Innovation Activities of ROADIDEA Project

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Abstract

Innovation processes of the ROADIDEA project are based on futures research methodologies Charrette and Futures Workshop as explained by the WFUNA (World Federation of the United Nations Associations) Millennium Project. The Millennium Project is a global participatory futures research think tank of futurists, scholars, business planners, and policy makers who work for international organisations, governments, corporations, NGOs, and universities. According to the Charrette method the innovation processes are continuous and based on digital communication methods, with two major innovation seminars of at least two-day brainstorming and evaluation sessions.

The first innovation seminar was held on 12-13 May 2008 in Prague. There were altogether 36 participants in the seminar including 3 members of the Steering Committee and the Coordinator of another INFSO project. The seminar was conducted by using various innovation methods, such as group discussion, brainstorming, pub session, Socratic Walking seminar, and deliberative evaluation with basketing (categorisation). The results include 34 fully studied ideas, of which 19 were short-listed after the evaluation. From these, 12 ideas were chosen for further work with dedicated idea teams, consisting of 6 piloting ideas, 3 modelling ideas and 3 general development ideas. All ideas are discussed through dedicated wiki-software in www.roadidea.eu.

The second seminar was held in Dubrovnik on 14-15 May 2009. The participants consisted of 24 members of the ROADIDEA consortium partners and 8 other partners who represented parallel projects, Steering Committee and one industrial designer acting as the chief evaluator. The results of energy scenarios produced by the Millennium Project Global Delphi Process in 2008 were used as alternative futures for operational environment in 2030. The futures workshop consisted of brainstorming in three groups, pub session, group discussions and two evaluation cycles. There were 13 ideas shortlisted and evaluated to find 5 best ideas as radical as possible for the future in 2030. The 5 best ideas can be further developed by using their wikis in www.roadidea.eu.

1. Innovation Activities

Innovations in ROADIDEA will be created using well-tested brainstorming methods such as Charrette and Futures Workshop described by the WFUNA Millennium Project (Glenn & Gordon 2003, Glenn 2009) and in Heino Apel's (Apel 2004) article covering both seminars,

the time in-between for running pilots and processing of the ideas for the Road Map after the seminars.

Charrette is an intensive face-to-face process (see figure 1) carefully designed to bring people from various disciplines and expertise to create new solutions to problems within a short period of time. The first round (the innovation seminar) will produce the ideas to the focus groups that will take on the ideas and develop their work accordingly. The second round will further develop the ideas under piloting and create new ones for further consideration.
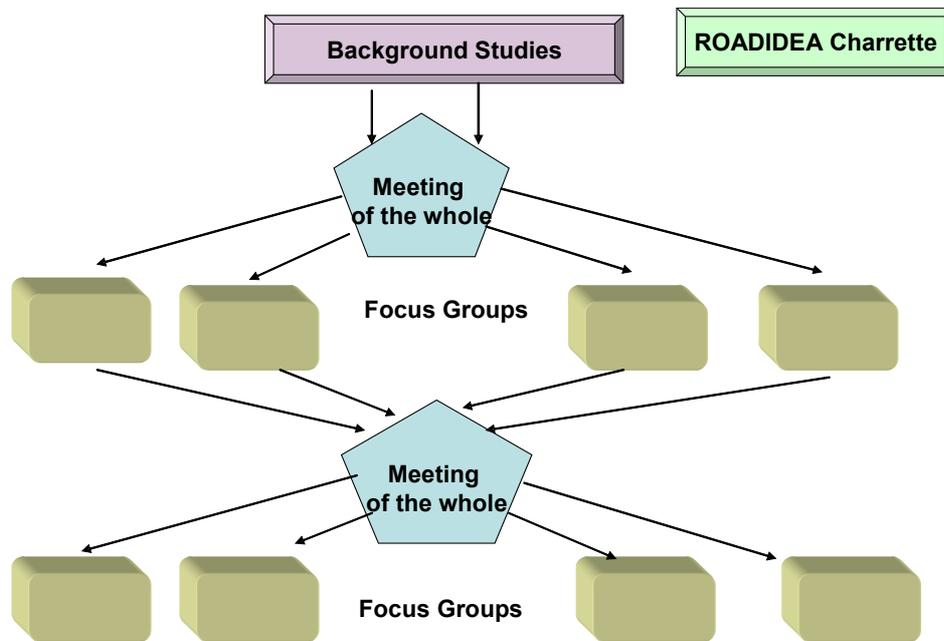
Figure 1: Charrette Method

Futures Workshop method is used in the seminars for free brainstorming. It is necessary to guide the brainstorming by using rules and codes of conduct that lead conscious effort to create ideas for products and services. In theory, the two-to-three-day futures creation seminar is facilitated by 1-2 professionals and usually follows the following steps: preparation, imagination and creation process, options for realisation, task allocation for moving from intention to action. The main features of the workshop include: free collaboration of various experts from different fields, anonymous criticising process, innovative creation of solutions, and defining concrete results and actions. However, the criticising process is left out since the aim is to create new fresh ideas and not to criticise existing ones. The plan for innovation activities and necessary pre-processes (background studies) of seminars are explained in detail in D5.1 (Keskinen 2008a)

2. The first innovation seminar

In the first innovation seminar, the best innovations were sought for during the seminars using first individual idea creation (there may be ideas created already before the seminar by participants in their own professional environment) and then in group work using various methods: flip papers on the wall, post-it adhesives, Socratic Walking seminar, Pub seminar, in groups, subgroups and plenary sessions. The evaluating of the ideas was done using "heart stickers" and the new "basketing" procedure, where ideas are given

labels according to their character. To ensure the full exploitation during the project life cycle of the ideas created, a 2-3 person team (IDEA Team) was appointed to take care of each idea.

Working method, group work and different tasks for participants were prepared. There were two major grouping methods namely Simple Random Sampling and Self-Organised Selection. To promote the innovative thinking a special slide show was running all through the workdays.

Summarising, the results include 34 fully studied ideas, of which 19 were short-listed after the evaluation. From these, 12 ideas were chosen for further work with dedicated idea teams, consisting of 6 piloting ideas, 3 modelling ideas and 3 general development ideas.

The ideas are divided in three groups: Service ideas, Modelling ideas and General development ideas. In addition several pilots were selected as follows.

2.1 Service ideas

CROSS BORDER WEATHER ALERTS
    Location-based systems
MOBILE PHONES AS SENSORS
    Mobile sensor data acquisition
MyRoute, MOBILE POCKET GUIDEBOOK
    My Route Mobile Pocket Guide is a system for providing travel information and
    updates over a mobile network. It gives the traveller / driver comprehensive real
    time traffic information needed for well-informed travel decisions (pre-trip
    information) as well as information during the journey (on-trip).
MyTravel, TOILET-TOMTOM
    My Travel Toilet Tom-Tom service is offered to all drivers and travellers. It gives a
    driver / traveller the possibility to find information on availability of toilets along a
    planned route, with particular impact on places for disabled persons and mothers
    with small children. It could also give the driver / traveller possibility to check the
    other resting possibilities at chosen place.
IN-VEHICLE INFORMATION
    Invehicle information about speed, road condition and traffic situation
EUROADMAP
    European road weather databases using sponsor-based business model
EYEAR
    Road Eye: friction data collection and transmission (acoustic, optical, invehicle   etc.)

2.2 Modelling ideas

PULP FRICTION
    Friction model: combined with RWIS and weather and maintenance activities
TRAFFIC FORECAST MODELS
    Traffic forecast models
PORT
    Port-related traffic modelling

2.3 General development ideas

FREEDATA
    Free geospatial and weather data
RTFM
    Better and tailored user-interfaces of text, image, audio, considering personal characteristics of users: language, disabilities, age, health, and other personal needs
STAYHOME
    What are the effects of choosing staying home instead of choosing to travel a certain route?

2.4 Pilots

FRICTION PILOT
    Model "Pulp Friction" - Modelling road surface friction (Practical implementation)
GOTHENBURG PILOT
    Merging of traffic and weather data in Gothenburg area (Practical implementation)
FOG PILOT
    The Fog Warning System in the Venice Region (Concept)
PORT PILOT
    Modelling the Multimodal Traffic Situation in the Port of Hamburg (Concept)

Many more additional ideas were presented that either complemented the short-listed ideas or did not get enough evaluation points. However, all ideas were basketed and stored to the ROADIDEA web site for further use. The results of the first innovation seminar are explained in detail in D5.2 (Keskinen 2008b)

The seminar survey results (50 % responded from 36 participants) indicate that the seminar was well received. The majority of participants were of the opinion that no truly radical ideas were created, however, they could name the most radical ideas from their point of view. The overall problem was that the concept "radical" was varyingly understood and no consensus prevailed. Also, what was radical to one person was not so to another. However, the main target of ROADIDEA is to study the overall innovation potential of European transport services, and especially analyse the barriers for their further exploitation. In this respect the seminar provided ample material for studies and for the first pilot product development phase. According to the replies, the most radical ideas were: Eye from above 3 votes, Personal filtering, My Route 2 votes, Everything that moves gives location information, 2 votes and EYE FROM ABOVE 2 votes and The social mobility system 2 votes.

3. The second innovation seminar

Preparations for the second innovation seminar included a survey of the state of the art of the existing ideas and pilots. The questionnaire summarised various questions such as vision, obstacles, legal problems, data availability, exploitability, business opportunities, primary and secondary target customers, and plan for work in 2009. The Technical Committee was used as the platform to discuss the guidelines and futures scenarios up to 2030 to be used in the seminar. Several advance material in addition to these was sent to participants to study in April-May 2009.

In the second innovation seminar, the session 1 was introductory including briefings from the guest speakers. The session 2 of the seminar discussed the state-of-the-art of the

existing ideas and pilots in three (randomly selected) groups and plenary. The work for the remaining 10 months was discussed. In the session 3 the main session 4 was introduced, the alternative futures for 2030 discussed (prepared by the Millennium Project in 2008, see www.millennium-project.org). The tasks of the session 4 were discussed at the preparatory Pub Session that was conducted in 9 small groups. In the final session 4 of Free Radicals, the three groups (grouping was done through random sampling) conducted a futures workshop under three alternative world scenarios.

3.1 The Session Free Radicals

In the beginning of the session the Innovation Manager held a plenary briefing focusing on futures thinking and the chosen scenarios. The basic understanding of futures research needed more guidance - this was evident even after the first innovation seminar - therefore it was necessary to introduce the ontology and paradigm of the discipline even though there was ample material disseminated concerning this.

The grouping for the three brainstorming groups was based on simple random sampling. Each group was allocated two group leaders (members of Technical Committee), who also were briefed through prior guidance and a training session on synectics method. After the session all flip papers containing evaluation information (collection of hearts and ranking) were photographed for documenting.

Alternative futures used in the futures workshop of Free Radicals were scenarios for 2030. The scenarios are the result of global networked Delphi research work executed by the Millennium Project. The Millennium Project is the most renowned and globally rewarded knowledge base creator on alternative futures images, trends and signals. The project was started by the American Council to the United Nation's University in 1997. Ten years later it moved over to work under WFUNA. The work of the project is continuously based on a wide global network of thousands of experts in all disciplines. More detailed information of this global futures knowledge creator can be found in www.millennium-project.org. Finland through its Futures Research Centre is one of the most active nodes of the network representing Nordic countries.

The four scenarios describe four different worlds for 2030. The first scenario is deemed as impossible since it would mean that the world would continue "business-as-usual" and that would is a disaster scenario, which will not be taken into account. It is, however, interesting and educative to study, what can happen if the global community will not improve its ways. The scenarios were as follows (table 1):

Table 1. Millennium Scenarios for 2030 (Millennium Project 2008)

Scenario 1: Business as Usual—The Skeptic	Scenario 2. Environmental Backlash
Moderate growth in technological breakthroughs Moderate environmental movement impacts Moderate economic growth Moderate changes in geopolitics and war/peace/terrorism	Moderate growth in technological breakthroughs High environmental movement impacts Moderate economic growth Moderate changes in geopolitics and war/peace/ terrorism
Scenario 3: High-tech Economy – Technology Pushes Off the Limits	**Scenario 4. Political Turmoil**
High growth in technological breakthroughs Low environmental movement impacts High economic growth Few changes in geopolitics and war/peace/terrorism	Moderate growth in technological breakthroughs Low environmental movement impacts Moderate/low economic growth Major changes in geopolitics and war/peace/terrorism

The participants were divided into three randomly sampled groups. Each group was allocated one of the three scenarios (Worlds 2, 3 and 4) as the operational environment for the innovation work. The groups resulted to altogether 13 ideas, out of which 5 best were evaluated using futures workshop method (brainstorming cycles).

The futures workshop used brainstorming in three groups and two evaluation cycles to find 5 best ideas as radical as possible for the future in 2030. There were 13 ideas shortlisted and evaluated. The five best of these in order of preference are as described in 3.2. (the sixth best was also discussed and evaluated). The results of the second seminar are explained in detail in D5.3 (Keskinen 2009).

3.2 Ideas of the second seminar

3.2.1 Semi-public transport *Service production & support systems of advanced private public transport services* (55 points)

The basic understanding of the idea is that in future, best travel services are in public transport units. Personal cars are not allowed for fancy nomadic devices, buses, trains. Car-pool vans will have all fancy services. The service production and support systems of advanced private public transport services has been developed taking into account security and safety services.

There will be 3-dimensional (taxi) traffic navigation. Radar-based collision avoidance systems are implemented in vehicles. Autonomous driving is common. There also may be flying taxis that follow the road networks.

Car sharing will be based on electronic vehicles. Accurate travel and travel time information to make best choice will be commonly available. Personal travel device service (rent) is ready to be used on (large) public transport stations. There also may be some kind of relaxing system as service in the vehicles. Comfort on-demand at a price!

3.2.2 DYNAMOBI *Cooperative dynamic navigation, multimodal and scalable* (52 points)

DYNAMOBI service system is based on navigation services that are easy to use, multimodal, modular, and scalable. Navigation guides the user to his/her destination. The user just points at the target in digital map or gives the name by keyboard or speech. The multimodality includes all transport modes, also walking, cycling, rollerblading, skiing etc. The scalability means that all travel distances can be combined: from a town or city to a country to continent to the globe.

The service system is modular utilising local and regional traffic network models in a grid. The models react to incidents and congestion immediately, predicting their duration and impact on the network (recurring congestion nationally built in) thus being dynamic. The cooperation is ensured by users with the system who get individual guidance, which will depend on how the other users are behaving and following the guidance so that in case of too many rerouting to the same route, a part is guided to the next alternative, etc. (relying on users being positioned when needed or prompted by user query). There will also be travel related booking and payment services.

3.2.3 No-man driving *Autonomous driving (43 points)*

If there is no person physically driving the car it is called Autonomous Driving. Then it is important to know who is actually driving, i.e. who is responsible of the act. It can also be that some type of semiautonomous driving is an option: a combination of physical driver and computer-aided system (either in the car or in the infrastructure). It is evident that travel time is radically shorter in the case of autonomous driving. It is important that there are good systems for e.g. speed control.

It is important to test the reactions of the car (how well the car can function). The driving wheel could have a heart beat monitor and other life indicators, thus ensuring to avoid bad drivers: drunken, old, sick, young (risky drivers!).

The speed control can be done by cameras using a black box in the car. The "outside" signals coming from infrastructure might do the speed regulation, behaviour control, witnessing the happenings on the road and in the car, driving in the background all the time and recommending breaks, mandatory overnights etc.

Increasing the perception of risk with acoustic design of vehicle and acoustic risk indication features could be developed. Systems can be developed to avoid also adverse and bad weather driving, and intelligent road condition monitoring. The liability questions must be solved, too.

3.2.4 Waste to energy *Bio-waste used as energy for cars (42 points)*

If bio-waste were into packed tubes they could be used as an energy source later in the cars. Also biogas (& methane) from waste can be used as fuel. There could be bio-waste collection service and people may have tax refunds through producing bio-waste for energy production. A stand-alone bus "fuelling" from bio-waste could be developed.

Biomass power plants and car battery charging in-house could be developed thus forming the independent energy demand & supply cycle. Dense network of fuel stations with different fuels including changeable accumulators (batteries) could be established and even give possibility to leave your waste for bio-energy production!

Geobacteria have already been harnessed to produce electricity from human and other type of bio-waste in the laboratory. The IT systems development is naturally needed for organising and maintaining these processes.

3.2.5 TRAWORK *Travelling on offices - working on transport (41 points)*

The idea is to have virtual offices, actually perhaps "office-on-demand"!
Travelling on offices and thus working on transport is already possible; e.g. using laptop on fast speeding trains and even have internet connections has been developed.

Office-on-demand rental company could be a business idea. There could also be service for shopping while working. Targeted transport services for companies (working during journey) are needed, as will as fluent "rent a vehicle" and taxi services. This means that there should be WAN everywhere (web services).

Daily activities & travelling management and optimisation services together with dynamic incident-based traffic network management & services systems are needed. This implies also new thinking in creating new business models. Traffic forecasting during incident duration with impacts would also be an asset.

3.2.6 LEGO-BLOCK TRANSPORT *Intelligent modular structures (39 points)*

The cars parts (cabin, engine, wheels) should be modular as lego-blocks, and super light weight vehicle be cheap or as status expensive. Modular car trains are possible. Wind shade for better aerodynamics of cars are needed. Small sizing as a trend - slot time plan would mean better routes, high speed travel possible, and lower fuel consumption.

4. Final Remarks

The evaluation of both ideas and the innovation procedures are conducted by the project and an outside evaluation expert. The evaluation results are reported in the public report of the respective work package of the project. All material is presented as public documents in web site www.roadidea.eu. The 5 best ideas are also opened for interaction using wiki software.

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