Syntegration

Brainport Smart District

Helmond, April 5th-8th 2017

"What do we need to start with today to make Brainport Smart District by 2022

a lighthouse as the most livable adaptive residential area

using cutting edge research and technology

enhancing socio-economic development?"

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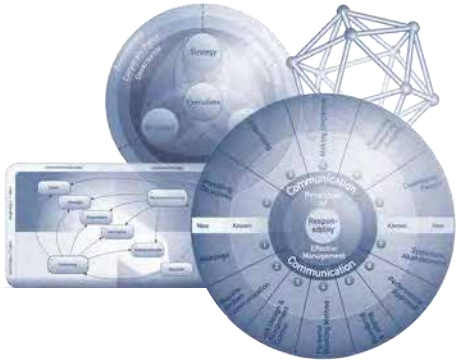
May 18th 2017



System-cybernetic
Malik ManagementSystems®
for mastering complexity

Reading Guide for the digital Report

Please note the following points when reading the **digital** report:

1. **Links** for quick and easy navigation:
   a. Main navigation area: in the center at the top of each slide
   b. Links to further details: within the text or in the footnotes. Slides that are interrelated are being presented connectedly. Return to the starting point by several mouse clicks or by pushing the ESC-key once.
2. **Colors** in graphics and models carry information and make navigation and understanding easier.
   The colored bullets correlate to the 12 topics of the syntegration.

Glossary

BSD:	Brainport Smart District
IMS:	Integrated Management System
IOT:	Internet of things
MAAS:	Mobility as a service
PM:	Project Management
S1-5:	System 1-5 / system function 1-5, see VSM
SME:	small and medium sized enterprises
TCA:	Tasks, Competences, Accountabilities
TIEx:	Total Immersion Exploration
TCC:	Transformation Control Center
VSM:	Viable System Model

Table of Contents

42 Participants discuss and shape the future of Brainport Smart District

Participants: Experts and representatives of
industry, knowledge institutes, government, network organizations and civil society

Helmond, Automotive Campus
April 7th 2017

Picture: Third day of the syntegration. The list of participants can be found here.

- Executive Summary -

- Executive Summary -
Key results of the Syntegration

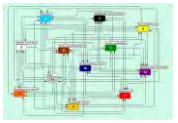
1. With the Syntegration, BSD integrates into different levels of a system of innovation (local, regional, national and also international).
2. The participants who mostly did not know each other before quickly found into an effective mode of intense collaboration. This was due to the high interconnectivity of the Syntegration process starting with setting the own agenda on the first day.
3. Integration of expert- and context knowledge during the Syntegration. The continued interconnection after the Syntegration is crucial for the success of the implementation.
4. A Smart District needs Smart Governance: Interconnected and highly dynamic urban development requires a sufficiently high control capacity to process information real time in a complex decision situation. Information must be filtered, compressed, integrated to initiate the right control measures. Effective implementation of complex urban projects needs sufficient capacity and expertise to manage this complex and highly dynamic transformation process. See the proposal for an exemplary governance structure for the ecosystem BSD on page 62.
5. A specialty in the case of BSD is certainly that an entire district will be designed and built from scratch. It will be the job of the implementation team to realize it by 2022.
6. There is not only a governance structure needed for the future city district but also for implementation. And because the implementation team will be around for quite a long time, we suggest to organize it according to the same viability principles as the district itself – just on a temporary basis.
7. The first steps taken are strategically crucial for further success: The Syntegration members see the highest priority in the design of this process and the definition of Phase One: Implementation of BSD with an open infrastructure approach. See ranking of projects on page 86.
8. 'We need to implement specific projects in the necessary order and timeline.' (Participant quote): The overall roadmap for BSD has to be elaborated, defining the strategic objectives of the topics/programs and pointing out interdependencies between topics/programs and actions.
9. The transitional strategy will determine BSD's elementary path by following the fundamental policy decisions. It will further define how BSD meets its ambition and its future challenges in a changing environment. Operational planning in the sense of a multi-annual plan will then translate the strategy's objective and benchmarks and its key measures into daily business.

Corners of the icosahedron

The 12 topics of the Syntegration

The topics and recommendations are interconnected

Systemic interconnection of the topics: Link



Green — Diverse participation

What has to be done to integrate all relevant stakeholders in the process of design and implementation to reach the best diverse participation?

Group members: Thom Hawxwell, Nicolle Lambrechts, Laurens Schwiebert, Lara Tamarinof, Christ Tielemans, Sander Willems, Mariane Zuleta Ferrari

Yellow — Open infrastructure

What has to be considered and done to build a future infrastructure that serves the needs of all relevant stakeholders and is adaptive over time?

Group members: Noud de Loos, Bauke de Vries, Lorenzo Della Corte, Marieke Post, Willem-Jan van den Heuvel, Dirk van Helvoirt, Alexander Vancolen

Brown — Green self-sustainable city

What has to be considered to make BSD "green" and self-sustainable?

Group members: Michael J. Dawkins, Thom Hawxwell, Sebastian Perez, Marieke Schoots, Christ Tielemans, Paul van Rijn, Wiko Wolters

Red — Resilient city

What are the requirements to make BSD resilient? Which actions have to be taken to move to resilience of a SMART district?

Group members: Nico Baken, Geertje de Kort, Manon Grond, Martijn Messing, Jeroen Naves, Marieke Post, Rianne Valkenburg

Purple — Attractive built environment

What has to be done regarding appearance, methods and processes to make BSD a highly attractive and safe place to live and work?

Group members: Noud de Loos, Lorenzo Della Corte, Manon Grond, Elphi Nelissen, Anna Oosterhuis, Sebastian Perez, Joost van der Geest

Gold — An area with energy

What has to be done to design BSD as an area with free, accessible and renewable energy in 2022?

Group members: Geertje de Kort, Henk Kok, Jeroen Kroonen, Nicolle Lambrechts, Martijn Messing, Leon Piepers, Michael van Hulst

Silver — Data

What has to be done to ensure that acquisition and usage of data supports the implementation and operation of BSD?

Group members: Jeroen Kroonen, Joost Meijer, Rens Mulder, Leon Piepers, Alexander Schmidt, Sander Willems, Mariane Zuleta Ferrari

White — Mobility in, to and from

How can mobility for persons, goods and services be SMARTly designed regarding dimensions and modes?

Group members: Michael J. Dawkins, Josje Mooibroek, Peter Portheine, Alexander Schmidt, Lara Tamarinof, Dick van Beuzekom, Willy van der Heijden

Orange — Everything as a service

What has to be done to make BSD a society that "shares" to improve quality of life?

Group members: Nico Baken, Debra Becker, Henk Kok, Joost Meijer, Willem-Jan van den Heuvel, Dike van de Mheen, Alexander Vancolen

Black — Health and well-being in a participating society

What areas need to be addressed to take health and well-being to a next level in a SMART district and a participating society?

Group members: Debra Becker, Rens Mulder, Wytske Teeuwen, Dick van Beuzekom, Willy van der Heijden, Dirk van Helvoirt, Dike van de Mheen

Light blue — €cosystem

How can the €cosystem of BSD be created to fulfill the expectations of current and future stakeholders and at the same time meet the challenges of a SMART district?

Group members: Jeroen Naves, Anna Oosterhuis, Laurens Schwiebert, Rianne Valkenburg, Michael van Hulst, Paul van Rijn, Wiko Wolters

Dark blue — Implementation Process

How do we have to organize ourselves to ensure that the actions necessary to achieve BSD will be implemented?

Group members: Bauke de Vries, Josje Mooibroek, Elphi Nelissen, Peter Portheine, Marieke Schoots, Wytske Teeuwen, Joost van der Geest

The 34 recommendations from the 12 topics (1/2)

Group	Topic	Nr	Recommendations	Contact Person
Green	Diverse participation	1	Participatory platforms	Nicolle Lambrechts Wytske Teeuwen Thijs Nooijen
		2	Develop concrete co-creation processes	
		3	Long Term participation	
Yellow	Open infrastructure	1	Open Infrastructure	Marieke Post
Brown	Green self-sustainable city	1	Ensuring the green	Christ Tielemans
		2	Mapping of stocks and flows	Thom Hawxwell
		3	Ensuring regeneration aspects of BSD	Sebastian Perez
Red	Resilient City	1	Create and adopt a resilience index	Geertje de Kort
		2	Risk analysis	
		3	Personal resilience	
Purple	Attractive built environment	1	Create a new perspective on attractiveness built environment	Sebastian Perez
		2	Realize attractive built environment	
		3	Create innovative ways to planning and building	Joost van der Geest
Gold	An area with energy	1	Facilitate / Create an alliance	Nicolle Lambrechts
		2	Build up an energy transition design team	Michael van Hulst

The 34 recommendations from the 12 topics (2/2)

Group	Topic	Nr	Recommendations	Contact Person
Silver	Data	1	Start a living manifesto	Joost Meijer
		2	Design the data galaxy	
		3	Design the nerd room (platform for business)	Alexander Schmidt
		4	Education center (platform for people)	Sander Willems
White	Mobility in, to and from	1	Develop MAAS system	Josje Moolbroek
		2	Building up infrastructure, mobility, green sustainable city design team	
		3	Ist-analysis now	Alexander Schmidt
		4	Deliver comfortable goods delivery system	Dick van Beuzekom
Orange	Everything as a service	1	Review existing knowledge – specifically Brandevoort 1	Lara Tamarinof
		2	Define short term sharing priorities – key initial success areas.	Joost Meijer
		3	Define long term sharing / communal sharing structure	Alexander Vancolen
Black	Health and well-being in a participating society	1	Design support	Wytske Teeuwen
		2	People behavior	
		3	Design and environment	Wytske Teeuwen Dirk van Helvoirt
Light blue	Ecosystem	1	Financial team	Anna Oosterhuis
		2	New value creation	Rianne Valkenburg
		3	Inspiration team	
Dark blue	Implementation process	1	Create the start-up process – Phase 1 of the implementation	Peter Portheine
		2	Information Accumulation	Bauke de Vries

Implementation of the Syntegration results

Next steps

(1) Set up Governance Structure (tasks, competences, responsibilities)

(2) Define members of the implementation team (tasks, competences, responsibilities).

(3) Set up and train as a task force.

(4) Define governance model: communication (feed forward feed back), decision-making process (boards, escalation), participation (transparency, citizen feedback), mode of working

(5) Define principles (premises for design)

(6) Design Implementation process Phase One (tentative design)

(7) Define Pilot (and set checkpoints/milestones for reality checks)

(8) Run (coached)

The six standard assessment issues are evaluated positively

71% of the participants evaluate the benefits of the results for the organization as very good and good. Two thirds consider their willingness for implementation high and very high. The exchange of information and knowledge is at 82%. For a large group of participants of whom many did not know each other before, this is a very good result.

Some oral feedbacks by the participants at the end of the Syntegration:

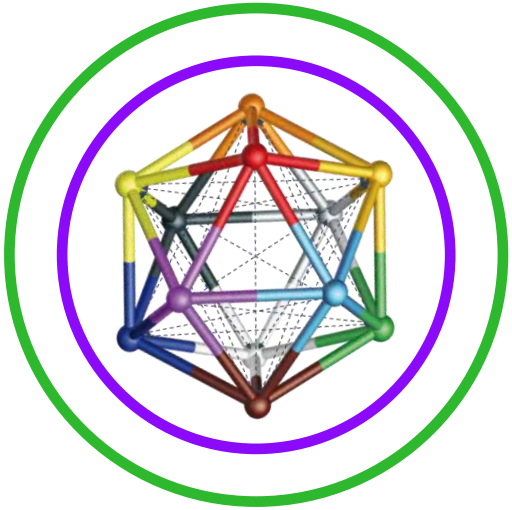
Everyone starts thinking outside the box

Complex problems can only be solved from different angles and with different views

The dreamed future became clear

You can get good results despite the complexity of the topics and the large number of people involved.

The complete oral feedbacks are at the end of this report (link). The evaluation of the participants' written feedback is to be found in a separate document.



- Detailed Report -

The Syntegration process and the results after 3½ days

Syntegration Process

Cybernetic communication architecture and simultaneous, holistic exploration for effective implementation

No. of projects to be defined

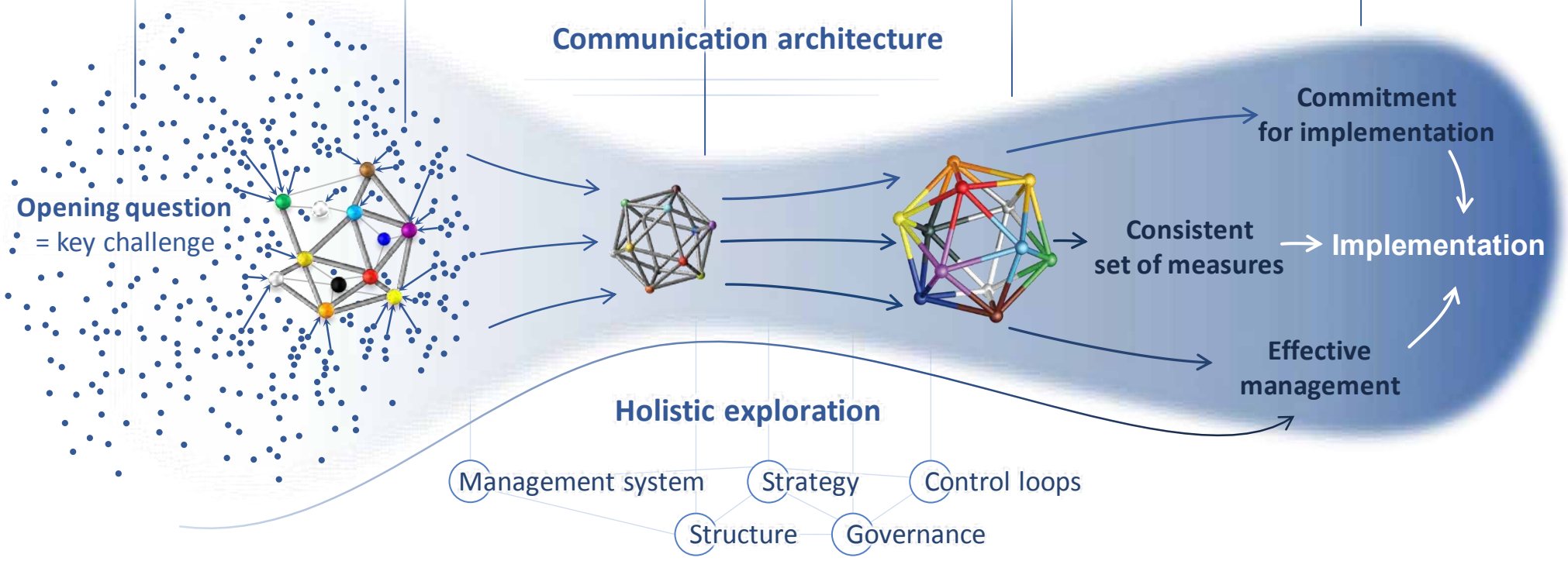
401 Statements of importance

21 Topic candidates

12 Topics

34 Recommendations for action

XX Projects*



* Projects = Bundling of recommendations for actions by the implementation team, partly based on the evaluation of the systemic impact, can be supported by Malik experts.

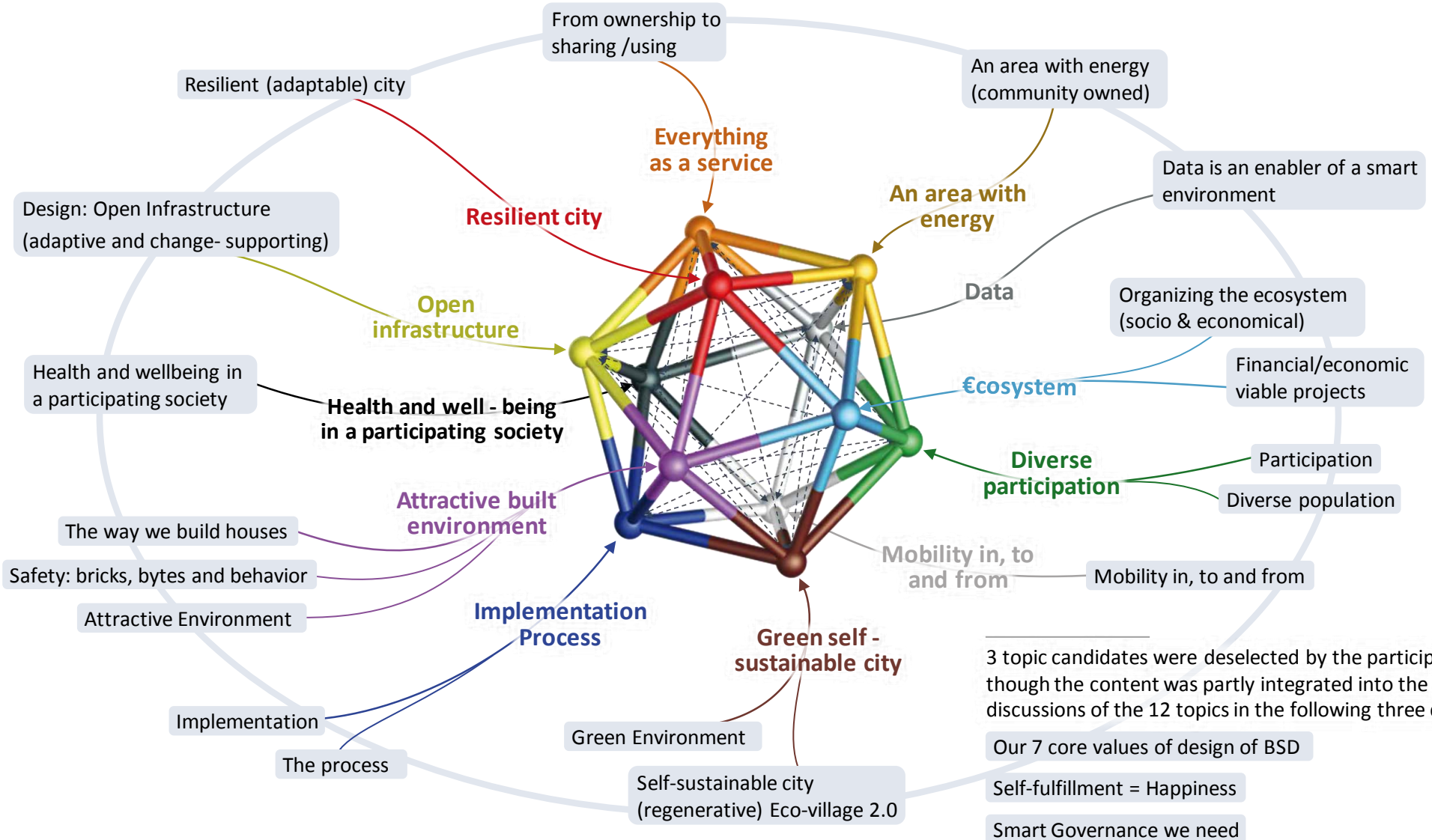
The 42 participants set their own agenda: 401 statements of importance …

Condensed to 21 topic candidates ...

No.	Topic / proposed by	Content
1.	**Implementation** Peter Portheine	How to ensure effective implementation of our Syntegration results?
2.	**An Area with energy (community owned)** Michael van Hulst	What: Decentralized sustainable (aggregator); Why: (Relevance) How: participation, owned product, storage, trading, distribution Examples: Solar, wind , geothermal, open source district heating, heat & cold exchange (low temperature); Argument: profit to the people (power)
3.	**Health and wellbeing in a participating society** Dick van Beuzekom	Health care cares about health, not about sickness, Technology can help us there, Less cure, more prevention, more care; Equal accessibility, Cost reduction, Sharing responsibility; Built environment will reflect inclusion and wellbeing and promote healthy living
4.	**From ownership to sharing /using** Alex Schmidt	From owning of using: More efficient if physical products are owned and maintained by a service provider, Competition among service providers creates efficiency, Cannot be subject to pure/unrestraint market → rules; Concept of sharing; Free will to choose for each individual; Oblige to circular economy
5.	**Our 7 core values of design of BSD** Jeroen Kroonen	What: design and work together based on set of core values; Why: without core values no common ground; How: dynamic process and use core values as check; Examples: respect for end-user, share your data, happiness and respect for all, from me to we, from ego to eco, sense of ownership, "The 10 commandments", take user participation as your core
6.	**Self-sustainable city (regenerative) Eco-village 2.0** Sebastian Perez	What: A city that solves problems and demands where they are created; Why: Cities become independent from grid systems, cleaning pollution; How: Design self-sufficient system: energy positive, water, sewage, food, ownership network and data, people first - technology second, permaculture
7.	**Data is an enabler of a smart environment** Joost Meijer	Data should be owned by the people → group; Service provider are allowed on the network → decided by the group; Network should be democratic and open; Blockchain / IOT as enablers
8.	**Participation** Willems Sander	What: Social inclusion (=> vulnerable groups), build houses people, community involvement, commitment: shared values, shared spaces, end-user driven, idea sharing
9.	**Attractive Environment** Manon Grand	What: 1. Quality of the built environment and public space, 2. Light House. Attractive = sustainable => Quality of Life; Flexible, Modular Adaptive to changes in urban space design
10.	**Green Environment** Christ Tielemans	What: green area / blue area, food production / personal mobility, climate adaptation; Why: health, education, O2 & CO2, biodiversity; How: Social and human needs as a starting point

No.	Topic / proposed by	Content
11.	**Self-fulfillment = Happiness** Nico Baaken	Value! psychês energeia ginetai kat' aretên; Why: Happiness: enjoy, acknowledgement, insight; How: By cultivating the civic virtues and fostering communities
12.	**Mobility: in, to and from** Joost van der Geest	Car-free areas, MAAS, shared, Hyperloop to Düsseldorf, bike proof, walkability, vibrant public space, automated transport
13.	**Open Infrastructure (adaptive and change-supporting)** Leon Piepers	We need to develop/build/maintain infrastructure to support our new smart system over time; infrastructure supports everything; examples: local heat distribution, water waste recycle loops, modular design for future needs, resilience by design
14.	**Financial/economic viable projects** Laurens Schwiebert	Why: to make it come true; How: To make choices; What: attracts private/public founding, incorporate private stakeholders, industry/SME's
15.	**Resilient (adaptable) city** Marieke Schoots	What: coping, recover, absorb, adapt, transform and grow as an area; Able to fail safely / smart in 10 years; Why: There will be shocks: migrations, climate, terrorism; Arguments: adequate reaction to major events or chronic issues like artificial intelligence and climate migration; Examples: adaptive policy-making, feedback loops, from drugs and crime to new urban design / mobility
16.	**Organizing the ecosystem (socio & economical)** Rianne Valkenburg	What: new business models for realizing and developing, involving QH (incl. residents) in a sustainable way; How: Create commitment and opportunities with value for all; for everything: mobility, energy, services etc.; creating platforms for continuous innovation and adaptation
17.	**Diverse population** Debra Becker	Accommodate all ages, women, background; Refresh population; Creates more resilient environment; Creates social cohesion and support; Diverse popul. is smart: more viewpoints; risk reduction; Difference seen as strength.
18.	**Smart Governance we need** Martijn Messing	Why: Rules and regulation, political decision-making, government management structures, block for development of BSD; How: Direct democracy, Experimental status, Self-organization
19.	**The way we build houses** Anna Oosterhuis	Building houses as blocks (modular) / printing on demand; Finding a more integral concept of constructing and re-constructing; Slim bouwen; Climate adaptive (new materials / cradle to cradle); Rainproof
20.	**Safety: bricks, bytes and behavior** Lara Tamarinof	What: A safe place, without detection/fear/cameras/gates; Why: To live at ease; How: Building, architectural design, supported by traditional technology
21.	**The process** Jeroen Naves	What: Find a realistic way to realize the goals; How: User involvement, Involvement of companies, Think about money, Think about regulation; Why: Goals need to be realistic

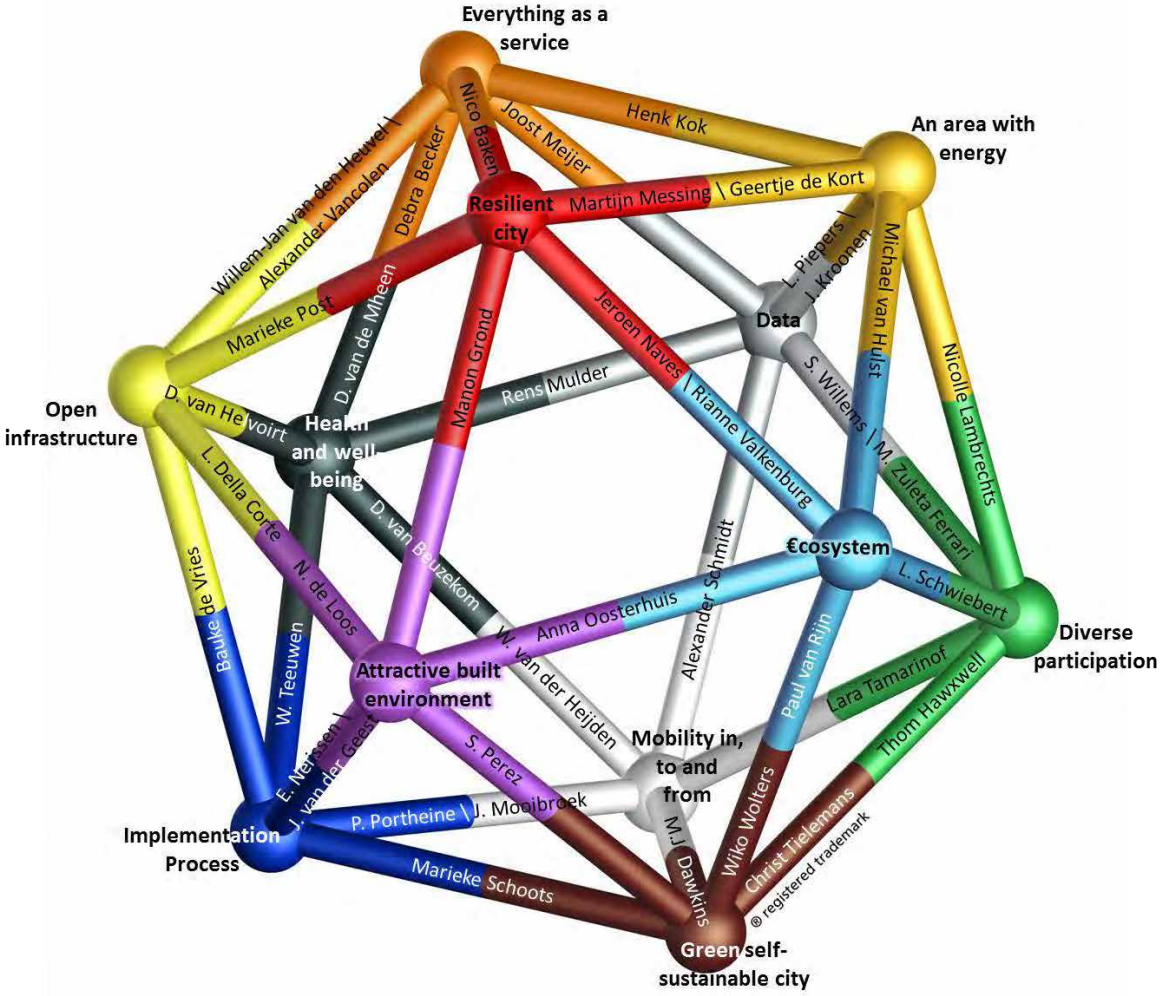
… Consolidated by the participants to the 12 topics of the Syntegration



3 topic candidates were deselected by the participants, though the content was partly integrated into the discussions of the 12 topics in the following three days:

- Our 7 core values of design of BSD
- Self-fulfillment = Happiness
- Smart Governance we need

Working in the most stable communication architecture for the following 3 days: Maximum interconnectivity between 42 people and the 12 topics



The 42 participants were assigned as team members to the 12 topics by an optimizing algorithm, according to their own assessment, to which topics they can contribute the most.
In two further roles – as critics and observers – every participant could contribute to and was informed about all other topics.

The communication architecture of the icosahedron, the cross-linking logic of the group compositions, the specific sequences and additional interconnecting elements, altogether maximized the interconnectivity between the 42 people and the 12 key topics.

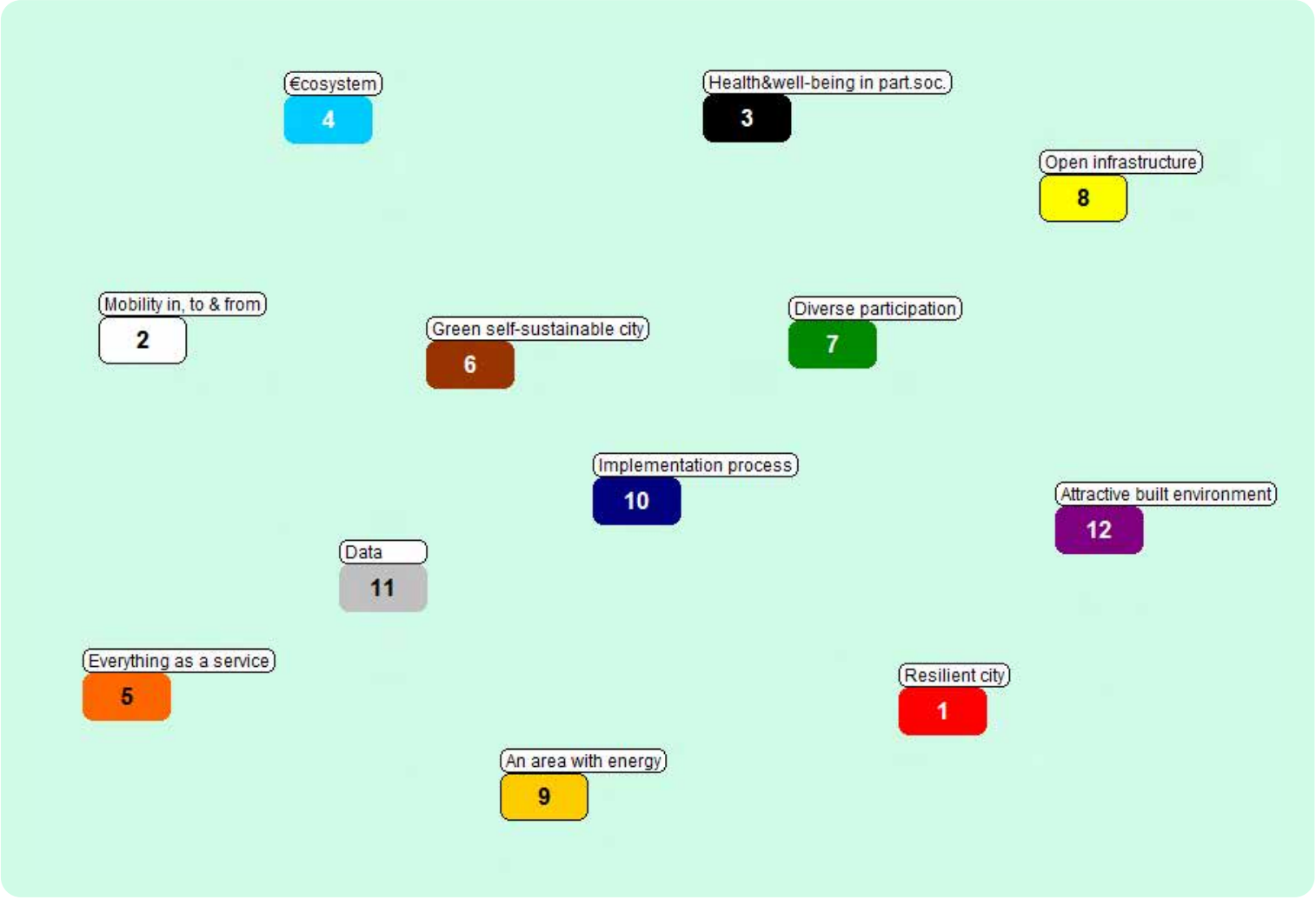
Within this structure, the participants who mostly did not know each other before, quickly found into an effective mode of intense collaboration.
After 4 days, they were interconnected on both, the people level and the content level.
The previously diverse and distributed knowledge is now shared to a wide extend and a set of interrelated recommendations and actions has been developed for all 12 topics.

The 12 topics of the Syntegration

In the next slide you will find the topics spread out over the flat of the slide for a particular purpose.

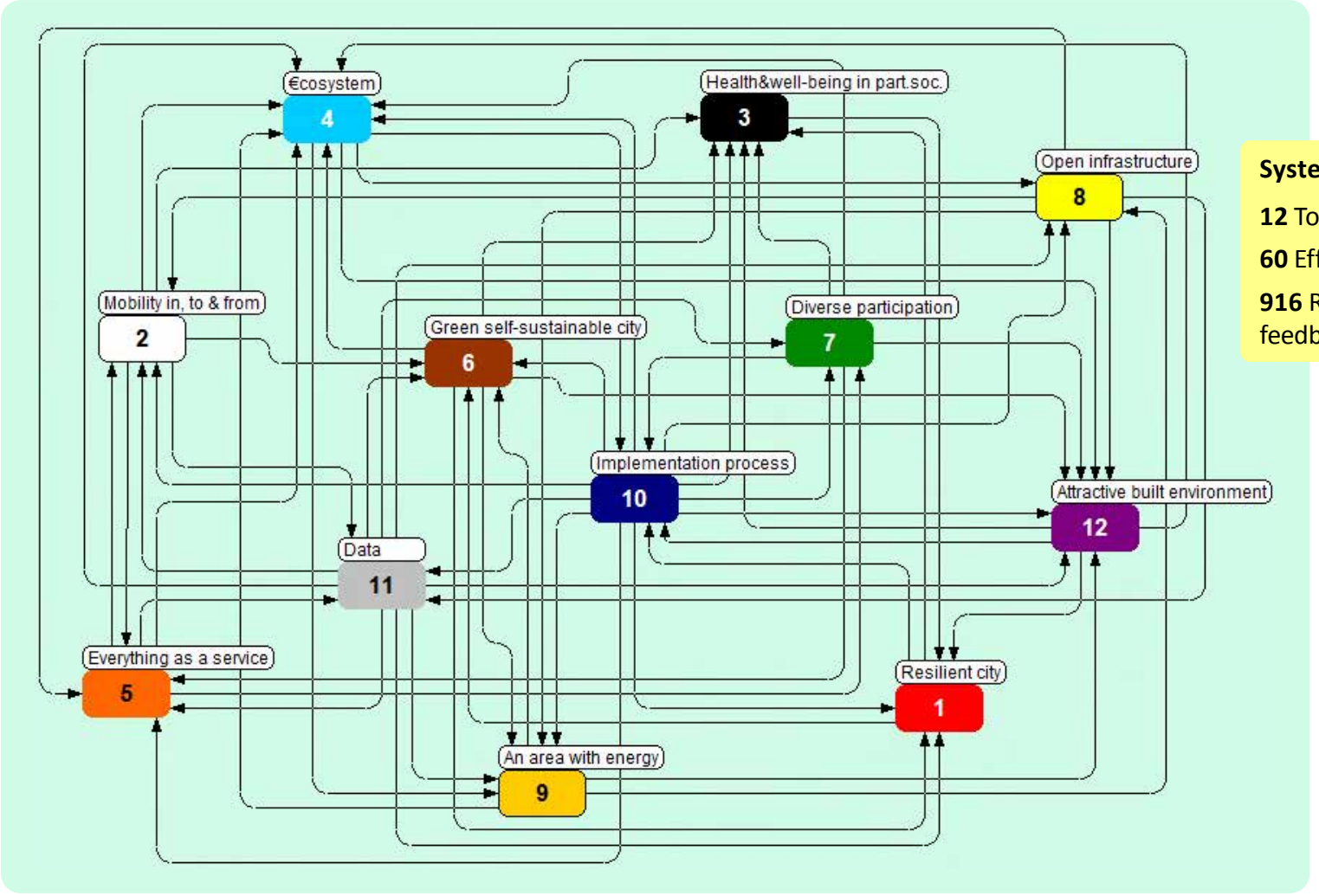
1. Diverse participation
2. Open infrastructure
3. Green self-sustainable city
4. Resilient City
5. Attractive built environment
6. An area with energy
7. Data
8. Mobility in, to and from
9. Everything as a service
10. Health and well-being in a participating society
11. Ecosystem
12. Implementation process

The 12 topics of the Syntegration …



Colors of the topics in the syntegration

… and how they are interconnected to form a system



System-Facts:

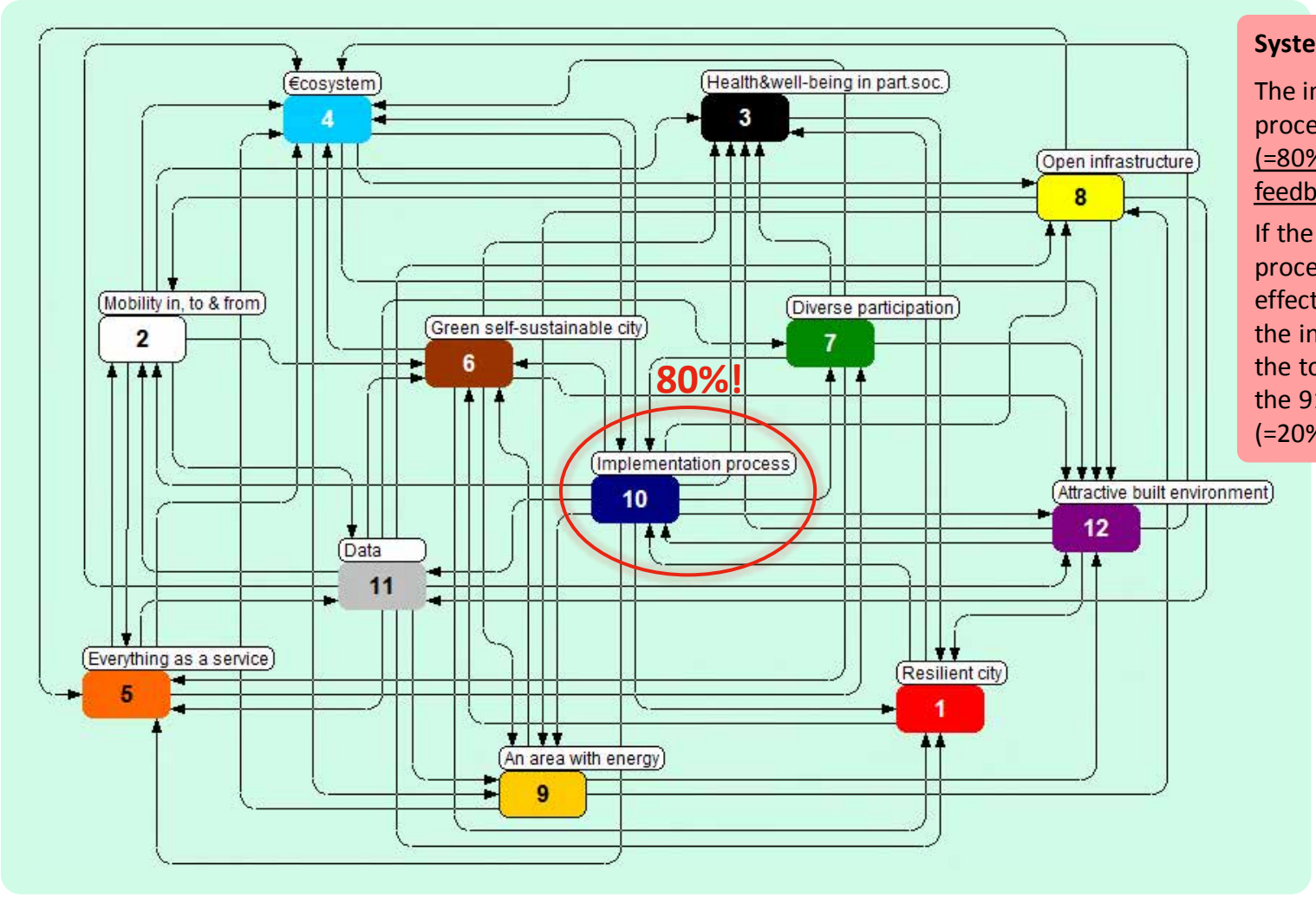
12 Topics

60 Effects

916 Reinforcing feedback loops

Colors of the topics in the syntegration

The continued interconnection after the Syntegration is crucial for the success of the implementation



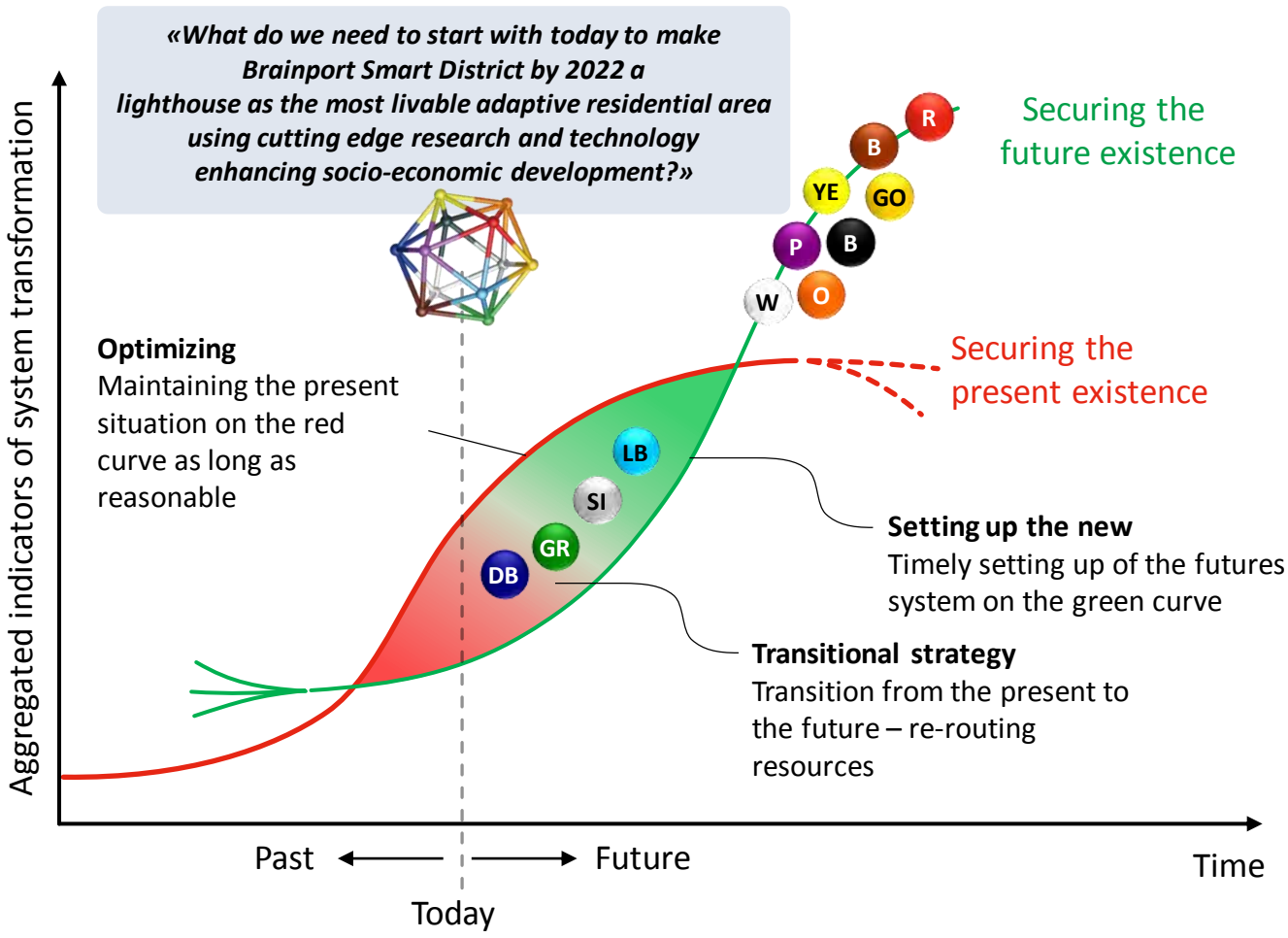
System diagnosis:

The implementation process is part of 732 (=80%) of the reinforcing feedback loops.

If the implementation process is not set up effectively, upholding the interconnection of the topics, only 184 of the 916 feedback loops (=20%) are active!

Colors of the topics in the syntegration

The double S-Curves
Paradigm of fundamental system transformations
„Replacing the existing by the new" – mapping the topics on the S-Curves



The 12 topics of the syntegration

- Green: **Diverse participation**
- Yellow: **Open infrastructure**
- Brown: **Green self-sustainable city**
- Red: **Resilient city**
- Purple: **Attractive built environment**
- Gold: **An area with energy**
- Silver: **Data**
- White: **Mobility in, to and from**
- Orange: **Everything as a service**
- Black: **Health and well-being in a participating society**
- Light blue: **€cosystem**
- Dark blue: **Implementation Process**

Reading Guide

In the following you find the **summary of the 12 work groups' results**. The focus lies on the recommendations and actions as presented at the end of the Syntegration in the plenary by the work groups. The complete summarizing statements of all working sessions and the final recommendations for action are embedded as PDF-documents on every page. For opening them, double-click on the PDF-icon, while in ordinary working mode (not in presentation mode).

During the entire Syntegration a team of five Malik management experts listened to the discussions and talked to the participants with a special focus on management, strategy, structure and governance applying the Malik Management Models to the current situation of Brainport Smart District (BSD).
This **Total Immersion Exploration** (TIEx) already started before the Syntegration: The participants were asked about BSD's challenges, weaknesses and strengths. The answers were clustered and interconnected in a system model "BSD-issues" as shown during the Syntegration (embedded to the right on this page).

The blue shaded boxes on the following pages contain hints and advice by the Malik management experts.

The in-depth exploration results are found in the fourth part of this report.

BSD-issues system_model

The **videos** of the presentations by the 12 groups at the end of the Syntegration can be viewed by clicking on the link on each of the following pages (while in Powerpoint presentation mode). Please note that the videos are embedded in the individual youtube account of Malik and cannot be found by searching google or youtube. Only persons who know the exact URL can view the videos. This way, the privacy of the presentations is protected, while still enabling you to individually share this important final moment of the Syntegration with those who could not be present.

Diverse participation

What has to be done to integrate all relevant stakeholders in the process of design and implementation to reach the best diverse participation?

Recommendations (contact person):

1. Participatory platforms (**N. Lambrechts**, W. Teeuwen, T. Nooijen -> same for all 3 recomend.)
2. Develop concrete co-creation processes
3. Long Term participation

Group members: Thom Hawxwell, Nicolle Lambrechts, Laurens Schwiebert, Lara Tamarinof, Christ Tielemans, Sander Willems, Mariane Zuleta Ferrari

Link to video

Recommen-dations

Statements of sessions 1+2

Edited transcript of the team presentation

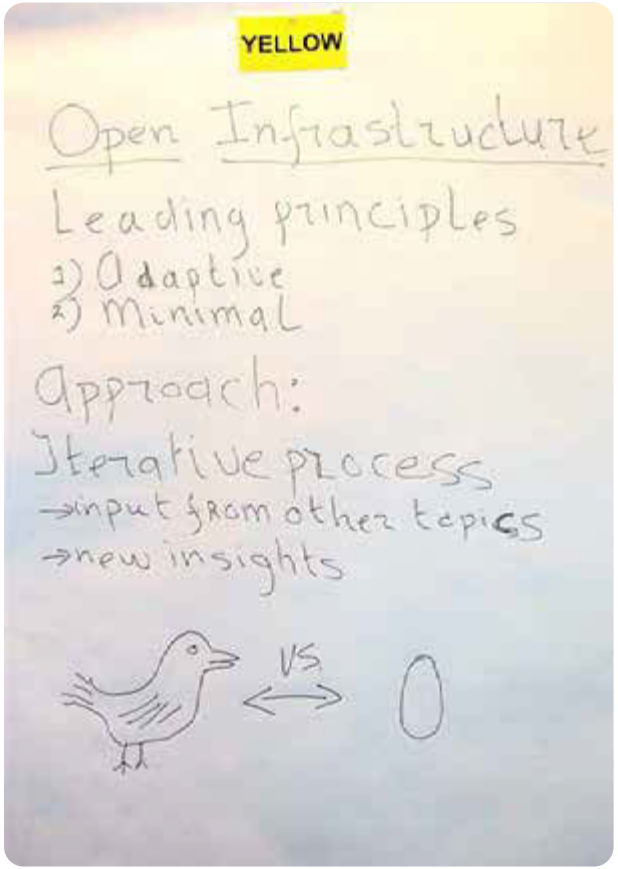
Presented by **Thom Hawxwell** (see video recording for original soundtrack):

1. We were always discussing the topic on two separate levels: on the short term and the long term level.
2. On the short term level we need to integrate participation in the design of the district, on the long term level we have to consider participation and diversity characteristics that need to exist in the district at the end.
3. On the short term level we developed a concept that is basically the idea of a co-creation process: This includes an event like a start-up competition or a hackathon where we invite future stakeholders to solve open questions or challenges that come out of the Syntegration process (see recommendation 2).
4. On a long term level we want to achieve better participation and more diversity in the district: Therefore we were looking at the idea of a participation platform (see recommendation 1) with an online and off-line area where you can share things and encourage voluntary exchange, linking also to the topic of “An area with energy” and “Data”.
5. On the third pillar we dealt with “steering for diversity”: What do we have to do now to ensure diversity in the future? We thought it would be an idea to host the diversity matrix (see recommendation 3) to the group that is developing the road map of the district.
6. We suggest to go through this process where you ask: 1) Who do we want to be living in this district? and 2) How can we integrate certain elements to the process to ensure the inclusion of these certain groups?
7. To sum it up it is all about creating the right incentives, creating the right environment and putting the right people in the process to come up with results.

a. Conduct a profound analysis of all partners / stakeholders regarding characteristics, interests and expectations in designing, implementing and operating BSD.
b. Decide which partners / stakeholders need to be involved in which topic and in which governance body as well as the stage when they have to be involved in the planning and implementation process.
c. Based on the stakeholder analysis conduct an analysis of possible conflicts and resistance that are likely to occur between the involved stakeholders. Consider which conflict strategy based on the underlying principles of creating BSD is appropriate to deal with conflicts and resistance.
d. Consider participation also in terms of a new way to govern and to modernize democracy (see reflection 1).

Open infrastructure

What has to be considered and done to build a future infrastructure that serves the needs of all relevant stakeholders and isadaptive over time?



Recommendations (contact person):
Open infrastructure (Marieke Post)

Group members: Noud de Loos, Bauke de Vries, Lorenzo Della Corte, Marieke Post, Willem-Jan van den Heuvel, Dirk van Helvoirt, Alexander Vancolen

Link to video

Recommen-dations

Statements of sessions 1+2

Edited transcript of the team presentation

Presented by **Bauke de Vries** (see video recording for original soundtrack):

1. We are in a way the counterpart of the participation topic. Participation is about people and this is about the rest. To connect things you need an infrastructure.
2. You can see that our poster (see picture on left) is rather abstract and without colors because we want to stay rather minimal and invisible as much as possible.
3. **The leading principle is that infrastructure if not needed should not be developed.**
4. We are of course aware of the fact that we should adapt to future developments. So if infrastructure is developed it should be adaptable.
5. To support this concept we need an iterative process: The drawing (see again picture on left) expresses the chicken and egg problem which played and important role during all our discussions. We need to start tomorrow and the people in this topic have their own ideas. On the other hand all the other topics have their requirements. So we are in this loop, this iterative process of bringing these things together to then at a certain time make the best decision possible within the context to keep it adaptive and minimal.

a. Institutionalize a mechanism to anticipate future developments
b. Use anticipatory legislative possibilities to stay open and flexible
c. Find ways to include governance aspects directly in the infrastructure

(For some details on a. to c., see reflection 1)

Green self-sustainable city

What has to be considered to make BSD "green" and self-sustainable?

Recommendations (contact person):

1. Ensuring the green (C. Tielemans)
2. Mapping of stocks and flows (T. Hawxwell)
3. Ensuring regeneration aspects of BSD (S. Perez)

Group members: Michael J. Dawkins, Thom Hawxwell, Sebastian Perez, Marieke Schoots, Christ Tielemans, Paul van Rijn, Wiko Wolters

Link to video

Recommen-dations

Statements of sessions 1+2

Edited transcript of the team presentation

Presented by **Sebastian Perez** (see video recording for original soundtrack):

1. The main discussion was: what is smart. I think it took us a hundred years to understand what is smart. And nature is smart.
2. I will talk about apples as an example. We are used to throwing apples away. But trees don't do that. And we, too, have to learn to put the apples back into the ground so to speak.
3. I have a dream. And it was maybe for a long time my dream alone. I felt alone with my dream. But I have realized: **WE** have a dream! And our dream is of a green self-sustainable city that
    1. generates no waste;
    2. generates clean water;
    3. generates positive energy;
    4. provides us with enough food and
    5. most importantly: provides quality of life, happiness, integration and cohesion.
4. I invite you all to share this dream and to spread it. I must be very big so that we can positively impact the region and the world **by living** in the Brainport Smart District.

Think about sub-structures of BSD that might need to be self-sustaining as well (see reflection 1).

Resilient City

What are the requirements to make BSD resilient? Which actions have to be taken to move to resilience of a SMART district?

Recommendations (contact person):

1. Create and adopt a Resilience Index (G.de Kort)
2. Risk Analysis (G.de Kort)
3. Personal Resilience (G.de Kort)

Group members: Nico Baken, Geertje de Kort, Manon Grond, Martijn Messing, Jeroen Naves, Marieke Post, Rianne Valkenburg

Link to video

Recommen-dations

Statements of sessions 1+2

Edited transcript of the team presentation

Presented by **Marieke Post and Geertje de Kort** (see video recording for original soundtrack):

1. Imagine you live in a wonderful place that supports you and your community to have a very happy and healthy life. This place offers services (provision of health care, ensuring economical independency, offering cohesion in the society and an according infrastructure) and has a governance system that overlooks it all. This ideal situation exists in a dynamic environment.
2. In the future there will be (chronic) stress attacks such as epidemics, migration, climate change, terror attacks etc.
3. All of that has an impact on our ecosystem, our environment and our personal happiness and resilience.
4. We thus would like to create a resilient model not only for the whole system but also for you as a person.
5. For this purpose we adopted 2 of the 3 components as set out in the "City Resilience Framework" by the Rockefeller Foundation; the 4 dimensions and the 7 qualities (see below). We made a matrix taking those 2 components and the basic idea is that you measure everything against it.
6. For example if you take infrastructure - however you build your infrastructure – the content of the infrastructure should be measured against it. If you take the principle "Reflectiveness" for example - are you creating a learning environment; are you learning from what could go wrong? Do you have the resourcefulness, do you have redundancy?

The 7 qualities: (1) Reflectiveness, (2) Resourcefulness, (3) Robustness, (4) Redundancy, (5) Flexibility, (6) Inclusiveness, (7) Integration.

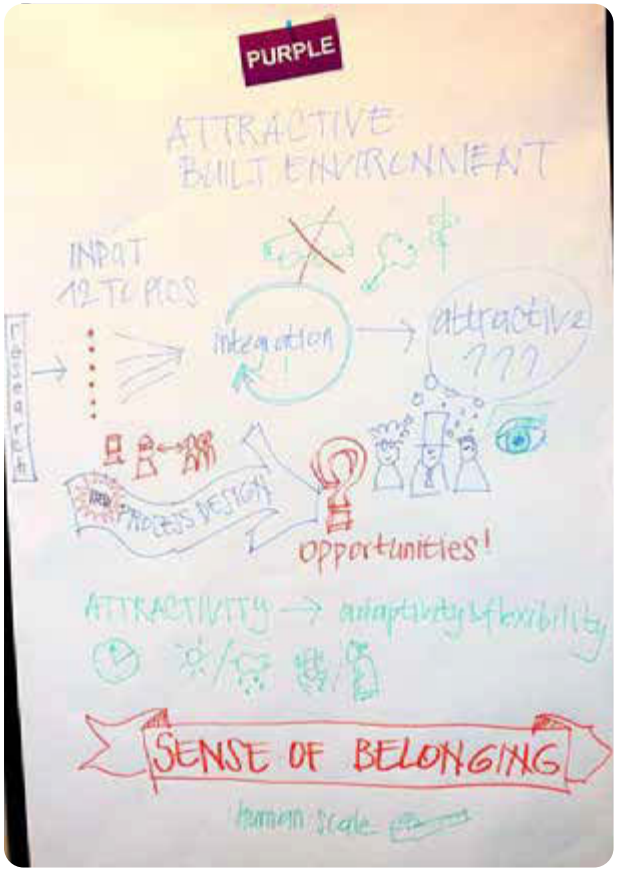
The 4 dimensions: (1) Health and Well-Being, (2) Economy and Society, (3)Infrastructure and Environment, (4) Leadership and Strategy

a. Create a governance mechanism that ensures resilience and adaptation
b. Use scenario planning as a tool
c. Make BSD ultrastable to be prepared for unexpected impacts
d. Consider that personal resilience has a management aspect as well

(For some details on a. to c., see reflection 1)

Attractive built environment

What has to be done regarding appearance, methods and processes to make BSDa highly attractive and safe place to live and work?



Recommendations (contact person):

1. Create a new perspect. on attr. built env. (S. Perez)
2. Realize attractive built environment (S. Perez)
3. Create innovative ways to planning and building (J. van der Geest)

Group members: Noud de Loos, Lorenzo Della Corte, Manon Grond, Elphi Nelissen, Anna Oosterhuis, Sebastian Perez, Joost van der Geest

Link to video

Recommen-dations

Statements of sessions 1+2

Edited transcript of the team presentation

Presented by **Joost van der Geest** (see video recording for original soundtrack):

Attractive build environment

Preamble

1. We need to work with all the input from other groups and scenarios: Can you image if there are no longer cars, if there is open infrastructure, etc.
2. Attractiveness is an individual concept: "Beauty is in the eye of the beholder"
3. -> Inhabitants of an area should be involved to design their houses and public space. So we need a new design processes to involve people in an early stage.
4. What is attractive in future? That is impossible to say.
5. -> We need to be adaptive. For instance we could employ a LEGO model for different phases in life, seasons, for requirements today and tomorrow such as a greenhouse or a summerhouse
6. An important concept in this context is the Sense of Belonging.
7. If you feel at home, that is very attractive.
8. We need to respect human scale.
9. -> Attractive building must be safe, and allow for different interests in different areas.

a. Find best practices for smart city solutions and community building. Make a virtual Showcase. Present it to other groups for input. Decide: What is set and what is open for design by participations. Run a survey for input.
b. Make a design plan for the whole area employing the best of class features of smart cities - that are a set condition for BSD - and leave room for individual further concretization by inhabitants. Start with a defined area for a built BSD showcase and leave room for lessons learned and revision (because other groups will move to and work in the area and requirements will change over the time).
c. Find the right tools for such co-creation processes (see part 3 and reflection 2).
d. Find ways to include governance aspects directly in the building structure (see reflection 1).

An area with energy

What has to be done to design BSD as an area with free, accessible and renewable energy in 2022?

Recommendations (contact person):

1. Facilitate / Create an alliance (N. Lambrechts)
2. Build up an energy transition design team (M. van Hulst)

Group members: Geertje de Kort, Henk Kok, Jeroen Kroonen, Nicolle Lambrechts, Martijn Messing, Leon Piepers, Michael van Hulst

Link to video

Recommen-dations

Statements of sessions 1+2

Edited transcript of the team presentation

Presented by **Michael van Hulst** (see video recording for original soundtrack):

An area with energy

Preamble

If I put my house for sale to live in the most sustainable city in the world what would it take that my wife would say yes? Therefore we thought of an area where energy is free, accessible and sustainable.

First Phase (red curve)

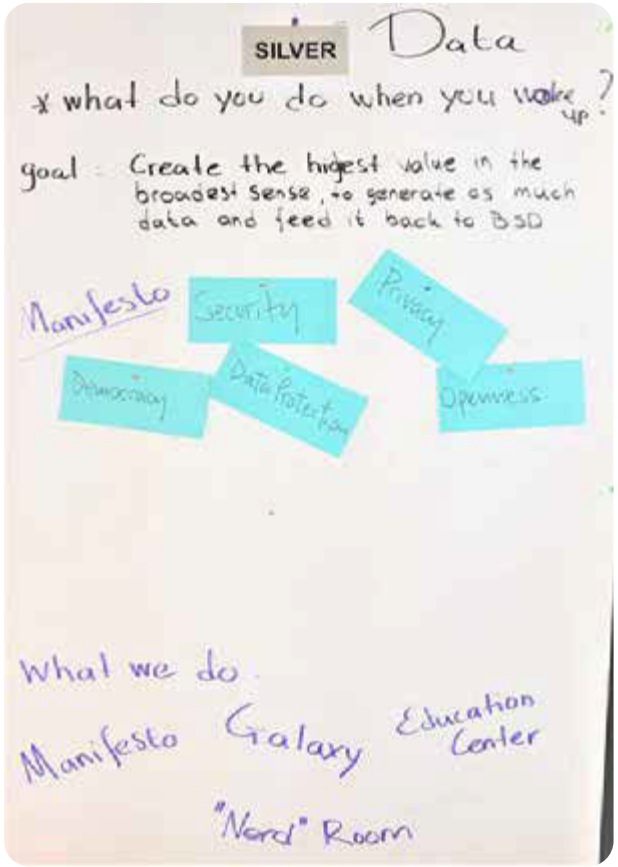
1. To kick start the topic we need to define a geographical area and form a coalition of the willing
2. Create a showcase: We will take existing technologies / solutions to achieve ambitious goals and communicate it to attract investors to scale up.

Second Phase (green curve)

1. Build up an energy transition design team at the same time.
2. Employ layer model to decide where we can invest or descale.
3. Data is an enabler. New economy design principles will allow for new business models. That will add to the attractiveness.
4. We already have a coalition of the willing and need a few months to work this out.

Data

What has to be done to ensure that acquisition and usage of data supports the implementation and operation of BSD?



Recommendations (contact person):

1. Start a living Manifesto (J.Meijer)
2. Design the Data Galaxy (J.Meijer)
3. Design a Nerd Room (A.Schmidt)
4. Education center-platform for people (S.Willems)

Group members: Jeroen Kroonen, Joost Meijer, Rens Mulder, Leon Piepers, Alexander Schmidt, Sander Willems, Mariane Zuleta Ferrari

Link to video

Recommen-dations

Statements of sessions 1+2

Edited transcript of the team presentation

Presented by **Joost Meijer, and Alexander Schmidt** (see video recording for original soundtrack):

1. **J.M.** When you woke up this morning what did you do? I think we all peed this morning.
2. **J.M.** Well Michael is going to use our very intelligent toilet. And what is that toilet going to tell us? It is going to tell us how healthy he is. We will get the right diet - but that's the good story. There is also a bad story; the insurance is looking with him and they see he is not so healthy so they will raise the health insurance. Is that what we want?
3. **J.M.** No. So we will create the highest value with this data and feed it back to the BSD. As you might understand we have to think about the basic rules on how to deal with this data. We need to have a manifesto in which as a group of people we define how the people living in the BSD are going to deal with this data. We have to talk through a number of these topics; we have to talk about security, privacy, we have to make sure that the data is open so everybody can use it and feed it back to the system.
4. **A.S.** Yes, but how do I get to know about this data?
5. **J.M.** We have a solution for that as well. We defined 4 things. One of the most important things we want to start with is to have an education center because otherwise people are going to loose us. We need to keep thte people informed on what we are doing what their benefits are and we also need to bring them into the process and teach them how they can use this data and how others can use it.
6. **J.M.** We will have a group / goal to set up a manifesto so we can describe together in a democracy how this data is going to be used and made available. But you can only do this when you have a place where the data is.
7. **J.M.** We thus will create a data galaxy where all this data is. So when you put it in or take it out you have to give something back (data, value, service, …)
8. **J.M.** And in the bottom we have the nerd room, because there need to be some nerds that connect all these things and make sure that this is running and working.
9. **A.S.** You saw what happened with my data this morning. It is really important that I know what my data is intended to be used for and this is why we set it up in a way that I have my own personal private storage of data and can decide if I want the data to be released for what use.

Create an "Operations Room" like for the implementation team where data come together and are turned into information (see part 3).

Mobility in, to and from

How can mobility for persons, goods and services be smartly designed regarding dimensions and modes?

Recommendations (contact person):

1. Develop MAAS system (J. Moolbroek)
2. Building up infrastructure, mobility, green sustainable city design team (J. Moolbroek)
3. Ist-analysis now (A. Schmidt)
4. Comfortable goods delivery sys. (D.van Beuzekom)

Group members: Michael J. Dawkins, Josje Mooibroek, Peter Portheine, Alexander Schmidt, Lara Tamarinof, Dick van Beuzekom, Willy van der Heijden

Link to video

Recommen-dations

Statements of sessions 1+2

Edited transcript of the team presentation

Presented by **Alexander Schmidt and Michael Dawkins** (see video recording for original soundtrack):

We were all quite clear on Wednesday that mobility is a topic. So let's see where mobility is a topic for a future citizen of the Brainport Smart District:

I'm a happy citizen of the Brainport Smart District, I wake up, I go have a shower first. In the shower, I might think of what I have for breakfast, maybe an egg. I have my egg, and then, what am I going to do today. Go and have a chat, maybe call my mom, work a little bit. And after work, what am I going to do? Maybe go to the sea, or I do some sports, think about the dinner I'm going to have with my friends and family, and I feel free all the time. I have the choices I want, I feel healthy, and there is nothing I can't afford. Where do you see mobility in here?

It's nowhere, because it is not an issue for a future citizen of the BSD. If I wake up today, then in the shower, I have to think of how I get to work. For my egg I might already be late. Then to my meeting I have to get to the bus. The bus might be late, or it's not coming at all. Then from my meeting to the shore it is a train ride, the train just doesn't come. And then because of all this, it's already too late and I can't do any sports as was mentioned before. Right?

With the system we are going to design here, mobility is not an issue anymore. We are not just telling a story here, we have to find some concrete steps to get there.

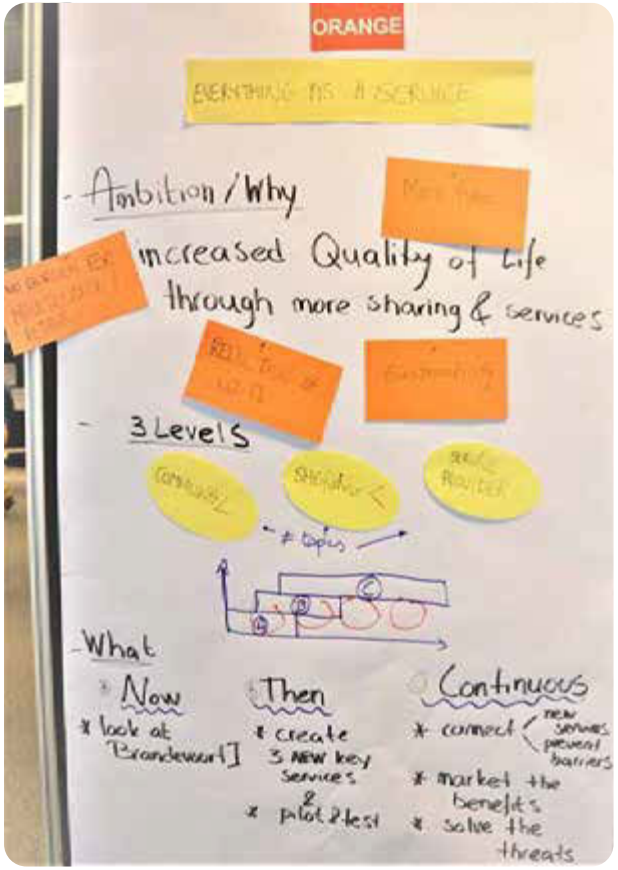
1. Mobility is going to start this month. We already have some **test tracks** that are going to be realized between Helmond, Brainport and Eindhoven, and beyond. So we are going to **collect data**, what is out there.
2. We are going to **connect gravitation points in the region**, think about the High Tech Campus, hospitals, places, where people want to travel to. In the future, Brandevoort is going to be the place where you are the most connected person in the Netherlands, maybe in the world.
3. Another concrete step is that we are having **the first MAAS service** here in the region that can be done within a couple of years. **In 2022 that is possible** - partly in the region.

So you don't have to think about where you want to be – it is just simply not an issue.

Design the mobility hub according to a flight control center.

Everything as a service

What has to be done to make BSD a society that "shares" to improve quality of life?



Recommendations (contact person):

1. Review existing knowledge (L. Tamarinof)
2. Define short term sharing priorities (J. Meijer)
3. Define long term sharing / communal sharing structure (A. Vancolen)

Group members: Nico Baken, Debra Becker, Henk Kok, Joost Meijer, Willem-Jan van den Heuvel, Dike van de Mheen, Alexander Vancolen

Link to video

Recommen-dations

Statements of sessions 1+2

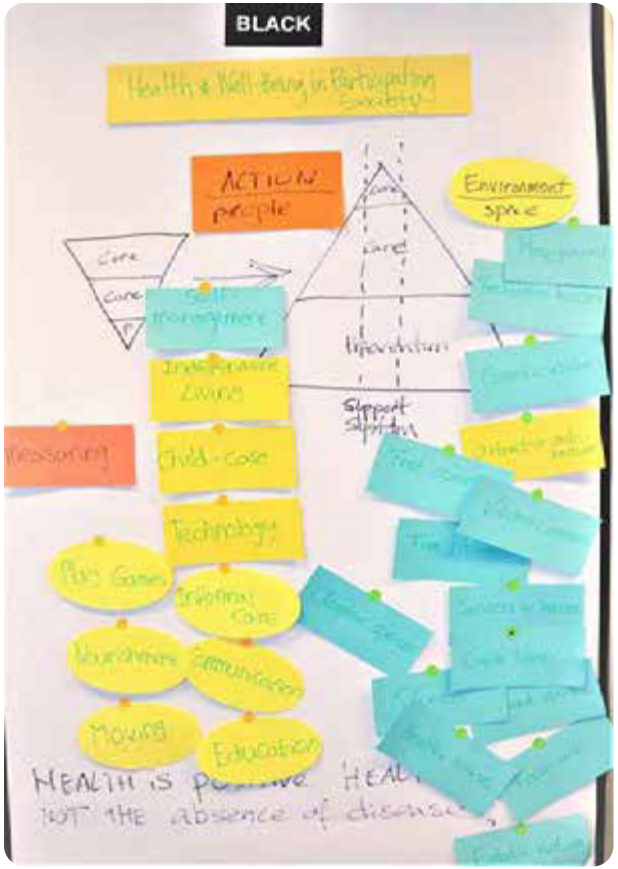
Edited transcript of the team presentation

Presented by **Alexander Vancolen** (see video recording for original soundtrack):

1. We set up a clear ambition, asking why "Everything as a service" has to be considered: It should increase the quality of life through sharing and services otherwise it doesn't make any sense.
2. We found also some clear advantages. For instance there is no burden of maintenance/repair and it will reduce costs and increase sustainability which means in the end you will have more time for other things.
3. We also thought about the threats and possible resistance of stakeholders to this topic.
4. We looked at the topic from three different levels:
    a) A communal point of view where you provide services to the community as a whole.
    b) Also you can see it as sharing in the sense of renting out assets you still own and get paid for it or get service in return.
    c) Also you can put assets as well as services of a third party into a pool in the sense of donating and giving it to the community.
5. We then have to look at the different topics (in alignment with the different levels) where "Everything as a service" can be applicable, for instance "mobility as a service".
6. What are we planning to do?
    a) On a short term level we are definitely looking at the area where parts of the topic are already implemented like Brandevoort 1 (see recommendation 1) and learn from that.
    b) As a next step we need to create three new key services and test them 1 (see recommendation 2).
    c) And continuously we need to connect with all the different other areas we talked about the last few days and see what we can get out of it to create new services but also see that there are no barriers to make this happen. We also need to put attention on the branding to convince the people and on the threats and resistance of the stakeholders (see recommendation 3)
7. During the process it is important to have feedback loops to see what is good and what needs to be improved.

Health and well-being in a participating society

What areas need to be addressed to take health and well-being to a next level in a SMART district and a participating society?



Recommendations (contact person):

1. Design support (W. Teeuwen)
2. People behavior (W. Teeuwen)
3. Design an environment (W.Teeuwen, D.van Helvoirt)

Group members: Debra Becker, Rens Mulder, Wytske Teeuwen, Dick van Beuzekom, Willy van der Heijden, Dirk van Helvoirt, Dike van de Mheen

Link to video

Recommen-dations

Statements of sessions 1+2

Edited transcript of the team presentation

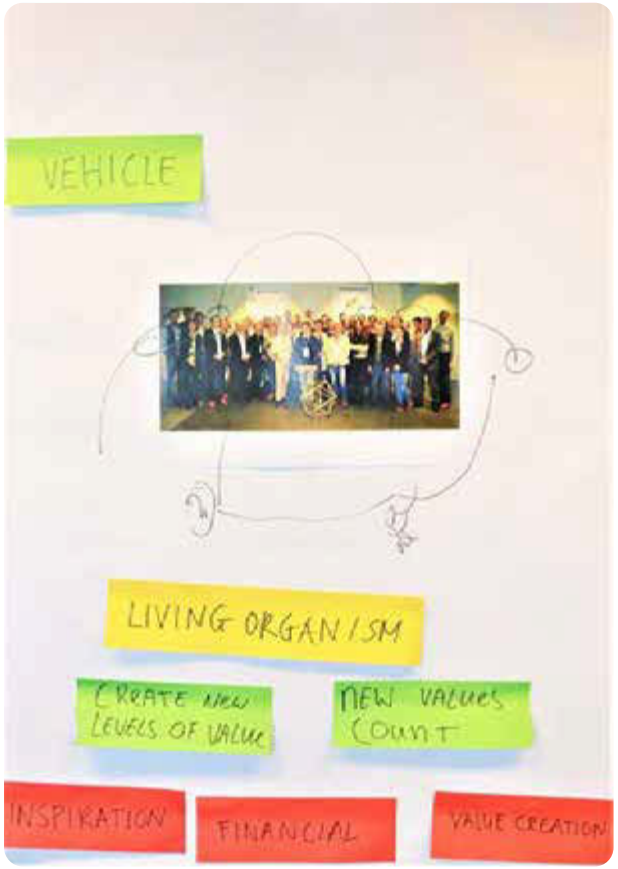
Presented by **Dick van Beuzekom** (see video recording for original soundtrack):

1. Our group believes that in designing this topic we have to change the system and turn around the "health pyramid": We want a system where "cure" needs to be the smallest part because health is "positive health" and not the absence of a disease.
2. The action of people as well as the right environment space should foster "care" and "prevention" of health.
3. On the side of "people" we need to enable "self management" to support care and prevention.
4. Environmental aspects of support include all the other topics we talked about like attractive architecture, fresh air, healthy house …
5. Technology and data can support the system and people by delivering the right information for care and prevention.

a. Health is a complex topic as it involves many aspects. The right management means are needed to make it work.
b. Connect to "diverse participation" and explore the expectations of different stakeholders regarding well-being and health care and prevention.
c. Find a clear definition of health / well-being aspects regarding stakeholder expectations that have to be taken into account by the other topics.
d. Consider system features such as regulation of health care supply and demand, incentives for providers, level of public / private funding or the extent of coverage. Among others, these features have a direct impact on system functioning and hence on its performance.
e. Consider where applications and solutions of e-health and e-government can be implemented in the infrastructure of BSD and build up a (digital) interconnection and interaction between health issues as well as for instance services, mobility and environment.

€cosystem

How can the €cosystem of BSD be created to fulfill the expectations of current & future stakeholders and at the same time meet the challenges of a smart district?



Recommendations (contact person):

1. New Value Creation (R. Valkenburg)
2. Financial Team (A. Oosterhuis)
3. Inspiration Team (R. Valkenburg)

Group members: Jeroen Naves, Anna Oosterhuis, Laurens Schwiebert, Rianne Valkenburg, Michael van Hulst, Paul van Rijn, Wiko Wolters

Link to video

Recommen-dations

Statements of sessions 1+2

Edited transcript of the team presentation

Presented by **Rianne Valkenburg** (see video recording for original soundtrack):

The answer is simple: the ecosystem, that's us! All of us together. This is where it started Wednesday afternoon, and this is where it is right now. We are the ecosystem. We just heard 10 presentations with a lot of content generated on all the different topics but this, us, will be the vehicle to get there.

1. So what does this vehicle need to ensure that all this content gets further developed? We already did a lot of that because we already shared our ideas and our thoughts. And this ecosystem will only grow as a living organism (Maybe there are startups that don't even know yet they are startups that will be part of this ecosystem.)
2. To facilitate that we need to keep alive the dream we started with in this ecosystem. So we thought of a few **core values** (Not leading, but following; Adaptiveness; Not only €; Committed contributors; Everyone feels invited; Increase the freedom of people; Ensure freedom of choice).
3. And we have to make sure that in this ecosystem new values will also emerge. It's not only about money. It's also about education and reputation and all values that we can use to keep this vehicle going. The other thing is that we need to create new levels of value. And this is the fuel and dream that will keep this vehicle going.
4. And how can we make sure that the vehicle keeps going? We suggest three actions:
    1. Value creation: we have to make sure that we understand why we are in this ecosystem, what our value is and how we can make that grow. This should be a flow model that helps us keep growing and living.
    2. We also need a financial team. We need to have an inventory of what's already there and what will be possible and we gave them an assignment to find a 100 Mio € extra because we know our dream is big. And we have to keep our core values big and we need to keep going.
    3. And we also need inspiration. We suggest to bring in radical and disruptive thinkers who keep challenging us on the core values to keep the dream alive to make this ambition come true.

Ecosystems are always complex systems. They need an according governance system – implicit or explicit. Especially in the case of BSD as there is a very specific purpose to these ecosystems. Therefore, they need a certain design to fulfill this purpose (see reflection 1 and reflection 3).

Implementation Process

How do we have to organize ourselves to ensure that the actions necessary to achieve BSD will be implemented?

Recommendations (contact person):

1. Create the start-up process – Phase 1 of the implementation (P. Portheine)
2. Information Accumulation (B. de Vries)

Group members: Bauke de Vries, Josje Mooibroek, Elphi Nelissen, Peter Portheine, Marieke Schoots, Wytske Teeuwen, Joost van der Geest

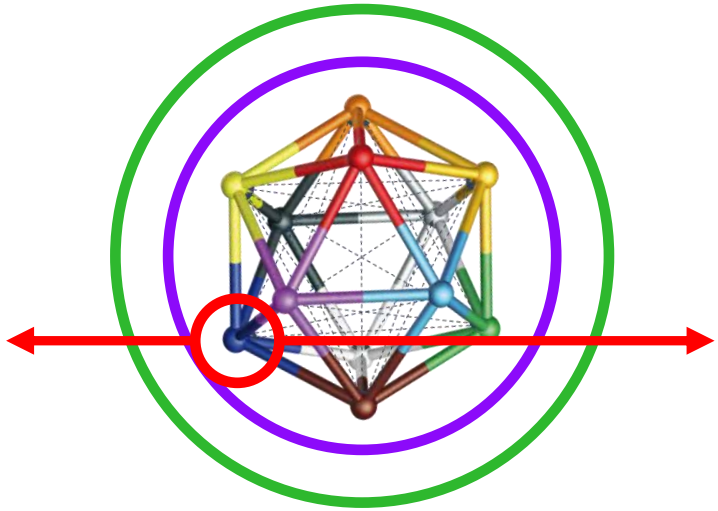
Link to video | Recommen-dations | Statements of sessions 1+2

Edited transcript of the team presentation

Presented by **Elphie Nelissen** (see video recording for original soundtrack):

1. In the end our goal is to make planet earth more sustainable. And it is not only for here, but also for other countries: **be an example** that is so good, so attractive that other countries come and help, maybe even developing countries, so they don't make the mistakes we have made. And not only here and there – also now and then: **let's focus on 2050**. In the end, we want to improve the quality of life.
2. So the way we are going to do this is setting **a lot of different goals, not only the usual ones**. That is difficult, because we know well, how we are doing things right now. But this is different: we have higher goals, so we have to do it differently.
3. We have a **sense of urgency**, and that's very positive. The world around us is aware of the fact that we can't go on the way we are operating our cities. We are destroying our planet. That's the sense of urgency that is all around us. So let's make use of that.
4. One of the things we might do is collect a lot of good examples. We deal with **a lot of topics**. We have more dreams. We have **a goal that is moving**, which makes it difficult. But it's important to be aware of that and to be flexible to deal with that. We have to collect a lot of information.
5. We have to go beyond our imagination, because **we can't imagine how we live in 2050**. We are aware of all the **risks that have to be taken**, because we don't know the future. So we need a lot of trust and a lot of time. There are many uncertainties that we have to deal with. That **needs a flexible organization and a flexible process**. We wrote the process down in the two recommendations.
6. I really want to ask those who are going to be responsible for the whole process to give us **trust** and to give us **time** and **money** to get there, because this is something that we will certainly need.

a. Because BSD's development involves various projects that mutually affect each other, the overall effective implementation requires a Transformation Control Center as the coordinating hub (see part 3).
b. An adaptive governance structure for both, the implementation and the future BSD is needed as the "nervous system". We suggest to design this system for effective decision and control according to proven cybernetic principles (see reflection 1).
c. The transmission from overall goals to results by individual people requires a management system with distinct elements (see reflection 2).



- Transformation Control -
For effective implementation of the Syntegration results

Core elements «Integrated Implementation Program»

Double-click on the pdf icon (while in Powerpoint-working mode, not presentation mode) for a description of the integrated implementation program

- Sensitivity model®: Systemic prioritization and effect analysis
- Viable System Model®: The basis for organizational functioning
- Integrated Management System® (IMS) for effective implementation
- …

- Prioritization of measures and "project-clustering»
- Operational / organization structure
- Resource planning
- Establishment of communication architecture

- Real-time control of activities
- Monitoring and Reporting
- Impulses for further co-ordination and implementation
- Control of impact and goal achievement

- Effective project staff setup for steering and implementation
- Assignment of project managers

- Malik Solution Camp
- Competence development of decision makers and implementation team

Implementation Control

in order to achieve fast and sustainable Success

In order to achieve effective changes in the system the dosage of the interventions is crucial for success.

Strategy implementation and effective governance

The systemic control loop model (see reflection 3) shows, that effective **smart district governance** is one of the most important starting points to achieve fast *and* sustainable changes in the system. Furthermore the outstanding significance of **citizen participation** and effective **complexity management** becomes evident.

1. Complexity management and transformation control
   The individual effects of one factor to all others are diagnosed and visualized in the impact-risk-map. It shows the effect of the individual factors to the whole system: effective **complexity management** and **transformation control** are especially active control levers. With these levers effective changes in the system can be achieved fast and sustainably.

2. Prioritization
   The comparison of the system model with the Syntegration's 34 recommendations results in their **systemic impact diagnosis** (for details see here). With 41% of the actions, more than 50% of the systemic impact can be achieved.

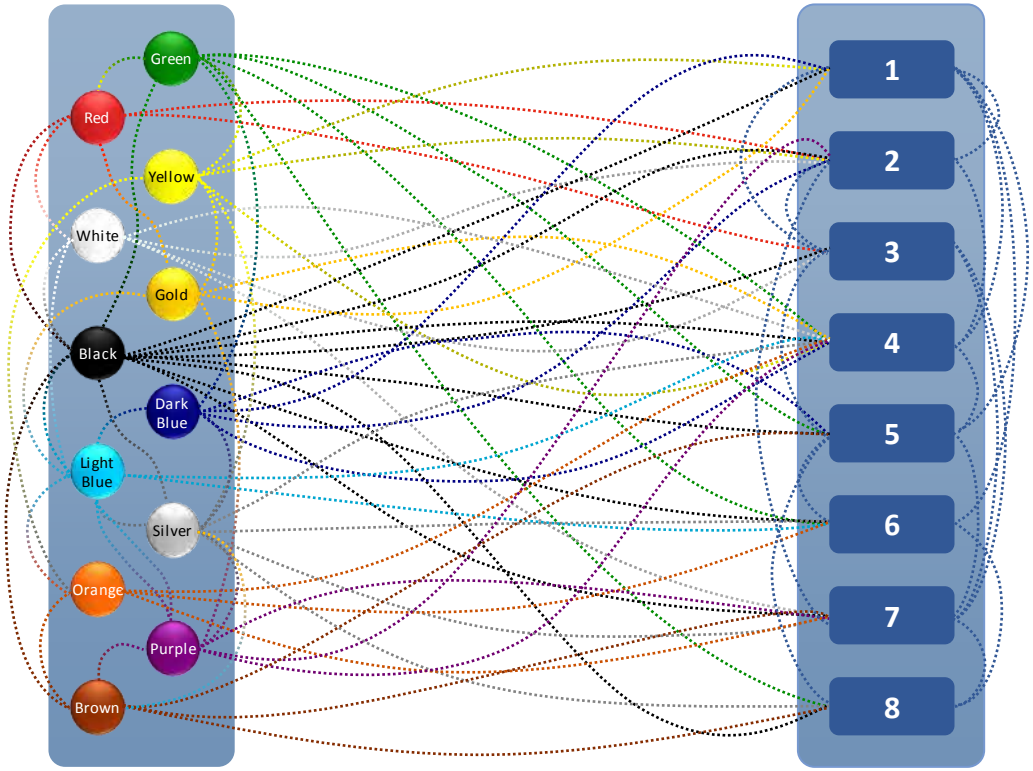
3. Implementation control (= steering) by the Transformation Control Center (TCC)
   The TCC is functionally responsible for implementation control. It collects information on the different topics / programs and their implementation status. As many topics / programs are mutually affecting each other, the TCC can make profound suggestions for the bundling of some of the 34 actions and can advise on their interrelations for making the right decisions during the implementation process. This enables a harmonized implementation management.

Why a Transformation Control Center (TCC) is necessary …

Interaction of the 12 topics and roundabout 34 actions
with the different organizations without central management

Topics and actions

Partners / stakeholders directly involved in implementation
(e.g. only 8, in reality probably more)



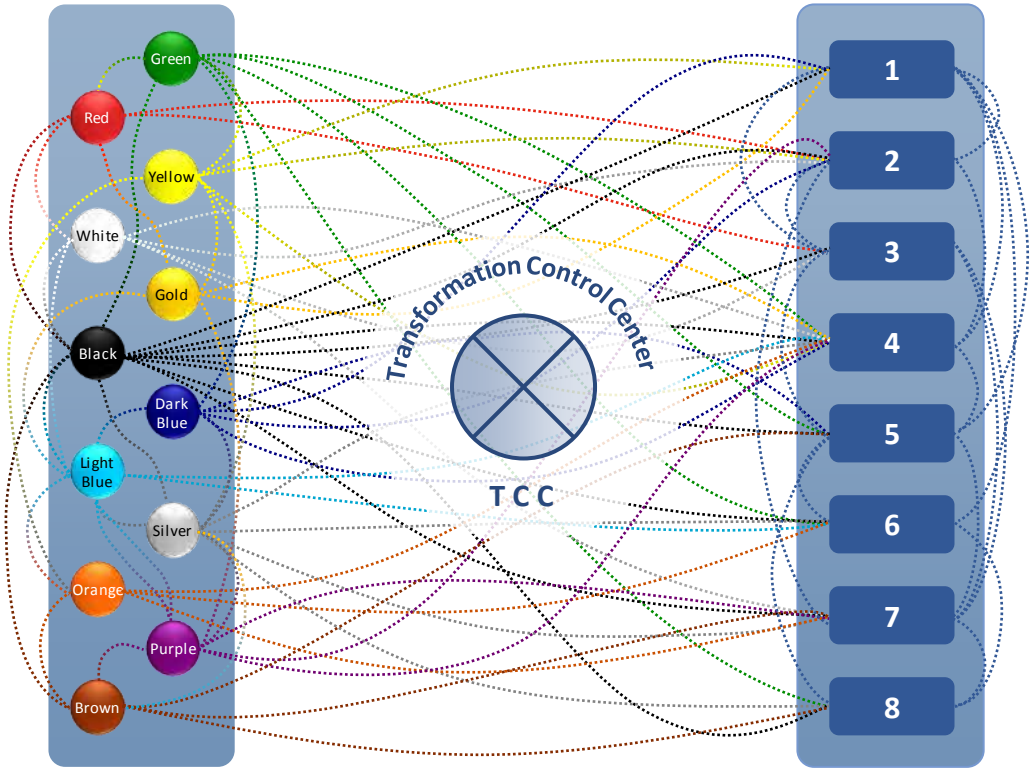
There are up to 5,000 interconnections between the 12 topics, its 34 recommended actions and the 8 organizations.
This demonstrates the level of complexity of the system.
Without governance and coordination, the implementation will be cumbersome, conflict-laden and slow and will probably fail altogether.

The advantage of the whole program lies in its interconnectedness and the mutually reinforcing impact of all topics.

The Transformation Control Center (TCC) carries out the essential coordination of the implementation

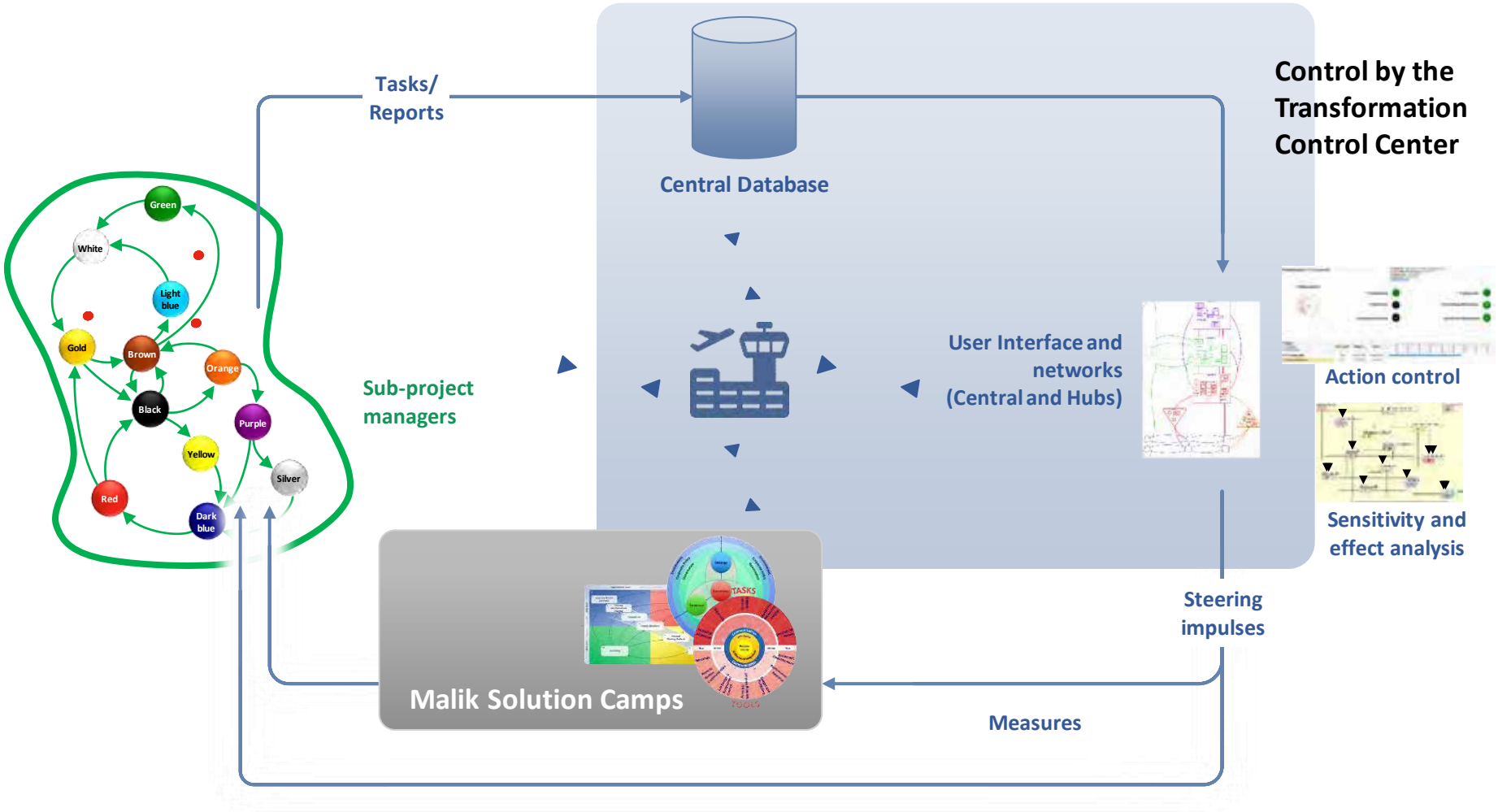
Topics and actions

Partners / stakeholders directly involved in implementation
(e.g. only 8, in reality probably more)



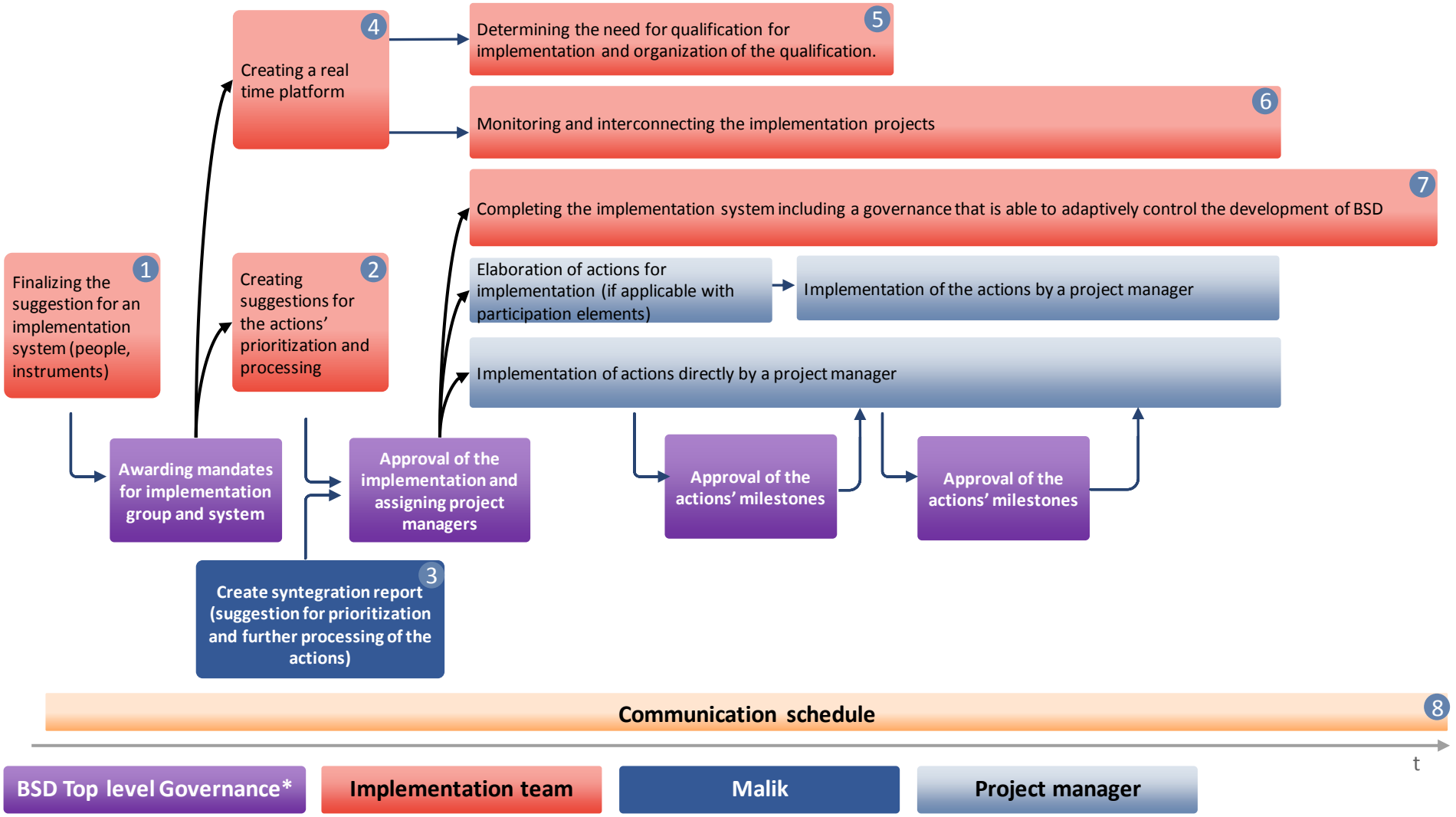
There are up to 5,000 interconnections between the 12 topics, its 34 recommended actions and the 8 organizations.
This demonstrates the level of complexity of the system.
Without governance and coordination, the implementation will be cumbersome, conflict-laden and slow and will probably fail altogether.

Implementation by a Transformation Control Center



Implementation of the Syntegration Results (1/5)

Project Schedule



* BSD steering group / to be further developed. For system-cybernetic recommendations by Malik, see Viable System Model: reflection 1

Implementation of the Syntegration Results (2/5)
Description of the Project Schedule's Elements

1. **Finalizing the suggestion for the instruments to be used in the implementation including technical realization. Creation of a qualification concept for the TCC-members**
   (e.g. document storage, project assignments, list of actions, system model, key factors for evaluation of results, communication schedule, qualification and training schedule).
   ⇒ For this purpose existing instruments of the BSD should be checked for their usability.
   ⇒ Important topics for the qualification of the TCC-members are project management and Sensitivity Modelling (see reflection 3).
   Proposed target date: end of May 2017

2. **Prioritization of recommendations and actions & clustering**
   ⇒ Diagnosis of the interdependencies of the Syntegration's recommendations and actions with the Sensitivity Model
   ⇒ Prioritization of actions concerning their impact for the starting phase
   ⇒ Clustering of actions in 3 categories ('immediately feasible', 'postponed' and 'further elaborations necessary')
   ⇒ Description of the necessary elaborations
   ⇒ Suggestion for the implementation project managers in coordination with the contact persons for the topics / recommendations appointed during the Syntegration

3. **Delivery and presentation of Syntegration report**

4. **Technical realization of the implementation instruments**
   ⇒ Document exchange platform and real-time information on actions. Creation of transparency for all people involved in the implementation.
   ⇒ Design of control cockpits and if applicable setting up a TCC-room.
   ⇒ Real-time control of the implementation status across various partners / stakeholders similar to flight control centers in an integrated system.
   Proposed target date: End of June 2017

Implementation of the Syntegration Results (3/5)
Description of the Elements in the Project Schedule

5. **Determination of the need for qualification on various levels (implementation team / TCC-members, project managers and project team members, Syntegration participants)**
   ⇒ Introduction of the necessary qualification measures. This includes an individual enabling program and solution camps (moderated workshops), in which qualification in management tools and methods happens in combination with project work. Solution camps can also be used for enabling participation of different partners / stakeholders.
   ⇒ We suggest to soon conduct a solution camp on effective governance including application of the Viable System Model (see reflection 1)
   Proposed target date: End of June 2017

6. **Holistic control and monitoring of the implementation progress**
   ⇒ Preparation of the milestones' approval in the BSD steering group
   ⇒ Determination of demand for interconnection between different project teams to achieve an overall optimum
   ⇒ Support of diagnosis and decision processes on the basis of this interconnection
   Proposed target date: End of July 2017

7. **Completion of the implementation system including a governance that is able to adaptively control (=steer) the development of BSD, effectively integrating the various partners / stakeholders**
   This for example includes systemic evaluation of the environment, strategy development and -adaptation, coordination- and feedback mechanisms… (see reflection 1)
   Proposed target date: Mid September 2017

8. **Development of a communication schedule and communication**
   ⇒ Continuous communication on the transformation status. To be addressed: overall development, individual actions
   ⇒ Decision who is the target group and what are the media for communication
   ⇒ Naming of personnel resources for communication
   Continuous, proposed date for first communication: May 8th 2017 (after meeting in Düsseldorf)

Implementation of the Syntegration Results (4/5)
Malik Management Enabling

(Online)consultation during implementation

Individual support of the implementation team, project managers or project team members by a Malik Management Guide

1. Initial getting to know each other between Malik Management Guide and participants, interview and questionnaire
2. Needs-based online-consultations with a Malik Management Guide (email, conference call, video conferencing,…) incl. support in all management-related issues of the implementation
3. Specific problem solving, reflection and clarifying questions on implementation, application of management instruments etc.

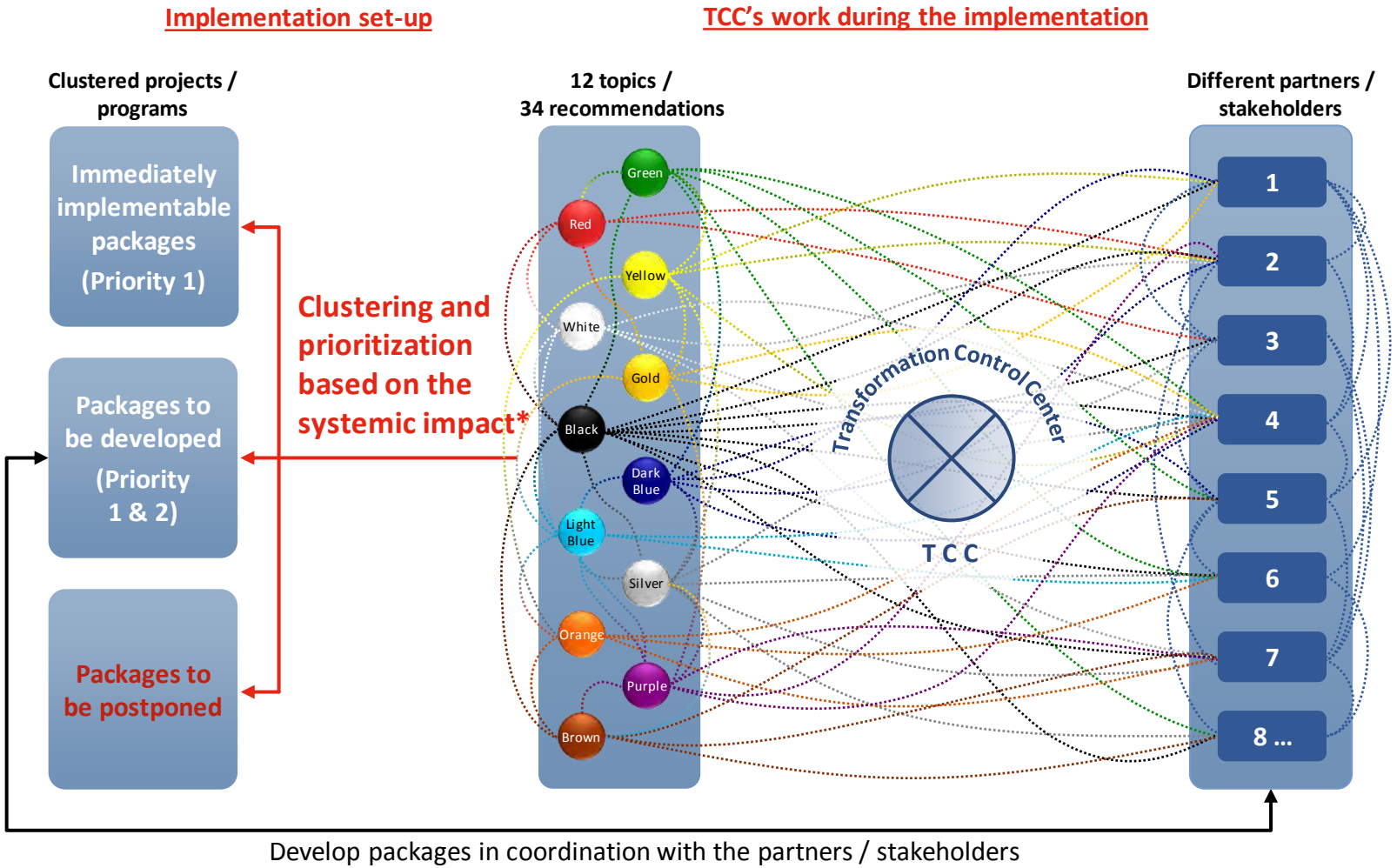
The Malik understanding of management:*

Management is the transformation of resources into value for customers or for society.

It is management which makes societal organizations function or fails to do so *and* ***therefore, management is one of the key functions of modern society.***

* See also reflection 2: Setup of a management system to ensure successful implementation and transformation

Implementation of the Syntegration Results (5/5)
Clustering of the recommendations and actions



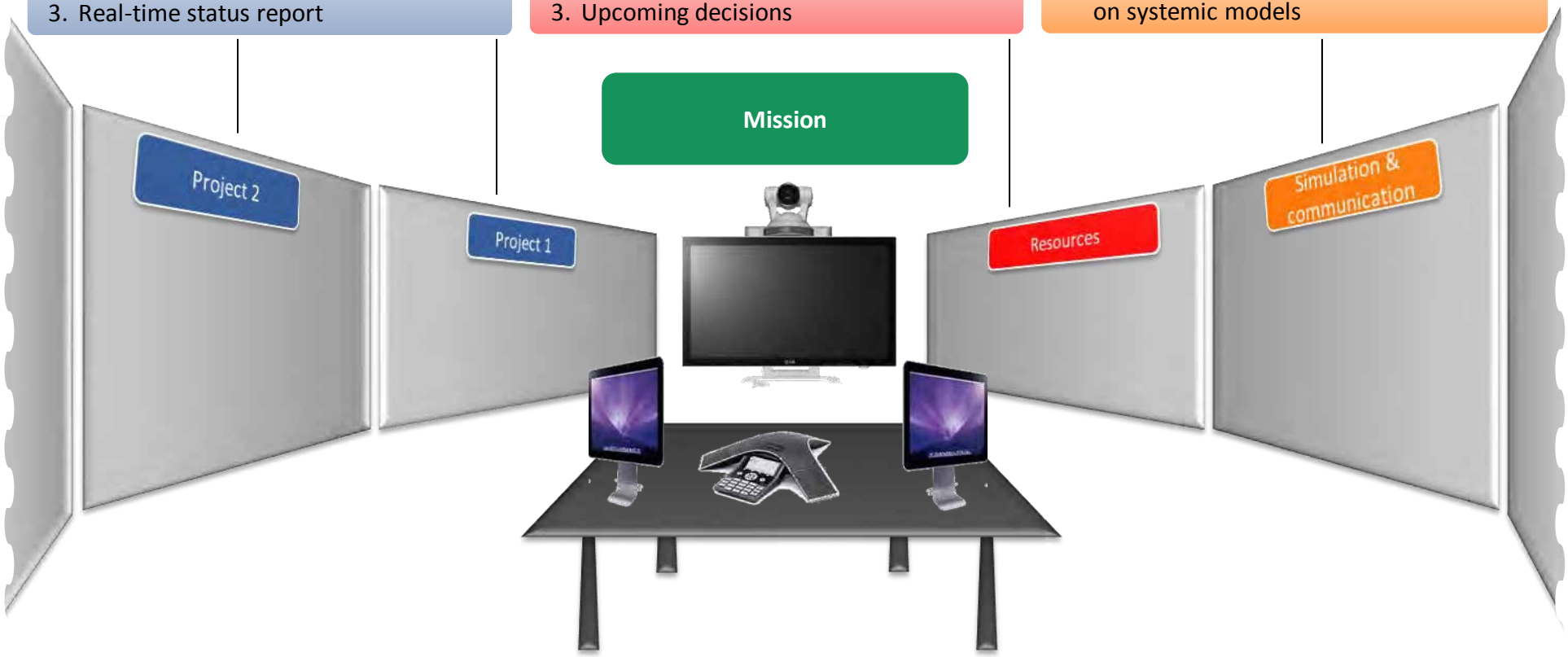
*Systemic impact diagnosis and details on the methodology: see here in reflection 3

Design of implementation control room
Components of a Transformation Control Center

Project assignments & status
1. Project assignments
2. Project schedule: work packages, deadlines, resources, team
3. Real-time status report

Resources control & overview
1. Overview of the organizational web & resources in a Viable System Model[1)]
2. Critical incidents
3. Upcoming decisions

Simulation & communication
1. Sensitivity model for simulating the effects of actions before taking decisions[2)]
2. Communication concept & tools, based on systemic models



1) For an introduction on the Viable System Model and a recommended governance structure for BSD, see reflection 1
2) For a Sensitivity Model of BSD, see reflection 3

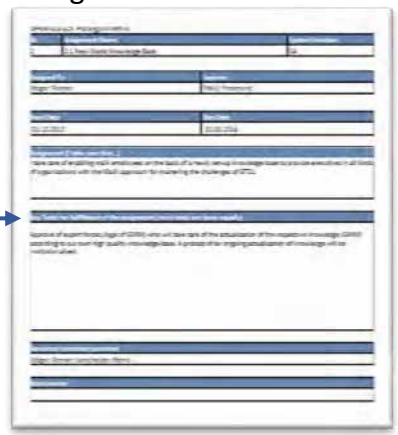
Real-time control and information (IT-supported)

The pictures on this page are examples of electronic cockpits that fulfill some of the necessary control functions described on the previous page:

1. Project assignments & status
2. Resources control & overview
3. Simulation & communication

„Cockpit“ on overall level

Assignments



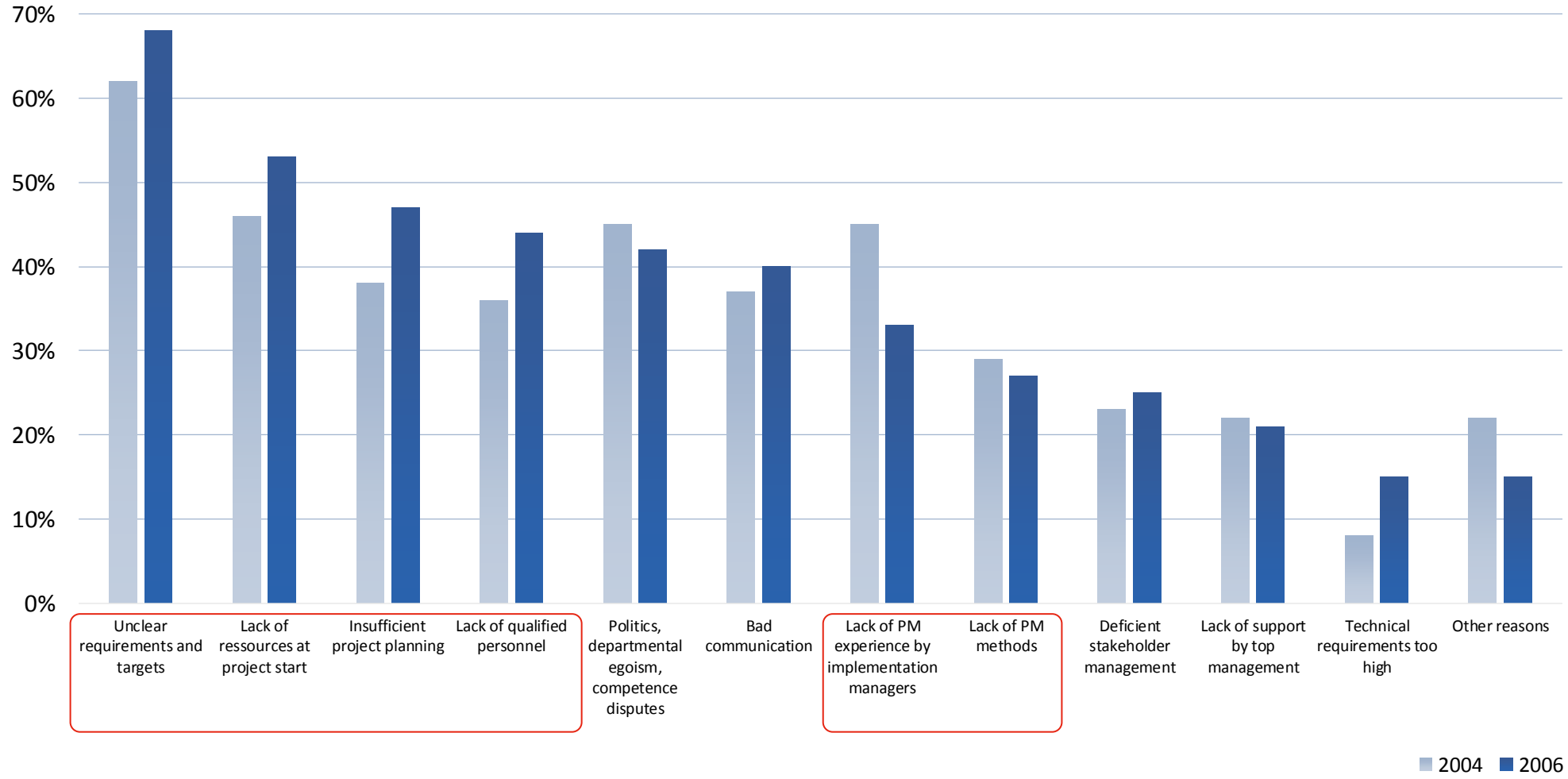
Transformation Control Center

„Cockpit“ on project level

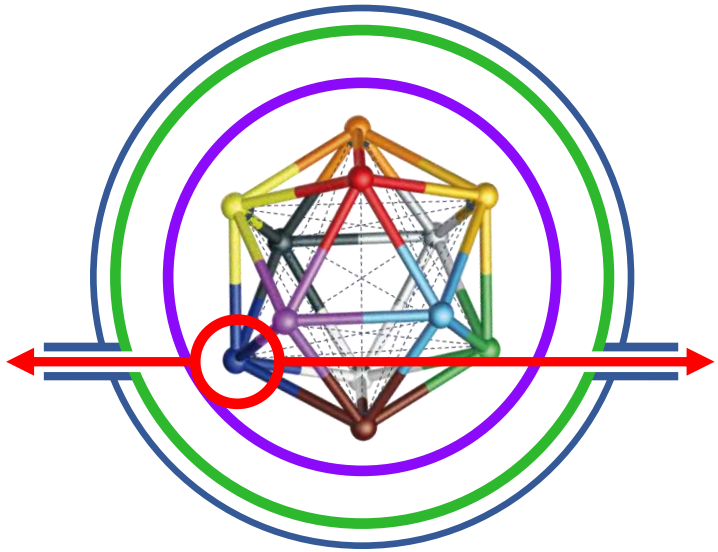
Measures / Reports

Why an effective transformation control is so essential for the success of BSD

Reasons for projects not achieving their goals



Source: Results of a Project Management study by GPM, 2006



- In-depth Results of Exploration -

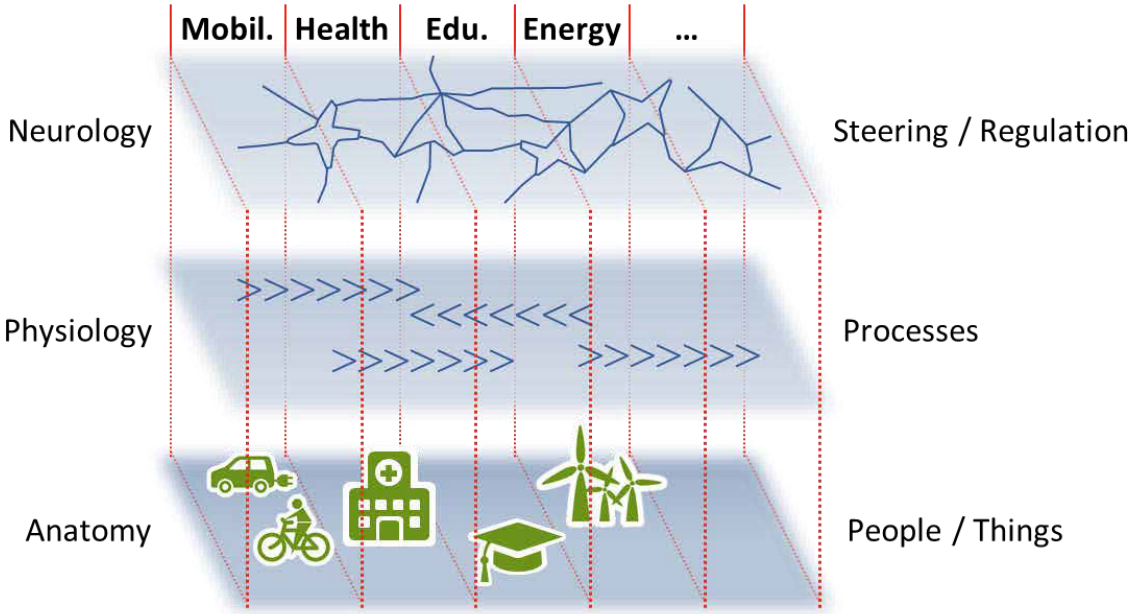
Effective governance and management for BSD

Reflection 1: Governance structure
A Smart District needs Smart Governance

1. BSD needs a "nervous system" to really work. And only a nervous system – the governance of BSD - will make it as resilient and adaptable as it will need to be.
2. One of the most important parts of the governance of BSD should prove to be an explicit mechanism designed to make it adaptable to both known and unknown stress factors.
3. Vital tools for smart governance will be effective feedback and monitoring capacities of both inside and outside impacts and new anticipatory legislative instruments.
4. Self-organization – and thereby less regulatory effort - can be achieved by integrating governance functions right into the infrastructure of BSD.
5. New participatory mechanisms should be used to foster co-creation and opinion / consensus forming and strengthen the shared image and vision of BSD.
6. BSD is a subsystem of two other systems: the City of Helmond and Brainport Technology Region. These two systems will have to coordinate in the right way to give BSD the guidance but also autonomy it needs to be successful.

3 dimensions and 2 viable systems

1. During Syntegration discussions mostly circled around the **factual level** such as mobility, energy, architectural aspects, etc. Even though every now and then the **need for governance was recognized** for certain aspects it was never really discussed.
2. To make an analogy to the human body the factual level can be compared to the anatomy of the body and its physiology. For a functioning system, however, the **"neurological" level** is also needed. Because this is where governance happens. Steering. Regulation. In the end - these are the things that make everything else work. This is the dimension on which a discussion about a possible structure for governance must happen.
3. In the following slides we will introduce a structural model of governance which is derived from the human nervous system. This model encompasses **all relevant governance functions** for a system designed **for long term viability**. It can serve as a **framework for the regulatory design of both the BSD and the Implementation Team**. Both need a functioning governance structure. It may be more obvious for the BSD but the Implementation Team should be designed as a viable system as well. At least for the time being until BSD is a reality.

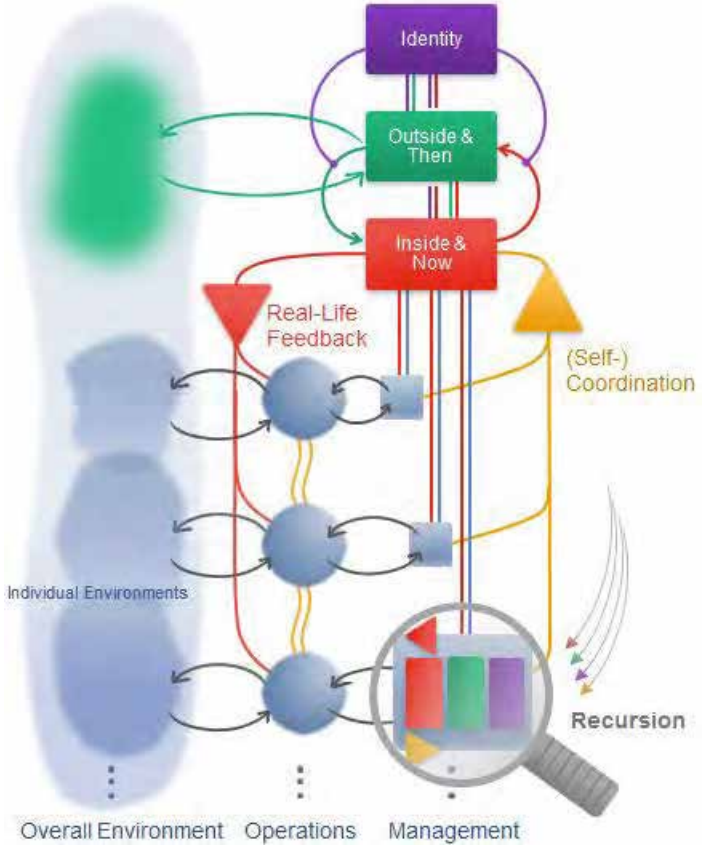


The Malik Viable System Model® (VSM®)

Using a cybernetic control model as a framework for city systems design

Derived from the human nervous system, the most developed regulatory mechanism for the mastering of complexity, and based on systems theory and cybernetics, the VSM comprises all the necessary and sufficient pre-conditions for the viable functioning of any system.

It is thus the only and most adequate reference model for complex systems diagnosis and design.



Every system needs an **identity-forming function (system 5)** providing its purpose and values. It guards the balance and manages the transition between the present and future state of the system.

To safeguard long-term viability, an **outside & then (system 4)** perspective is required. This strategic intelligence function is in constant dialogue with the overall system environment, gathering and processing relevant information to ensure system stability (resilience, adaptability) and build up future success potentials.

The operative functioning presupposes an **inside & now (system 3)** perspective of the present state of the system. Via operative control mechanisms, maximum effectiveness and efficiency within the **sub-systems (systems 1)** can be ensured.

For keeping the present system in control, it is balanced via **(self)-coordination mechanisms (system 2)**. They foster a desired level of collaboration and information exchange between the sub-systems.

Real-life feedback mechanisms (system 3*) provide the inside and now function with unfiltered information by feeling the pulse of the current system at all times.

The **systems 1** produce the desired output, ensuring maximum value towards the systems' relevant environment (customers, society, …). This requires a close dialogue with the respective environment to keep up with its changing demands.

In order to permit for self-coordination, the **systems 1** are designed in such a way that they can maintain the highest possible level of autonomy. This is ensured via the **principle of recursion**, which applies the same principles of viability on all systems levels.

VSM aspects touched upon by the participants during Syntegration

(though sometimes only on the factual level without recognizing their governance properties)

Identity – System 5

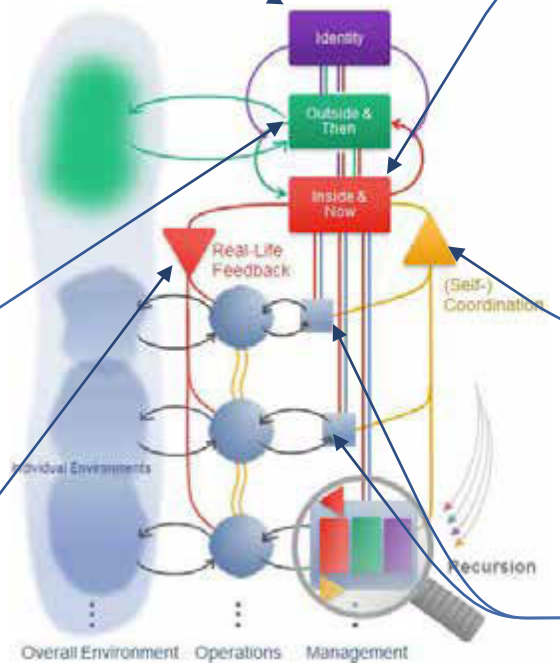
1. Values (€cosystem; Attractive built environment).
2. Participation of different stakeholders and citizens (Diverse Participation)
3. Residents, Council (Green self-sustainable city)
4. Holacracy, Sustainocracy (Green self-sustainable city)
5. Data manifesto (Data)

Outside & Then – System 4

1. Resilience according to the Rockefeller Foundation (Resilient City)
2. Risks and scenarios (Resilient City)
3. Adaptability (Open Infrastructure; Resilient City)
4. Modularity (Attractive built environment)

Real-Life Feedback – System 3*

1. Sensors, data and control network (Open Infrastructure)



Inside & Now – System 3

1. Network Governance: Residents, Council, Experts, Municipality/Political actors (Green self-sustainable city)
2. Redundancy (Open Infrastructure)
3. Co-creation process and inclusiveness (Participation)
4. Gravity centers (Mobility)
5. Data (e.g. Mobility; Data; Health and well-being)

(Self-)Coordination– System 2

1. Regulations (Green self-sustainable city; Attractive built environment)
2. Shared space (Attractive built environment)

Sub-Systems – Systems 1

1. Every "entity" as autonomous as possible (Open infrastructure)

Note: many of these aspects were only discussed on the factual level.
Their governance dimension remained mostly unrecognized or was at least not mentioned.

How to set up a city for viability?

Questions to consider when designing a governance structure for BSD

As BSD is to be newly designed, it is a huge opportunity to also design the governance system for it from the start and in a smart way so it can grow and adapt alongside the infrastructure and the processes. Here are some of the questions that will need to be considered (some exemplary concepts will be addressed in more detail on the following slides):

Identity – S5

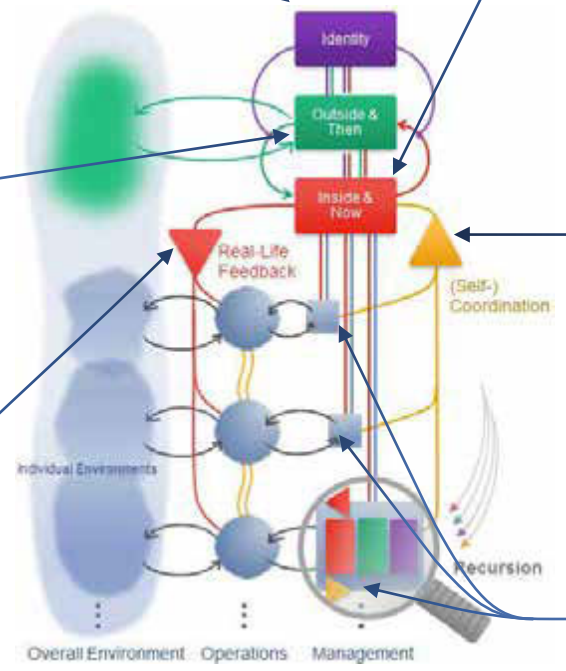
1. Do we have a common understanding of what a "Smart City" means and is that in line with a broader understanding of the notion "smart city" towards the outside world?
2. Do we have a clear city mission behind which all the stakeholders involved can align?
3. When different opinions need to be bridged do we have a way to do this?

Outside & Then – S4

1. How can we **set up mechanisms** to ensure maximum resilience and adaptation of BSD to impacts, both, internal and external, known and unknown? (robustness, anticipation, scenario-planning, aligned response)
2. What can we do to prepare for developments in terms of **laws and regulations**? Are there early warning systems we can use to prepare?

Real-Life Feedback – S3*

1. Are there lessons learned for the operative management? (e.g. Are the right policies released? Do they speed up or paralyze intended action?)
2. Are things running smoothly or are there potential hidden risks that might spin the system out of control? (e.g. data collection and data monitoring tools, abiding by the rules and values)



Interconnections – S5-S4-S3-S3*-S2-S1

1. Are there direct emergency communication channels in place?
2. Are the interlinks between the system's functions intact?

Inside & Now – S3

1. How do we set up institutions capable / sufficient to ensure the operative functioning of the system?
2. What further operative control mechanisms need to be established to ensure maximum effectiveness and efficiency on all levels?
3. Do we have a good ***Governance for Implementation***?

(Self-)Coordination– S2

1. How can the regulatory and administrative apparatus be designed to support the sub-systems running effectively and efficiently versus paralyzing them?
2. How can we ensure a maximum level of **self-organization** of the sub-systems via self-regulatory mechanisms?

Sub-Systems – S1

1. What should be considered the **sub-systems** of BSD?
2. What competences need to be shifted from those sub-systems to BSD to provide for overall coherence and governance of the system without endangering the required level of autonomy of the sub-systems?

Possible levels of recursion of "Brainport Smart District"

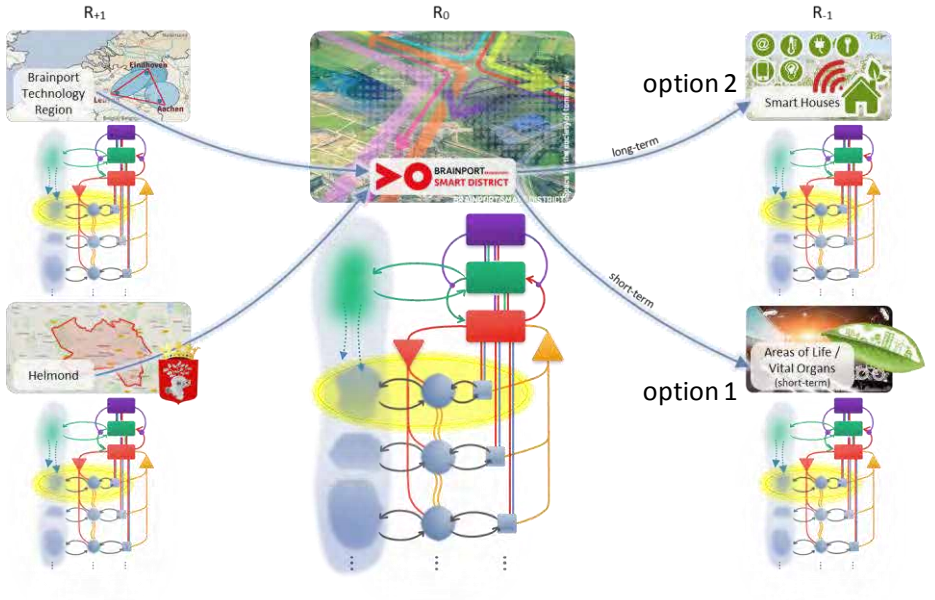
1. For a right governance of the BSD it is important to decide what the sub-units should be. That is a decision. There is not really a right or wrong. Just alternatives generating more or less complexity which therefore might be more or less easily managed by the superordinate system.
2. We will look at 2 possible options (below) for the definition of the sub-units of the BSD just to give an example of how a segmentation discussion could look.
3. "Upwards" the BSD should be considered a sub-system of two systems: the Brainport Region as the overarching driver and the City of Helmond of which it will be a district. This perspective already accounts for the fact that BSD will be in a special position and there will have to be considerable coordination between Brainport Region and Helmond.

BSD sub-unit option 1:

1. Segmentation along the general needs that define the quality of life for the citizens: mobility, health and well-being, energy, etc.
2. In this option the superordinate system would have to ensure the overall functioning and interplay of those defined areas in their interconnection so as to provide the citizen with an overall functioning system. This would require quite some steering effort.

BSD sub-unit option 2:

1. Segmentation along quarters and eventually (smart) homes with autonomous housing units as mentioned in group «open infrastructure».
2. In this option relative autonomy is built into all the levels and the general needs that define the quality of life for the citizens is provided for by the respective superordinate level in its interconnection.

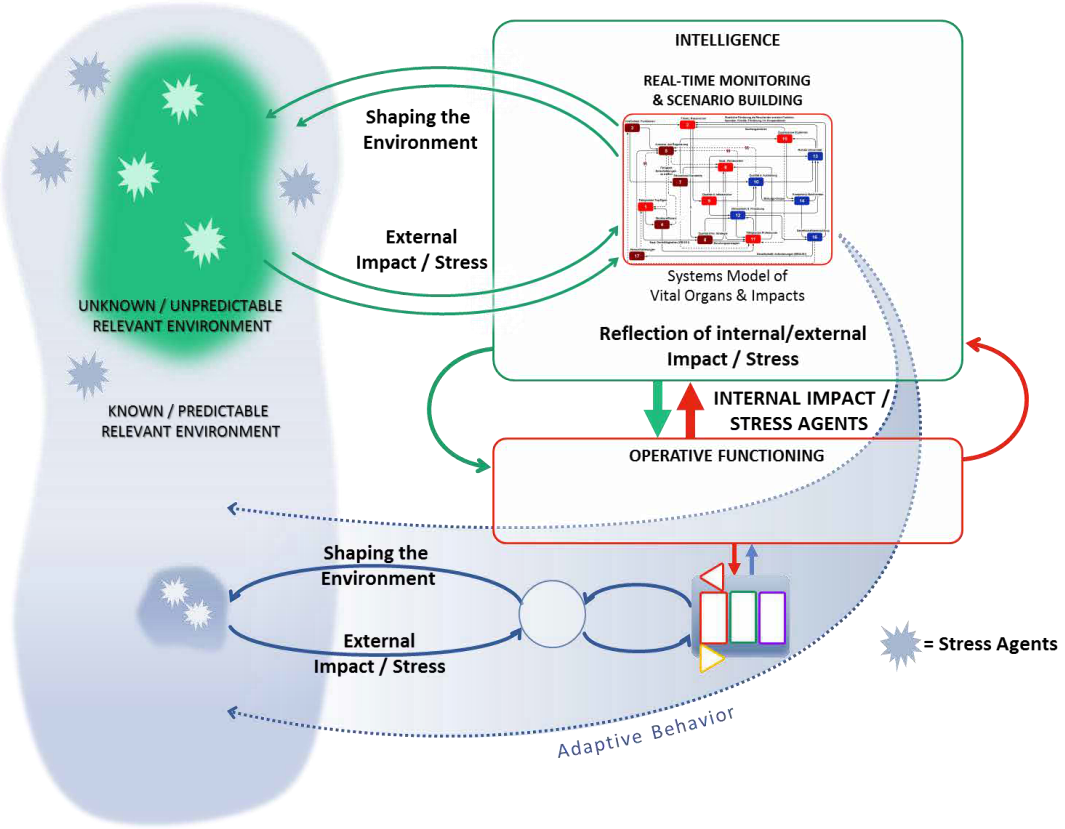


The Principle of Recursion:
Every viable system is part of a viable system and consists of viable systems itself.
This way the entire organization can be designed based on the same model – all levels, all units, all functions, …

Mechanisms to ensure maximum resilience and adaptation (1 of 2)

Known and unknown stress factors

1. Resilience, adaptability, flexibility and robustness are necessary characteristics of any system. But they are even more important for a city that means to keep changing with technology and new standards. The goal is to **anticipate possible internal and external stress factors** and how they might impact the vital organs of the city (mobility, energy, environment, etc.).
2. It has been well researched in cybernetics what criteria such an adaptation mechanism needs to fulfill. The most important one is that **there needs to be a model of what means to be controlled** so foresight and adaptation can happen effectively.
3. The drawing on the right side depicts this. It also shows a possible solution for BSD: A **sensitivity model of the "vital organs" of the city** and all the impacting factors BSD might encounter. This model depicts all aspects of the vital organs of the city in their interrelation.
4. Based on such models one can build scenarios, diagnosing the effects of an impact on a specific vital organ but also on other vital organs as they are all interdependent. **Scenario planning** is one of the most important things when it comes to being prepared for impacts and to be resilient and adaptable because we are obviously dealing with the future. And the future is always uncertain – at least insofar as complex systems are concerned.
5. This would be a possible way to deal with known stress factors. But what about unknown ones? There are ways to deal with those, too. Systems that can **withstand arbitrary and unforeseen impacts** are called ultrastable in cybernetics. No details can be given here but suffice it to say that ultrastability can be designed.



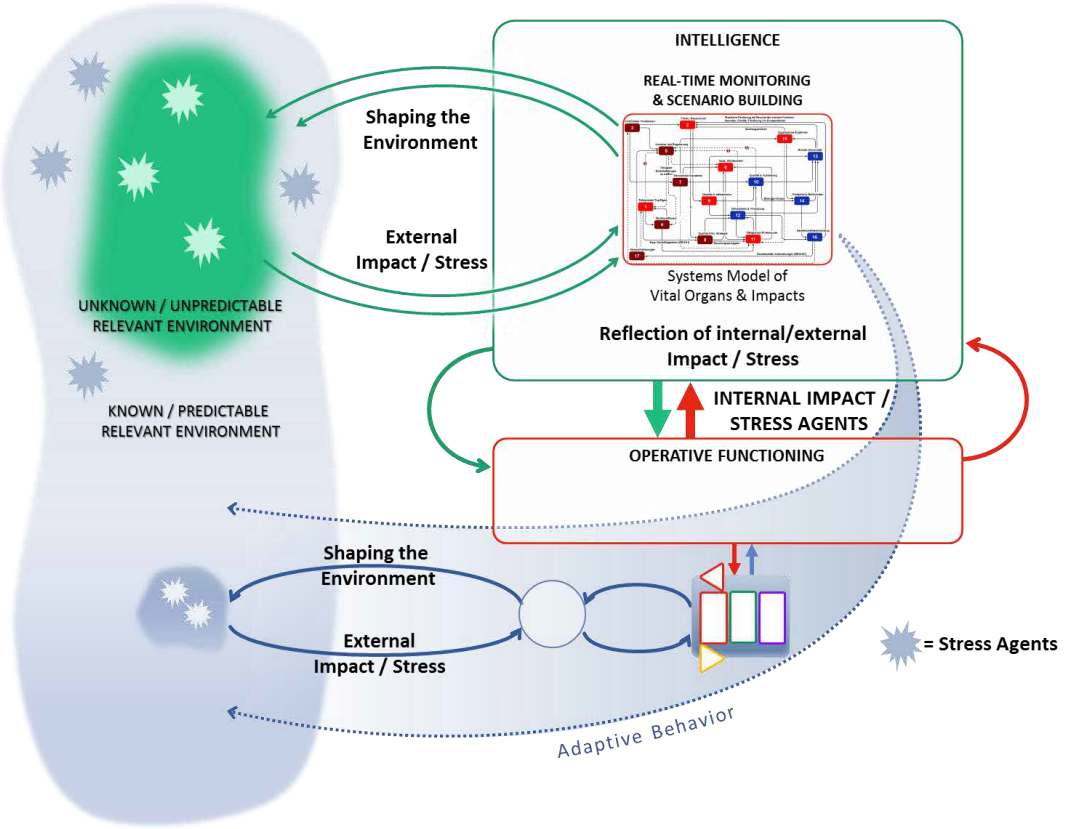
Mechanisms to ensure maximum resilience and adaptation (2 of 2)

Monitoring

1. Certainly, monitoring is another important parameter to be considered. This will happen in abundance in the BSD - no doubt. It is important, however, that these **data** are **transformed into information**. And this depends on the applied filters.
2. An example of an important but often forgotten monitoring tool is the **algedonic signal** (1). Algedonic signals are pain or pleasure signals that call for immediate action. There may be other signs of pain and pleasure that don't require fast action but the algedonic signal does. And they need to be designed and organized. On the factual level the emergency number is an example. Police, firefighters or doctors need to react immediately. On the governance level algedonic signals concern mostly the coherence of the entire system.

Legislation

Another mechanism that is largely being neglected is **anticipatory legislation** (2). The idea is to prepare rules and regulations in anticipation of events. Such regulations would only come into effect when particular conditions are fulfilled. But then they are ready and there is no need to first go through the procedures of passing a new rule. This might come handy in the case of BSD particularly.



1. Algedonic = From Ancient Greek *ἄλγος* (algos, "pain") + *ἡδονή* 'pleasure'. 2. See also Malik, C., Ahead of Change, Frankfurt 2010.

Real-life Feedback and Self-regulation

Governance as an emergent property

Real-Life Feedback

1. Feedback is one of the most important mechanisms of effective governance. A system is in a constant state of flow and it needs information about the things that happen. Otherwise regulation cannot happen. And the S in BSD must naturally mean **real-time feedback also on the governance level**. That does not necessarily mean that feedback must always be immediate but according to the rhythm of the matter concerned and without delay.
2. An example for real-life feedback are the satisfaction buttons at certain airports. The customers can immediately rate the service they just received. In BSD this could mean that throughout the city inhabitants might find such buttons as a general expression of their current state of happiness or for certain important services such as mobility, health, energy, etc. Or there could be a special feedback app for the inhabitants. The possible applications are endless but must be designed so the outcome is information and not just data.

Governance by self-regulation

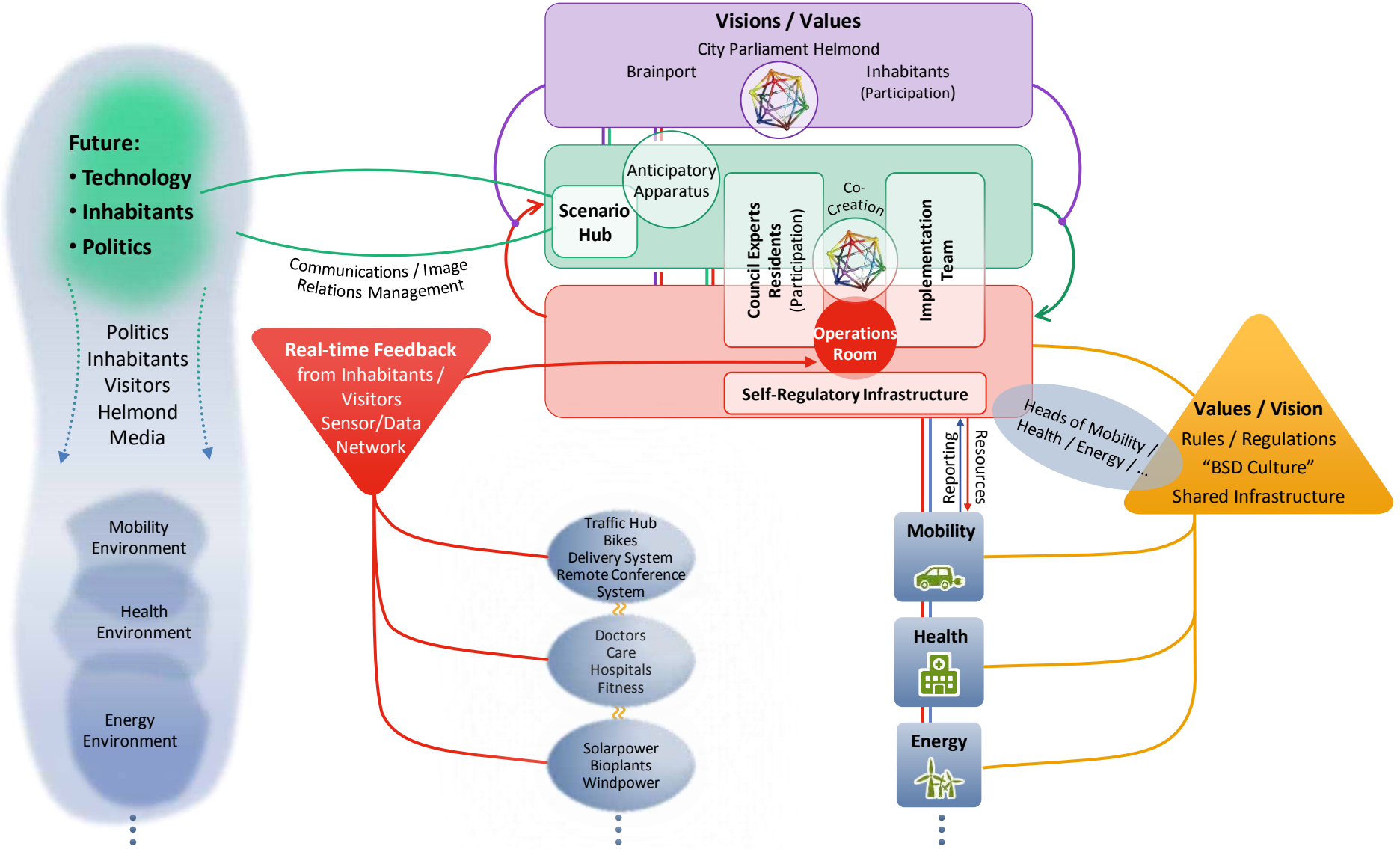
1. An interesting experiment for a newly designed BSD would be to see which governance aspects could be built right into the infrastructure. There are quite some issues that were discussed during Syntegration on the factual level that can have a governance function as well, e.g. shared spaces and gravity centers. Both can have a strong coordinating function in terms of the VSM. Then there is the matter of regulations. It would be worthwhile to think about **how BSD would have to be built so certain regulations are not even necessary** because of materials chosen for example or because of the layout of the city. The perfect example is of course the traffic round-about.
2. It is possible that many governance aspects would thereby be fulfilled by self-regulation. **Governance would become an emergent property** of city infrastructure which would greatly reduce the regulatory effort required to keep the city functioning.

Participatory City Creation

New ways to shape decisions and democracy

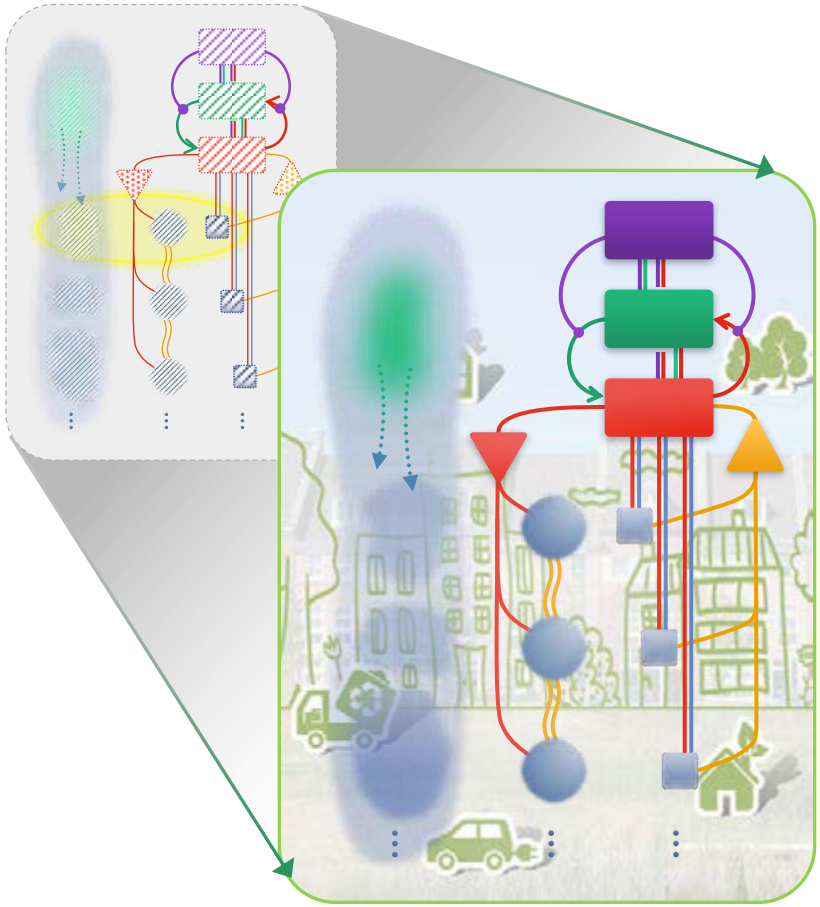
1. The usual **«top down»** approach to city planning and governance **does not seem to fit for BSD**. After all, everybody who moves to BSD knows what they are in for. And why should these people not be given the chance to contribute to the development of the city and help shape and realize new ideas?
2. «Regular» democracy has reached its limits in our societies. And it certainly cannot cope with constant and fast change, let alone swift transformations. **New ways should be tried** to include inhabitants in shaping their own society.
3. Such ways might go from **remote voting on special issues** by means of a special app to methods of **including large numbers of people** for **opinion, consensus and solution forming** (Syntegration).

Exemplary governance structure for BSD



One temporary viable system creating a permanent viable system

1. A specialty in the case of BSD is certainly that an entire district will be **designed and built from scratch**. It will be the job of the implementation team to realize it by 2022.
2. Because of this and as mentioned before, there is not only a **governance structure needed** for the future city district but also **for implementation**. And because the implementation team will be around for quite a long time, we suggest to organize it **according to the same viability principles** as the district itself – just on a temporary basis. Once BSD is realized the implementation organization will cease to exist – or become something else. That remains to be seen.
3. Therefore, the implementation team also requires an identity and common goals and values. It will need to be flexible and have to adapt to changing circumstances. It will have to operate and coordinate its units fulfilling its purpose. And those units should probably be considered the individual projects the team has to manage.



Reflection 2: Management System

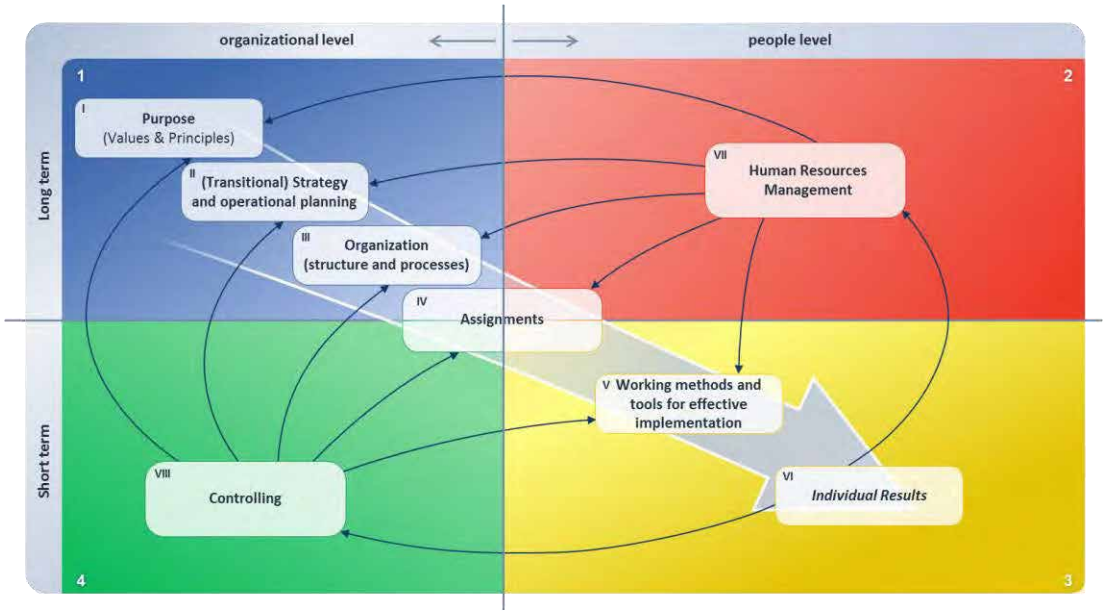
Setup of a management system to ensure successful implementation and transformation

1. In order to create, control and further develop the implementation of BSD all **necessary functions of management as the operating system of the (project) organization** have to be incorporated. This includes the design, steering and development of the management system as a whole (Management of the management processes).
2. In the Integrated Malik Management System IMS® all management processes that are needed for an **effective total control** of an organization are represented. It delivers a framework for the management system of BSD.
3. The setup of the management system has to ensure the functioning of all management elements that lead **from the purpose of BSD to the results of the implementation**. On the following pages are some first recommendations on the setup of the management system.
4. Success factors of implementation are **professionalism in management** and **transformation control** of BSD.

The Integrated Malik Management System IMS®

Dimensions and elements of the operating system

General version with 8 subsystems



It is management which makes societal organizations function or fails to do so and therefore, management is one of the key functions of modern society.

Model description of the Malik IMS

The Malik IMS was developed for the management of organizational areas, that are directly **responsible for results**. It contains all relevant dimensions and elements of management required: related to the organization as well as related to the people, short-term as well as long-term, static as well as dynamic.

In the Malik IMS all management processes that are needed for an **effective total control of an organization** are represented.

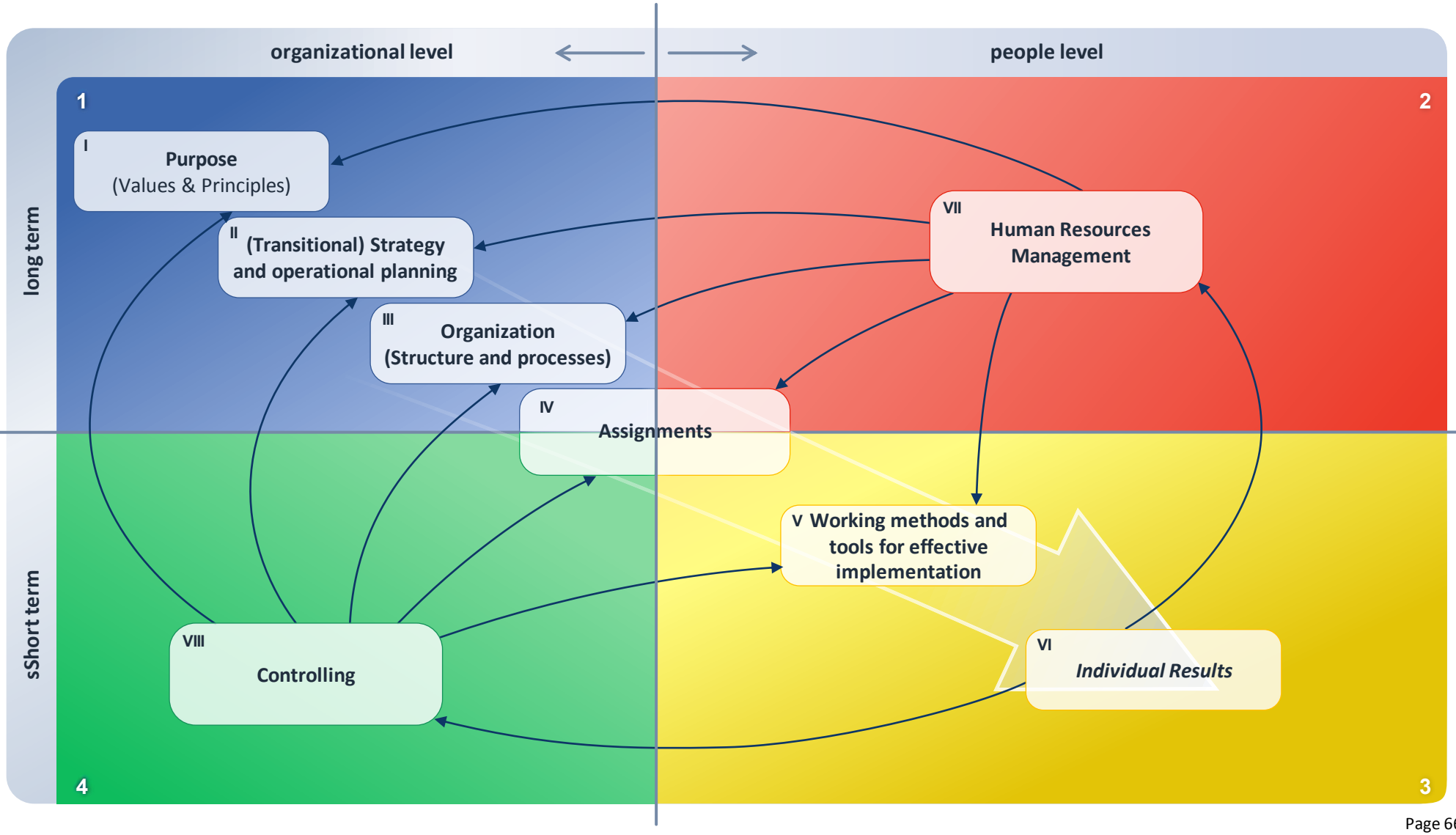
Malik IMS as the Operating System for today and tomorrow

The **Malik Management Systems®** are for organizations, what the operating system is for computers and what the central nervous system is for the human body. Designing a management system for BSD has to consider that **a management system is needed to operate BSD in the future and** also a management system is needed that **serves as an operating system for the transition and implementation period**. The Malik IMS delivers the framework for both systems. No further elements have to be added to transform economic and social resources into results and value for BSD – now and tomorrow.

To move, change and control the implementation system of BSD, complexity management and transformation control (see below, impact-risk-map) are the most effective levers. In order to create, control and further develop the implementation of BSD all necessary functions of management as the operating system of the (project) organization have to be incorporated. Organizational and people-specific aspects have to be considered balancing long term benefits against short term constraints simultaneously.

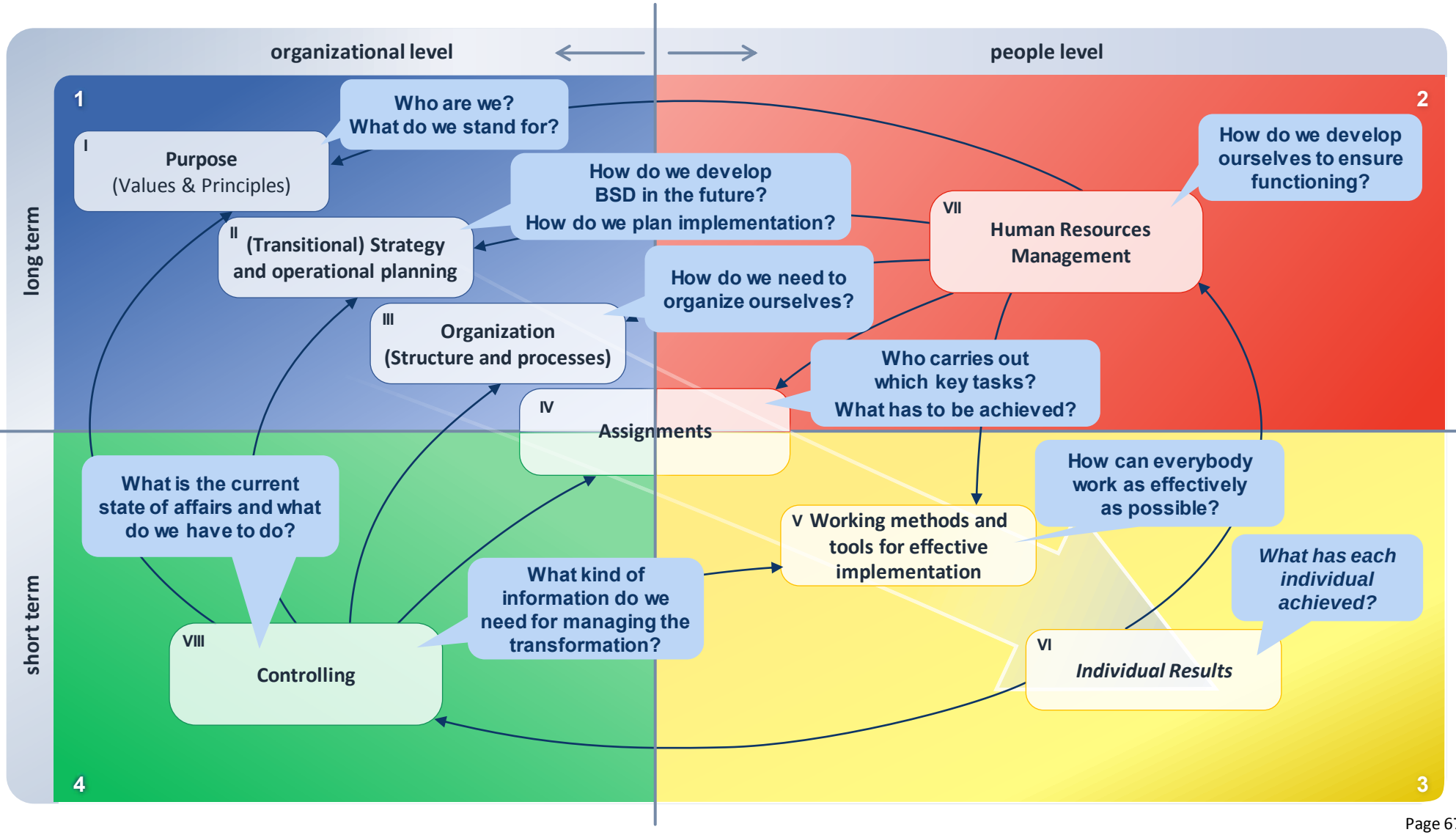
The Integrated Malik Management System IMS® - Overview

Ensuring the functioning of 8 subsystems to manage transition and implementation



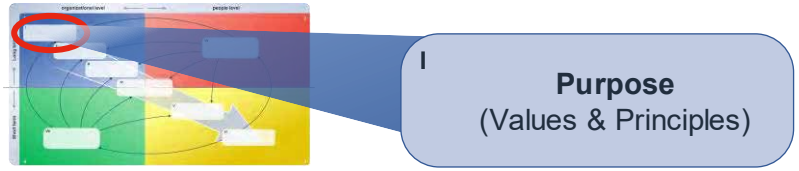
The Integrated Malik Management System IMS® - Overview

8 subsystems to manage transition and implementation with questions to be answered



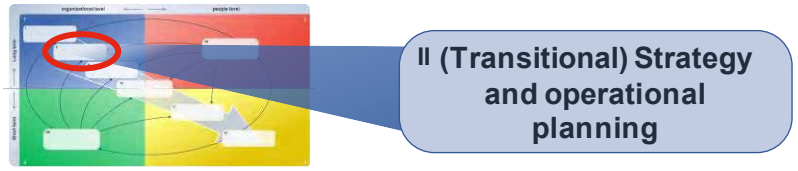
The Integrated Malik Management System IMS® - Overview

Recommendations regarding the setup of the management system along the road of transition (1/2)



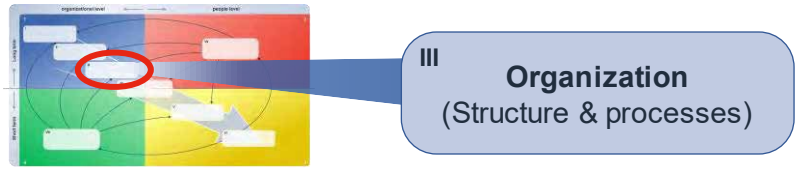
"Let's describe the dream." (Participant quote): Values and principles, guidelines and regulations have to ensure a clear long term orientation on the intention of BSD. Fundamental decisions that determine the ground lines of BSD on a long-term basis are entitled.

The ambition for BSD was described as a first draft in Iteration I of the topic "Implementation Process". Discussed values and guiding principles were also elaborated and can now be consolidated: "Resilient City" (Iteration I), "€cosystem" (Iteration II), "Everything as a service" (Iteration I), "Open Infrastructure" (Iteration II) , "Data" (Iteration II) , "Attractive Built environment" (Iteration II).



"We need to implement specific projects in the necessary order and timeline." (Participant quote): The (transitional) strategy will determine BSD's elementary path by following the fundamental policy decisions. It will further define how BSD meets its ambition and its future challenges in a changing environment. Operational planning in the sense of a multi-annual plan will then translate the strategy's objective and benchmarks and its key measures into daily business.

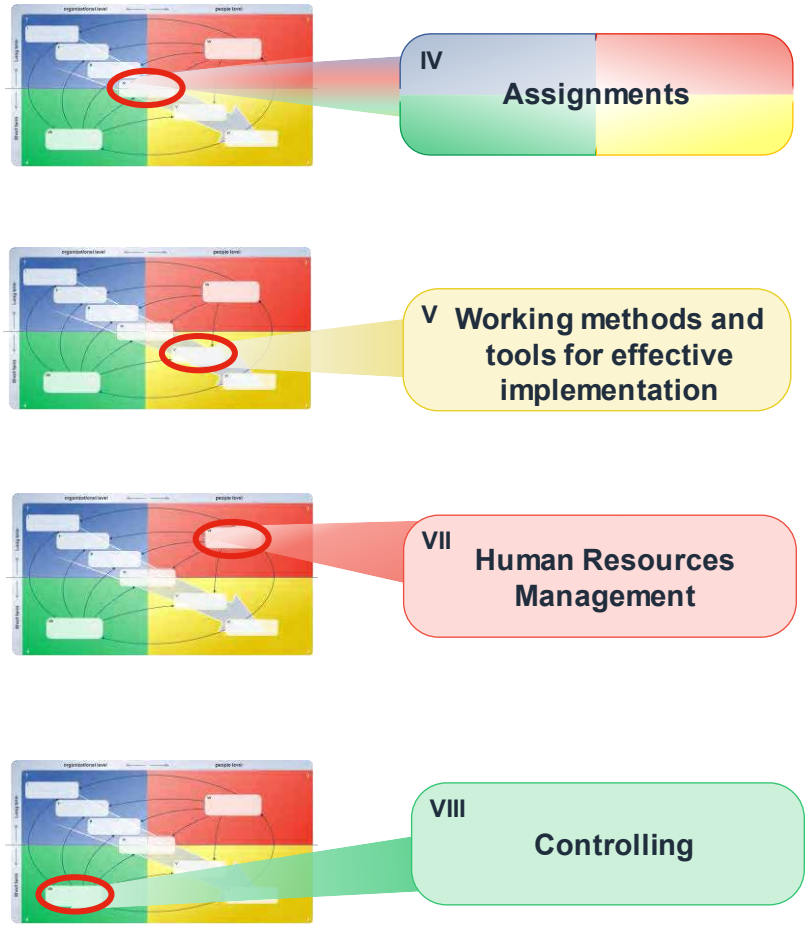
The overall roadmap for BSD has to be elaborated, defining the strategic objectives of the topics/programs and pointing out interdependencies between topics/programs and actions (see also the recommendation of the topic "Implementation Process" and part 3 of this report on Transformation Control)



"It is key to organize ourselves in a way to ensure that the actions to achieve the ambitions of BSD will be implemented." (Participant quote): Organizational structure and operational processes are based on the systemic functions operating, coordinating, optimizing, intelligence and identity and values. For recommendations see reflection 1.

The Integrated Malik Management System IMS® - Overview

Recommendations regarding the setup of the management system along the road of transition (2/2)



"We need to decide what has to happen now." (Participant quote): Assignments serve as the tool to control the main activities in the different topics/programs . They ensure that an effective contribution is made over time to the implementation of BSD and determine also priorities that are derived from the situational demands during the implementation period. Assignments also represent the transition from the long-term objective of a topic/program to the short-term dimension.

(Managerial) Working methods and the use of the right tools ensure effectiveness on the road to results : The working method of each project group and each individual helps to transform the assignments in an individual action. The working methods are decisive for the effectiveness of the project and the persons involved.

To enhance the effectiveness of the people involved, educational measures on prioritization of tasks, planning, time and self-management should be implemented.

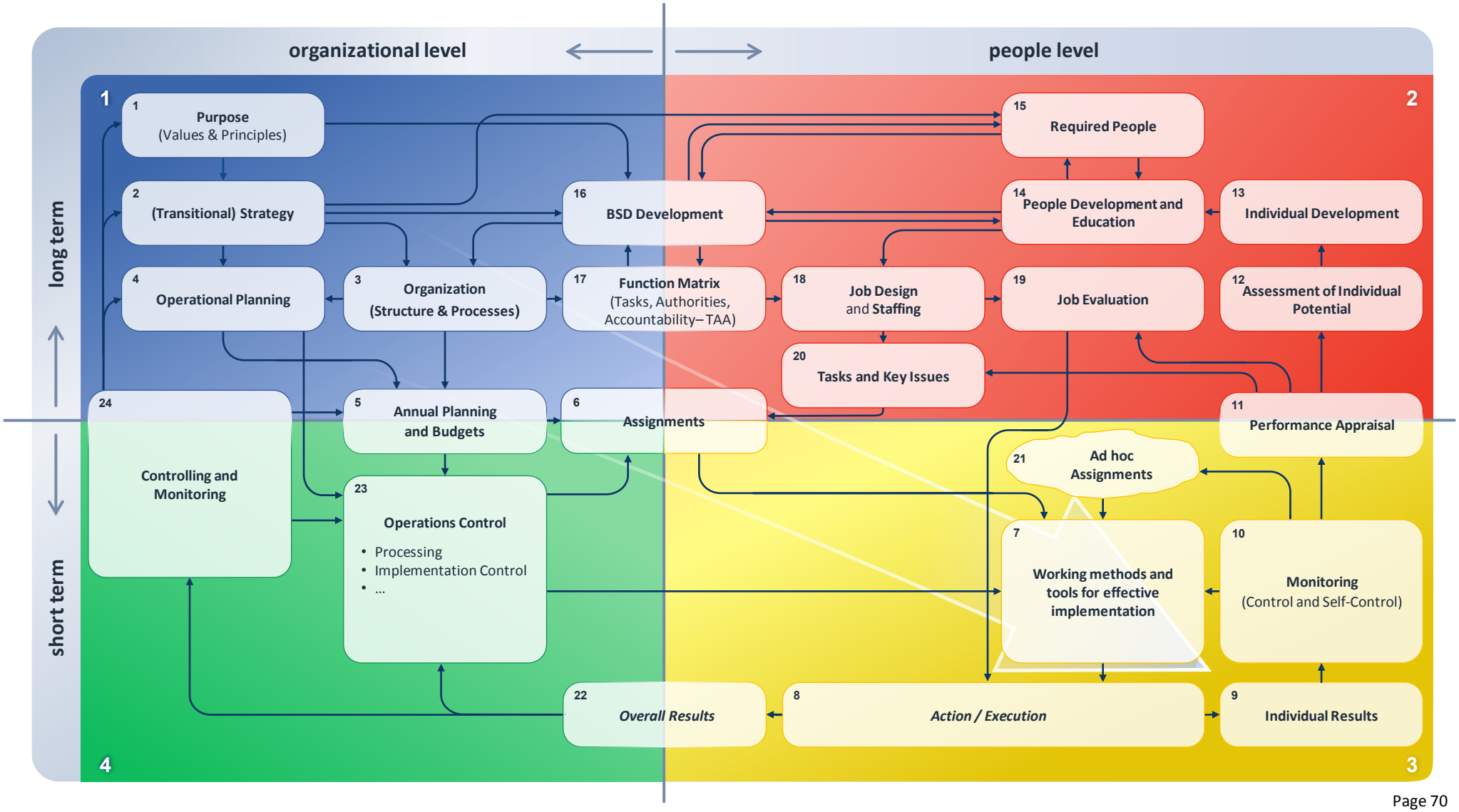
The right people at the right time: HR Management implies all measures to have the right amount of people with the right qualification at the right time as well as to support the continuous development of already involved people in line with current and future requirements of the implementation of BSD.

Recruitment and development of internal and external implementation staff has to be carefully and dynamically planned in alignment with the transitional strategy and operational planning.

"We have to deliver the necessary information to the topic teams during the creation of BSD." (Participant quote): Controlling and reporting has to be established as the most important feedback-system for the implementation of BSD. A Transformation Control Center (TCC) ensures real-time information as a basis for decision-making and control of operational processes. For recommendations see part 3 of this report on Transformation Control.

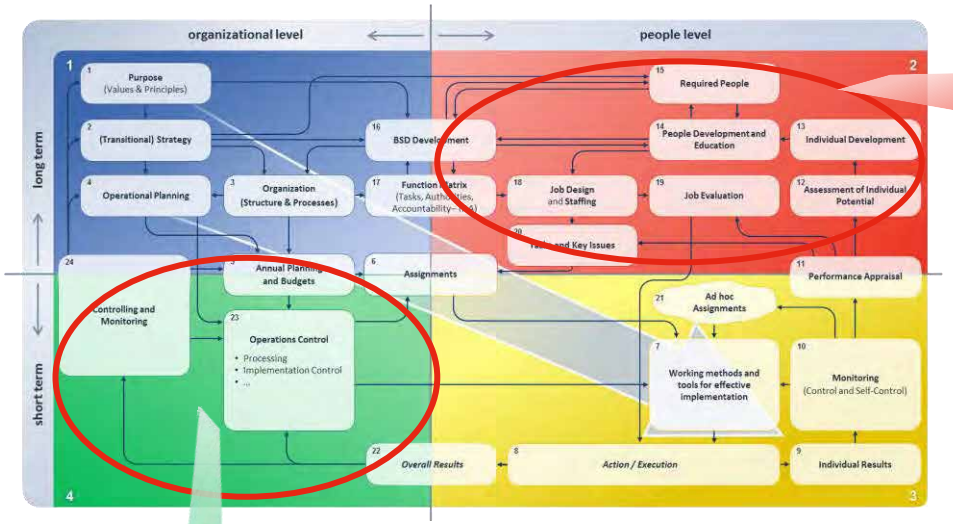
The Integrated Malik Management System IMS®

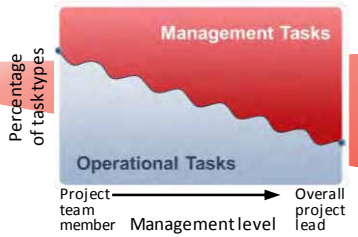
The detailed version of the Malik IMS gives further insight on designing a functioning management system



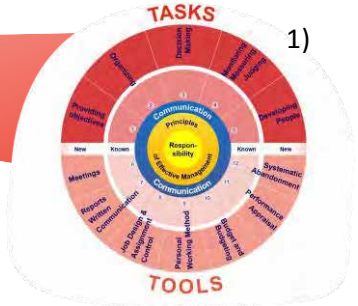
The Integrated Malik Management System IMS®

Professionalism in Management and Transformation Control as success factors for the implementation of BSD





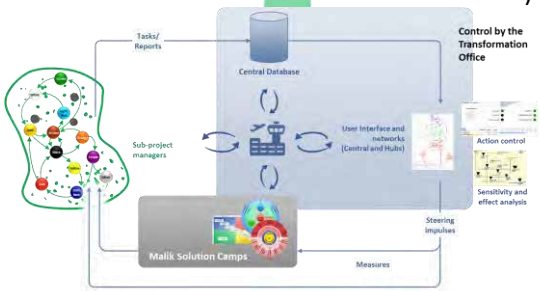
The right functional expertise is needed to fulfil the operational tasks of implementing the Syntegration topics.



1)

Managerial Effectiveness ensures the design, control and development of the overall implementation system.

Managerial Effectiveness **can be learned and should be learned**.



2)

Transformation Control - in order to achieve fast and sustainable success

Controlling and reporting has to be established as the most important feedback-system for the implementation of BSD.

The Transformation Control Center will ensure …

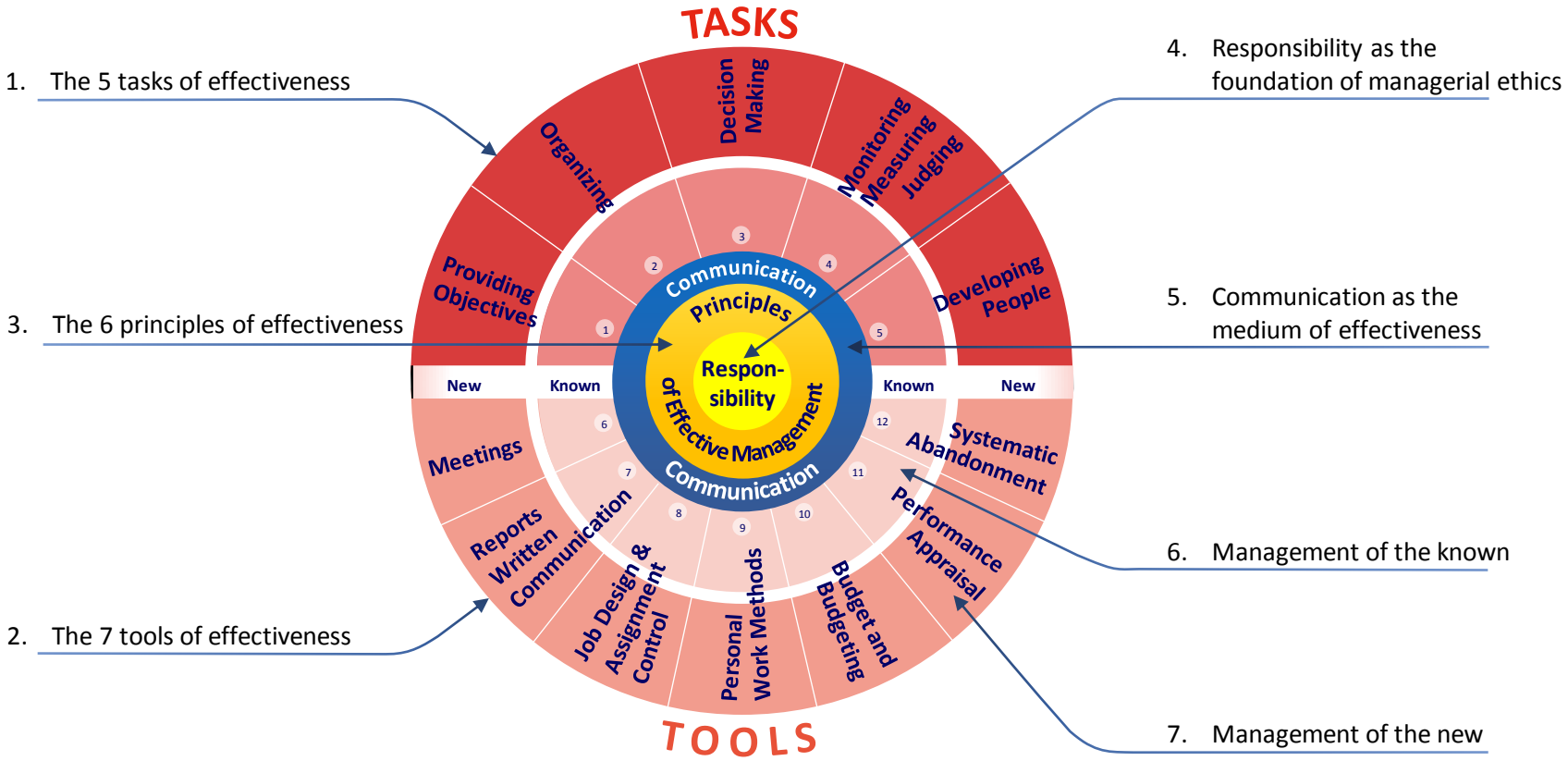
a. the creation of a real time platform
b. real-time information for decision-making and control of operational processes
c. monitoring and interconnecting of the implementation projects
d. completing the implementation system

1) See next page for an overview of the Malik Effectiveness Model 2) See part 3 of this report on Transformation Control

The Malik Standard Model of Managerial Effectiveness®
Managing People

Effectiveness means doing the right things. Efficiency means doing things right. The background of the model are two main questions: What do successful managers do? How do they do this?

We understand Management as a **learnable profession** which has four elements: **tasks, tools** for mastering the tasks, **principles of effectiveness** and the **responsibility** of executives which covers the ethics of management. **Communication** is the medium for effectiveness. **Leadership** of people is the result of the masterful application of the effectiveness model.



Reflection 3: Sensitivity Model

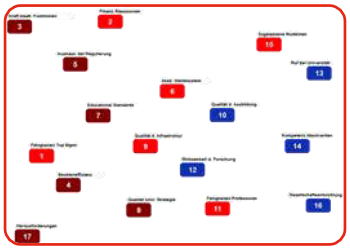
A systems view to recognize neuralgic points for rapid and sustainable success

1. **Well dosed interventions at the right spots** are required for an effective change in the system "Brainport Smart District".
2. The control loop model shows: **effective complexity management and smart district governance** are the key catalysts for achieving a thriving and viable BSD.
3. The diagnosis of the feedback loops also makes visible how essential **citizen participation** is for the development of BSD.
4. The analysis of all individual effects from one factor to all others results in the impact resp. risk map, which reveals the effect of the individual factors in the total system.
5. **Complexity management** and **transformation control** are active control levers that are especially useful to achieve fast and sustainable changes in the system Brainport Smart District.

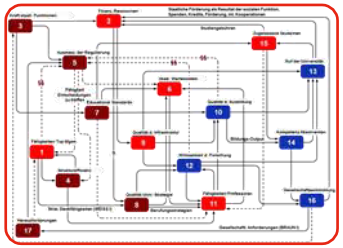
Basic process of the Malik Sensitivity Diagnosis for identifying interconnected control circuits

What does this tell us about the desired future of BSD and about how to achieve it?

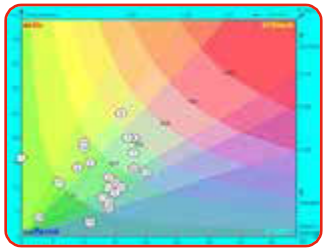
1. Which factors influence the system "BSD"?



2. How are these factors dynamically interlinked?



3. Which factors are the best levers to steer the system into the desired direction?



Methodology and Benefits: The Malik Sensitivity Diagnosis is an efficient system tool to find and visualize interconnections in complex systems. With this computer-based tool it is possible to integrate findings about complex environments, innovations, organization culture and more. The diagnosis **reveals the most powerful control levers for the development of the system in the desired direction with the least possible resource efforts**.

Detailed information on the Malik Sensitivity Diagnosis methodology can be found here.

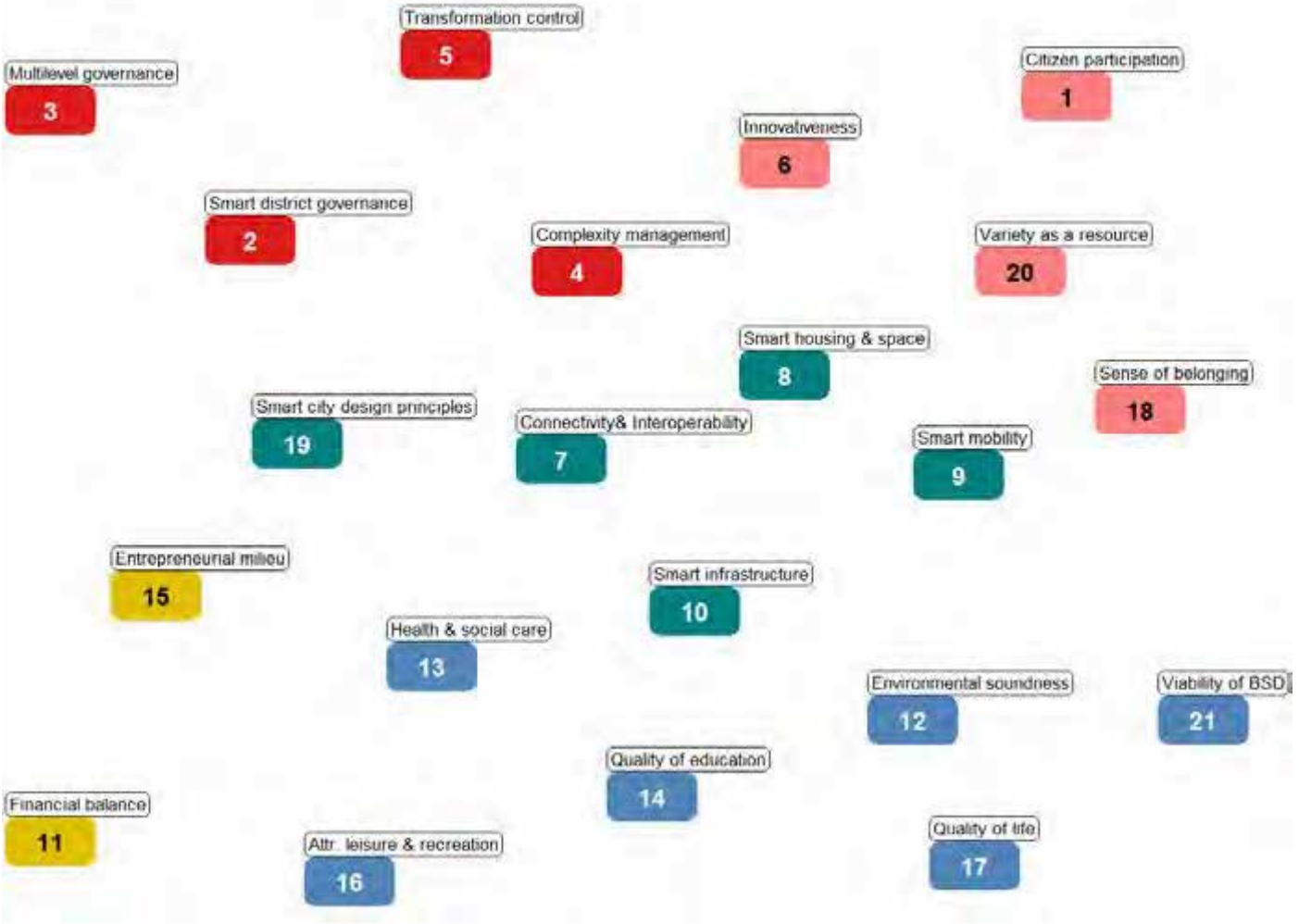
21 key factors for the development of Brainport Smart District

Following is the list of 21 key factors for BSD's development that have been defined on the basis of the Syntegration's discussions and results, and amended by reference to generic models for the functioning of smart cities. A description of all factors can be found here: link

In the next slide you will find the factors spread out over the flat of the slide for a particular purpose.

1. Citizen participation
2. Smart district governance
3. Multilevel governance
4. Complexity management
5. Transformation control
6. Innovativeness
7. Connectivity & Interoperability
8. Smart housing & space
9. Smart mobility
10. Smart infrastructure
11. Financial balance
12. Environmental soundness
13. Health & social care
14. Quality of education
15. Entrepreneurial milieu
16. Attractive leisure & recreation
17. Quality of life
18. Sense of belonging
19. Smart city design principles
20. Variety as a resource
21. Viability of BSD

The 21 key factors spread out over the flat for developing the interconnected system model "Brainport smart district"



Colors of factors: Red = governance & management, Light red = people & variety, Turquois = smart city technology & principles, Yellow = economy & finance, Blue = life & viability

Description of factors: see here

The 21 factors and how they are interconnected by invisible control circuits to form the system model "Brainport smart district"

System facts:

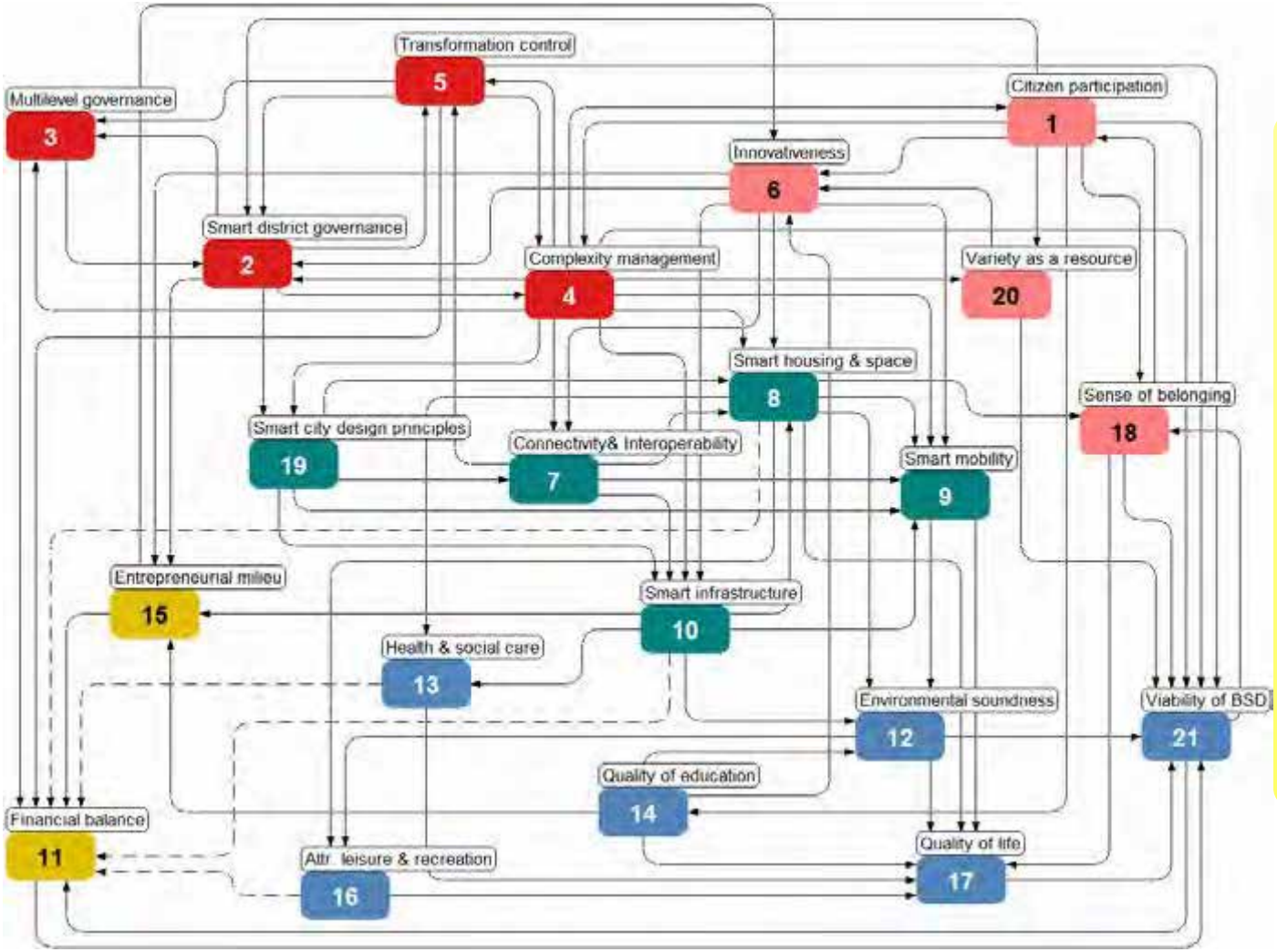
21 Key factors

81 Direct effects

1257 Feedback loops

a) 1032 Reinforcing loops

b) 225 Stabilizing / inhibiting loops



System diagnosis:

The system is rather strongly interconnected (degree of networking = effects/factors = 3.86 = 54% more than average).

Strong interconnection and the dominance of reinforcing feedback loops show that the system can be activated.

For gaining active control of the strongly interconnected system, single measures will not be sufficient. Concerted and simultaneous intervention at different parts of the system is needed.

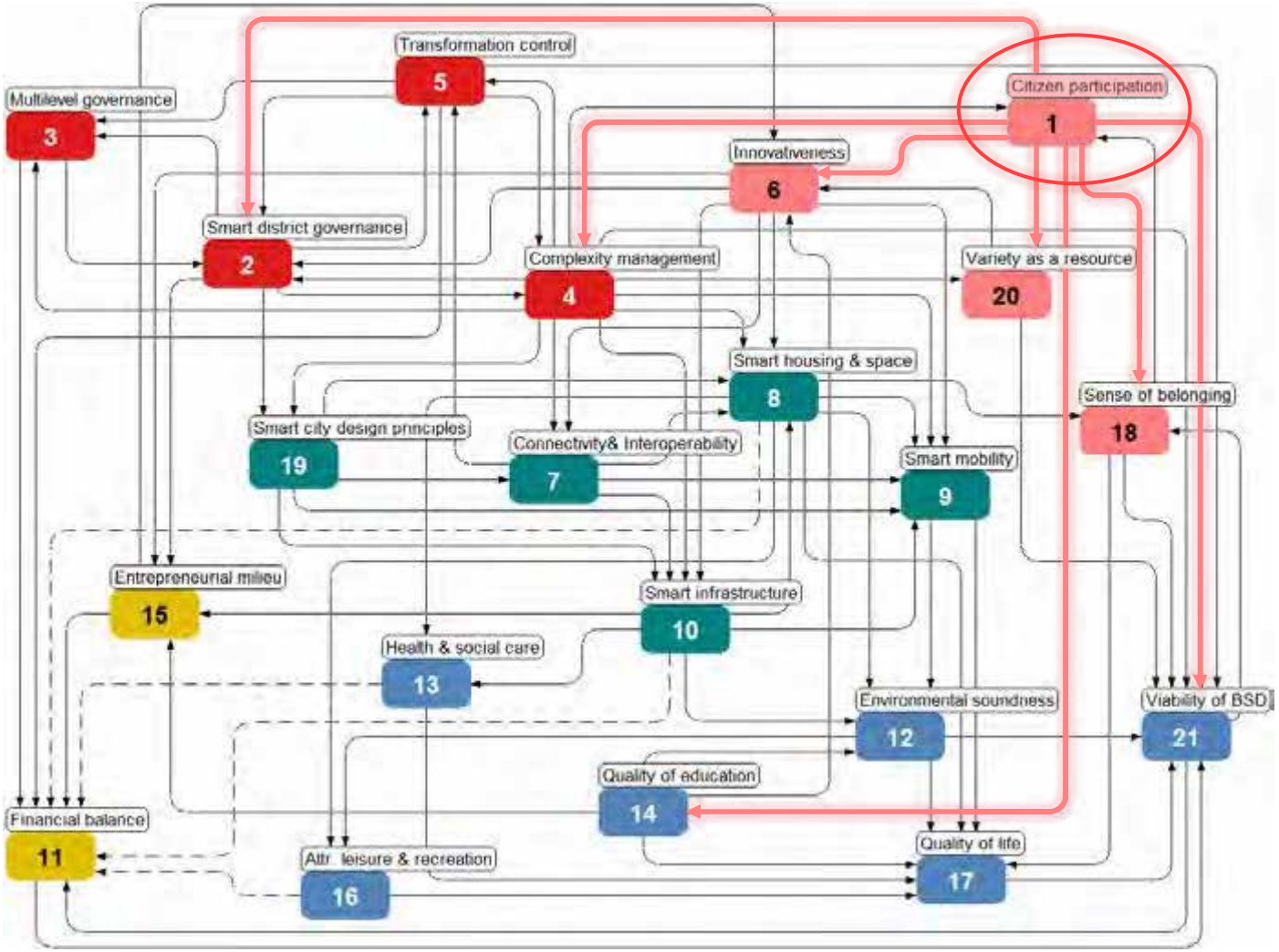
Colors of factors: Red = governance & management, Light red = people & variety, Turquois = smart city technology & principles, Yellow = economy & finance, Blue = life & viability

→ **Confirming effect**: The more, the more / the less, the less

⇢ **Opposing effect**: The more, the less / the less, the more

Description of factors: see here

Citizen participation is an essential driver of the system „Brainport Smart District“



System diagnosis:

Citizen participation is embedded in more reinforcing feedback loops than any other factor.

It is part of 974 of the 1032 reinforcing feedback loops (=94%)!

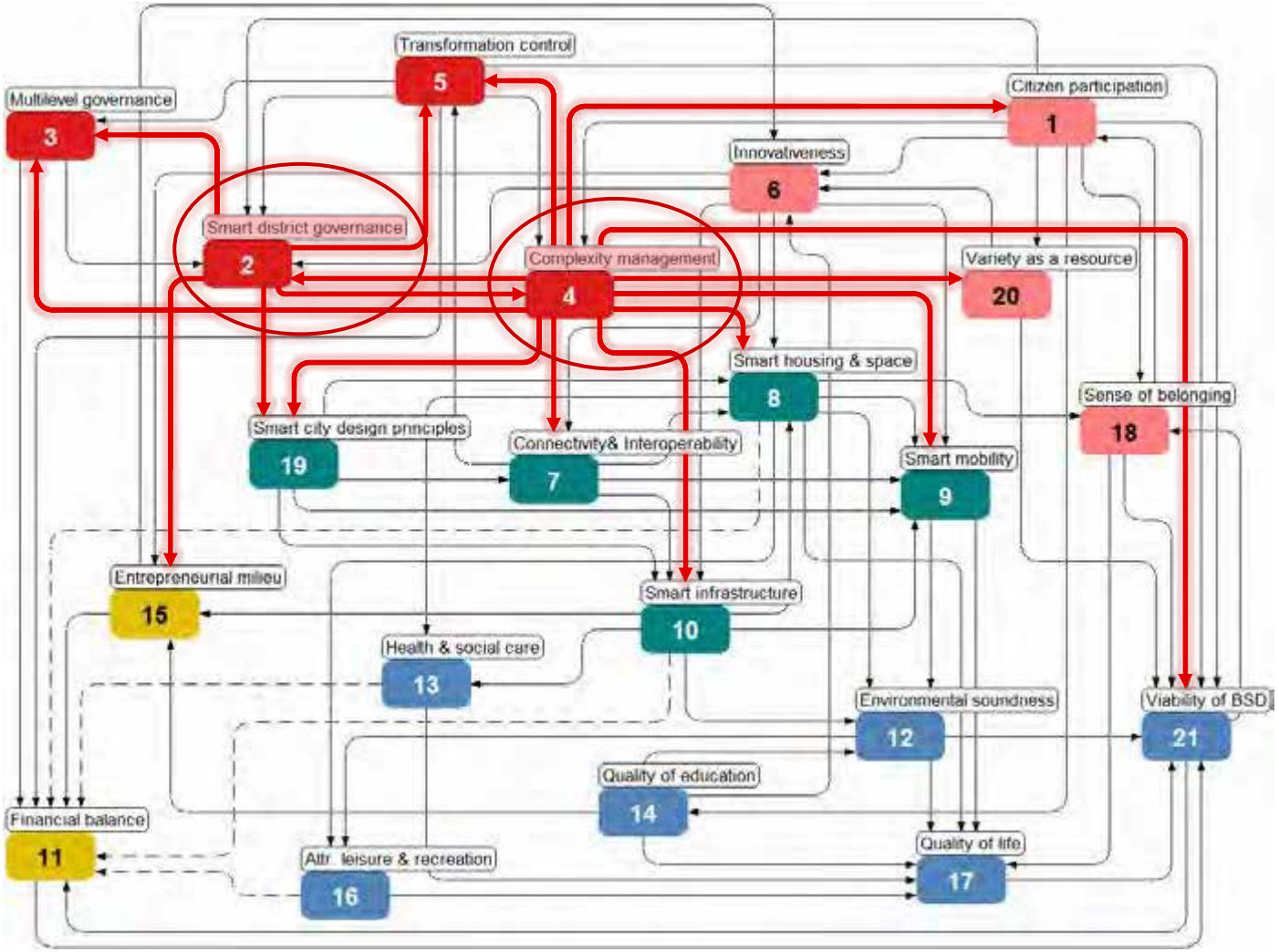
If it is deactivated, the number of reinforcing feedback loops is reduced to 6% (58 instead of 1032). The system “Brainport Smart District” can only be activated if citizen participation is achieved.

Colors of factors: Red = governance & management, Light red = people & variety, Turquois = smart city technology & principles, Yellow = economy & finance, Blue = life & viability

→ **Confirming effect**: The more, the more / the less, the less
⇢ **Opposing effect**: The more, the less / the less, the more

Description of factors: see here

Effective complexity management and smart district governance are the key catalysts for achieving a thriving and viable BSD



System diagnosis:

Complexity management, BSD's ability to steer the various interrelated projects effectively, achieving results through professional management, is a key factor, directly influencing the degree and the effectiveness of citizen participation and many other factors in the entire system.

Complexity management is part of 636 of the 1032 reinforcing feedback loops (=62%).

Combined with an effective smart district governance, which is part of 613 (=59%) of the reinforcing feedback loops, it is the key catalyst to achieving a thriving and viable Brainport Smart District.

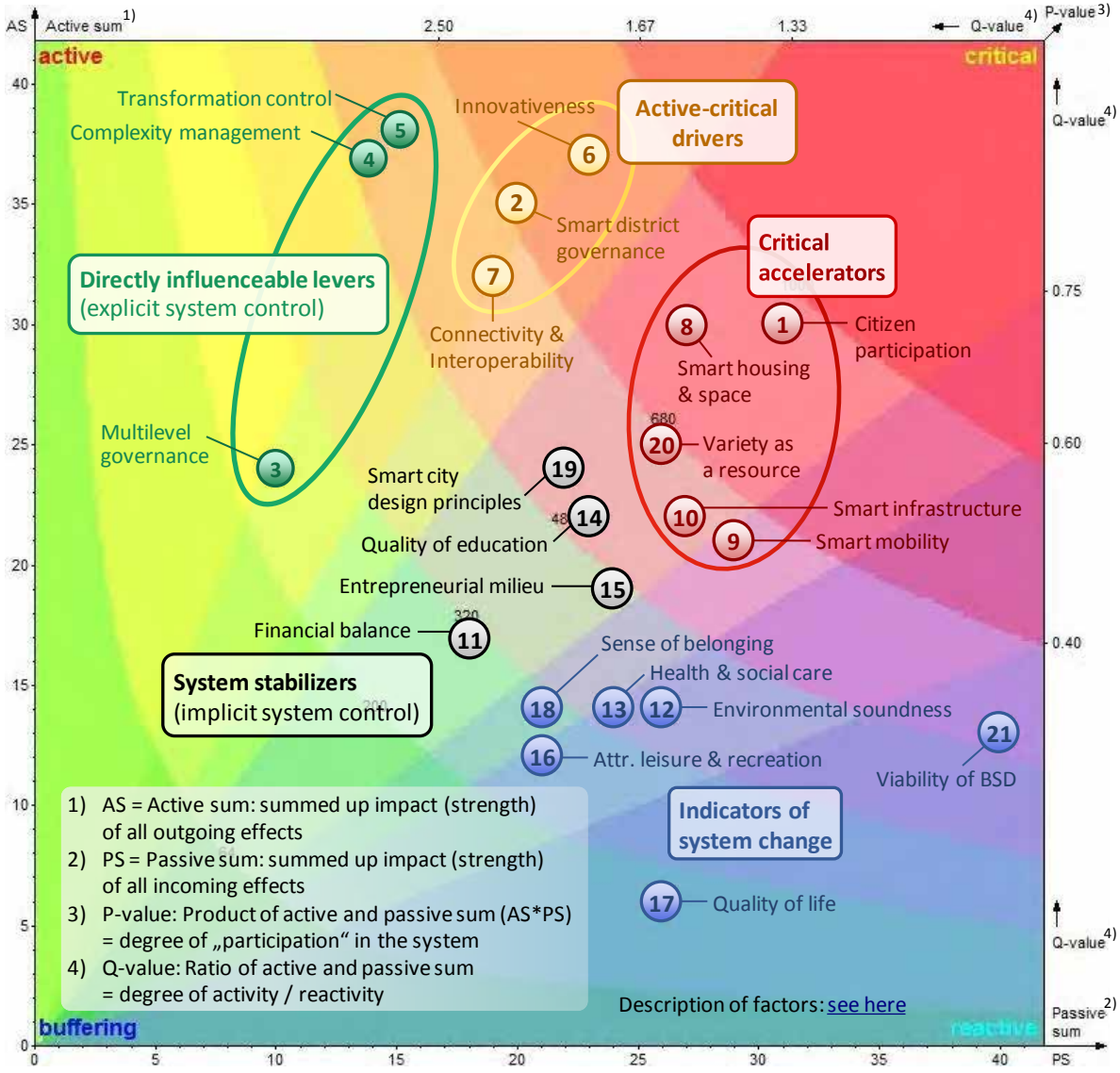
Colors of factors: Red = governance & management, Light red = people & variety, Turquois = smart city technology & principles, Yellow = economy & finance, Blue = life & viability

Confirming effect: The more, the more / the less, the less

Opposing effect: The more, the less / the less, the more

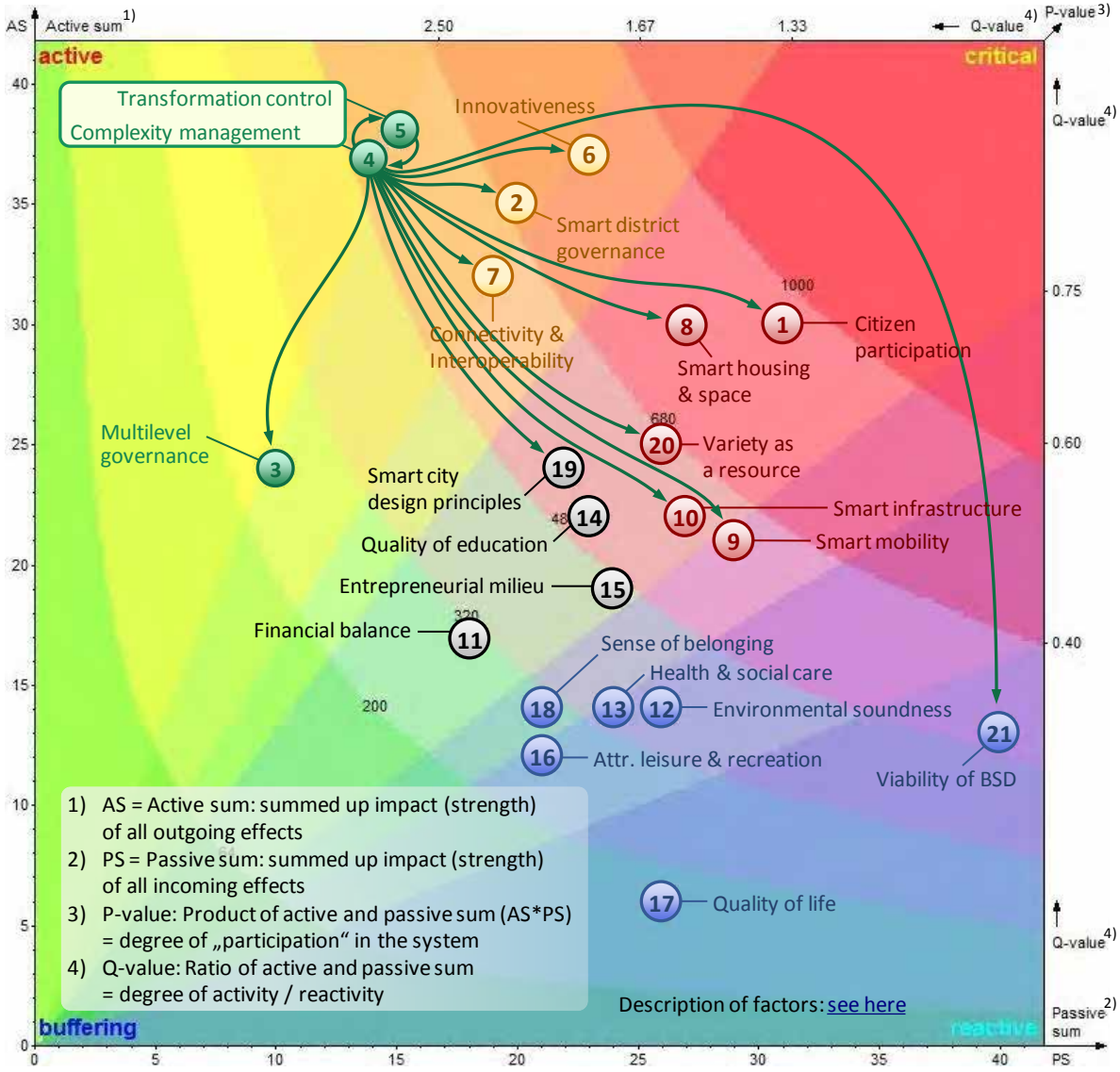
Description of factors: see here

How to move, change and control the system? The Impact / Risk Map
Simultaneous intervention from several angles is needed



1. **Most effective levers**: Complexity management (4) and Transformation control (5) are the most effective levers to initiate change in the system. They have a strong effect on the system (high active sum, vertical axis).
   The effect of Multilevel governance (3) on the overall system is not as strong, though it still is a good lever for system transformation, because it is only weakly effected by other factors (low passive sum, horizontal axis). You can work on all three factors, without being hampered by the weak status of other factors. This means increasing professionalism of management and the effectiveness of control systems and of multilevel governance are optimal starting points for sustainable change in the system.
2. **Active-critical drivers**: Smart district governance (2), Innovativeness (6) and Connectivity & interoperability (7) are equally active, but are already quite strongly influenced by many other factors (medium passive sum, horizontal axis). They are active-critical drivers that have an essential influence on the development of BSD. Though, simultaneous interventions at different parts of the system are needed to activate these factors.
3. **Critical accelerators:** Citizen participation (1) is most critical, followed by Smart housing & space (8) and Smart mobility (9), Smart infrastructure (10) and Variety as a resource (20). Improvement of these factors will have a strong influence on the system; but they are also strongly influenced by many other factors. Therefore, it requires simultaneous intervention from several angles in order to effectively change these critical accelerators.
4. **System stabilizer:** Financial balance (11), Quality of education (14), Entrepreneurial milieu (15) and smart city design principles (19) are system stabilizers that can be used for implicit control.
5. **Indicators of system change:** All other factors are are indicators of the successful development of BSD. The intended status will result from effective interventions in the more active part of the system.

Complexity management and Transformation control are the optimal starting points for effective system transformation



1. Transformation control (5), followed by Complexity management (4), has the strongest overall effect on the system (highest active sum, vertical axis).
2. As managerial professionalism and an effective transformation control are mutually reinforcing, they should be improved simultaneously and immediately. They can act as the nucleus for BSD's system transformation.
3. Remarkably, complexity management has a strong effect on all other active factors: Citizen participation (1), Smart district governance (2), Multilevel governance (3), Innovativeness (6), Connectivity & interoperability (7), Smart housing & space (8), Smart mobility (9), Smart infrastructure (10) and Variety as a resource (20). Therefore, it is the most powerful lever to activate the system.
4. Additionally, it also directly effects the overall viability of BSD.
5. As shown before, complexity management is rather weakly effected by other factors (low passive sum, horizontal axis). This means improving the effectiveness in managing BSD's complexities is the optimal starting point for sustainable change in the system.
6. Because management is a profession – a "craft" with clearly defined principles, tasks and tools that can be learned, complexity management can quickly and directly be improved.

The Malik Sensitivity Model: holistically understanding systems

The basic methodology

The system model created by Malik experts structurally follows five central steps:

1. **Identification of key factors**. On the basis of the participants' pre-syntegration evaluation (on strengths, weaknesses and challenges), previously made research and intensive observation of the discussions during the individual iteration groups as well as selectively conducted talks and interviews with the participants, the key factors for the development of the system are identified, refined and if needed revised. The factors in system models of organizations are usually of a *qualitative nature* and thus not fully detectable via quantification. (description of factors)

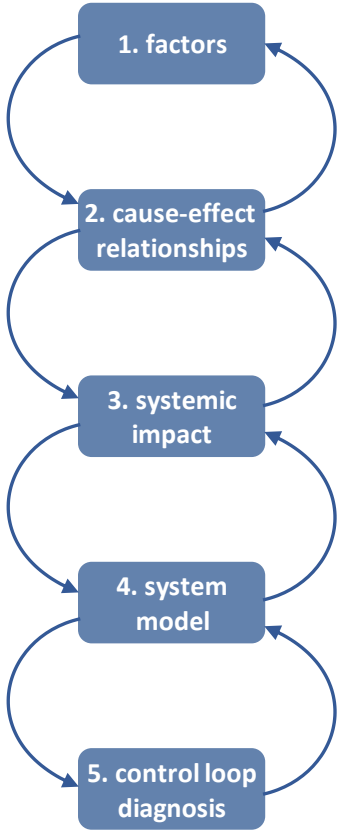
2. **Identification of causal relations.** Thereupon the factors are being evaluated whether they have an impact on the other factors and if so to what strength. Every factor thus is put in connection with every other one and the impact's strength is given an evaluation between 0 (no impact), 1 (impact less than a proportional one), 2 (proportional impact) and 3 (disproportionate impact).

3. **Diagnosis of the effectiveness and importance of the factors**. The evaluated effects of each factor on all other factors allows a diagnosis of the strength of its influence on the total system, how many other factors it affects and how strongly it is itself influenced by other factors.

   On the basis of four central parameters (active and passive sum as an addition of all outgoing respectively incoming values as indicators for the potency respectively the degree of influence, as well as the p- and q-values as product respectively quotient of the active and passive sum as an indicator for the degree of participation in the system behavior respectively the degree of activity / reactivity of the factor) each factor is located in a four-dimensional distribution of roles.

4. **Interconnection of the factors**. Based on these foundations a system model is designed, in which impacts are drawn in the form of directed arrows, which either mark a positive (= in the same direction) effect or a negative (= in opposite directions) effect. Impacts in the same direction are represented by solid arrows, impacts in opposite directions by dashed arrows.

5. **Diagnosis of the control loops.** Thereupon, on the basis of the interconnections, it is possible to analyze the number of control loops and the position of individual factors.



Each of these steps can become a starting point to evaluate, refine and correct the previous results with corresponding consequences in the system model. Discussion, evaluation and revision of the system model are central steps to developing an understanding of the system and the holistic, realistic view thus made possible.

Systemic impact diagnosis: Methodology

1. On the following slides the diagnosis of the *systemic* impact done by Malik is being compared to the prioritization made by the *participants* after the syntegration's final presentation.

2. There are differences between the evaluation methods used.

   i. Prioritization by the participants: Ten points are handed out, which should be awarded (non-cumulative) to different recommendations according to their importance.
   ii. Systemic impact diagnosis by Malik: Valuation of all recommendations according to their positive effects on the factors defined in the system model on a scale from 0 (no effect) to 3 (strong, positive effect), weighted according to the degree of the factors' activity resp. passivity (q-value, see impact-risk-map).

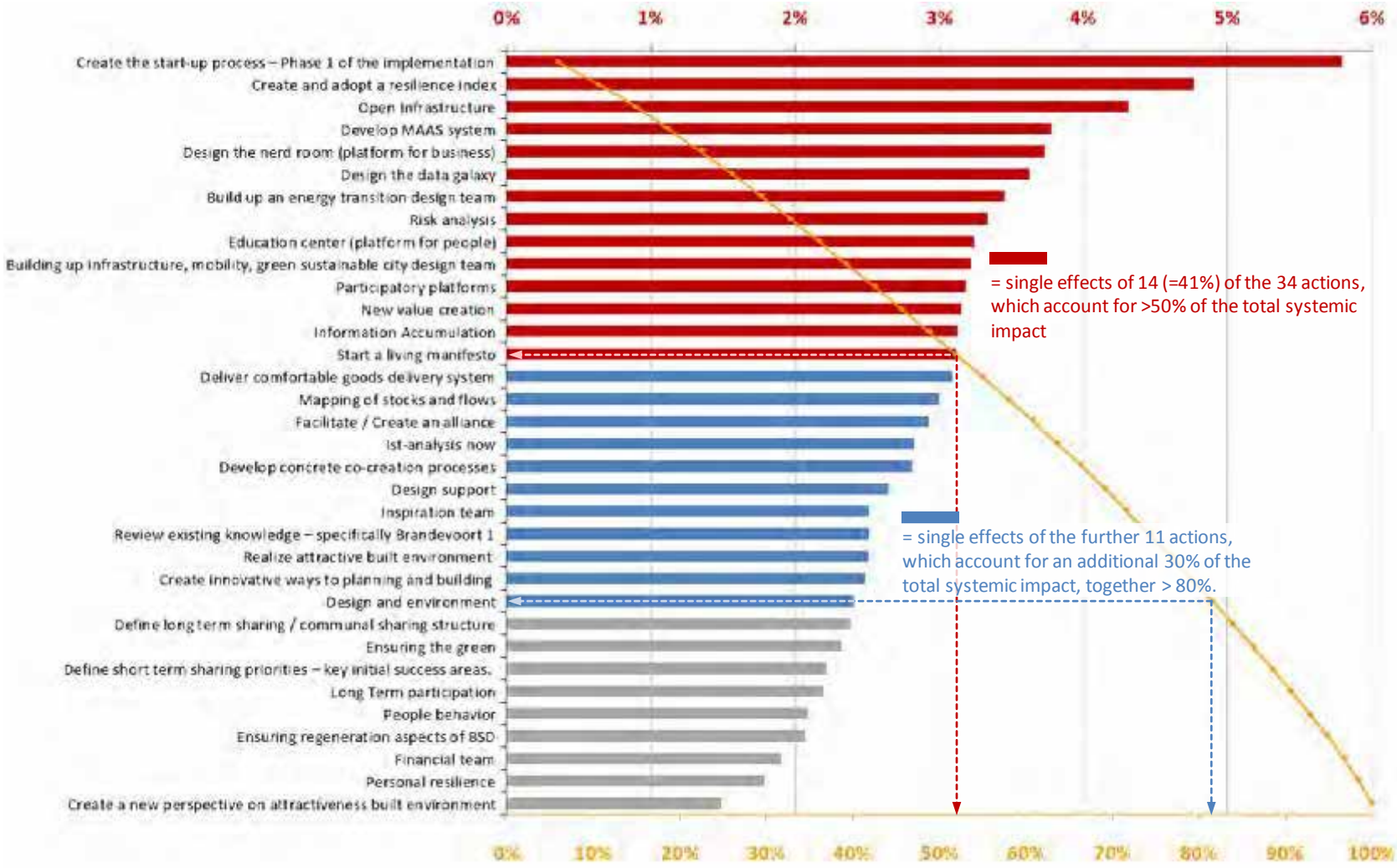
3. The systemic impact diagnosis by Malik thus differs especially by the fact, that (1) *all* recommendations have been evaluated and there has been no need for a partial selection and that it (2) tries to diagnose the importance of the recommendations holistically.

4. Thus there can be considerable deviations between the weighting in percentages of the participants' votes (ratio between the awarded points to a recommendation and the total number of points) and the accepted assessment of the recommendation's effectiveness within the sensitivity model.

5. During the implementation, the systemic effects and the interrelations between implementation steps will be crucial to building a strong foundation for the implementation. A solid system model, which can be developed or refined by the implementation group and project managers, is the basis.

Systemic impact diagnosis by the Malik Team

25 (=73%) of the 34 recommendations account for more than 80% of the systemic impact

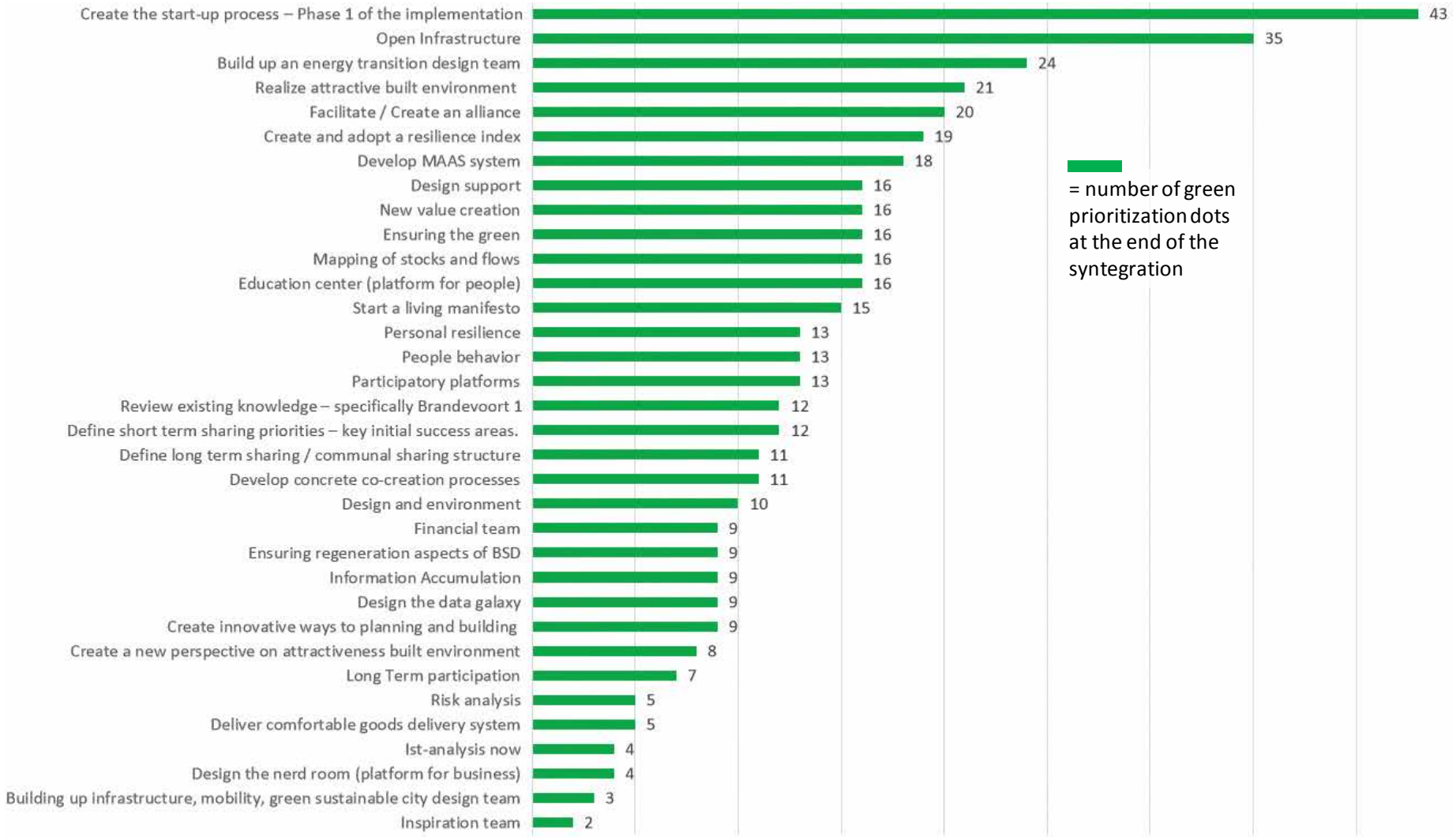


The diagnosis of the systemic impact of the recommendations is based on the Malik experts' estimation, how strongly each of the individual 34 recommendations affects the system BSD (described by the Sensitivity model).

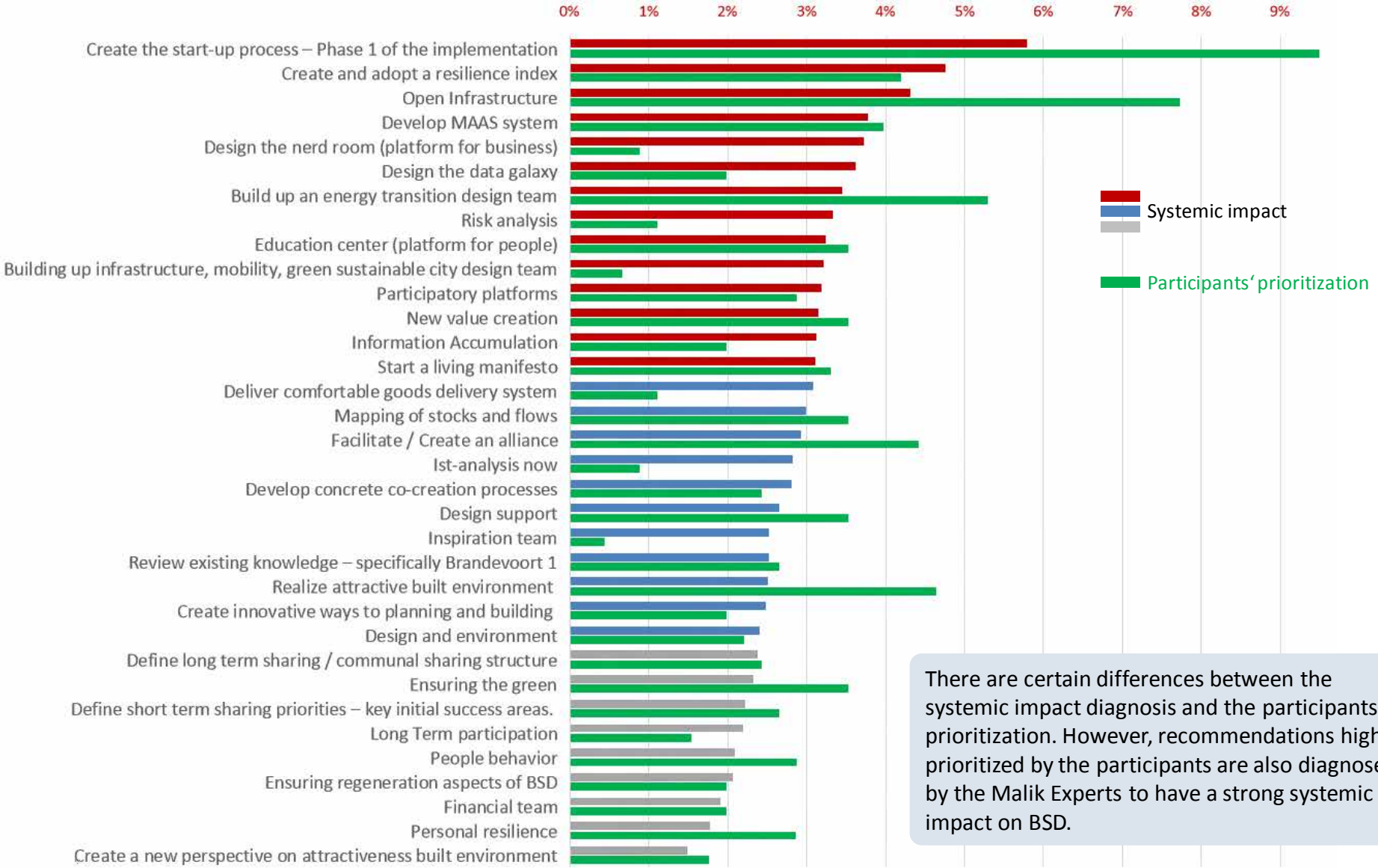
This estimation should ideally be validated with the implementation team in a workshop.

The comparison with the participants' prioritization is on the following two pages.

Prioritization by the participants



Comparison systemic impact diagnosis vs. participants‘ prioritization



There are certain differences between the systemic impact diagnosis and the participants‘ prioritization. However, recommendations highly prioritized by the participants are also diagnosed by the Malik Experts to have a strong systemic impact on BSD.

Key factors (1 of 2)

No.	Name	Description
1	Citizen participation	Citizen involvement (current and future inhabitants); cooperation between inhabitants, the city (government), involved institutes and companies; new channels and technologies for participation; citizen's commitment
2	Smart district governance	Governance for adaptive development; adaptive processes; adequate governance for the complete project that meets with the objectives of the urban development process as well as the research process; organize to self-organize; avoiding cooptation of the smart district concept by party politics; policy instead of politics
3	Multilevel governance	Precise and functioning roles, work-shares, decision making power in the intergovernmental interplay of district, city, region, up to national and European level; supportive policies on the different levels
4	Complexity management	Effective management of the complex process of BSD development, in such a way that all partners and persons can do their jobs; effectiveness on the organizational and the people level; managing conflicting goals
5	Transformation control	Effective steering of the development of BSD, especially the implementation of the Syntegration results; information and coordination hubs; systemically effective integration and steering of the various topics, projects and organizations
6	Innovativeness	Capacity and mindset of innovation; knowledge-based society; supportive policy giving room for the new, for experi-menting; realization of the "Living lab"; innovative companies, new forms of organization, participation for innovation
7	Connectivity & Interoperability	Effective data management and use of data for innovation; balance of ICT, privacy, ownership of data; open & secure; interoperability of assets & systems, functioning interfaces
8	Smart housing & space	Smart & attractive housing and space for work and leisure, making use of interconnectivity, generating new value for inhabitants and companies; part of the "Living lab", energy efficient, following the "human scale", affordable
9	Smart mobility	Smart & efficient mobility systems for people and goods, interconnected, shared, part of the "Living lab", higher convenience than conventional mobility, low or no emissions, stimulating healthy physical activity, affordable
10	Smart infrastructure	Smart infrastructure for water, production, waste, energy; making use of interconnectivity, efficient, low emission, local renewable energy, off-grid, adaptive, part of the "Living lab"
11	Financial balance	Sustainable finance and funding of BSD, effective integration of sources from different spheres (governmental, private, corporate) and levels (local, regional, national, European, global); staying affordable for BSD inhabitants and companies; financial sustainability through high effectiveness of value creation (=management) incl. innovation (=greatest value created by the "Living lab")

Key factors (2 of 2)

No.	Name	Description
12	Environmental soundness	Green self-sustainable city; highest air and water quality; realization of cradle to cradle and up-cycling; any action done in a climate neutral manner; inhabitants can connect with nature; nature is in the center of attention
13	Health & social care	Effective system for health & social care, providing high standard and service-level for everybody; making use of new interconnectivity, while securing data-privacy; citizen participation in health & social care
14	Quality of education	Quality of education for all ages and life-stages; making use of new interconnectivity; citizen involvement; well-integrated into regional education system
15	Entrepreneurial milieu	Investment milieu, supportive policies, innovativeness and interconnectedness of BSD's entrepreneurs and companies, availability of resources (knowledge, skills, finance, space)
16	Attractive leisure & recreation	Attractive space and offerings for leisure & recreation; culture, sports, food, nature, etc.
17	Quality of life	Overall quality of life, as perceived by BSD residents, including a safe environment
18	Sense of belonging	Feeling connected to the community and the idea/principles of BSD, cohesiveness, integrating citizens effectively and sensibly, establishing mechanisms of trust between key actors
19	Smart city design principles	Level of realization/application of smart city design principles, following the values as discussed during Syntegration: human centeredness, holistic thinking and acting, minimalism, requirements-driven service, sharing channels for better re-use, everything as a service, cradle to cradle, participation, elephant path, resilience, robustness, redundancy, etc.
20	Variety as a resource	Inherent plasticity and variety of the technologies employable, new technologies, interdisciplinary/transdisciplinary; a lot of professional knowledge; Brainport has system integrator skills; smart solutions integration and cooperation (healthcare, mobility, living, working, data); multidisciplinary team behind the ideas; existing governance network demonstrating effective triple helix cooperation; focus on collaboration within an innovation ecosystem; diversity
21	Viability of BSD	Overall viability of BSD, including social, political, ecological, economic and financial viability; viability through self-organizing, resilience, adaptiveness, embeddedness

The Participants of the Syntegration (1/3)
Active Participants

No	Title	Name	Prename	Function / Responsibility	Department
1	Prof. Dr.	Baaken	Nico	Senior strateeg KPN en hoogleraar network architecture and services TU Delft	KPN
2		Becker	Debra	Commercial director	Honeywell
3		Dawkins	Michael J.	Innovation Hub Lead	SU
4		de Kort	Geertje	Programma Manager Duurzame en Gezonde Stad	Gemeente Eindhoven
5		de Loos	Noud	Oprichter en ingenieur	Energieclub Helmond Regio
6	Prof. dr. ir.	de Vries	Bauke	Chair Information Systems Department Build Environment	TU / e
7	PhD	Della Corte	Lorenzo	Onderzoeker Law, allignment open data en privacy	TiU
8	ir.	Grond	Manon	Medewerker Onderwijsontwikkeling faculteit Bouwkunde	TU / e
9		Hawxwell	Thom	Research Assistant at Fraunhofer IAO	Fraunhofer
10		Kok	Henk	Advice & managament o.a. Triangulum	Gemeente Eindhoven
11		Kroonen	Jeroen	Innovation manager Energy	Provincie Noord Brabant
12		Lambrechts	Nicolle	Beleidsadviseur Energy & Clean Tech	Provincie Noord Brabant
13		Meijer	Joost	Bewoner , IoT Platform Brandevoort	Itility
14		Messing	Martijn	Interim Beleidsadviseur Energy & Cleantech Provincie Noord-Brabant	Martijn Messing
15		Mooibroek	Josje	Programma Manager ABS	Gemeente Helmond
16		Mulder	Rens	Student-assistent programma Kijk op Brabant: concurrentiepositie Brabant in Europa	Telos
17		Naves	Jeroen	Advocaat, Specialist IT-recht	Pels Rijcken & Droogleever Fortuijn
18	Prof. ir.	Nelissen	Elphi	Hoogleraar Building Sustainability, bestuurlijk verantwoordelijk faculteit bouwkunde	TU / e
19		Oosterhuis	Anna	Conceptontwikkeling innovatieve bouwoplossingen	Hurks/Adriaans
20		Perez	Sebastian	Intercultural Business Communication	Globalizen Intercultural Business Communication
21		Piepers	Leon	Public Affairs en Investor Relations	Enexis/Enplus

In alphabetic order

The Participants of the Syntegration (2/3)
Active Participants

No	Title	Name	Prename	Function / Responsibility	Department
22		Portheine	Peter	Programma Manager BSD	Gemeente Eindhoven
23		Post	Marieke	Marketing Chess Wise	Chess Wise
24		Schmidt	Alexander	Mobility Innovation	Fraunhofer
25		Schoots	Marieke	Programma Manager Sociale Innovatie	TiU
26		Schwiebert	Laurens	Projectleider TU/e Smart Cities Project	TU / e
27		Tamarinof	Lara	Initiatiefnemer Duurzamer Helmond, de Weggeefhouk, bewoner Brandevoort	Stadslab Helmond
28		Teeuwen	Wietske	Programma Manager Sociale Stad	Gemeente Helmond
29		Tielemans	Chris	Initiatiefnemer Buurtmoestuin, docent HAS en expert stadslandbouw	Buurtmoestuin Brandevoort
30		Valkenburg	Rianne	Medewerker Faculteit Industrial Engineering & Innovation Sciences	Tu/e
31		van Beuzekom	Dick	Fysiotherapeut Brandevoort	Fysiotherapie "de Veste"
32		van der Geest	Joost	Programma Manager Wonen	Gemeente Eindhoven
33		van der Heijden	Willy	Directielid	OMO Scholengroep Helmond
34		van Helvoirt	Dirk	Coordinator	Waterschap AA en Maas
35		van Hulst	Michael	Manager Zuid Nederland Eneco Holding	Eneco
36	Prof. dr.	van Mheen	Dike	Directeur Tranzo, wetenschappelijk centrum voor zorg en welzijn	TiU / Tranzo
37		van Rijn	Paul	Directeur Particulieren vestiging Helmond	Rabobank
38		Vancolen	Alexander	Business Development manager	Bosch Security Systems
39		Willems	Sander	Community software voor woningbowuprojecten, co-founder	Sowebuild
40		Wolters	Wiko	Directeur Wolters Vastgoed	Actief Bouwen
41	Dr.	Zuleta Ferrari	Mariane	Burgerparticipatie/citizen perspective/trust/values social dynamics/resilience	TiU

The Participants of the Syntegration (3/3)
Guests

No	Title	Name	Prename	Function / Responsibility	Department
1		Nooijen	Thijs		Gemeente Helmond
2		Ouwehand	Bas		Fontys
3		Smeulders	Paul		Gemeente Helmond
4		Spierings	Annemarie		Provincie Noord-Brabant
5		Thijs	Lenie		Gemeente Helmond

Original Participants' Comments at the End of the Syntegration

Oral Feedback (1/3)

No.	*„During the last 3.5 days, the most important impression or the most important moment to me was …"*
1	With a large group of people you can achieve so much.
2	In the different roles you use knowledge in different ways without interruption.
3	I think the realization this kind of discussion need to be based on expertise.
4	You focus on concrete topics and results.
5	… how relevant the information is spread throughout the system organically.
6	…the energy within the group.
7	…the diversity of the people.
8	…the communication system.
9	… working on not the obvious but these beautiful minds that uncovered during the process.
10	…how clever citizens are!
11	… the opportunity to learn about other topics and see I can contribute to topics I didn't think I could.
12	Datagroup: almost left out, and proved out to be one of the most creative teams.
13	… the 20 minutes before presentation where everything fell in place.
14	Moments of confusion and chaos proved out to be needed for growth.

Original Participants' Comments at the End of the Syntegration

Oral Feedback (2/3)

No.	*„During the last 3.5 days, the most important impression or the most important moment to me was …“*
15	… the different roles
16	…through different roles and topics things fell together.
17	… to see such a group of different people with one goal and one mission to make a smart and sustainable city.
18	… that you can get good results despite complexity of topics and large number of people involved.
19	Discussions in the implementation team were important. Especially the lunch meeting.
20	… learning about difficulty of grounding big ideas.
21	This program is so well organized and structured so that difficult things can….
22	… Friday that everyone starts thinking outside the box.
23	… how different people can think about reshaping same values and same goals.
24	… the willingness to jump in and embrace it. Engagement and commitment of all of us here.
25	I liked the thinking around the green line.
26	The timing was energizing.
27	Now I know, we can really realize this together.
28	…ambition to action plans.

Original Participants' Comments at the End of the Syntegration

Oral Feedback (3/3)

No.	*„During the last 3.5 days, the most important impression or the most important moment to me was …“*
29	We had great open discussions.
30	Dreamed future became clear now.
31	…role of the critics.
32	…amazing presentations.
33	…shared personal core values.
34	The Swiss amazed me: they really got us in shape.
35	We need different angles and different moods.
36	…everybody taking it seriously but it was also a lot of fun.
37	Combined energy makes me believe that really we realize this smart city together.
38	I enjoyed the fact that no matter what background everyone talked to each other with much openness.
39	… that critics can be so constructive
40	…that a lot of my personal core values are shared.
41	Complex problems can only be solved by different angles and different views

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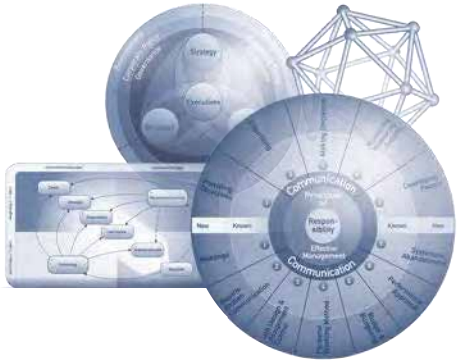

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