A proposal for a future Barcelona Manual on Design

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On February 13th 2014, €Design took part in the *Expert Workshop on Measuring the Use and Economic Impact of Design: New Perspectives on Innovation*, with the participation of EU, OECD, Eurostat, NESTI and WIPO representatives to share the knowledge and experiences resulting from the latest research activities on the economic contribution of design.

In this workshop €Design introduced the fundamental pillars of the guidelines on how to collect data and measure the role and economic contribution of design in the value added of nations, economic value creation of businesses and creation of quality jobs.

The objective of WP5 is to formulate a set of guidelines in line with the content of the *Expert Workshop on Measuring the Use and Economic Impact of Design: New Perspectives on Innovation*, with the participation of EU, OECD, Eurostat, NESTI and WIPO. Then, we will circulate this initial draft of guidelines to the EU, OECD, Eurostat and NESTI for comments and contributions. Then we will insert contributions to the text and issue a final version of the proposed Guidelines for collecting and interpreting design data as a factor of production in user-centred innovation. The final objective is to offer of text of Guidelines that could be the origin of a new chapter of the Oslo and /or Frascati Manuals or, eventually, be the origin of a new Manual on Design as part of the Frascati Family of Manuals.

Copies of the draft of the Proposed Guidelines for Collecting and Interpreting Data were sent for comments/contributions to experts of

- the World Intellectual Property Organization (WIPO),*
- the Office for Harmonization in the Internal Market (OHIM),*
- the Organization for Economic Cooperation and Development) OECD and*
- EUROSTAT.*

We received enriching comments/contributions that were added to the final text. We do not publish the comments received since they reflected the views of the authors that do not necessarily correspond to official opinions of the institutions. Thank you all for the contributions!

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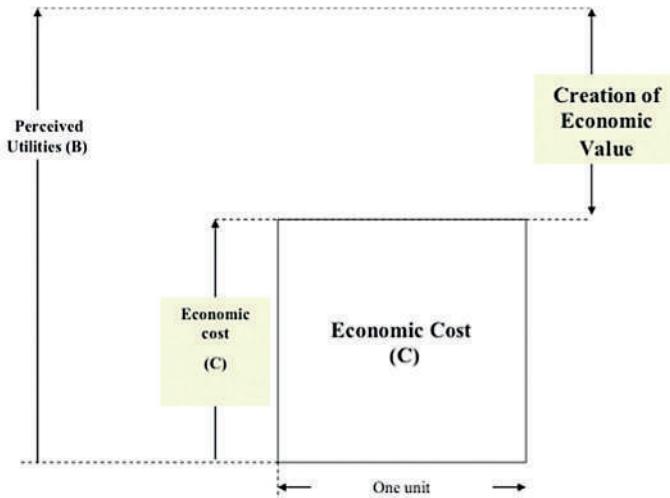
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1. Conceptual foundations for defining Design as an economic factor of production

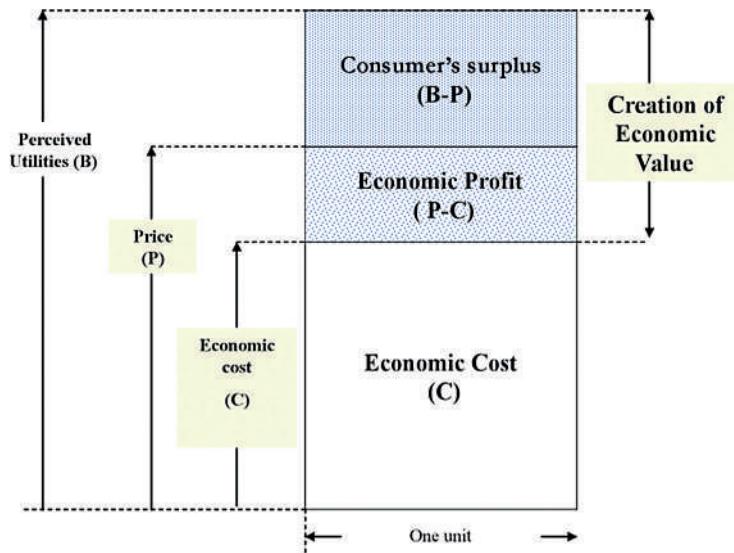
- 1 The EU Commission "Staff Working Document Design as a Driver of User-Centered Innovation notes that:

Design has no commonly agreed definition and the word is given different meanings in different contexts. Very often, design is associated with the aesthetic aspect of objects only, whereas in reality, its application is much broader.

- 2 The aim of €Design is to advance towards a new definition of design, specifically as an economic factor of production. To do this, we shall first identify the economic issues where design can play a relevant role.
- 3 The different definitions of Economics usually relate to the study of how to satisfy people's/user's/costumer's unlimited wants or needs with limited resources and have something to do with scarcity of resources. So in economic terms, it is necessary to understand the capacity of any object of transaction (goods, services, environments, experiences, communication...) to satisfy people's needs.
- 4 In economics, utility is defined as the capacity to satisfy wants or needs perceived by a consumer/user/costumer in any object of transaction. Since people's availability of resources is limited, it is fundamental to identify needs or wants and to offer objects of transaction with the correct combination of utilities (Stigler 1950, Read 2007)
- 5 Economic value creation results from the difference between "perceived utilities" gained in a transaction and the economic cost of delivering that transaction. Since economic value creation depends on the utilities perceived, it is observer relative and it is not intrinsic. Therefore, it is client/user/consumer-based.



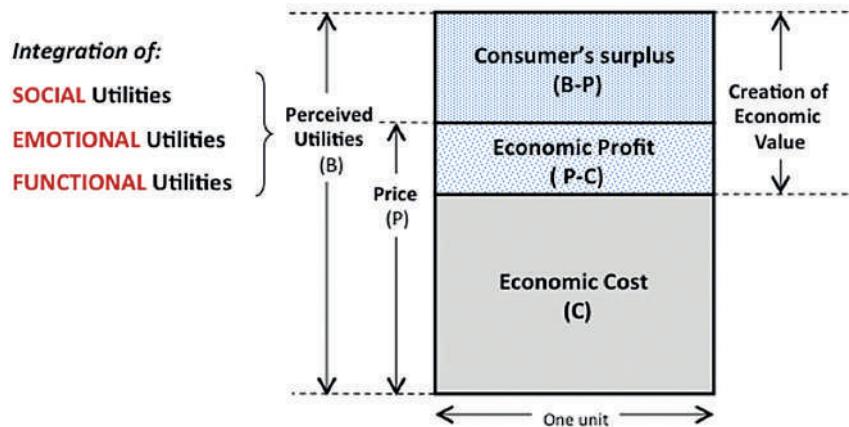
- 6 Depending on the price the market accepts, the creation of economic value is divided between economic profit (for the business) and consumer's surplus.



- 7 The Commission Staff Working Document "Design as a driver of user-centered innovation" notes that design plays a role in the creation of utilities as well as to lower costs. Therefore €Designs works with the hypothesis that design has a role in the creation of economic value:

Design thus contributes to creating unique competitive advantages that helps the move away from pure price competition, not least through the creation and strengthening of identities and brands at corporate or product level. Additionally, design has the potential to lower costs, such as production, assembly, packaging, storing, transportation and disposal costs, and — as such — strengthens profitability and competitiveness.

- 8 From this description, we can see that design input need not be focused exclusively at the product level, and that design can have an impact on promotion, brand development, corporate identity, cost reduction and process execution. Thus, creating utilities, design contributes to the delivery of functional (performance, functionality), social (how am I perceived by others) and emotional utilities (how does it make me feel), or a combination of all three.



- Thus, if design is to play a role in the creation of economic value, design shall have a role in satisfying better functional, emotional and social needs or similar needs more efficiently.

Thus, if design is to play a role in the creation of economic value,
design shall have a role in satisfying better

Functional utilities
what functions can be performed

Emotional utilities
how does it make me feel

Social utilities
what does it say about me to others

And/or to reduce costs

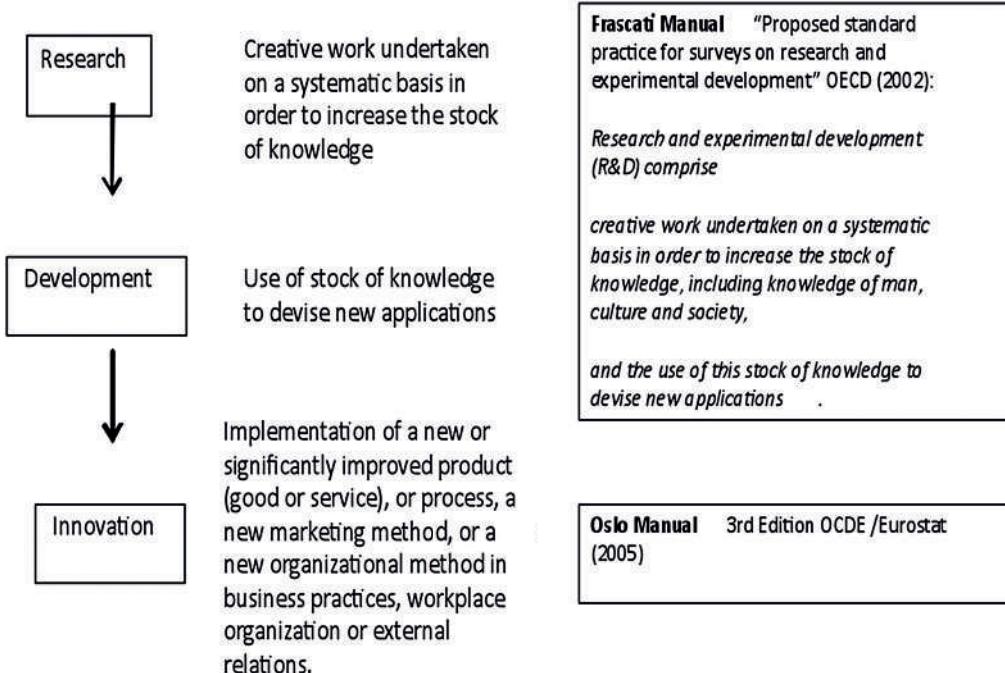




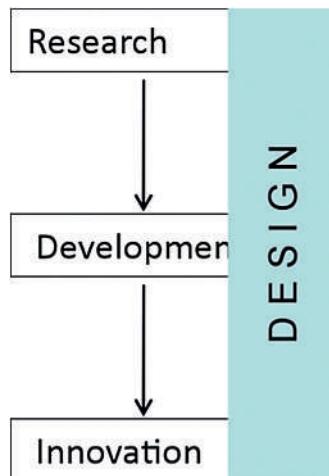
Hospital Sant Joan de Déu
Integration of emotional, social and functional utilities

2. Mapping design concept within the conceptual framework of Frascati family of manuals

- 10 The Organisation for Economic Co-operation and Development (OECD) developed the Frascati Manual: Proposed Standard Practice for Surveys on Research and Experimental Development and with the cooperation of Eurostat developed the Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data. The Frascati family of manuals provides a common framework so most research, development and innovation surveys follow standard guidelines allowing comparability of data collected.
- 11 The Frascati family of manuals is based on a conceptual framework which has evolved iteratively with successive editions of the manual.
- 12 The conceptual framework presented by the combined Frascati and Oslo manuals does not leave any room for a 'fourth step' in the chain of concepts. Thus, any new articulation of design as a specific concept must fit within the established frameworks.



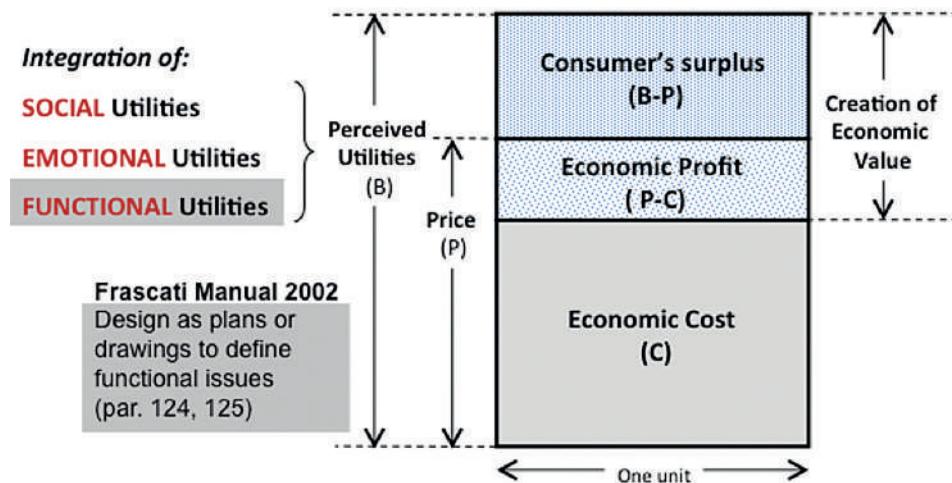
- 13 The latest versions of the Frascati and Oslo Manuals are no longer exclusive of science and technology. The concept of 'research' is now open to include any creative work. Experimental development is open to the use of any stock of knowledge to devise any new application. Innovation is open to any implementation.
- 14 As a result of this broad treatment of Innovation, Development and Research, the conceptual framework of Frascati family of manuals does not leave any room for design to be characterized either as a step after innovation or as something different from innovation. Thus, within the existing conceptual framework of Research, Development and Innovation, design can only be described as a specific form of Research, Development or Innovation.



- 15 The Frascati Manual (OECD 2002) describes the scope of design as a specific activity within research and development, limited to the creation of plans or drawings aimed at defining functional issues:

- Industrial design:*
124. *The vast bulk of design work in an industrial area is geared towards production processes and as such is not classified as R&D. There are however some elements of design work which should be considered as R&D. These include plans and drawings aimed at defining procedures, technical specifications and operational features necessary to the conception, development and manufacturing of new products and processes.*
125. *For example, if an engineering product which incorporates machined, heat-treated and/or electroplated components has been developed, the drawing up and documenting of the requirements for surface smoothness, heat treatment procedures or electroplating process requirements, whether incorporated in the drawings or as separate specification sheets, are considered R&D.*

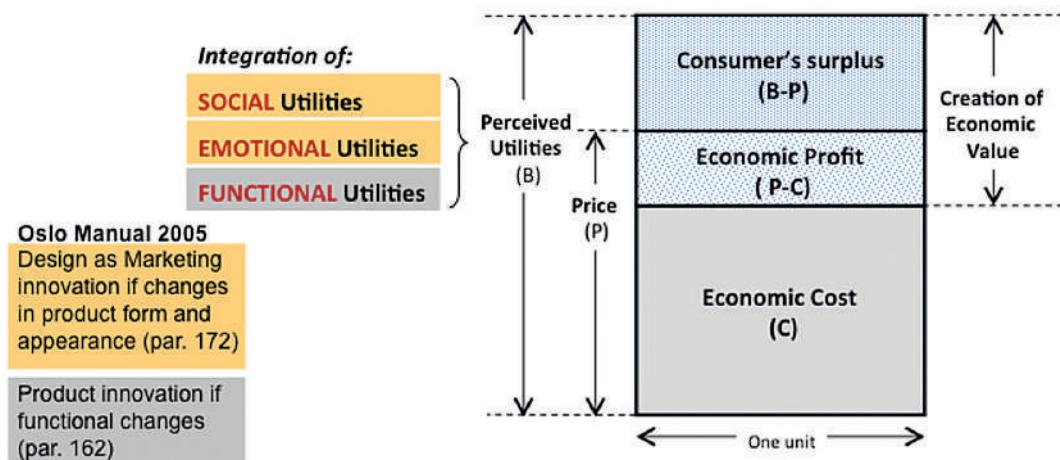
16 Frascati Manual (2002) (par. 124, 125) positions design as a contributor to functional utilities



17 The Oslo Manual (OECD 2005) describes design as a specific type of innovation, as part of the development and implementation of product innovation limited to aesthetical/form elements and also considers that design can be a marketing innovation:

- 162. *Design is an integral part of the development and implementation of product innovations. However, design changes that do not involve a significant change in a product's functional characteristics or intended uses are not product innovations. However, they can be marketing innovations, as discussed below. Routine upgrades or regular seasonal changes are also not product innovations.*
- 172. *Marketing innovations include significant changes in product design that are part of a new marketing concept. Product design changes here refer to changes in product form and appearance that do not alter the product's functional or user characteristics...*

18 According to Oslo Manual (2005), design can be a marketing innovation relating to social and emotional utilities and a product innovation relating to functional utilities.



- 19 The Oslo Manual focuses on the concept of design as the creation of form and appearance of products, although it accepts that design activities may be understood by enterprises in more general terms.

2.4. Design

344. *The term product design, as used in the definition of marketing innovations, refers to the form and appearance of products and not their technical specifications or other user or functional characteristics ... However, design activities may be understood by enterprises in more general terms, as an integral part of the development and implementation of product or process innovations, as described in Section 2.2.3 of this chapter. The categorisation of design activities will thus depend on the type of innovation they are related to.*
345. *All design activities for the development and implementation of product innovations (including work on form and appearance) and of process innovations should be included either in R&D or in other preparations for product and process innovations.*
346. *Work related to changes in product design that are marketing innovations (and not product innovations, i.e. where the functional characteristics or intended uses of the product in question are not significantly improved) should be included in Preparations for marketing innovations.*
- 20 The definition of design presented in paragraph 345 of the Oslo manual "all design activities for the development and implementation of product innovations should be included either in R&D or in other preparations ..." is not in line with the narrow concept of design presented in paragraph 124 of the Frascati Manual: "The vast bulk of design work in an industrial area is geared towards production processes and as such is not classified as R&D. There are, however, some elements of design work, which should be considered as R&D. These include plans and drawings aimed at defining procedures, technical specifications and operational features necessary to the conception, development and manufacturing of new products and processes".
- 21 The Frascati family of manuals accommodates design within the concepts of Research, Development and Innovation and acknowledges that design could be understood more broadly. The definitions used between the two manuals are not in line and they acknowledge that the definition of design could be broader (Tether 2006).

3. Defining design as an economic factor of production

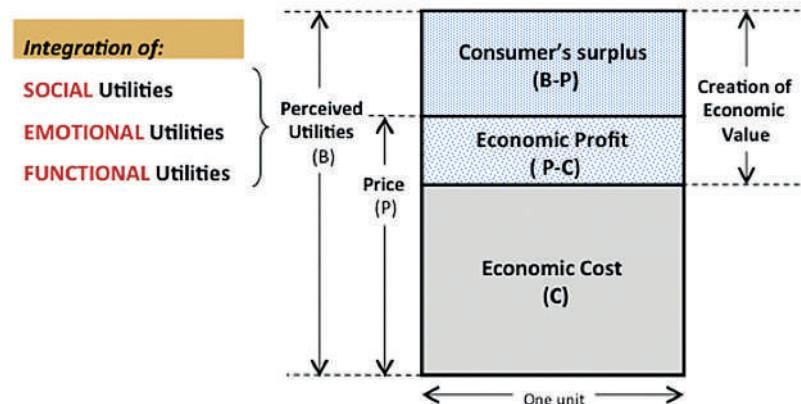
- 22 From an economic perspective, a key aspect of design is that it aims to integrate, to fit, to create a balance, between functional utilities (directly related to the function/performance/usability/problem solving dimension of design) and the emotional and social utilities (more related with the aesthetic/form/meaning creation/sense making dimension of design).
- 23 Consumers will dedicate their limited resources to either one object of consumption or another according to the perceived utilities and costs. Competition between diverse utilities and costs originate substitution processes and the length of economic lives. Substitution may occur when a new alternative offers the better/new utilities or when a new alternative offers similar utilities at a lower cost. A given user will also opt for the object providing the best experience.
- 24 The right integration of functional, emotional and social utilities causes substitution, when it satisfies similar needs at lower costs or when it satisfies higher/new needs at the same cost, or when it satisfies substantially higher /newer needs at an increased cost. Substitution works both ways, to substitute and to be substituted. Design will benefit from an economic life as long as it is not substituted by new designs. Protection of design outcomes and enforcement of rights thus plays a key economic role.
- 25 The distinctive characteristic of design as a factor of production is that “design activities focus on the integration of functional, emotional and social utilities” (Nomen et al, 2011). Thus, €designs works with the following definition of design as an economic factor of production:

To design is [to focus on] the integration of functional, emotional and social utilities.

To design is [to focus on] the integration of the satisfaction of user's/costumer's/consumer's functional, emotional and social needs and wants.

Design as integrator

€Design 2013
Design as integrator, at the very outset of systemic innovation



- 26 In economic terms, to prevent the destruction of the value created by design, it is necessary that the outputs of design activity should be protectable and that protection shall be enforceable. This definition also encompasses the perspective of consumers/customers, as it is based on the economic notion of perceived utilities. Aspects which are not covered by design law may however be covered by patent law or civil law, giving rise to complexity in the protection of design as integrator.
- 27 Design can be viewed as both a process and also an outcome. Thus, we can adapt the definition of design, recognising these two basic categories:
- Design as a process: Activities to integrate functional, emotional and social utilities.
 - Design as an outcome: Goods, services, marketing or organizational methods with integrated functional, emotional and social utilities.
- 28 By exception, we can also articulate what is not design:
- Design activities are not R&D or innovation activities focused solely on performance improvements (scientific or technical improvements) without considering the emotional or social utilities perceived by the market.
 - Design activities are not artistic activities focused solely on emotional or social utilities without considering the functional utilities perceived by the market.
- 29 We already concluded that in the current Frascati family of manuals (R&D and Innovation), the definitions of design that are used are not in line and that the definition of design could be broader. If to design is to focus on the integration of functional, emotional and social utilities, then, the focus on integration is the discriminating factor distinguishing a design activity from other forms of R&D or innovation activities. Thus, we can expand on our definition to express design in the context of R&D and innovation:
- Design as a type of research and development activity: Within an R&D process, design is the set of activities that focus on the integration of functional, emotional and social utilities of a research or development outcome.
 - Design as a type of innovation activity: Within an innovation process, design is the set of activities that focus on the integration of functional, emotional and social utilities of an innovation outcome.

4. Design as an integrator vs. an add on

- 30 For a long time, design was considered as an add-on process, taking place after technology development. Under this perception, design was limited to styling, to create the aesthetics of an artifact, which independently provides new or improved functional utilities.
- 31 The 2005 edition of the Oslo Manual addressed the systemic dimension of innovation, dedicating a chapter to innovation linkages and their measurement. The OECD no longer perceived innovation as a linear phenomenon beginning with technology development, but as a complex and systemic phenomenon. Under this perception, the focus shifts towards an emphasis on linkages and integration.
- 32 The EC Staff Working Document 'Design a driver of user-centered innovation' 2009 also addressed the view of design as a strategic, cross-functional and multidisciplinary innovation activity.
- 33 In line with the conclusions from the Oslo Manual 2005 and the EC Staff Working Document 'Design a driver of user-centered innovation' 2009, in €Design framework, to design is to integrate functional, emotional and social utilities as a complex and systemic phenomenon.

5. Design and the legal concept of Industrial Design

- 34 The European Commission recently launched the tender MARKT/2013/064/D "The economic review of Industrial Designs in Europe". The tender is a good example of the traditional conflict between the legal concept of industrial design and the general concept of design.
- 35 The tender limits the scope of design to the appearance of articles and limits the concept of European design-industries to the industries gaining a competitive advantage in the aesthetic part of a product providing similar levels of performance as competitors, therefore limiting the comprehension of the economic contribution of design.
- 36 The legal concept of design is limited to the protection of the appearance of an industrial article, causing a conflict between the legal concept of industrial design and the concept of design in a lay or general term. WIPO¹ indicates (and the tender also mentions) that:
 - a. *in a lay or general sense, design refers to the creative activity of achieving a formal or ornamental appearance for mass-produced items that, within the available cost constraints, satisfies both the need for the item to appeal visually to potential consumers, and the need for the item to perform its intended function efficiently.*

The conceptual framework of design as the integration of functional, emotional and social utilities is in line with the WIPO mentioned "lay or general vision" concept of design as creative activity satisfying both visual appeal and the intended function.

- 37 WIPO² indicates (and the tender also mentions) that:

- b. *in a legal sense, industrial design refers to the right granted in many countries, pursuant to a registration system, to protect the original ornamental and non-functional features of an industrial article or product that result from design activity*

In a legal sense, industrial design registrations only relate to the ornamental and nonfunctional features. The legal protection granted under industrial design law is limited to the old concept of design considered as a styling add-on, limited to appearance of an industrial article. This vision of design is in line with the technology push model of innovation that conceptually prevailed until new consensus migrated from the old concept of technological innovation to the new conceptual framework with four concepts of innovations: product (good and service), process, organizational and marketing, under the Oslo Manual 2005.

¹ WIPO Intellectual Property Handbook Second edition, (2004) reprinted 2008, §2.639 p. 112.

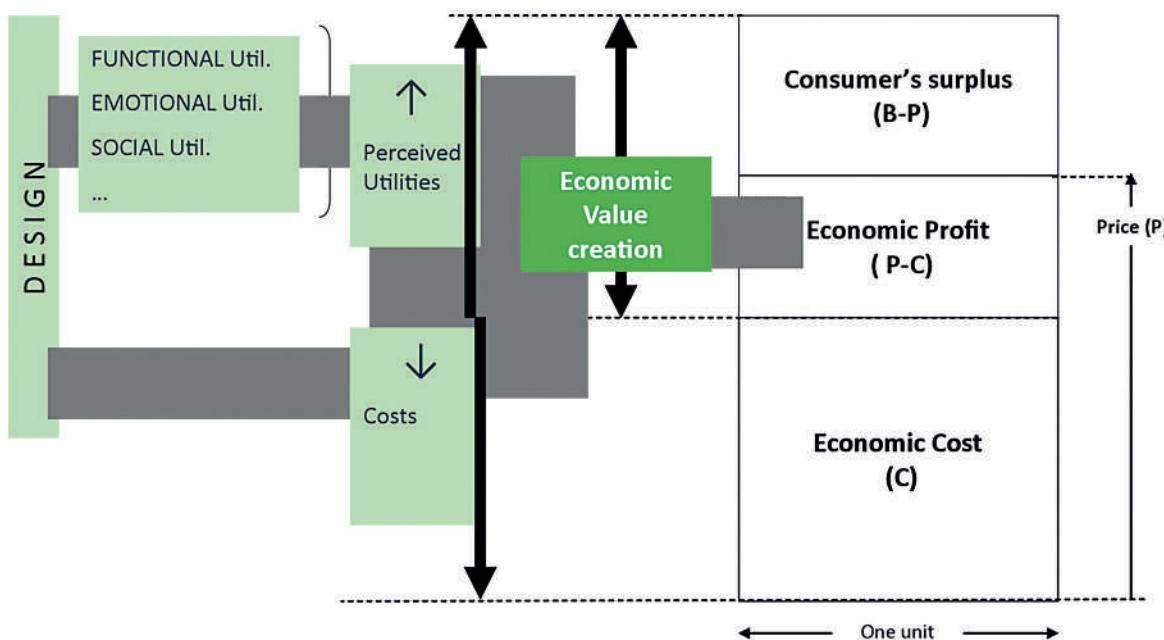
² WIPO Intellectual Property Handbook Second edition, (2004) reprinted 2008, §2.639 p. 112.
http://www.wipo.int/export/sites/www/freepublications/en/intproperty/489/wipo_pub_489.pdf

- 38 OECD and Eurostat evolved from a lineal vision of innovation –where design was a styling add-on at the end of a technology push– to a concept of innovation as a complex phenomenon, with a systemic relationship with economic value creation and value added. In systemic innovation, design plays a key role at the very outset, as an integration of performances and emotions to provide the best experience wanted or needed by users. In this vision of design as an integrator in systemic innovation, design plays a key role in the growth, prosperity and creation of quality jobs.
- 39 The conceptual gap between industrial design as the appearance of an industrial article and the function of design as an economic factor in systemic innovation limits the use of industrial design registrations data as an indicator of the economic contribution of design.
- 40 In relation to DG MARKT tender, we believe that the European Commission should definitely avoid working on the basis that the economic contribution of design is limited to aesthetic differentiations of articles with similar performances:
... if the technical performance of the various products provided by different manufacturers is relatively equal, aesthetic appeal, along with, of course, cost, will determine the consumer's choice. The legal protection of industrial designs thus serves the important function of protecting one of the distinctive elements by which manufacturers achieve market success.
(*Invitation to tender N° MARKT/2013/064/D: Title : The economic review of industrial designs in Europe page 17*)³
- 41 In order to achieve the goal of providing meaningful data to policy-makers, we understand that the vision of the European Commission expressed in the cited tender need to be reformulated and enlarged to the vision of design as integrator of functional, emotional and social utilities at the very outset of systemic innovation.

³ This text was previously used in the followig documents from WIPO: International Bureau of WIPO, *The Main Object of Industrial Property: Inventions, Industrial Designs. Marks*, WIPO/LIC/WL6/9111; and in http://www.wipo.int/mdocsarchives/WIPO_IP_RYD_02/WIPO_IP_RYD_02_INF5.pdf

6. The complex relationship between economic value creation and design

- 42 There is no evidence of causality between the cost to generate an intangible asset and its resulting economic value. The investment in design is a necessary condition to increase utilities or to reduce costs (or both) but the investment is not a sufficient condition for success. Some relationships and correlations have been noted, but there is the need to identify better tools to monitor the contribution of design to the economic value creation for business and GDP growth for nations.
- 43 Design may act as an integrator of utilities or to increase efficiency reducing costs for similar utilities. The relationship between the effort in design and reaching economic profit is known in economics and can be summarized as follows:



- 44 There is currently no empirical evidence that the economic value creation by design may be a linear system where outcomes are directly proportional to inputs.
- 45 If the economic value creation by design is not directly proportional to design inputs, then, it is a non-linear system requiring dynamic models to understand and monitor the relationship between economic value creation and design.
- 46 The 2005 Oslo Manual (§253) raises the importance of innovation linkages and also raises the issue that identifying innovation linkages stops short of providing the information necessary for a dynamic model. However, such information can make a valuable contribution to understanding design systems that can help to determine the influence of government programs to encourage greater knowledge sharing or diffusion.

- 47 In a dynamic model, feedback loops, stocks and flows are fundamental to understand and monitor the non-linear outcomes resulting from changes in the inputs.
- 48 It is critical to understand and monitor the dynamic models explaining the role of design in the process to create economic value, because in non-linear systems, a small change in a flow or stock may cause an important impact in the output result. A small design effort may cause an important increase in economic value creation
- 49 As a hypothesis, a small effort in integrating important new or improved functional utilities with new or improved social and emotional utilities may result in a disproportionate increase in economic value creation. In contrast, a large effort in developing new or improved functional utilities that are not integrated with new or improved social and emotional utilities may result in little increase in economic value creation.
- 50 We propose that new data is needed to provide quantitative evidence to test this effect, for which there is substantial anecdotal and qualitative evidence. This suggests the need for additional questions within existing measurement frameworks (e.g. CIS).
- 51 Specifically, in order to provide evidence of this effect, data is needed on the extent to which firms consider the functional or experiential (emotional and social) utilities in isolation or in a more integrated fashion.
- 52 The answers will be fundamental to understanding the positioning of a firm towards design and, with this data, to analyze the rest of statistical data as possible components of a dynamic system. €Design hypothesis is that design, understood as an integrator of functional, emotional and social utilities at the very outset of systemic innovation, may be a key factor enabling important non-linear efficiencies in the economic and social value creation of firms and GDP growth of nations.

7. Is the economic contribution of design relevant?

53 The importance of the economic contribution of design is one of the factors providing the degree of priority that design may deserve for policy makers.

54 €Design research works with the hypothesis that the relevancy of the economic contribution of design greatly depends on the concept of design, on the role of design in the innovation picture. Europe 2020 Flagship Initiative Innovation (p22) works under the hypothesis that "*design is of particular importance and is recognized as a key discipline and activity to bring ideas to the market transforming them into user friendly and appealing products*".

55 Two interpretations of "transforming" could apply:

i- **Transforming focuses on design as a styling add-on**

According to this first interpretation of "transforming", we position design as a styling add-on at the end of a technology push innovation, or as a mere styling exercise of a functional good. The importance of the economic contribution of design as a styling add-on is marginal.

ii- **Transforming focuses on design as integrating functional, social and emotional utilities.**

According to this second interpretation of transforming, we position design at the very outset of systemic innovation, integrating performances and emotions, creating experiences. The importance of the economic contribution of design as integrator of experiences is major.

- The economic and social dimension of design as styling add-on is marginal compared with the economic and social contribution of design in systemic innovation, as integrator of emotions and performances, of experiences.
- Design as a styling add-on requires different guidelines for measurement and monitoring than design as an integrator of experiences.

8. Proposal of new questions on design in innovation surveys

56 Currently policy makers receive data on the registration activities of industrial designs from the World Intellectual Property Office (WIPO), Office for Harmonization in the Internal Market (OHIM), Organization for Economic Cooperation and Development (OECD) and national intellectual property offices. Industrial design protection focuses on styling, on the aesthetics of a functional good.

57 Currently the Community Innovation Survey (CIS) includes three questions related to design:

Question 5.1 relates to shape and appearance

Question 7.1 relates to design registrations

Question 9.1 relates to the aesthetic dimension of design

58 Currently policy makers do not receive data on design as integrator functional, emotional and social utilities of user's/costumer's -the capacity to satisfy his/her needs and wants- at the very outset of systemic innovation. Policy makers need quality data to monitor the social and economic contribution of design as an integrator.

Policy makers data on design

marginal economic contribution	Policy makers receive information from
As a styling add on at the end of a technology push innovation model	WIPO, EPO, OECD statistics and DG MARK tender
As considered in CIS questionnaire	5.1 shape or appearance 7.1 Design registrations 9.1 aesthetic design
relevant economic contribution	
Design as integrator at the very outset of systemic innovation	Data not available to policy makers Need to add questions to CIS

Our hypothesis is that design, understood as a systemic phenomenon, may be one of the factors enabling important non-linear efficiencies in the economic and social value creation of firms and GDP growth of nations.

59 €Design (WP2 and WP3) proposes an initial set of three questions to be included in the CIS questionnaire or in alternative innovation surveys. In order to reach the formulation of these three questions, €Design follows a methodology that began identifying ways in which firms might be asked about design that would result in data which might go some way to helping quantify the benefits of design as an economic factor of production.

- 60 Questions were trialled in four stages, each one informing the next. Data was collected from firms in the countries of all six project partners to enable consideration of the robustness of questions across national boundaries. A cognitive-test approach was applied to determine whether respondents were able to understand the concepts introduced and whether they felt able to provide reliable data.
- 61 This first round of questions demonstrated that current questions in the Community Innovation Survey do not match respondents' perceptions of design as a part of innovation. Therefore, €Design concluded that independent questions on design are needed.
- 62 Trials highlighted the inherent difficulties in asking about design, which is acknowledged to be a 'slippery concept' to define. €Design proposed definition of design as the integration of functional, social and emotional utilities has proven successful as an underpinning logic to questions, but less successful when used directly in questions.
- 63 As a result of these various rounds of testing, 3 questions proved to be both successful at generating useful data on design as an economic factor of production and were also judged to be understandable and possible to answer in testing. Question 1 asks for a comparison of innovations against competition along a number of dimensions. Question 2 examines the introduction of different types of innovation. Question 3 explores whether the design resources used are in-house, outsourced or a combination of both.

Recommended Question ① Introduction of innovations

During the three years 20XX-20YY, did your enterprise introduce ...

Please tick Y or N in each case

		Y	N
Goods that:	Provide changes in technology, performance or functionality, including usability	<input type="checkbox"/>	<input type="checkbox"/>
	Provide lower costs of production	<input type="checkbox"/>	<input type="checkbox"/>
	Provide changes to product form (appearance) or packaging	<input type="checkbox"/>	<input type="checkbox"/>
Services that:	Provide changes in performance (e.g. efficiency, speed) or new levels of functionality to customers (e.g. internet banking, pick-up and drop-off services for rental cars)	<input type="checkbox"/>	<input type="checkbox"/>
	Provide changes in user-experience	<input type="checkbox"/>	<input type="checkbox"/>
Production process, distribution method or delivery method that:	Reduce the cost of manufacturing or delivering goods and services (e.g. automation equipment)	<input type="checkbox"/>	<input type="checkbox"/>
	Increase the quality of manufacturing or delivering goods or services	<input type="checkbox"/>	<input type="checkbox"/>
	Enable the production or delivery of an entirely new product or service	<input type="checkbox"/>	<input type="checkbox"/>
Marketing methods that:	Use new media or new techniques for promoting goods and services	<input type="checkbox"/>	<input type="checkbox"/>
	Use new methods for product placement or new sales channels for goods and services	<input type="checkbox"/>	<input type="checkbox"/>
	Create a new brand image, brand symbols or brand identities for goods and services	<input type="checkbox"/>	<input type="checkbox"/>

Recommended Question ② Comparison of new products against competitors

For products (goods and services) introduced in the last three years, how do they compare against competitive offerings in your market place? Note: If your firm has multiple product ranges targeted at different market segments, please answer for the dominant or most significant products in your portfolio that best characterise your business.

Please one box only for each category

Technical performance or functionality in comparison to competitive products (e.g. efficiency, precision, speed, accuracy etc)

Significantly worse <input type="checkbox"/>	Slightly worse <input type="checkbox"/>	About the same <input type="checkbox"/>	Slightly better <input type="checkbox"/>	Significantly better <input type="checkbox"/>	Not applicable <input type="checkbox"/>
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Style or aesthetics in comparison to competitive products (e.g. how the product or service looks, its appearance, shape or graphics)

Very dated, unattractive or unappealing <input type="checkbox"/>	Slightly dated, unattractive or unappealing <input type="checkbox"/>	About the same <input type="checkbox"/>	Slightly more up to date, attractive or appealing <input type="checkbox"/>	Significantly more up to date, attractive or appealing <input type="checkbox"/>	Not applicable <input type="checkbox"/>
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Brand identity in comparison to competitive products (e.g. how strongly customer's associate with the brand or overall image of the product)

Very weak brand identity <input type="checkbox"/>	Weak brand identity <input type="checkbox"/>	About the same <input type="checkbox"/>	Strong brand identity <input type="checkbox"/>	Very strong brand identity <input type="checkbox"/>	Not applicable <input type="checkbox"/>
--	---	--	---	--	--

Delivery to customers in comparison to competitive products (e.g. speed of delivery, responsiveness, efficiency)

Significantly worse <input type="checkbox"/>	Slightly worse <input type="checkbox"/>	About the same <input type="checkbox"/>	Slightly better <input type="checkbox"/>	Significantly better <input type="checkbox"/>	Not applicable <input type="checkbox"/>
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Sales price in comparison to competitive products

Significantly lower <input type="checkbox"/>	Slightly lower <input type="checkbox"/>	About the same <input type="checkbox"/>	Slightly higher <input type="checkbox"/>	Significantly higher <input type="checkbox"/>	Not applicable <input type="checkbox"/>
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Recommended Question 3 Design resources for innovation

For the implementation of new products (goods and services), please indicate the type of design resources that **best** describes the resources that you use (examples are provided).

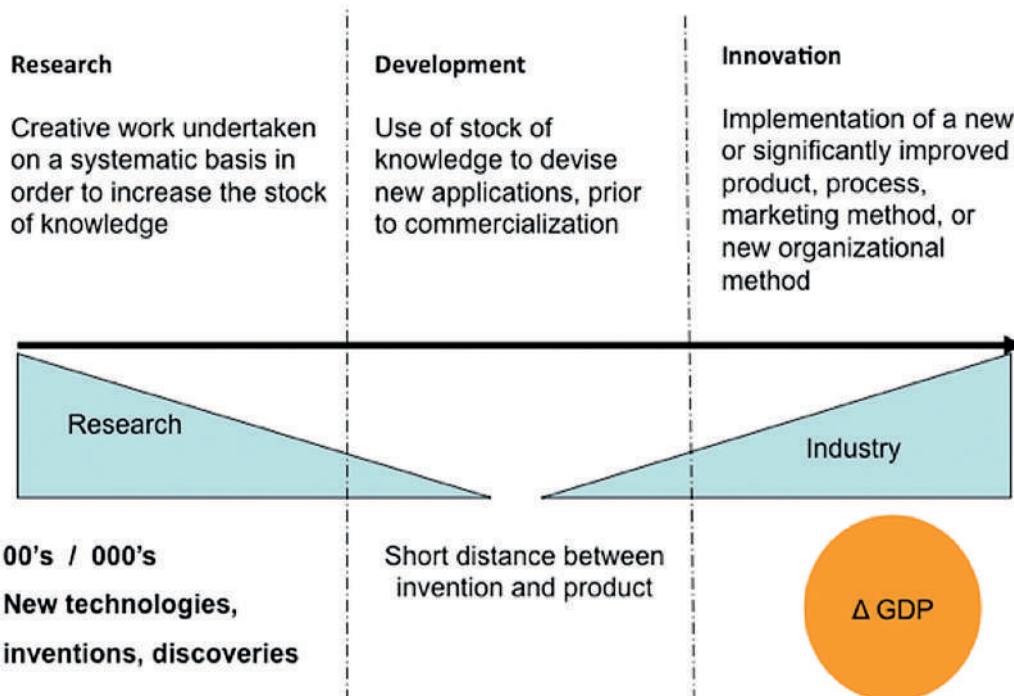
		Please <input checked="" type="checkbox"/> one box only for each category		
		In-house	Outsourced	Both in-house and outsourced resources used No specific design resources
Goods that:	Please tick the most appropriate option	<p>Provide changes in technology, performance or functionality, including usability e.g. engineering designers, software designers, ergonomists, electronic designers</p> <p>Provide changes to product form (appearance) or packaging e.g. Industrial designers, product designers, interface designers</p> <p>Provide significant improvements in performance (e.g. efficiency, speed) or new levels of functionality to customers (e.g. internet banking, pick-up and drop-off services for rental cars) e.g. Service designers, process designers, user interface designers, web designers</p>		
Services that:		<p>Reduce the cost or increase the quality of manufacturing and delivering goods and services (e.g. automation equipment) e.g. Engineering designers, production engineers, process designers</p>		
Marketing methods that:		<p>Use new techniques for promotion, use new methods for product placement or create a new brand image, brand symbols or brand identities for goods and services e.g. Graphic designers, branding designers, strategic designers, web designers</p>		

9. The role of Design in Innovation

- 64 For a long time, design was considered as an add-on process, taking place after technology development. Under this perception, design was limited to styling. It was perceived as the addition of aesthetics to an artifact that, independently, provides new or improved functional utilities.
- 65 The economic contribution of design as a styling add-on is minor compared with the economic contribution of design as integrator.
- 66 The economic contribution of design understood as the integration of functional, emotional and social utilities becomes critical in systemic innovation. Design is a key factor at the very outset of innovation understood as a complex, systemic phenomenon and becomes fundamental to increase the economic value added of nations, business productivity and the creation of quality jobs.
- 67 The 2005 edition of the Oslo Manual addressed the systemic dimension of innovation, dedicating a chapter to innovation linkages and their measurement. The OECD no longer perceives innovation as a linear phenomenon beginning with technology development, but as a complex and systemic phenomenon. Under this perception, the focus shifts towards an emphasis on linkages and integration.
- 68 The EC Staff Working Document 'Design a driver of user-centered innovation' 2009 also addressed the view of design as a strategic, cross-functional and multidisciplinary innovation activity.
- 69 In line with the conclusions from the Oslo Manual 2005 and the EC Staff Working Document 'Design a driver of user-centered innovation' 2009, in €Design framework, to design is to integrate functional, emotional and social utilities as a complex and systemic phenomenon.
- 70 Under systemic innovation, design plays a center role at the very outset of the innovation process, as integrator of functional, emotional and social utilities to offer new or better experiences to a user/consumer/costumer.

The importance of technology push

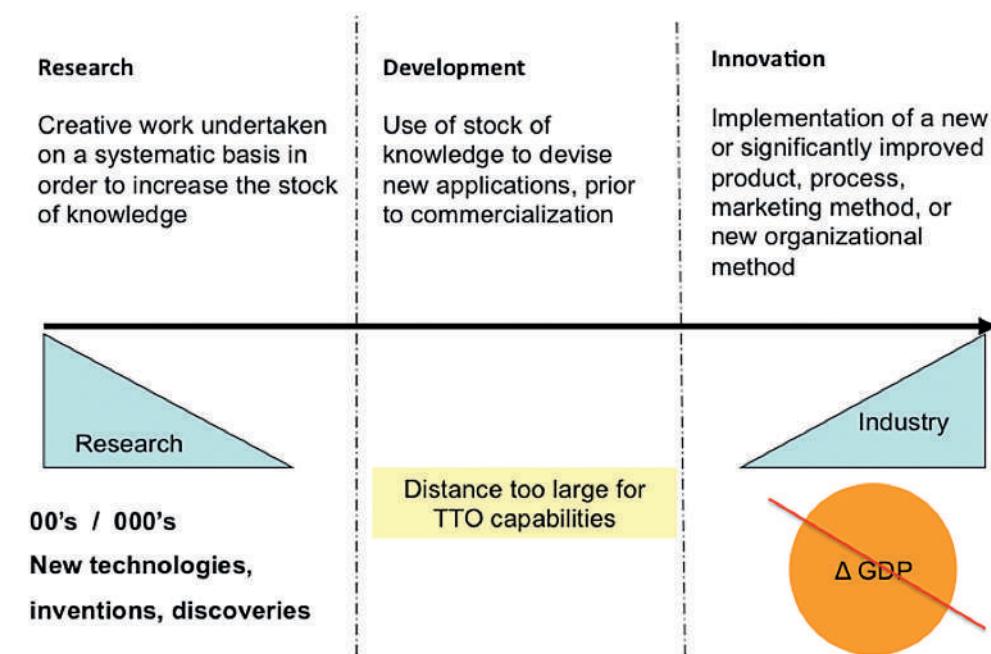
- 71 Under a technology push, the focus is placed on basic research with the goal to obtain new technological inventions that will provide breakthrough innovations. It is the correct model of innovation when the user needs better technology driven performances and the "distance" is short between the invention and the product demanded by the user. For example, it is the case for a new vaccine, where the discovered vaccine is the drug itself. It is not the case for a new mobile communication experience, for example.



- 72 The close distance between new biomedical IP and new biomedical products, could be one of the explanations of the strong concentration of licensing income coming from this industry. According to the final report dated June 2013 of the European Commission "Knowledge Transfer Study 2010-2012"(page 127):

Biomedical IP is the largest generator of license revenue, accounting for 87.0% of the total license revenue for 2011, followed by 'other subject areas' at 6.0% and by ICT at 3.9%.

- 73 Technology push is not efficient when the "distance" is too large or too complex between the new or better technology and the experience needed or wished by the user.



74 When the distance is too large, or too complex, between the outcome of research activities and what users need, Technology Transfer Offices (TTO) are not efficient and the universities and research centers are not able to bring their inventions to market. Then, the Innovation Gap takes place.

75 Data shows the low efficiency of Technology Transfer Offices in Spain:

TTO network, Spain 2011	
Total university expenditure in R&D:.....	3.224 millions €
Licensing income.....	2,4 millions €
% ratio	0,07 %

[http://www.redotriuniversidades.net/portal/index.php?
option=com_joomdoc&view=docman&gid=629&task=cat_view&Itemid=100016&lang=es/](http://www.redotriuniversidades.net/portal/index.php?option=com_joomdoc&view=docman&gid=629&task=cat_view&Itemid=100016&lang=es/)

76 According to the final report dated June 2013 of the European Commission "Knowledge Transfer Study 2010-2012"(pages 122 and 127) , licensing income provides only a small financial gain to European Public Research Organisations (PRO):

... it costs universities on average €84.8 million research expenditures to earn €1 million euro of license income in 2010 and €91.8 million in 2011.

... Limited to respondents that reported license income and research expenditures, total license income only accounted for 0.9% of research expenditures by universities, 3.0% of research expenditures by other research organisations, and 1.2% of all research expenditures by PROs.

77 Results from US leading universities show better ratios than Spanish universities but the ratio of licensing income to total research investment is still marginal:

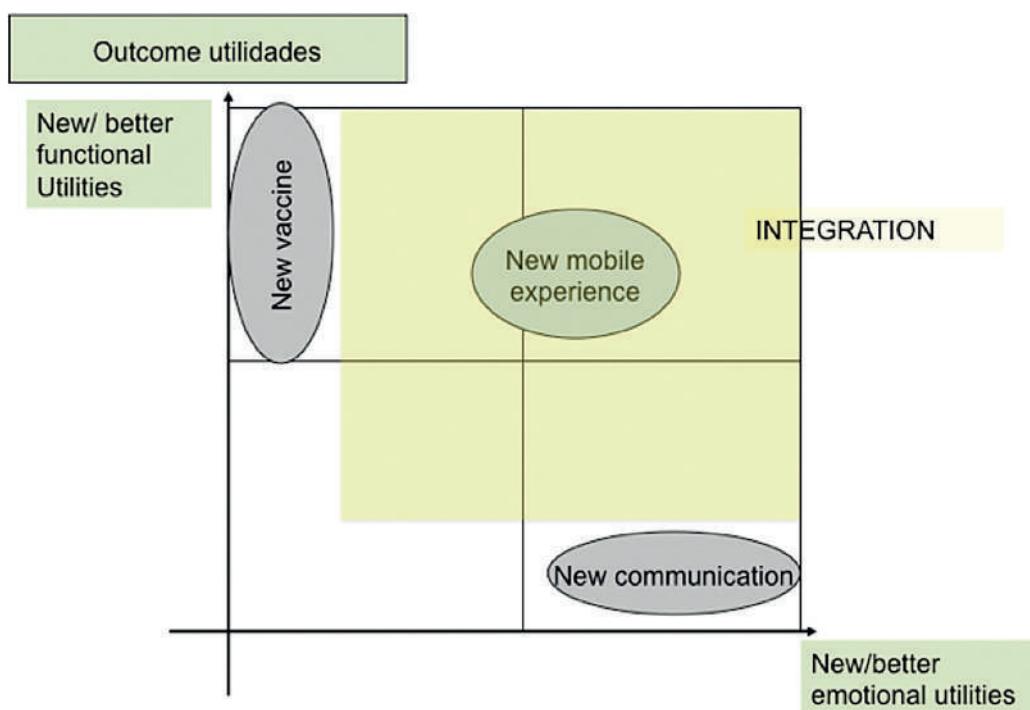
(million USD)		
	University of California	MIT
Anual R&D expenditure in Research (average 2006-2010)	4,262	1,305
Licensing income (2010)	104	69
% ratio	2,45 %	5,30 %

University of California, Report of the Working Group on Technology Transfer,
Octubre 2012

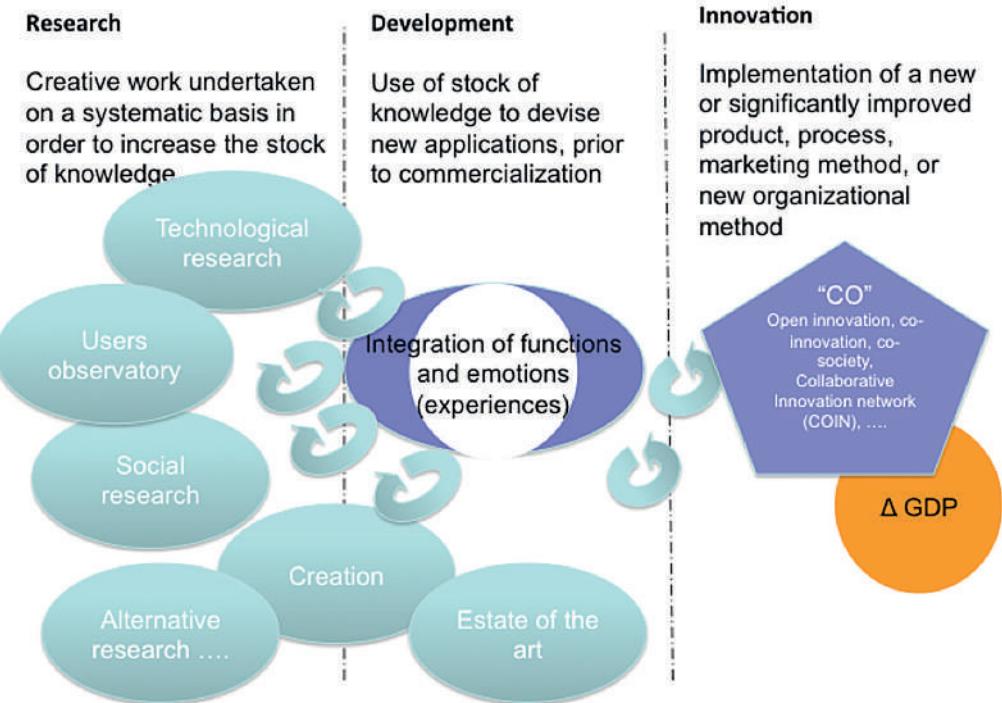
- 78 There is no doubt that investment in research is an important priority to increase the stock of knowledge of mankind. But under the present model of technological push, the research results directly reaching industry are marginal. The economical contribution of research outputs is via knowledge spillovers, although they are hard to monitor and to evaluate.
- 79 Technology push is fundamental for innovations focusing on new or better technological functions or performances and when the distance is short between the new invention and the new good, services or experiences desired or needed by the user/customer/buyer.

The importance of the systemic model of Innovation

- 80 When the user desires or needs new experiences combining functional performances and satisfying new or better emotional/social needs or wants, innovation becomes a complex, systemic phenomenon.
- 81 Design as integrator of emotions and functions becomes a central axis at the very outset of the innovation process.



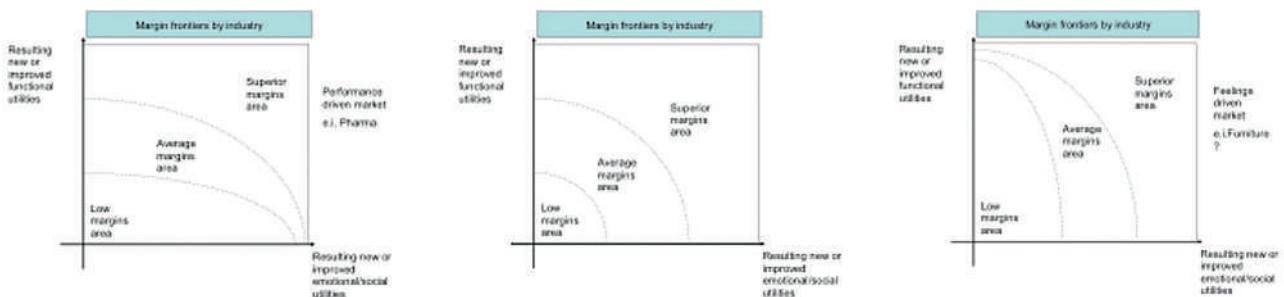
- 82 When innovation becomes a complex, systemic phenomenon, the number of innovation agents extends beyond the technological community. The stock of knowledge of many new players is required, and the linkages between all the agents become fundamental. The innovation model is no longer lineal neither cumulative. It is a systemic, open, collaborative, complex model.



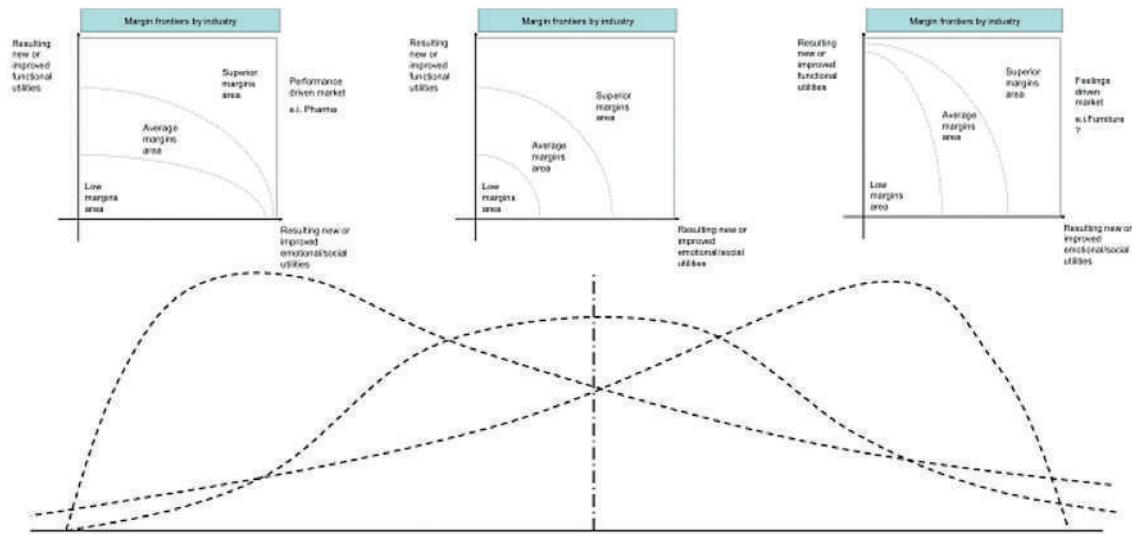
- 83 Several investigative techniques like design research, user-centered innovation and other forms of techniques based on user's needs and wants are factors of systemic innovation.

Fit between public policies and innovation models

- 84 In order to achieve an innovation activity contributing to the creation of economic and social value, a correct fit is fundamental between public policies and the reality of the existing economic models and their corresponding innovation models.
- 85 The first step is to map the type of markets covered by the different industries. Do they prevail on demanding functional needs (pharmaceutical, chemistry ...); does the market need to satisfy an integration of functional and emotional needs, do they demand new experiences (mobile communications, automotive, home appliances ...); or does the market mainly need to satisfy emotional needs (cultural activities, amusement ...)

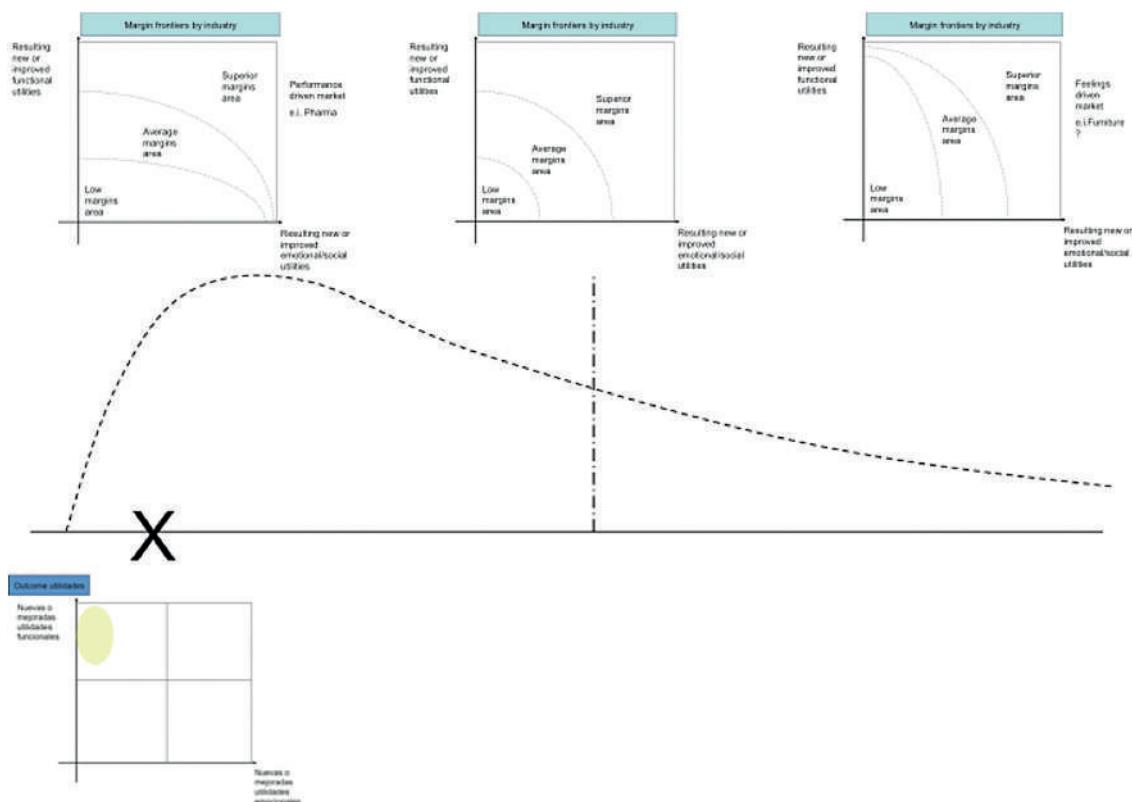


- 86 Depending on the dominance of the types of markets covered by the different industries, a region may present different curves of distribution of the dominant demands:

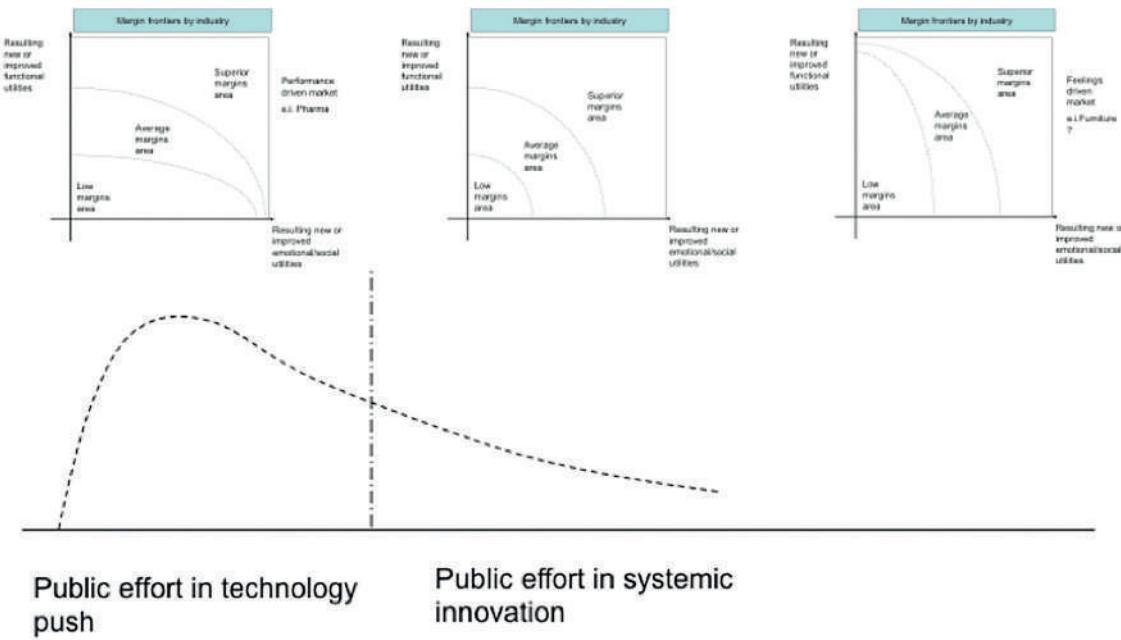


Technological regions and technology push model

- 87 When a region has a dominance of technological industries focusing on satisfying user's technological needs, then it is adequate to apply a technology push model of innovation

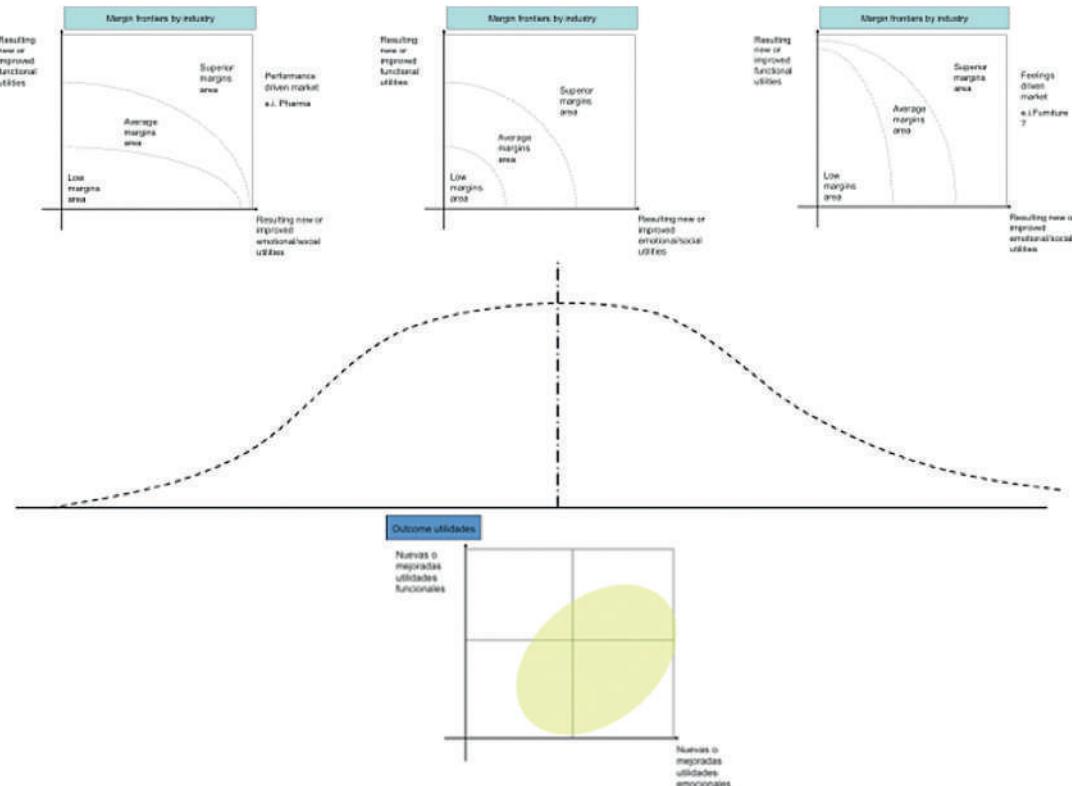


- 88 Under this scenario, public policy efforts may focus on technology push programs

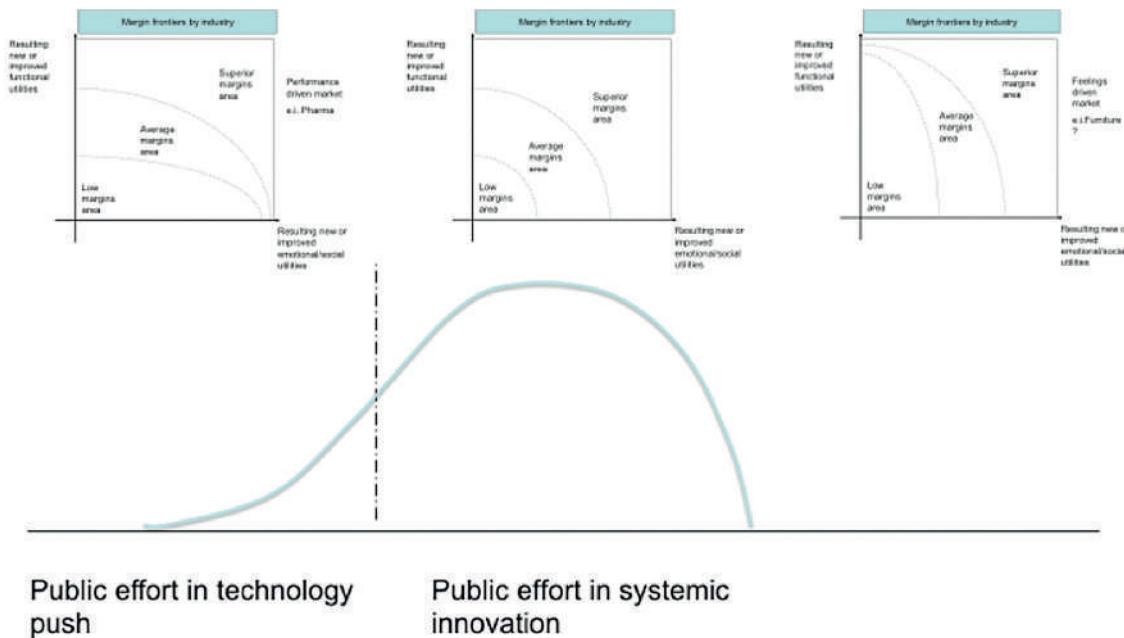


Region with industries involved in systemic innovations

- 89 In a region with strong economic pillars based on industries offering to the user/customer new or better experiences (automotive, mobile communications, home appliances, sport-goods,...) the importance of innovation shifts towards the correct integration of performances and emotions.



90 Under this scenario, the innovation public policy shall focus on initiatives endorsing systemic innovation



91 In economic models requiring systemic innovation, design as integrator becomes a fundamental factor of innovation. Policy makers need tools to monitor and to measure the importance of systemic innovation in the current economic model and the new economic models that policy makers want to open. In case the economic model requires systemic innovation, policy makers require tools to measure and monitor the role of design as integrator at the very outset of innovation and need the tools to bring design in the innovation ecosystem.

ANNEX I

€ Design interaction with the revision of the Frascati Manual

€ Design contribution to the scoping stage of the Frascati Manual 7.0

In line with the results from WP1, WP5 first step has been to submit to the OECD and Eurostat, by October 31st 2013, €Design contributions to the scoping stage of the Frascati Manual revision.

The revision of the Frascati Manual is part of the 2013-2014 Program of Work of the OECD Committee for Scientific and Technological Policy (CSTP), NESTI's parent committee.

CONTRIBUTIONS:

Contributions to the scoping stage of the manual revision shall be submitted in the form of responses to the following questions:

- 1- Have you used the Frascati Manual, and if so, how and for what purpose? Please provide examples.
- 2- What specific contents of the Manual have you used / consulted / referred to?
- 3- Were the guidance, examples and other content helpful for your intended purposes? Can you explain why?
- 4- Did you find any of relevant information missing, inaccurate or of limited relevance to your purposes? Can you explain why?
- 5- Are there, in your opinion, any changes in the content, presentation and navigability of the material that would help improve your use of the Manual? If so, could you please list them?

€Design contributions focused on answers to questions 4 and 5:

- a. Did you find any of relevant information missing, inaccurate or of limited relevance to your purposes? Can you explain why?

4.1 Problems with the concept of Design in Frascati Manual

- 1- The Frascati Manual (OECD 2002) describes the scope of design as a specific activity within research and development, limited to the creation of plans or drawings aimed at defining functional issues:

Industrial design:

- 124 *The vast bulk of design work in an industrial area is geared towards production processes and as such is not classified as R&D. There are however some elements of design work which should be considered as R&D. These include plans and drawings aimed at defining procedures, technical specifications and operational features necessary to the conception, development and manufacturing of new products and processes.*
125. *For example, if an engineering product which incorporates machined, heat-treated and/or electroplated components has been developed, the drawing up and documenting of the requirements for surface smoothness, heat treatment procedures or electroplating process requirements, whether incorporated in the drawings or as separate specification sheets, are considered R&D.*
- 2- The Oslo Manual (2005) limits the concept of design to the creation of form and appearance of products, although it accepts that design activities may be understood by enterprises in more general terms.

2.4. Design

344. *The term product design, as used in the definition of marketing innovations, refers to the form and appearance of products and not their technical specifications or other user or functional characteristics ... However, design activities may be understood by enterprises in more general terms, as an integral part of the development and implementation of product or process innovations, as described in Section 2.2.3 of this chapter. The categorisation of design activities will thus depend on the type of innovation they are related to.*
345. *All design activities for the development and implementation of product innovations (including work on form and appearance) and of process innovations should be included either in R&D or in other preparations for product and process innovations.*
346. *Work related to changes in product design that are marketing innovations (and not product innovations, i.e. where the functional characteristics or intended uses of the product in question are not significantly improved) should be included in Preparations for marketing innovations.*

- 3- The definition of design presented in paragraph 345 of the Oslo manual "all design activities for the development and implementation of product innovations should be included either in R&D or in other preparations ..." is not in line with the narrow concept of design presented in paragraph 124 of the Frascati Manual: "The vast bulk of design work in an industrial area is geared towards production processes and as such is not classified as R&D. There are, however, some elements of design work, which should be considered as R&D. These include plans and drawings aimed at defining procedures, technical specifications and operational features necessary to the conception, development and manufacturing of new products and processes".
- 4- The Frascati family of manuals accommodates design within the concepts of Research, Development and Innovation and acknowledges that design could be understood more broadly. The definitions used between the two manuals are not in line and they acknowledge that the definition of design could be broader (Tether 2006).

4.2 The problem of the connection between Frascati Manual and the 1997 version of Oslo Manual⁴

- 5- Frascati Manual 2002 (§65 a 83) still refers to the old Oslo Manual concept of Other innovation.

all those scientific, technical, commercial and financial steps, other than R&D, necessary for the implementation of new or improved products or services and the commercial use of new or improved processes.

These include acquisition of technology (embodied and disembodied), tooling up and industrial engineering, industrial design n.e.c., other capital acquisition, production start-up and marketing for new and improved products.

The new conceptual framework under the 2005 Oslo Manual overcame the concept of "Other innovation activities". But Frascati still makes a reference to this concept and drags its exclusionary effects.

- 6- The origin of the problem is that Oslo Manual 1997 focused on a technological vision of innovation. In fact, Oslo Manual 1997 focused on the concept of Technological Product & Process innovation (TPP innovation) and considered the "Other innovation activities" as something apart, or as activities that were not TPP innovation.

⁴ OECD/Eurostat (1997), *Proposed Guidelines for Collecting and Interpreting Technological Innovation Data – Oslo Manual, The Measurement of Scientific and Technical Activities Series, Paris*.

Figure 3. Type and degree of novelty and the definition of innovation

			INNOVATION			Not innovation Already in firm
			Maximum	Intermediate	Minimum	
			New to the world	(a)	New to the firm	
TPP	Technologically new	Product				
		Production process				
		Delivery process				
	Significantly technologically improved	Product				
		Production process				
		Delivery process				
INNOVATION						
Other innovation	New or improved	Purely organisation				
Not innovation	No significant change, change without novelty, or other creative improvements	Product				
		Production process				
		Delivery process				
		Purely organisation				

TPP innovation Other innovation Not innovation

7- The definition of TPP innovation was:

all those scientific, technological, organisational, financial and commercial steps which actually, or are intended to, lead to the implementation of technologically new or improved products or processes.

So, the scope of innovation was restricted to technological novelties, leaving outside the scope of innovation, any novelty lacking technological improvements. The Oslo Manual 1997 presented the following taxonomy of innovation:

8- We understand that Frascati Manual shall overcome the technological bias, in line with the evolution conducted under 2005 Oslo Manual.

4.3 R&D as a factor within the complex phenomenon of systemic innovation. The importance of linkages

9- The Frascati definition of research contains the activities of basic research, applied research and experimental development.

10- The present definition of basic research contains the characteristic of: *without any particular application or use in view*. Basic research is perceived as an isolated activity, autonomous from its surrounding environment.

- 11- On the other hand, the present definition of applied research requires being oriented to a specific practical aim or objective. In this case, Research is no longer an independent activity, isolated or autonomous. It becomes an activity related to its surrounding environment, with the goal to provide answers to specific needs and wants. We understand that, following the 2005 Oslo Manual conceptual framework of innovation as a complex, systemic, phenomenon, Frascati Manual 6.0 has the problem that does not provide guidelines to monitor and measure research as a factor within the complex phenomenon of systemic innovation.
- 12- The scope of Frascati Manual shall also go beyond the present restricted concept of experimental development to provide guidelines to monitor and measure development as a factor within the complex phenomenon of systemic innovation.
- 13- The scope of Frascati Manual shall also consider the systemic dimension of applied research and development, in line with the conceptual framework of systemic innovation under Oslo Manual 2005. Frascati Manual shall provide guidelines to monitor and measure the linkages between system actors.
 - b. Are there, in your opinion, any changes in the content, presentation and navigability of the material that would help improve your use of the Manual? If so, could you please list them?

5.1 Changing the concept of Design in Frascati

- 14- For a long time, design was considered as an styling add-on, taking place after technology development. Under this perception, design was limited to styling, to create the aesthetics of an artifact, which independently provides new or improved functional utilities.
- 15- The 2005 edition of the Oslo Manual addressed the systemic dimension of innovation, dedicating a chapter to innovation linkages and their measurement. The OECD no longer perceived innovation as a linear phenomenon beginning with technology development, but as a complex and systemic phenomenon. Under this perception, the focus shifts towards an emphasis on linkages and integration.
- 16- The EC Staff Working Document 'Design a driver of user-centered innovation' 2009 also addressed the view of design as a strategic, cross-functional and multidisciplinary innovation activity.

17- In line with the conclusions from the Oslo Manual 2005 and the EC Staff Working Document 'Design a driver of user-centered innovation' 2009, in the framework of €Design we propose the following definition: To design is to integrate functional, emotional and social utilities as a complex and systemic phenomenon.

18- If to design is to focus on the integration of functional, emotional and social utilities, we can expand on our definition to express design in the context of R&D:

- *Within an R&D process, design is the set of activities that focus on the integration of functional, emotional and social utilities of a research or development outcome.*

5.2 Introducing the relationship between Applied Research, Development, Innovation and Design

19- We propose that Frascati Manual provides answers to the questions: Does innovation follow Research? Or does Applied Research follow innovation requirements? Or what other relationship may it exist between both concepts.

20- We understand that innovation follows research under a technology push model of innovation, where the distance is narrow between the new invention and the new product demanded by market (for example, a new vaccine). We understand that Applied Research follows innovation requirements under a systemic innovation model, and design plays a key role as integrator of functional, emotional and social utilities, when the result of the research is just one of the factors under a systemic innovation (for example a new mobile phone experience).

21- Frascati Manual shall provide guidelines to understand and monitor the role of development as a connector between research and innovation. For example the development of research results implies different linkages and methods than the development of an innovation project. Does development follow research or does development follows innovation requirements?

22- Frascati Manual shall provide guidelines to understand and monitor the role of design as an add-on to research under a technology push model of innovation and to provide guidelines for design as an integrator under a systemic model of innovation. When the scope of design is narrowed to a styling add-on the latest phases of a technology push, efforts are focused in basic research to obtain breakthrough innovations. Under a systemic innovation model design plays a key role at the very outset of innovation as an integrator of functional, emotional and social utilities, with the goal to provide new experiences to users/customers/buyers. A design activity that will trigger new developments and research activities in order to provide applied answers to the specific needs of the new innovation project.

23- Presently, Frascati Manual provides answers to the measurement of the research and development activities within a lineal technological push model. The scope of Frascati Manual shall enlarge to provide guidelines to the measurement of linkages, efforts and results under a systemic model of innovation were applied research and development become factors within a complex systemic innovation model and where design plays a central role as integrator of experiences combining performances and emotions.

6 Proposal of €Design for further steps

24- €Design will be pleased to contribute with OECD/Eurostat in the following phases of preparation of Frascati Manual 7.0.

25- Within Work package 5, € Design has the objective to propose guidelines for Frascati Manual 7.0 in order to monitor design as a factor of production and as a strategic integrator between market implementations and R&D efforts.

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