Cluster-based Innovation through Embedded Systems technology

Project no.:	**REGIONS-CT-2013-320043-CLINES**
Project full title:	**Cluster-based Innovation through Embedded Systems technology**
Project Acronym:	**CLINES**
Deliverable no.:	**D6.3**
Title of the deliverable:	**Delta Analysis of Projection and Baseline**

Contractual Date of Delivery to the CEC:	**M24**
Actual Date of Delivery to the CEC:	**M24**
Organisation name of lead contractor for this deliverable:	**TUM**
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Participants(s):	**Partners 1,2,3,4,5,6**
Work package contributing to the deliverable:	**WP6, WP4**
Nature:	**R**
Version:	**1.0**
Total number of pages:	**23**
Start date of project:	**01.09.2013**
Duration:	**36 months**

Abstract:

The outcome of the virtual evaluation of the proposed joint actions is presented. The verdicts are based on a forecast by managers of (cluster) projects that rated the success of the actions, had they been implemented in the scope of their project. Full data tables for this delta analysis of projection and baseline are given on the valuations of the actions vis-à-vis the CLINES sub goals.

Keyword list: virtual evaluation, delta analysis, projection, sub goals, actions, KPIs, virtual application, interviews

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Summary

This document collects evaluation verdicts on the actions proposed under the Intermediate Joint Action Plan. The verdicts are based on a forecast by managers of (cluster) projects that rated the success of the actions, had they been implemented in the scope of their project. Full data tables for this delta analysis of projection and baseline are given on the valuations of the actions vis-à-vis the CLINES sub goals.

1   Introduction

The CLINES consortium is developing a Joint Action Plan. The intermediate version of this plan is already available (D4.2). The aim of Task 6.4 is to evaluate if the actions planned under this action plan are in fact conductive to promote the sub goals that the CLINES consortium has set for itself from the call goals.

The way to evaluate planned actions is to virtually apply those actions to ongoing projects, and then make a delta analysis of the projection and baseline. That is, the managers of selected projects were asked to evaluate if the actions would have been beneficial, had they been implemented in the scope of their projects.

The projects itself were chosen from projects running in the cluster ecosystems of the partners, based on their similarity to the actions and projects proposed under the Joint Action Plan.

The verdicts of the project managers were mostly collected in interviews, and combined into a standardised statistics. This data will serve as input for the Intermediate Evaluation and Sustainability Report (D6.2).

The document is structured as follows:

Chapter 2 presents the projects that were used as the basis for the evaluation, their focus and overlap with the CLINES goals and planned actions.

Chapter 3 details the evaluation procedure used to elicit the valuations from the project managers.

Chapter 4 contains the collected answers on the usefulness of the actions (the delta analysis), presented in tables.

2   Reference Projects

The challenge was to find ongoing (or soon to be started) projects that have a similar partner structure as the CLINES consortium, projects that propose actions similar to the ones foreseen by the intermediate Joint Action Plan. Optimally, they would already treat the CLINES topic areas of Smart Mobility, Smart Living, Smart Environment and Smart Energy.

The CLINES partners collected and rated potential project candidates, out of which eight were selected. They are presented in the following.

Each section gives the name of the projects, states the name of the CLINES partner that proposed the project from its ecosystem, displays a brief comment of the reviewer on the core of the project, and gives a short description of the project.

In the table, for each project the expected impact is given, and the CLINES topic area that the project is close to. Each project touches many of the CLINES sub goals – we list the ones that are most prominent or unique to the project. The check box section at the end of the table shows which stakeholder groups are involved in the project – industry, SMEs, policy makers, or research institutions.

2.1   *Smart City Lighthouse Call Munich*

Project Proposer: BICCnet

Reviewer comment: Cross-domain, public-private

Description:
The city of Munich is participating in the call H2020 SCC 1 2015; BICCnet supports the municipality in finding partners and getting ideas to incorporate in the call.

Expected Output / Impact	Area: Smart City/ Embedded Systems	Focus Goals & Sub goals	
Smart city community building, coherent proposal to the call.	Smart Mobility, Smart Energy	Appreciate and leverage regional and joint strengths, create a joint regional vision, involve stakeholders, collaborate across sectors, create public & political awareness, create joint value, unlock new opportunities, Provide knowledge of public funding opportunities;	
Industry	**SMEs**	**Policy**	**Research**
x	x	x	

2.2   Agenda Cyber-Physical Systems

Project Proposer: BICCnet

Reviewer comment: Roadmap

Description:
Commissioned by the German Ministry of Research, the Agenda Cyber-Physical Systems provides a comprehensive and systematic overview of the technology trends and innovation potential associated with Cyber-Physical Systems (CPS) and draws conclusions concerning the priority areas for research and action. CPS are highly networked Embedded Systems with extensive inbuilt software intelligence – as for example required by Smart Cities.

BICCnet was part of the team of 5 core authors. Expert opinion was recruited by BICCnet from the cluster network of company specialists and research seniors, using one-on-one interviews as well as field-calibrating group sessions. Contributing companies ranged from tiny SMEs to several multinationals.

Expected Output / Impact	Area: Smart City/ Embedded Systems	Focus Goals & Sub goals	
Overview of the technology trends and innovation potential associated with Cyber-Physical Systems (CPS)	Embedded Systems for Smart Mobility, Smart Living, Smart Energy	Focus research effort, Funding sources, involve stakeholders, collaborate across sectors, create public & political awareness, close research & technology gaps	
Industry	**SMEs**	**Policy**	**Research**
x		x	x

2.3   INFINIT

Project Proposer: AAU

Reviewer comment: Local networking project

Description:
InfinIT is a Danish network for innovative utilization of IT. The goal is to convert the infinite possibilities that technology offers into concrete collaborations between research and industry. Therefore, researchers and enterprises working with or using IT are invited to participate in collaboration projects and the exchange of knowledge, thus creating a forum where we can work together to generate exactly the knowledge that Danish industry and society needs – whether in terms of embedded systems, mobile technology, security, big data, wearables or something else entirely. The work in infinIT builds upon close collaboration between research and enterprises.

Both strategic activities and research activities are performed, of which the major part take their point of departure in a number of interest groups consisting of representatives from both research institutions and enterprises. As such, the activities will be adapted to the needs and challenges that Danish industry faces.

Expected Output / Impact	Area: Smart City/ Embedded Systems	Focus Goals & Sub goals	
Match making, small innovation projects and large applications.	Technology community building / Embedded Systems	Focus research effort, create joint value, develop innovation competences and capabilities, stimulate SMEs as international innovators, close research & technology gaps, focus on SMEs, provide knowledge of commercial investment, entrepreneurial funding, and venture capital;	
Industry	**SMEs**	**Policy**	**Research**
x	x		x

2.4 Arrowhead

Project Proposer: AAU

Reviewer comment: Business models

Description:
Arrowhead is addressing efficiency and flexibility at the global scale by means of collaborative automation for five application verticals. That means production (manufacturing, process, energy), smart buildings and infrastructures, electro-mobility and virtual market of energy.

Expected Output / Impact	Area: Smart City/ Embedded Systems	Focus Goals & Sub goals	
New business models and new products	Smart Energy	Business models, stimulate SMEs to become international innovation actors	
Industry	**SMEs**	**Policy**	**Research**
x	x		x

2.5   e-Menhir

Project Proposer: GAIA

Reviewer comment: Developing services for cities;

Description:
Cyber Physical Systems for the development of new public-private services in the smart city concept. Modular and scalable service platform for cities, based on leveraging existing infrastructure therein, for a faster, wider and more economical deployment.

Services cover the following areas:

- Street lighting

- Interaction with citizens through mobile devices

- Urban waste management and recycling

- Water management

- Traffic management

Expected Output / Impact	Area: Smart City/ Embedded Systems	Focus Goals & Sub goals	
Smart city community building	Embedded Systems for Smart Mobility, Smart Living, Smart Energy	All "Improve ESSC smart specialization" sub goals; strengthen European competitiveness on ESSC	
Industry	**SMEs**	**Policy**	**Research**
x	x	x	x

2.6   Catalogue of SC4C-Smart Capacities for Cities

Project Proposer: GAIA

Reviewer comment: Company confederation; Database with projects companies already accomplished in Smart Cities.

Description:
Range of "smart" products, services and solutions to citizens, governments, companies and players involved, developed by SMEs.

Expected Output / Impact	Area: Smart City/ Embedded Systems	Focus Goals & Sub goals	
Catalogue about the products, services and solutions around Smart Cities	Smart Mobility, Smart Living, Smart Energy, Smart e-government	Improve attractiveness, improve visibility, strengthen cluster organisations, create business focus on SMEs, unlock new opportunities	
Industry	**SMEs**	**Policy**	**Research**
x	x	x	x

2.7   *Smart Bike*

Project Proposer: DSP Valley

Reviewer comment: New products for as-to-yet not digitised domain.

Description:
"Smart Bike" is a cross-domain project to stimulate innovation between the sports/leisure bike industries on the one hand, and the smart electronic systems industry on the other. Goal is to make the bike, its rider, and the environment more intelligent in order to obtain a better overall biking experience (comfort, safety). As such, this project contributes to Smart Mobility, for once not focusing on the car but on the bike as an environment-friendly and healthy means of transportation.

Expected Output / Impact	Area: Smart City/ Embedded Systems	Focus Goals & Sub goals	
New product launches; active cross-sector co-operations between companies/SMEs; new start-ups in the domain; concept bikes; Eurobike Award Nominations; better (city) bike infrastructure; higher awareness of importance of bike in cities	Smart City (Smart Mobility) / Embedded Systems	Appreciate and leverage regional and joint strengths, create a joint regional vision, collaborate across sectors, strengthen cluster organizations, strengthen European competitiveness on ESSC, develop innovation competences and capabilities, stimulate SMEs as international innovators, unlock new opportunities, develop entrepreneurship	
Industry	**SMEs**	**Policy**	**Research**
x	x		x

2.8   *City of Things*

Project Proposer: DSP Valley

Reviewer comment: City-size living lab

Description:
City of Things is a one-of-a-kind initiative, connecting 200.000 urban citizens with developers and tech entrepreneurs, through a massive amount of smart devices spread over the city of Antwerp.

Expected Output / Impact	Area: Smart City/ Embedded Systems	Focus Goals & Sub goals	
City: differentiation, positioning of Antwerp as innovative city, focus on business and brains, city marketing, attracting business to Antwerp, new ventures	Smart Services (integrate city and commercial services), Personal mobility (multimodal transport), Health by using beacons, self-reporting, Retail (innovation boulevard)	Create value together, focus on SMEs, unlock new opportunities, develop entrepreneurship	
Industry	**SMEs**	**Policy**	**Research**
x	x		x

3   Delta Analysis Evaluation Procedure

Following the idea of virtual evaluation, the goal was to find out if a proposed action would have been beneficial, had it been implemented in a specific project.

To obtain this answer, we turned to the experienced project managers that run or ran those projects, to gather their input on the answers. Their feedback was generally collected in the form of interviews – in person, or via phone.

The hard work really fell to those project managers. For each of the proposed actions, they had to imagine implementing it in their project. Then look at the CLINES goals, and the associated Key Performance Indicators (KPIs), and judge if the action, in their project, would have helped the CLINES goals/KPIs. They thus did a delta analysis (verdict) of the projection (what would it do) and baseline (their project experience).
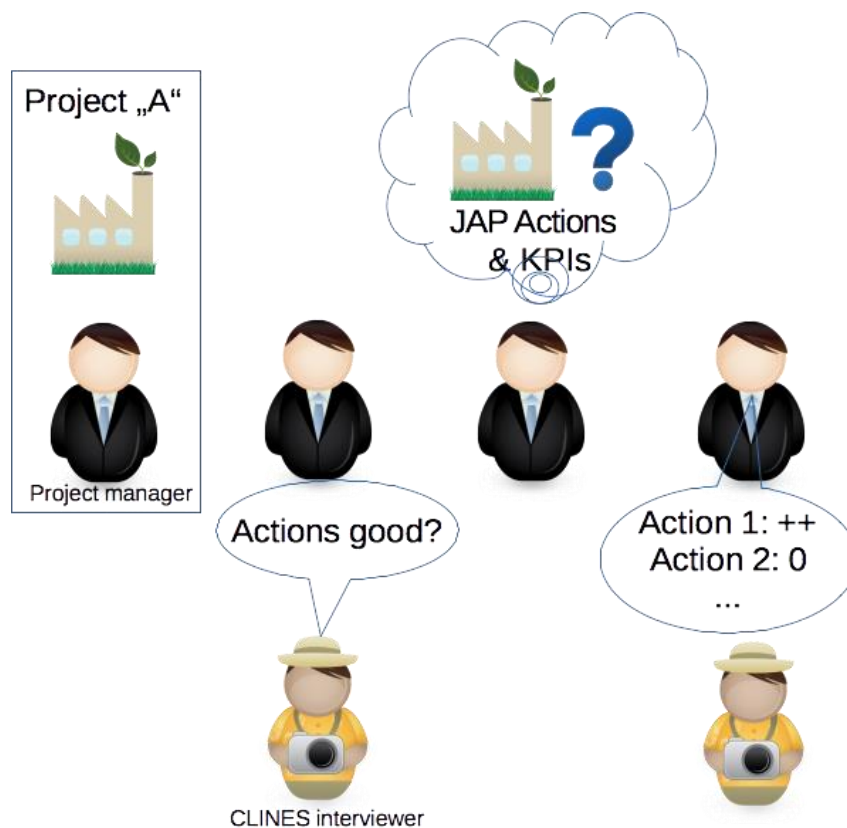
Figure: Obtaining evaluations for each action: The project manager of a specific project "A" was given the actions planned under the CLINES JAP. The project manager then evaluated if these actions would have helped his project – using the CLINES KPIs as a guideline. His evaluation was documented by the CLINES interviewer.

An example: An expert from the Smart Bike project would consider the action "Create common vision based on SWOT", evaluating how it would impact the sub goal of "leverage joint and regional strengths". For that, he would look at the relevant KPIs "Big picture Smart City" and "Smart specialisation value chains", and then decide that it would "help" (+).

In the following, you will find a table with the goals and sub goals of CLINES and the corresponding KPIs, and a description of the categories the project managers had to use to rate the action.

3.1 Goals and KPIs for virtual evaluation

This table shows the goals and sub goals of the CLINES project (compare D4.2), and the corresponding KPIs (compare D6.1) that were used by the project managers to rate the success of the proposed actions under virtual application to their project.

Goals	Sub goals	KPIs
Improve SmartCityTech smart specialisation		
	Create a joint regional vision	- Smart Specialisation services - Companies positioned in Smart Specialisation - Acceptance of the Smart Specialisation Strategy
	Appreciate and leverage regional and joint strengths	- Big picture Smart City - Smart specialisation value chains
	Focus research effort	Research institutions positioned in Smart Specialisation
	Involve stakeholders	- Attractiveness of Smart City Platform - Involvement of local authorities
	Collaborate across sectors	Reference projects
	Create public & political awareness	- Policy acknowledging ES as KET for Smart Cities - Public awareness for ES as KET for Smart Cities

Build a vibrant SmartCityTech eco-system		
	Improve visibility to strengthen European competitiveness on SmartCityTechnology	• Formal CLINES / ESSC cluster office • Showrooms and prototypes • ESSC competence publications
	Create joint value	• Creation of project networks
	Improve attractiveness	• Contact requests
	Foster transnational cooperation between regional eco-systems	• Formalised cluster cooperation • Cluster exchange intensity
	Strengthen cluster organisations	• Personnel stability • Stable base funding • Policy recognition
Develop innovation capacities		
	Develop innovation competences and capabilities	• Common innovation activities • Contact intensity SME - university departments
	Close research & technology gaps	• Formal Business-Academia cooperations
	Stimulate SMEs as international innovators	• Innovative topics visible to SMEs Access to Innovation Infrastructure
Create more business		
	Develop entrepreneurship	• Smart City training for entrepreneurs
	Develop business models	• Offer construction

	Unlock new opportunities	• Contact intensity between SMEs and big players
	Improve access to international partners	• International contacts
	Focus on SMEs and start-ups	• International ES markets for SMEs • SME Federation
Mobilise funding sources for SmartCityTech		
	Facilitate public-private-partnering	• PPP Best Practices
	Provide knowledge of commercial investment, entrepreneurial funding, and venture capital	• Contact with funding organisations
	Provide knowledge of public funding opportunities	

3.2 Action evaluation categories

A project manager evaluating an action in virtual application to his project could choose from the following reply options:

++ Helps
The action definitely helps to achieve the goal under consideration.

+ Helps a little
The action makes it easier to achieve the goal.

0 No effect
The action has no effect on achieving the goal or not.

- Hurts
The action actually hinders in achieving the goal.

n/a Not applicable
The action would make no sense in the scope of my project. It can thus not be evaluated.

4   Evaluation Statistics

This section gives the results of the virtual evaluation and baseline analysis. For each action, it contains the combined evaluations of the project managers if the action supports the individual CLINES sub goals for which it was introduced. For an explanation of the evaluation categories, see Chapter 3.2.

Note that the number of projects evaluated is eight (see Chapter 2), the valuations for each action thus sum up to 8 (including "n/a", of course).

Example: For the action "Create common vision based on SWOT", and the sub goal of "create regional vision", two project managers concluded the action is not applicable in their project, two said it "helps a little", and four said it "helps".

4.1   Create common vision based on SWOT

Sub goals /Values	n/a	-	0	+	++
Create regional vision	2			2	4
Leverage regional strengths				3	5
Focus research effort			3	2	3
Involve stakeholders		1		2	5
Collaborate across sectors		1		3	4
Create awareness			1	2	5

4.2   Mediate cross-sector and to public agencies

Sub goals /Values	n/a	-	0	+	++
Create regional vision	1			5	2
Leverage regional strengths				6	2
Focus research effort			1	5	2

	n/a	-	0	+	++
Involve stakeholders				1	1	6
Collaborate across sectors					3	5
Create awareness				2	3	3

4.3   Permanent Smart City stakeholder roundtable

Sub goals /Values	n/a	-	0	+	++
Create regional vision	2			2	4
Leverage regional strengths	1			2	5
Focus research effort	1			3	4
Involve stakeholders	1			2	5
Collaborate across sectors	1			2	5
Create awareness	1		1	2	4

4.4   Communicate CLINES vision; use examples

Sub goals /Values	n/a	-	0	+	++
Create regional vision	1	1		4	2
Leverage regional strengths		1	1	5	1
Focus research effort	1		1	5	1
Involve stakeholders		1		4	3
Collaborate across sectors			1	6	1
Create awareness	1			6	1

4.5   *Analyse and influence regional policies*

Sub goals /Values	n/a	-	0	+	++
Create regional vision	2		2	3	1
Leverage regional strengths	2		2	2	2
Focus research effort	2	2	2	1	1
Involve stakeholders	2		2	3	1
Collaborate across sectors	2		2	2	2
Create awareness	1	1	1	4	1

4.6   *Joint international events*

Sub goals /Values	n/a	-	0	+	++
Improve visibility	1	1		3	3
Create joint value	1	1	2	2	2
Improve attractiveness	1	1		4	2
Cooperation between eco-systems	1	1		4	2
Strengthen cluster organisations	2	1	1	2	2

4.7   *Formal Smart City/CLINES office*

Sub goals /Values	n/a	-	0	+	++
Improve visibility	2		2	3	1
Create joint value	2		3	2	1

	n/a	-	0	+	++
Improve attractiveness	1		2	4	1
Cooperation between eco-systems	2	2	2	1	1
Strengthen cluster organisations	2	1	2		3

4.8   *Matchmaking across sectors and across regions*

Sub goals /Values	n/a	-	0	+	++
Improve visibility	1			2	5
Create joint value	1	1	1	1	4
Improve attractiveness	1			4	3
Cooperation between eco-systems	1			3	4
Strengthen cluster organisations	2	1	2	1	2

4.9   *Connect to similar (EU) projects*

Sub goals /Values	n/a	-	0	+	++
Improve visibility			1	3	4
Create joint value		1	3	1	3
Improve attractiveness			1	4	3
Cooperation between eco-systems			1	5	2
Strengthen cluster organisations	1	1	2	2	2

4.10 Company access to research groups, testbeds, and technical infrastructure

Sub goals /Values	n/a	-	0	+	++
Develop innovation competences	1			3	4
Close research & technology gaps	1			4	3
Stimulate SMEs as int. innovators	1	1		2	4

4.11 Innovation Workshops

Sub goals /Values	n/a	-	0	+	++
Develop innovation competences				3	5
Close research & technology gaps				3	5
Stimulate SMEs as int. innovators				1	7

4.12 Innovation sharing via demonstrators

Sub goals /Values	n/a	-	0	+	++
Develop innovation competences	1		1	1	5
Close research & technology gaps	1		1	3	3
Stimulate SMEs as int. innovators	1			1	6

4.13   Understand users via use cases

Sub goals /Values	n/a	-	0	+	++
Develop innovation competences				2	6
Close research & technology gaps			1	2	5
Stimulate SMEs as int. innovators			1	1	6

4.14   Better access to innovation competence via training/mentoring

Sub goals /Values	n/a	-	0	+	++
Develop innovation competences	1			5	2
Close research & technology gaps	1			5	2
Stimulate SMEs as int. innovators	1			3	4

4.15   Exchange of knowledge for Smart Cities (technology, solutions required)

Sub goals /Values	n/a	-	0	+	++
Develop entrepreneurship	1		2	5	
Develop business models	1			6	1
Unlock new opportunities	1			6	1
Improve access to int. partners	1		1	6	
Focus on SMEs and start-ups	1		1	6	

4.16   Match Making / Open development models

Sub goals /Values	n/a	-	0	+	++
Develop entrepreneurship	1		1	3	3
Develop business models	1		1	4	2
Unlock new opportunities	1				7
Improve access to int. partners	1				7
Focus on SMEs and start-ups	1		1	3	3

4.17   Facilitate international outreach for SMEs

Sub goals /Values	n/a	-	0	+	++
Develop entrepreneurship	2		1	4	1
Develop business models	2		1	4	1
Unlock new opportunities	2			1	5
Improve access to int. partners	2			1	5
Focus on SMEs and start-ups	2		1	2	3

4.18   Knowledge on business models

Sub goals /Values	n/a	-	0	+	++
Develop entrepreneurship		1	2	4	1
Develop business models				4	4
Unlock new opportunities				6	2

Improve access to int. partners			3	5	
Focus on SMEs and start-ups		2	1	4	1

4.19   Exchange between universities (entrepreneurship, technical skills)

Sub goals /Values	n/a	-	0	+	++
Develop entrepreneurship	3	1	1	3	
Develop business models	3	1		2	2
Unlock new opportunities	3	1		2	2
Improve access to int. partners	3	2	1	2	
Focus on SMEs and start-ups	3	1	1	3	

4.20   Public procurement

Sub goals /Values	n/a	-	0	+	++
Develop entrepreneurship	4		1		3
Develop business models	4			2	2
Unlock new opportunities	4			2	2
Improve access to int. partners	4		2	2	
Focus on SMEs and start-ups	4		1	3	

4.21   Funding opportunity exchange via regional lobby and funding offices

Sub goals /Values	n/a	-	0	+	++
Facilitate public-private-partnering			2	5	1
Provide knowledge on funding		1	2	4	1
Knowledge of public funding			2	5	1

4.22   Exchange knowledge on commercial investment

Sub goals /Values	n/a	-	0	+	++
Facilitate public-private-partnering			2	5	1
Provide knowledge on funding			2	4	2
Knowledge of public funding			3	3	2