



## **HLG KET – 2<sup>nd</sup> Phase – Working Document**

### **WG2: KETs Value chain and vertical integration**

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1.	Executive Summary .....	3
2.	How can Europe stay competitive for the benefit of society? .....	4
2.1.	The globally competitive “playing field” .....	4
2.1.1.	Asia – Pacific.....	4
2.1.2.	US – NAFTA .....	4
2.2.	What now for Europe? A European innovation model! .....	5
2.2.1.	This model must build on the unique strengths of Europe .....	5
2.2.2.	This model must keep / create / bring back value to Europe by using its value chain strength.....	5
2.2.3.	This model must be supported by a pronounced European political will that gives a clear signal to crucial groups .....	5
2.3.	Mission of WG2 on “KETs Value chain and vertical integration” .....	6
2.4.	Some definitions: “Value Chain” vs “Innovation Chain” .....	6
3.	Recommendations of WG2.....	7
3.1.	Recommendation 1 – Build a “European model” for KETs by bringing the public and private “business models” closer to each other .....	7
3.1.1.	Illustrative examples.....	8
3.1.2.	Ideas for a potential implementation .....	9
3.2.	Recommendation 2 – Include “Value Chain Correctness” as a positive selection criterion for public-funded projects.....	9
3.2.1.	Illustrative examples.....	9
3.2.2.	Ideas for a potential implementation .....	10
3.3.	Recommendation 3 – Build tailor-made instruments for different stages of the Value Chain into public policies .....	10
3.3.1.	Illustrative examples.....	11
3.3.2.	Ideas for a potential implementation .....	11
3.4.	Recommendation 4 – Check existing instruments for “Value Chain-fitness” for the deployment of innovation.....	11
3.4.1.	Illustrative examples.....	12
3.4.2.	Ideas for a potential implementation .....	12
3.5.	Recommendation 5 – Search for the highest leverage effect .....	13
3.5.1.	Illustrative examples.....	13
3.5.2.	Ideas for a potential implementation .....	13
3.6.	Recommendation 6 – Overall value chain specifics to be included in the overall report or in other WGs recommendations.....	14
3.6.1.	Distinct KET box in CSF (to be included in the overall KET report) .....	14
3.6.2.	Use unique and non-ambiguous definitions in innovation-related policies (to be included in the overall KET report).....	15
3.6.3.	Market pull points (to be included in the work of WG6).....	16
3.6.4.	Smart specialisation points (to be included in the work of WG5 and WG1) ..	16
3.6.5.	Skills points (to be included in the work of WG1).....	16

## 1. Executive Summary

The WG2 of the 2<sup>nd</sup> phase of the High Level Group (HLG) on Key Enabling Technologies (KETs) dealt with “KETs Value Chain and vertical integration”. The WG members and experts invited to the workshop had been chosen to cover all the KETs and relevant industrial sectors.

The WG analysed:

- The different KET Value Chains
- The way Value Chain considerations are handled by existing EU and Member State programmes
- The position European actors occupy in the stages of KET Value Chains

The main findings are:

- The need for KETs in upstream stages of the Value Chain to handle any societal challenge Europe is confronted with
- Mandatory collaboration is required
  - Between actors occupying different stages of the Value Chain in order to raise the EU to the next level of industrial excellence
  - Between actors from different KETs (transversality)
- The fundamental differences between the different KET Value Chains
- The fact that current EU and Member State programmes often look only to one sector (in most cases the end-user sector) expecting them to work with their corresponding Value Chains for innovative solutions to challenges. As a consequence innovative upstream solutions are often neglected, or worse, out of the scope of the given projects
- Some first ideas on specific stages of KET Value Chains that might benefit from extra policy input for:
  - Having a high leverage effect in terms of value creation in Europe
  - Being exposed to a highly competitive situation and deserving support to preserve European excellence

Five Value Chain specific recommendations emerged out of this analysis. Five further important points to be taken into account by the overall KET initiative or by other WG groups have been added. These ten recommendations are presented in the following document with corresponding case studies and ideas for potential implementation.

The most important ideas to emphasise are our proposals:

- To put policy input not only on the end-user sector, but also on crucial stages of the overall Value Chain allowing suppliers to develop innovation that can be pushed to the downstream stages of the Value Chain
- To introduce Value Chain Correctness as a positive selection criterion for public-funded projects
- To keep in mind the need for tailor-made instruments for different stages of the Value Chain
- To check existing instruments for “Value Chain-fitness”
- To support projects dependant on the leverage effect of the stages of the Value Chain covered
- To reserve a distinct KET box in the forthcoming Horizon 2020 Framework Programme for Research & Innovation (previously called the Common Strategic Framework).

## 2. How can Europe stay competitive for the benefit of society?

### 2.1. *The globally competitive “playing field”*

Europe has set up ambitious policies under the EUROPE 2020 strategy for growth to develop into a competitive region within a steadily increasing competitive global playing field.

During the first phase of the work of the HLG on KETs the model of a three pillar bridge<sup>1</sup> was developed to address this competitiveness race by ensuring that policies and public-private partnerships can be aligned to bridge the gap between research and a speedy and efficient deployment of KETs in and from Europe<sup>1</sup>. This first phase has indeed concluded that **it is crucial for Europe to develop a unique “business model” of how to deploy KETs over the next few years.** Success in achieving this will also pave the way not only for the KET initiative but also for other similar European initiatives.

For the recommendations of this report the results of the SWOT analysis of the HLG KET Interim report were taken as a basis.

As experienced in the current work, other regions of the world work according to specific models:

#### 2.1.1. **Asia – Pacific**

This region, especially China, is pushing innovation through dedicated political strategic programmes driven by the public sector. These programmes are accompanied by visible political will to progress and backed up by highly significant public investment in the range of several billions of Euros per technology in areas such as semiconductors and photonics. The target is to move to the high end of the value chain in priority areas by 2015. These programmes are also characterised by a convergence of public policies, alignment of government work towards the targets and implementation of decisions between national, regional and local levels towards the national target. Growing internal markets for consumer products as well as the target of world leadership in exports to other regions of the world are a major co-driver for these developments.

#### 2.1.2. **US – NAFTA**

The “Obama White House” has just published its call for action: the “Strategy for American Innovation – Securing our economic growth and prosperity”<sup>2</sup>. The target for the US’s future is to “out-innovate, out-educate and out-build the rest of the world”. The strength of the US administration is the focus i.e. in investing in what makes America stronger, cutting what does not help America and reforming how the government operates. The instruments to support their overall target are America’s entrepreneurial spirit and the ability to create leaner public structures to put this spirit into practice. This strategy is supported by a very high level political commitment to bring “manufacturing back to the USA”. In the last two years very significant investments of 7.5 billion US\$ have been made on KETs.

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<sup>1</sup> The mid-term report can be found under [http://ec.europa.eu/enterprise/sectors/ict/files/kets/hlg-working-document\\_en.pdf](http://ec.europa.eu/enterprise/sectors/ict/files/kets/hlg-working-document_en.pdf) for more details.

<sup>2</sup> See <http://www.whitehouse.gov/innovation/strategy> for more details.

## **2.2. What now for Europe? A European innovation model!**

In order to stay competitive both as an industrial location and as an European society with high living standards in terms of high employment, life and social comfort, and security of citizens, it has become imperative that the societal players have to undertake now a common task to establish an efficient “European model” which goes well beyond the current focus of policies towards the internal market within the EU region. Due to tradition and a political system based on subsidiarity, as well as the current financial crisis, Europe cannot afford to just copy either the Asian or the American models. The answer to global competition can only be the development of a specific and well-articulated European innovation model that:

- Builds on Europe’s unique strengths
- Keeps/creates/brings back value to Europe
- Is established in a short timeframe.

### **2.2.1. This model must build on the unique strengths of Europe**

- 1<sup>st</sup> class research and knowledge creation landscape
- Functioning network of SMEs and big companies, the latter often taking the role of “super customer”
- Long history of strong, world-leading industrial value chains<sup>3</sup>
- Geographical proximity of diverse knowledge and value chain partners
- The ability to deal with complexity, thus develop complex processes and products
- Long history of cooperation between various industrial, academic and public players
- Well developed markets ready for uptake of innovative products, processes and services.

### **2.2.2. This model must keep / create / bring back value to Europe by using its value chain strength**

The European Union benefits from the fact that different relevant industry sectors are based and manufacture in Europe. Nearly all industry sectors are in close proximity (only a few hundred kilometres distance or in local areas) and mostly structured in a “symbiosis” between big and SME companies with a track record of developing innovative and rather complex solutions. In addition, Europe has the opportunity to build on existing world leading industry sectors by strengthening them and supporting their rejuvenation and, at the same time, to support the creation of new businesses within existing enterprises or in new companies.

In this model of the integrated KETs approach, strong value chain related policies and support will ensure that the above-mentioned three pillar bridge does not only help cross the “valley of death” but is also broad enough (i.e. “with several lanes”) to speed up the completion of the innovation chain<sup>4</sup>.

### **2.2.3. This model must be supported by a pronounced European political will that gives a clear signal to crucial groups**

In terms of crucial groups, we have in mind:

- Public servants in their need to adapt to a broader interpretation of the innovation concept as more than “research plus / funding” and to the need for cross-sector and value chain-fit policies

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<sup>3</sup> See chapter 2.4 for a definition of the term Value Chain

<sup>4</sup> See chapter 2.4 for a definition of the term Innovation Chain

- Industry to gain trust in longer term investments within Europe, which has been a major weakness in the EU, and to widen their value chain business model
- And private investors to be confident towards political statements from the EC and the Member States in a real shift towards innovation in Europe.

The European innovation model also needs public policies and working structures at EU, regional and national levels that put, in the future, the focus more on global competitiveness rather than, as currently done, on competitiveness within the internal market. This would enable the development of such a model in a shorter timeframe than that of the EU 27 Member States individually.

Some of these characteristics of the European model will be developed further in this report.

### **2.3. Mission of WG2 on “KETs Value chain and vertical integration”**

Based on the background given in the introduction, it was clear that, in order to speed up innovation in Europe, the traditional *modus operandi* needed to be complemented with an approach that brings together and stimulates innovation at key stages of the value chain simultaneously, in order to create competition and breakthrough for comprehensive solutions. This principle applies also to KETs. The various contributions received during phase 1 of the HLG clearly identified the necessity to assess the KETs’ value chains from KETs to final products in order to identify and follow through on opportunities for KETs’ integration in other established or new value chains, as well as KETs’ contribution to addressing grand societal challenges. A particular emphasis was given to vertical integration between product suppliers, including these KETs, and users of the products.

The working group clarified the key elements of the different value chains from KETs to grand societal challenges and elaborated proposals to reinforce the links between the various parts of the value chains at a European level by considering, for instance, the contribution of KETs to the future European Innovation Partnerships, along with the appropriate measures to reinforce these links.

### **2.4. Some definitions: “Value Chain” vs. “Innovation Chain”**

These two terms, while different in meaning and in the players involved, are often used interchangeably.

In order to avoid confusion, it is crucial that this report states our respective understandings of the terms:

- “Innovation chain”: a term used in various political debates to describe the route from research to innovation and into competitive manufacturing with players such as academia, RTOs, industry, public sector. This term effectively describes the KET Bridge across the innovation “valley of death”.
- “Value chain”: a term used mainly by industry to describe the cooperation between the relevant business sectors (from raw material to final product) to ensure delivery of products and processes. This could be said to describe the size of the bridge (i.e. the several lanes/ width mentioned) and the speed at which this bridge can be crossed. An example of a value chain has players such as a materials producer, a photovoltaic assembler and a final solar panel device provider.

For the efficient deployment strategy of KETs both chains are interlinked and all elements have to be optimised as innovation can only be as strong as its weakest link (see Figure 1).

Value Chain	Base Materials	Advanced Materials	Device	Assembly	System	Recycling
Innovation chain						
Technology development						
Product development						
Production						

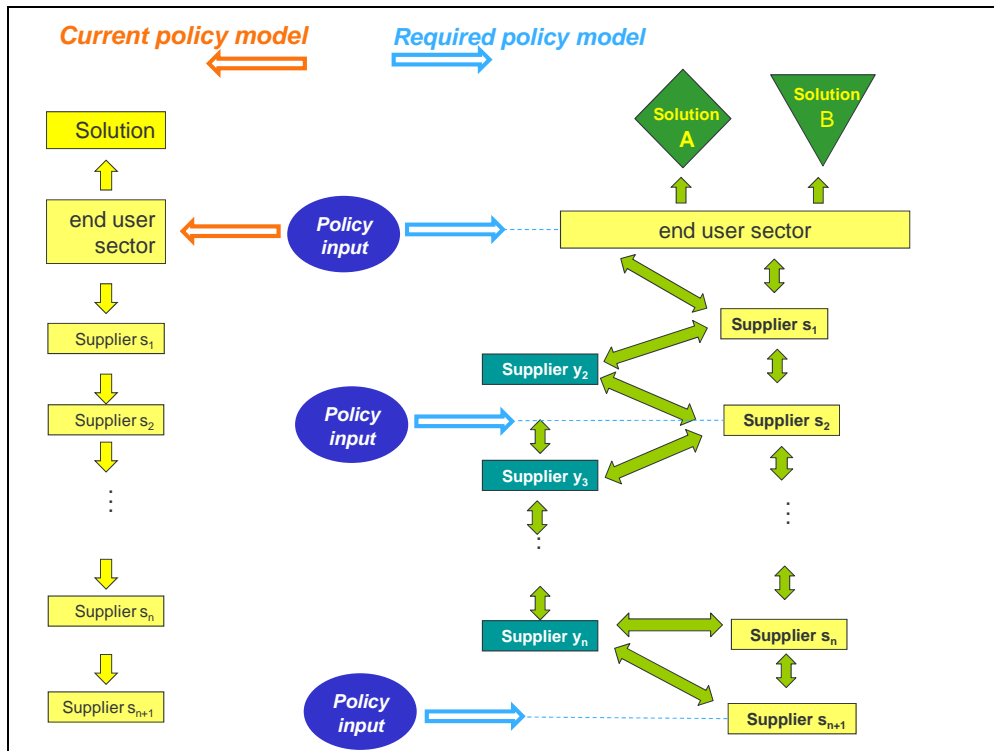
Figure 1: Matrix of Innovation chain and value chain

### 3. Recommendations of WG2

#### 3.1. Recommendation 1 – Build a “European model” for KETs by bringing the public and private “business models” closer to each other

From a political and strategy development perspective, the European modus operandi for public private cooperation traditionally looks only to one sector (in most cases, the end-user sector) expecting it to work with its value chain for innovative solutions to challenges. As an example, this model was chosen to set up the Public Private Partnerships in the Economic Recovery Plan to support specific sectors during the financial crisis. However this approach is designed and focussed primarily on the research side and is run as a sectorial model. A similar sectorial model enlarged to include innovation and market penetration is currently also the basis for the Asian approach, which has attracted significantly more public funding and political push and has already been described in the previous chapter of this report.

For the European model, competitiveness for ideas / solutions and speed are crucial to create added value for private and public investments. The currently used model has therefore to be complemented by a new political approach and thinking that simultaneously incentivises innovation and cooperation, both through policies and funding (e.g. FP 7, CIP and CSF/ Horizon 2020), at crucial stages of the value chain (see Figure 2).



**Figure 2:** Bridging the gap between current public and existing private models for business by providing simultaneous support at various stages of the value chain

In the majority of business areas, such as construction or automotive, the business models create competition for ideas/solutions not only by the competition between end product providers, but also by the initiative of the upstream sectors such as the advanced material producers to push their new materials into the downstream market sectors through an active market push policy. This business model could be adopted and supported by a public sector model that would therefore create even more synergy and value for public-private engagements into EU projects under CSF/ Horizon 2020 and other innovation related programmes. This approach would simultaneously target specific crucial stages of the value chain such as projects on materials development and on building design at the same time. It should also be evaluated if public support and strategic competition between different consortia in Pillar 1 and 2 of the “KETs Bridge across the valley of death” can raise the speed and quality of solutions.

### 3.1.1. Illustrative examples

- Currently instruments implementing the PPP model set up by the EC focus mainly on research and a sectorial approach. Future PPP instruments moving towards Pillar 1 and 2 must open up to structural value chain participation and even aim at competitiveness of projects through various consortia.
- In real life innovation is driven from both ends of the value chain. For example in the construction business innovation is pushed up and down the value chain from the construction companies and the material producers at the same time. For example, a chemical company is now leading the construction consortia for the Expo 2015 in Milan.

Another example is that light weight transportation is as dependant on the development of new materials as it is on the uptake of these materials in downstream industry sectors (Report “Hybrid material workshop” 2010) [http://www.suschem.org/upl/3/default/doc/DPI%20Rapport%20A4%20\(2\).pdf](http://www.suschem.org/upl/3/default/doc/DPI%20Rapport%20A4%20(2).pdf)

### **3.1.2. Ideas for a potential implementation**

- European industrial and R&I policies, as well as setting clear objectives and timelines, can also include political strategic directions to encourage the involvement of key sectors of the value chains that could align or compete for sustainable solutions to the set objective and their speedy delivery and broad market deployment.
  - Extend the coverage of the Public-Private partnership models to significant parts of the value chain in order to create added value by improving the speed of implementation and creating competition for solutions (e.g. consortia with different complementary approaches working towards the same target. The participation of the value chain in programmes and projects must be engrained by the EC in the governance structure of any new PPP and be monitored constantly by the public side.
  - The public-private programmes, supported by these policies, can be prepared under specific coordinative support actions to kick-start these complementary processes. This kind of action should have a separate distinct budget in innovation related projects.
- As the KETs are a perfect example for the importance of the value chain, the establishment of a distinct KET box in CSF/ Horizon 2020 and Structural funds would create market push for solutions to the societal challenges for Europe. It is obvious that an effective governance mechanism has to be established to ensure cooperation and complementarity between the areas of “tackling societal challenges” and “strengthening competitiveness” to ensure developed technology serves a purpose and at the same time that societal challenges define tasks for technology to solve.

### **3.2. Recommendation 2 – Include “Value Chain Correctness” as a positive selection criterion for public-funded projects**

Thus, “Value Chain Correctness” should be introduced as a positive selection criterion in the design and evaluation of future policies and EU funding programmes and thus in the selection of projects in pillars 1 and 2 (pillar 3 seems to be more the responsibility of and requires investment from specific companies). This means that the primary focus should be on both upstream and downstream parts of the value chain being engaged in the projects to bring added value to the geographic / political correctness.

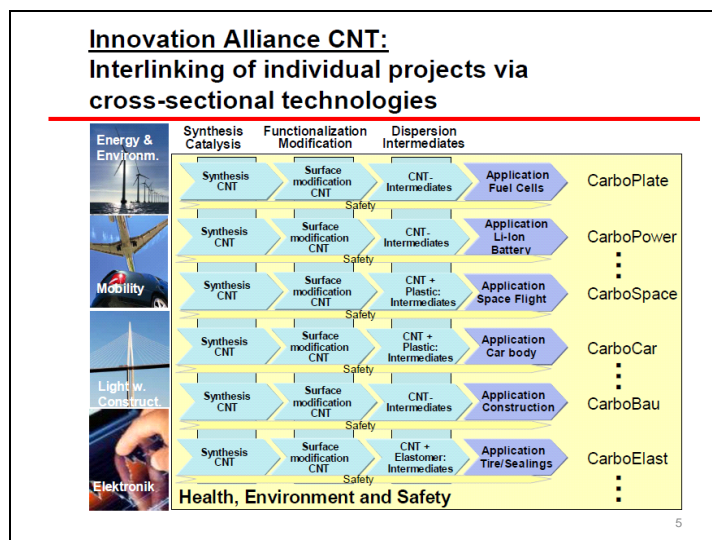
This selection criterion should ideally be implemented through inclusion of various partners up and down the value chain or, if this is not possible, through proven added value to several value chains (see German Innovation Alliance CNT).

Such a selection criterion will favour simultaneous support of critical stages of the value chain and projects that build on the EU strengths. Of course, in order to ensure best available added value by cooperation of the highest quality contributors and to achieve critical mass, this can be done via EU trans-national cooperation.

#### **3.2.1. Illustrative examples**

The Innovation Alliance CNT (Carbon Nanotubes) has been recently launched by the German Government and is a first example of a move towards a value chain approach in research and innovation. The basis is to analyse the priority value chains for nanotubes and

design dedicated programmes and projects, which help solve common problems for the various value chains. Funding is given only to projects that include this approach<sup>5</sup>.



**Figure 3:** Innovation Alliance CNT – Value chain approach in research and innovation

### 3.2.2. Ideas for a potential implementation

- Design of programmes for innovation (e.g. KET Pillar 1 and 2) has to formally include a value chain evaluation (e.g. European strength in comparison to other world regions, critical added value for Europe, etc.)
- Allocated funding proportion for projects with a demonstrated value chain approach was up to 20 % of the overall budget for the last phase in FP7 and CIP. In CSF/ Horizon 2020 and structural funds this rate should be 30% for innovation related projects by 2015.
- A positive scoring should be given to projects, which include more than two partners up- or downstream in the value chain relating to societal challenge in the area of “competitiveness” and “society” in the upcoming CSF/ Horizon 2020 or Structural cohesion funds.
- Project consortia should be evaluated by their engagement of a network including both big companies and SMEs working together in a “symbiotic” way.

### 3.3. Recommendation 3 – Build tailor-made instruments for different stages of the Value Chain into public policies

Most PPPs for innovation and also the integrated KET approach must consider two major different value chain types. They differ in terms of:

- Their structure: such as starting with a broad alliance of companies and leading to very few players that dominate the market entry, or starting with a few materials suppliers and broadening out to a range of players that are close to the market
- The volume and timing of their financing needs: some KETs need significant public support upfront, mostly in Pillars 1 and 2, while others have significant financing needs to establish globally competitive manufacturing sites.

Within the integrated KET approach various value chains for the deployment of KETs will follow various models, which have different needs:

- Major needs early in value chain – major needs late in value chain

<sup>5</sup> See <http://www.inno-cnt.de/en/> for more details.

- Value added more upfront – value added later at end
- Local cluster – EU trans-national
- Financing needs 10<sup>9</sup>-10<sup>10</sup>M€ - financing needs 10<sup>7</sup>-10<sup>8</sup>M€
- It is important to keep in mind that KETs often have interconnected value chains

### 3.3.1. Illustrative examples

- **Biotechnology:** A biotechnology pilot plant will have other time scale and investment needs compared to a KET deployment project of consumer products with shorter payback time.
- **Advanced materials:** It generally takes more than 10 years to bring new advanced materials products from concept to market, be it wide band gap semiconductors (e.g. Gallium Nitride (GaN)) or engineered substrates such as Silicon on Insulator (SOI) technology. Expenditures during this period, both as operating costs and as investments, precede revenue generation by many years.
- **Semiconductor sector (device manufacturing):** Is heavily dependant on
  - Up-stream from
    - Material suppliers: Especially as one of the major drivers for semiconductor innovation is materials based
    - Equipment vendors: Second major driver is equipment driven: e.g. litho and associated optics & SW & associated SW and handling systems developers
  - Down-stream from
    - Design houses or System houses: Increasing importance of heterogeneous system integration
    - Application users (with their own user specifications)

Furthermore beyond 32nm technology, there is a very close interdependence between systems technology and process technology because of process variability.

Thus, flexibility and also access to the required private and public capital must be targeted toward critical stages of the value chain. Indeed, along the innovation chain as well, the timelines for the various phases vary for example from:

- 5/9+ years for high risk research
- 5/3 years for feasibility, prototype, pilot and demonstration
- Less than 3 years for production, and training

### 3.3.2. Ideas for a potential implementation

It is therefore essential that within an integrated KET strategy, policies as well as financing instruments earmarked for KETs should be flexible enough to allow public-private partnerships to pass crucial stages of the innovation chain and of the respective value chain.

- Specific KET box in sectorial policies (i.e. health, energy)
- Specific funding volumes
  - According to structure
  - Timing of needs

## 3.4. **Recommendation 4 – Check existing instruments for “Value Chain-fitness” for the deployment of innovation**

Nearly all processes and instruments used by the EU and Member States have been designed to manage research and to lead creation of knowledge through publications and/or Intellectual Property. It is however also clear that research is just an early starting point in the

Innovation Chain. Demonstrators, pilot lines and other areas related to Pillars 1 and 2 follow different needs and require different models for public-private cooperation.

It is therefore necessary to review and potentially adapt existing and future EU policies and funding instruments in order to support innovation at different stages of the value chain (not only research) through:

- Results-driven programmes with clear targets, currently limited by constraints in terms of:
  - Funding, volume
  - Member States/ geographical representation
  - Inflexibility of consortia
  - Project structure and implementation
- Specific support to Pillar 2, which is critical to test the technology and the market and influences the other two pillars; indeed, pillar 2 requires specific, currently not fully deployed, mechanisms in the following cases:
  - Technology is almost ready, but residual technological risks need to be eliminated through scale-up demonstrations, up to pre-industrial pilots
  - Technology is mature, but residual non technological barriers block (fast) market uptake: demonstrations and other actions can be funded to overcome these barriers
  - Sectors or communities need to be stimulated to adopt available solutions through non technological innovation actions like training, awareness creation, standardisation

#### **3.4.1. Illustrative examples**

- Currently within FP7 in 2010, ideas are developed to impact the 2013 calls. This means that by 2014 the selection of project proposals has been completed, allowing signing consortia agreements and projects starting in 2015. Results from the project are then available earliest in 2017-2018. This process designed for research, and with good success for this area, is clearly not quick enough to run successful projects for pillar 1 and 2 of the integrated “KET Bridge”.
- The current CIP programmes are running in three domains with no common objectives and no cooperation between them. In addition, it is only focussed on SMEs and thus does not support the normal network of small and bigger companies - the backbone of Europe’s competitiveness. With an overall funding of 3.6 billion Euros CIP is strikingly under funded for innovation ( i.e. compared to 53 billion Euros for the current Framework Programme).
- For current research projects it is more important to include a broad participation of partners across the various Member States rather than focus on the coverage of the value chain through appropriate partners.

#### **3.4.2. Ideas for a potential implementation**

- Envisage a distinct programme for “seed funding” collaboration along the value chain (e.g. more use of the Coordinative Support Actions instrument –already used in current FP7- as a distinct value chain cooperation mechanism).
- Adjust the current rules of CIP and transfer then to CSF/ Horizon 2020 to support networking of big and smaller companies (e.g. anchor company concept) to build on EU strengths
- Especially in pillar 1 and 2, there should be a dedicated programme which enables several smaller projects to strengthen value chain cooperation, similar to the current Coordinative Support Actions (CSAs); they could initiate broader cooperation along the value chain (innovation is not only about funding but also about new ways of collaboration, mindset, etc.) using public funding as a “glue”

- Member States/ geographical representation should be balanced by the concept of “value chain correctness”
- Consortia should be more flexible to meet different requirements at different value chain stages and to create critical mass through, for example, open innovation. This could include the possibility to join or leave the consortium during a project (e.g. the content / focus may change depending on the stage along the value and innovation chains). There is already some experience in Austria in managing such changes.
- The project structure should be less prescriptive on implementation routes. In addition, it would be useful to create competition between projects in pillar 2 by public support for various approaches to a solution in parallel.

Use existing instruments and platforms with a proven track record for value chain cooperation and that have implemented the innovation chain in their work. Certain European Technology Platforms (ETPs) have taken this strategic direction and are fulfilling the criteria defined in the EC report “Strengthening the role of European technology Platforms in addressing Europe’s grand Challenges” (2009) (EC report, 2009, [ftp://ftp.cordis.europa.eu/pub/technology-platforms/docs/fa-industrialresearch-b5-full-publication-rp\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/technology-platforms/docs/fa-industrialresearch-b5-full-publication-rp_en.pdf)). They, as part of knowledge clusters, can contribute to advisory bodies on the selection / evaluation of programmes with a specific focus on projects from pillars 1 and 2.

### **3.5. Recommendation 5 – Search for the highest leverage effect**

As the amount of funding is limited, the focus should be on the Value Chain stages having the highest leverage effect. This would be a supplementary criterion for future project proposals.

In this context, it might also be useful to select the stages of the Value Chain to be supported in a first step as being those where Europe is in a good competitive position, from an industrial and/or from a R&D point of view.

#### **3.5.1. Illustrative examples**

To illustrate the required decisions, the following examples are noted:

- **Product strategies** – Biotechnology: Europe due to its strength in complex products and solutions and high social standards (i.e. high salary level and specific knowledge) may be more suited to focus on developing higher value added products rather than get significantly engaged in the race for biofuels.
- **Product applications** – Construction sector: Public funded projects should focus on renovation of the already extensive building stock rather than solely on building new houses.
- **(Almost) lost value chains for Europe** - Batteries and LEDs: There are only a few and scattered manufacturing facilities in Europe, owned by a European based company at the moment. Such a situation might lead to the decision to critically evaluate the public funding of research in this area, if the manufacturing is foreseeable as only happening in other regions of the world.

#### **3.5.2. Ideas for a potential implementation**

- Request “benchmarking chapter” with SWOT Analysis on EU strengths and weaknesses concerning the status of the various parts of the value chain for innovation related programmes and project selection.
- Establish an information system within the EC to facilitate decision making based on value chain added value for Europe.

- Bringing back critical parts of the value chain to Europe or “leapfrogging” into new applications and markets can be part of the evaluation.

### 3.6. Recommendation 6 – Overall value chain specifics to be included in the overall report or in other WGs recommendations

Preliminary note: The following recommendations are important to the success of the Integrated KET Initiative and emerged from the work of WG 2. They need to be taken up in the work of the overall KET group and/or have been addressed in the other work packages and should necessarily find their way in the final overall report.

#### 3.6.1. Distinct KET box in CSF/ Horizon 2020 (to be included in the overall KET report)

There is a need to convince EU stakeholders of the existence of a specific KET space within vital European Value Chains and therefore come to the conclusion of the need for a dedicated KET funding area within the future CSF/ Horizon 2020 programme. Indeed, several Value Chains have been analysed by the Working Group (Smart Building, Mobility, ...) each one showing the importance of KETs in the upstream part of the Value Chain – a part that is crucial and should certainly not be forgotten or neglected by the CSF/ Horizon 2020.

#### Illustrative examples

Two examples have been discussed in particular. Both show the absolute need to master KETs in order to satisfactorily address societal challenges:

- Energy Efficiency by the Smart Building concept (see figure 4)
- Sustainable Mobility (see figure 5)

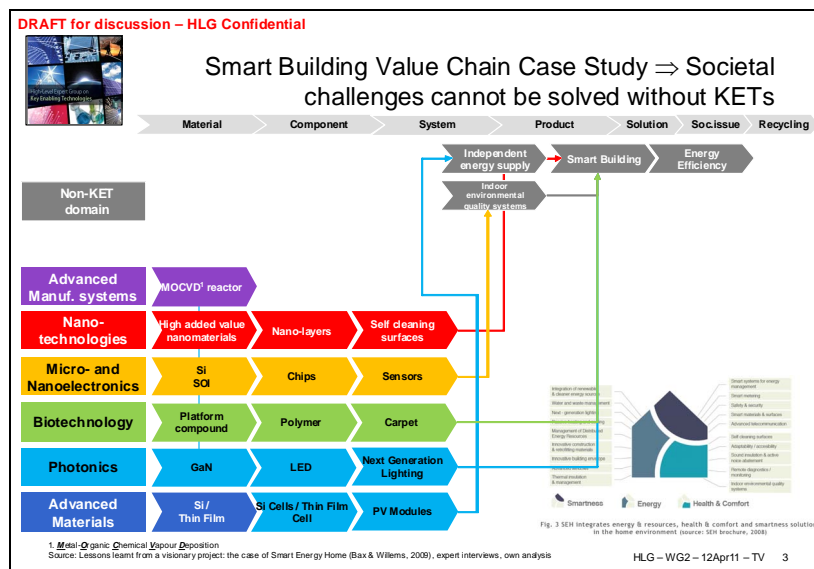
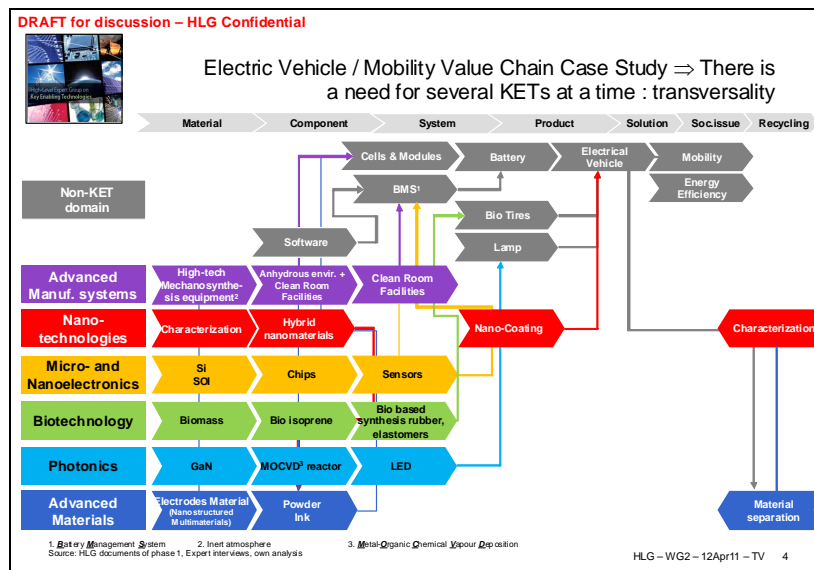


Figure 4: KETs as a prerequisite for the Smart Building Concept



**Figure 5: KETs as a prerequisite for the Electric Vehicle**

### Ideas for a potential implementation

Ring fence within the future CSF/ Horizon 2020 programme a dedicated budget for KETs.

### 3.6.2. Use unique and non-ambiguous definitions in innovation-related policies (to be included in the overall KET report)

In order to foster understanding and align and strengthen actions, it is essential to establish clear terminology in areas which already cause significant misunderstandings in the current work of the KETs.

1. Innovation Chain versus Value Chain
  - Innovation Chain = from research to demonstration up to competitive manufacturing
  - Value Chain = from raw material sectors to final product / services / recycling sectors
2. Local clusters versus EU trans-national cooperation
  - Clusters = local “eco-systems” bringing together centres of excellence and businesses
  - European trans-national cooperation = exploits the strengths of Europe along the value chain by cooperation towards a common objective from various locations through complementary expertise
3. Pilot Line versus Demonstration & Deployment projects
  - For reasons of clarity, these terms should be accompanied by reference to the technology readiness level in the specific application (see discussion of WG4)
4. Outcome of the sustainability evaluation for the individual projects versus the outcome of the sustainability evaluation for the overall solution
  - When using one wording or the other in the interest of the evaluation either of one project / technology or of the overall solution, one should be aware of the difference in outcome (e.g.: the electric car will be overall a sustainable solution only if the problem of energy storage and production is solved).

### **3.6.3. Market pull points (to be included in the work of WG6)**

Market pull measures should target creating added value for Europe throughout the whole value chain not only at the consumer product level.

#### **Illustrative examples**

Photovoltaics (PV) subsidies where European Market Pull funding (feed-in-tariffs) goes to a large extent in other regions of the world because solar cells are manufactured in these regions might not be the best example of good practice for European Market Pull funding.

#### **Ideas for a potential implementation**

A requirement for all Market Pull measures (including lead markets) to undertake a thorough analysis to provide incentives and added value for the underlying (KET-) Value Chain and evaluate the impact on European industry value chains of a given measure, not only for the final product.

### **3.6.4. Smart specialisation points (to be included in the work of WG5 and WG1)**

Especially in pillar 2 and 3 where decisions are targeted at higher investment in specific locations, the European added value should be guided by the smart specialisation policy. This implies tailor-made solutions depending on the technologies and the value chains. This ranges from local cluster formation / geographical proximity up to pan-European cooperation, to unify the most suitable actors and to achieve critical mass.

As examples illustrating this are:

- For Industrial Biotechnology, the feedstock and/or the localisation of a R&D facility determines the (often decentralised) location of the pilot/ demonstration project
- For Nanotechnology or Nano-/Microelectronics the pilot (Pillar 2) has to be located close to the next step of the specific value chains, for example, a device manufacturer or automotive manufacturer.
- Nevertheless, for certain other value chains and technologies and for technological research (Pillar 1), a EU wide network of excellence is needed , while the geographical proximity of the next step in the value chain might be a less critical issue

### **3.6.5. Skills points (to be included in the work of WG1)**

- The integrated KET approach requires a new skills set in the workforce of the value chain. These skills sets should include broad scientific and technical skills sets to develop interdisciplinary breakthrough solutions, business and personal skills to turn ideas into sustainable markets.
- Integrating these skills into higher education curricula and systems should be a dedicated area, as a pilot, within the EU Flagship Initiative “An Agenda for New Skills and Jobs”