To what extent can spatial collaborative activities be described with thinkLets from Collaboration Engineering to aid practitioners managing conflicts?
A city deal case study

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Preface

This research is performed between September 2020 and June 2021. Due to the travel restrictions and social distancing measures due to the COVID-19 pandemic it was not possible to collect data on location or in person. The data was collected with digital resources and via online interviews.

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Abstract

ThinkLets from Collaboration Engineering are proven techniques to manage conflicts in groups working on complex problems. It is unknown if thinkLets can also manage conflicts in spatial activities. To bridge this gap, this study analyzes spatial activities from a City Deal case study. The researcher and practitioners together reconstruct past spatial activities and analyze them. This study uses secondary data to determine spatial activities, and confirms these findings in interviews with practitioners, who are involved in the city deals. Potentially suitable thinkLets for spatial activities are identified based on characteristics of the spatial activity, and presented and discussed with practitioners. From this data, it is concluded that existing thinkLet procedures are sufficiently generally described to be used in the spatial domain. Having a spatial element is irrelevant in matching activities to thinkLets. This does not mean that thinkLets can always be applied to spatial activities. Matching thinkLets to spatial activities follow the same rules as matching non-spatial activities. To streamline the matching of thinkLets, a tool is developed to filter quickly through thinkLets.

Keywords: thinkLet, thinkLets, Collaboration Engineering, collaboration, spatial, city deal, case study, fundamental step, matching, pairing, coupling

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To you, the reader, I hope you enjoy reading this and can benefit from the content.

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Chapter 1: Introduction

1.1 Background and justification

Organizations frequently have to deal with complex problems that cannot easily be solved by individual effort. People with different resources, knowledge and backgrounds are brought together in a team to work on these complex problems, collaborating with each other. Apart from expertise, they also bring in their values, perspectives, experiences, and they may represent a particular stakeholders group; this may result in different types of conflict. These conflicts must be managed to work efficiently toward a common goal. This can be managed by facilitators who guide the group through collaborative activities.

Spatial collaborative activities have some additional conflicts to be managed, compared to non-spatial activities. In spatial collaborative activities, the group needs to make a collaborative spatial decision (Jankowski & Nyerges, 1997), often supported with spatial tools. Spatial tools have the purpose of intelligence, design or choice (Simon, 1960). For example, maps can be used for analysis, design or negotiation (Carton & Thissen, 2006). Maps and GIS systems can be a great tool in many situations as they encode a shared understanding of geographic phenomena and their interdependencies (MacEachren, 2000).

Some frequently occurring shortcomings and conflicts of these spatial tools are explicitly mentioned in the literature, including (1) miscommunication between the information the designer of spatial tools wants to transfer and what the user understands. Other conflicts present themselves in the form of (2) information overload, (3) conflict over values and goals, (4) shortcomings of models or (5) complexity of the interrelated set of issues and problems (Carton & Thissen, 2006). In spatial planning, these problems also occur, and it is recognized that plans to satisfy the conflicting and competing interests need to be developed (Elbakidze, et al., 2015). In recent years Group Spatial Decision Support Systems (GSDSS) have been developed to address this by identifying trade-offs, conflict and compromise between stakeholders groups in the spatial domain (Arciniegas & Janssen, 2012). Spatial Decision Support Systems (SDSS) incorporate GIS tools, such as spatial data management and cartographic display (Sugumaran V. , 1998). SDSS are popular in use; however, some of these systems are hardly used because they have shortcomings for practical use (Uran & Janssen, 2003). For example, users may (6) find the tool too detailed, (7) time consuming or (8) costly to use. A tool's output is (9) not directly useful, or there is (10) limited/lack of spatial evaluation. Another reason is (11) the need for training to use each DSS (Uran & Janssen, 2003). Since these 11 shortcomings were determined (in random order), a way of communicating the best practices to manage these conflicts and shortcomings may improve future designs of these collaborative activities.

An existing approach to manage these conflicts uses design patterns to support the collaborative work. This is called Collaboration Engineering (CE). *"Each pattern describes a problem which occurs over and over again in our environment and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice."* (Alexander, 1979) (de Vreede, Massey, & Briggs, 2009). For many conflicts and shortcomings, like structuring and managing miscommunication, information overload, and conflict over values and goals within group work, CE presents the lessons learned and best practices to increase these processes' efficiency. These patterns and their solutions are captured in building blocks called 'thinkLets'.

ThinkLets consist of explicit procedures that describe the activities in a packaged fashion, transfer information in a uniform language and show the 'best-of' practices from expert facilitators. ThinkLets are technology-independent, as they describe what a tool needs to do, not stating a particular technology. These

thinkLets aim to be time-independent and act as fundamental building blocks for collaborative activities. CE allows organizations with limited resources to take advantage of collaboration professionals' expertise without the need to hire scarce and expensive experts (de Vreede & Briggs, 2018).

1.2 Research problem

Different types of Decision Support Systems (DSS) are already implemented in several sectors. These systems are dependent on technology (de Silva, 2011) (Sugumaran & Degroote, 2010), and technologies used in society change rapidly. Building blocks based on more fundamental, technology-independent principles may provide a timeless basis for designing systems. This would allow for researching and designing building blocks for problems that do not yet exist. Some activities may contain components similar to past activities, enabling the reuse of existing building blocks. Some shortcomings of GSDSS are mentioned in the literature, so are some of their solutions. Capturing, understanding, and solving these shortcomings can help facilitators to prevent and/or address them in future activities—the research problem this study addresses is how thinkLets can aid practitioners in the role of a facilitator, to manage these challenges in the spatial domain.

The theory of thinkLets deals with addressing and solving these challenges, and thinkLets have been proven to work on non-spatial collaborative processes (Kolfschoten, Kosterbok, & Hoekstra, 2015) (de Vreede, Massey, & Briggs, 2009) (Konaté & Zaraté, 2011). The hypothesis is that there is merit in using thinkLets in <u>spatial</u> collaborative processes because thinkLets are fundamental building blocks and may therefore be adaptable to the <u>spatial</u> domain. If thinkLets can improve the efficiency and effectiveness in <u>spatial</u> collaborative activities this would enable organizations that deal with spatial and non-spatial activities to use thinkLets for the whole process. Then, these organizations too can reap the proven benefits of the Collaboration Engineering approach. ThinkLets may support facilitators in solving conflicts within the group and with the spatial tools. If this research finds thinkLets cannot be used in spatial collaborative processes, this study will identify gaps in spatial activities which cannot be described with thinkLets.

This research aims to test to what extent thinkLets can be used in spatial collaborative processes. Spatial collaborative processes often involve spatial tools. These tools may come with their own spatial challenges, which differentiates them from non-spatial processes. This study investigates these spatial challenges, and utilizes an existing list and description of thinkLets (Briggs & de Vreede, ThinkLets: Building Blocks for Concerted Collaboration, 2001). No cases with spatial collaborative processes, where thinkLets are applied, are found in the literature (see Appendix 1: Literature Review Spatial ThinkLets). This research considers spatial collaborative activities from three City Deal case studies provided by VNG-I; The International Cooperation Agency of the Association of Dutch Municipalities (VNG-I), which works with local governments worldwide. Three so-called city deals (from the DEALS program) are reconstructed to retrieve spatial collaborative activities. The spatial activities of one City Deal case study are comprehensively analyzed on matching thinkLets. City deals operate in the spatial domain and are therefore fit to retrieve spatial collaborative activities from. A literature review shows thinkLets have not yet been applied to city deals. This literature review can be found in Appendix 2: Literature Review city deal thinkLets. This study reviews how thinkLets work on the case studies' spatial collaborative activities to determine the extent to which thinkLets can be used in spatial collaborative activities.

1.3 Research objective

Literature shows that thinkLets have been applied in non-spatial activities to manage conflicts. Literature suggests no thinkLets have been used in spatial activities. This study will look into if and how thinkLets

could be applied in <u>spatial</u> collaborative activities. There is a knowledge gap since it is unclear if thinkLets can be used in the spatial domain. This study aims to research how thinkLets can aid facilitators in managing spatial collaborative activities to fill this knowledge gap.

This leads to the main research objective:

to determine to what extent existing thinkLets can systematically help practitioners guide a group of stakeholders in spatial collaborative activities and identify potential gaps in thinkLets.

1.3.1 Sub-research objectives

To test how spatial collaborative activities can be described with thinkLets, first, spatial collaborative activities are identified. Then proper thinkLets are matched to these activities, and the extent to which these thinkLets are capable of describing spatial activities is reviewed. Lastly, the extent to which the investigated case study represents all spatial collaborative activities is explored.

The following sub-objectives are formulated to achieve the main objective:

1. To determine what the spatial collaborative fundamental steps and their characteristics are in city deals
2. To determine to what extent spatial collaborative fundamental steps in city deals can be covered systematically with existing thinkLets
3. To determine to what extent the collaborative spatial fundamental steps covered systematically with existing thinkLets are representative for different city deals

1.3.2 Research Questions

Each sub-objective will be operationalized through research questions, as indicated below:

Sub research objective 1: To determine what the spatial collaborative fundamental steps and their characteristics are in city deals
The spatial collaborative activities from the case study are identified and broken down into their fundamental steps to which the corresponding characteristics are identified. These characteristics are relevant for matching these activities to thinkLets.

RQ1a: Which activities from a DEALS city deal are both spatial and collaborative?
RQ1b: What are the fundamental steps in these spatial, collaborative activities?
RQ1c: What are the corresponding characteristics* of these fundamental steps?
Examples of characteristics are the duration of the activity, the complexity of the task, type of input of the activity or focus/scope of the activity.

Sub research objective 2: To determine to what extent spatial collaborative fundamental steps in city deals can be covered systematically with existing thinkLets
Matching the thinkLets to the identified spatial collaborative fundamental steps is based on 1) characteristics of the spatial activity, 2) characteristics of the thinkLets, and 3) the judgement on applicability by practitioners.

RQ2a: Which spatial collaborative fundamental steps have matching characteristics with existing thinkLets?

RQ2b: For which spatial collaborative fundamental steps does the practitioner identify suitable existing thinkLets?

RQ2c: Which gaps can be identified in listed spatial collaborative fundamental steps for which there is no suitable thinkLet?

Sub research objective 3: To determine to what extent the collaborative spatial fundamental steps covered systematically with existing thinkLets are representative for different city deals

This research uses a single case study to test the thinkLets on spatial collaborative fundamental steps. An analysis of representativeness amongst other city deals from the DEALS program provides insight into how spatial collaborative activities can be described with thinkLets.

RQ3a: Which collaborative spatial fundamental steps can be found in different DEALS city deals?

RQ3b: Which collaborative spatial fundamental steps from other city deals have matching characteristics to existing thinkLets?

1.4 Conceptual Framework

The concept map (Figure 1) presents the relationships between the concepts in this study. The concepts primarily originate from the field of Collaboration Engineering.
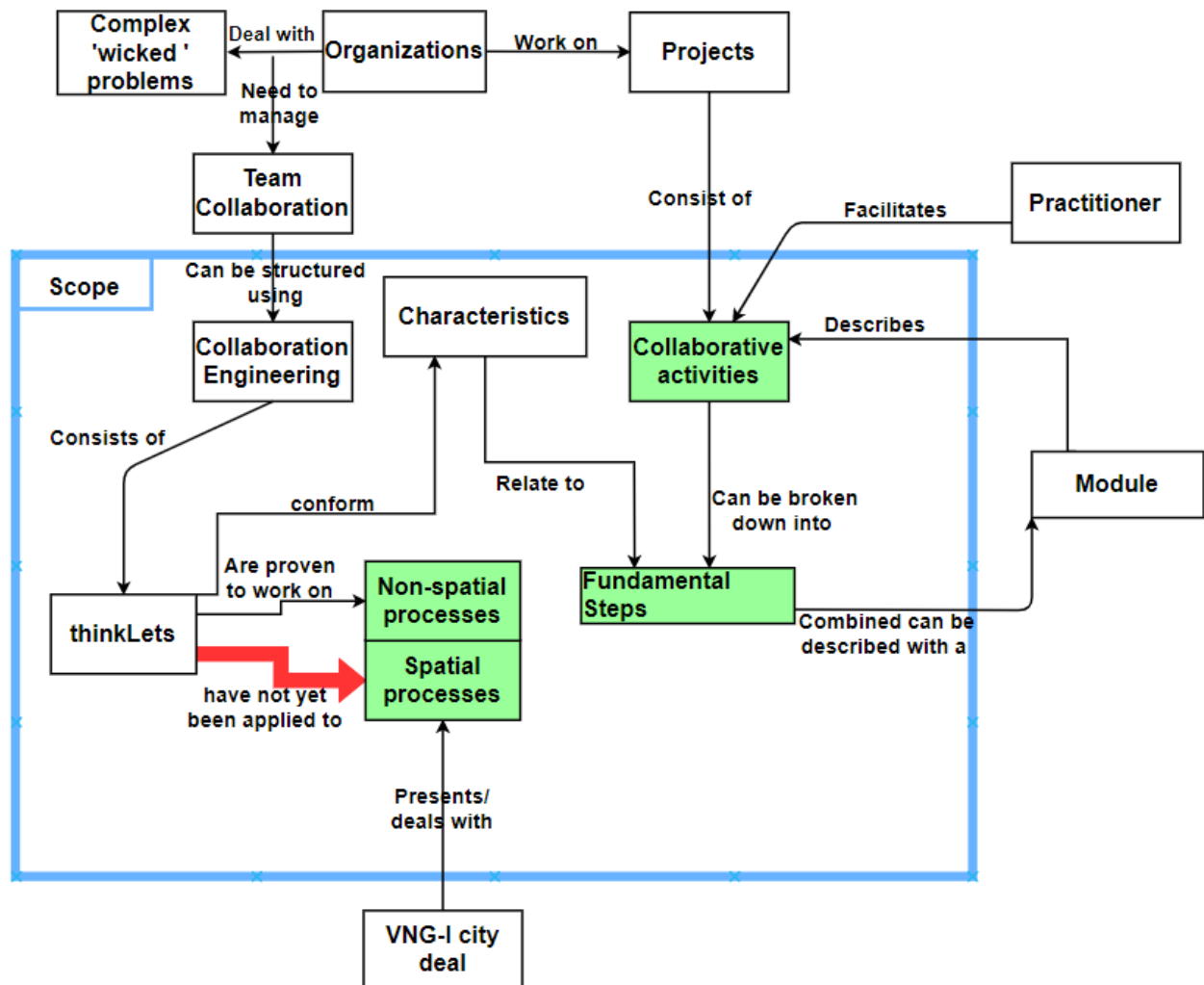
Figure 1: Concept map

The blue square in Figure 1 shows the concepts which are within the scope of the project. The research does not directly influence the concepts surrounding it. In green are the core concepts of this proposal. The red line shows the gap this research addresses. Can thinkLets, that have been proven to work on non-spatial processes be applied to spatial processes? The surrounding concepts are relevant to the research but will not be investigated thoroughly. What the literature tells about them is assumed to be correct. The VNG-I City Deals are analyzed, but only the spatial processes and activities of this case study lie within the research scope. The modules (i.e. the sequence of thinkLets) consist of spatial and non-spatial fundamental steps. If the practitioner sees a fitting thinkLet for a spatial fundamental step, thinkLets fit in the whole module. Organizations work on projects, and some have to deal with complex 'wicked' problems (Balint, Stewart, Desai, & Walters, 2011). An organization consists of individuals who are working on that

complex problem. The organization has to manage/organize these individuals as a team to solve these complex problems.

The CE approach is a method to manage and streamline team efforts. This method consists of thinkLets known to work on non-spatial processes, but these thinkLets have not yet been applied to spatial processes. This research aims to test if these thinkLets can be applied to collaborative spatial processes. These processes come from the VNG-I city deals to test this on. The non-spatial and spatial processes make up all collaborative activities (by definition, everything that is spatial plus everything non-spatial makes up all activities). A facilitator manages all complex collaborative activities in CE. These collaborative activities can be broken down into smaller units; fundamental steps. These fundamental steps have specific characteristics, which must match the thinkLets' characteristics. A single characteristic is sometimes referred to as an attribute, where all attributes together make up the characteristics. The name and description of all characteristics used are presented in section Appendix 4: Characteristics Adapted Activity Decomposition Method. All fundamental steps make up a module which is a structured description of a whole activity. The organization that is working on a project has different activities that make up a project.

1.5 Thesis Structure

This thesis consists of six chapters. The appendices contain background, operationalized or in-depth information, which is regarded as supporting material for the thesis.

Chapter 1: *Introduction,* includes background information and introduces the research topic, presents the research problem, the objectives and research questions and shows the main concepts and their relations.

Chapter 2: *Literature Review,* includes a summary of a literature review on the theory and concepts of Collaboration Engineering and thinkLets. It presents the structure of thinkLets and how to match thinkLets to fundamental steps. It also includes a definition of "spatial", "collaboration" and "activity".

Chapter 3: *Research Methodology,* includes a reproducible methodology on how to perform this research. This chapter is divided into a general introduction to the research strategy, it presents a research design matrix and goes through the methodology per research objective.

Chapter 4: *Results and observations,* includes a summary of the research results and presents observations of these results. All results are shortly discussed on shortcomings, and it provides result-specific remarks. All raw data is in the Appendix and in the attachments to this thesis.

Chapter 5: *Discussion,* includes a discussion of the results and of how this study's results fit in the broader context.

Chapter 6: *Conclusion and Recommendations,* includes a brief conclusion of the main research objective and suggests some recommendations for further research.

Chapter 2: Literature review

This chapter explores and elaborates on the concepts used in this research by reviewing literature. In the context of this research, the literature review is divided into two dimensions: 1) Conflicts in spatial activities and 2) Collaboration Engineering. The first dimension investigates the definitions of spatial collaborative activities, and presents literature on conflicts and shortcomings of existing methods. The second dimension presents a summary of the theory and concepts of Collaboration Engineering and thinkLets. It presents the structure of thinkLets and how thinkLets are matched to fundamental steps.

2.1 Conflicts in spatial activities

This study explores the extent to which existing thinkLets can be applied to spatial collaborative activities. In literature, the term 'spatial collaborative activities' is only used in terms of physical space (Schafer, 2004). This study considers a different definition of spatial. There is no suitable definition of a 'spatial collaborative activity'. To anchor the definition, the terms of 'spatial' and 'activity' are defined as follows:

Spatial is defined as: *"a location's geographical coordinates and spatial relations (i.e., proximity, overlap, containment, distribution pattern)"* (Keenan & Jankowski, 2019)

Activity is defined as: *"a task that the stakeholders involved actively work on together"* (Author's definition)

Since this research is considering conflicts in team efforts, and only looks into collaborative activities, the term 'collaborative' is defined as follows:

Collaborative is defined as: *''Interaction and cooperation among the stakeholders involved''* (Pelzer, Geertman, van der Heijden, & Rouwette, 2014)

These three definitions are separately presented to practitioners. These practitioners have worked on the city deals and have knowledge and expertise about the activities from the city deals. The practitioners can suggest activities that follow the spatial and collaborative definitions. This results in identifying examples of spatial collaborative activities. To illustrate what a spatial collaborative activity could be, the practitioners are given some examples, like *"map reading, selection of pilot areas or multi-stakeholder workshops"*. Spatial activities differ from non-spatial activities in that they require specific skills from the practitioner (e.g. interpreting maps, overseeing spatial relations or understanding spatial tools). The spatial tools used in spatial activities bring their own conflicts, of which 11 are described in section 1.1 Background and justification. These conflicts are managed by different types of Group Support Systems (GSS) technologies.

GSS increases the need for facilitation (Kolfschoten, Briggs, de Vreede, Jacobs, & Appelman, 2006). Skilled facilitators are better equipped to derive the benefits of GSS tools. Professional facilitators are scarce and expensive (Briggs, de Vreede, & Nunamaker Jr, 2014) because they require extensive knowledge on how to use the technology to create useful patterns of collaboration (de Vreede, Massey, & Briggs, 2009). Over the last decades, much research is done on how to limit the need for professional facilitators but still maintain the benefits of GSS. This is done by developing and evaluating ways to design productive, specific and easy to understand practices practitioners could successfully execute, without the ongoing intervention of a professional facilitator. This approach is called Collaboration Engineering (de Vreede, Massey, & Briggs, 2009).

2.2 Collaboration Engineering

Collaboration Engineering (CE) is an approach for designing high-value recurring collaboration processes. It captures the best practices of master facilitators, and packages the processes in a fashion that can be transferred to practitioners to execute for themselves. All without the ongoing intervention of professional facilitators (Kolfschoten, Briggs, de Vreede, Jacobs, & Appelman, 2006). This approach comes from the fields of Group Support Systems and Information Systems.

The origin of CE lies in the theory that organizations have to deal with complex problems that an individual cannot solve. However, people with different backgrounds are necessary to solve these problems, hence collaboration (de Vreede, Massey, & Briggs, 2009). This collaboration comes with its own technical, socio-economic and cognitive challenges. Managing these challenges is done by collaboration professionals (e.g. facilitators), who are scarce and can be expensive to hire (de Vreede & Briggs, 2018). These experts can increase the efficiency and effectiveness of collaboration in organizations (Kolfschoten & de Vreede, 2009). Using expert collaboration knowledge, organizations reduced their project cycle time by 60-90% and labor costs by up to 50% (Nunamaker, Jr., Briggs, Mittleman, Vogel, & Balthazard, 1997). Collaboration Engineering has been applied in several types of organizations like governments (Kolfschoten, Kosterbok, & Hoekstra, 2015), financial services and defense (de Vreede, Massey, & Briggs, 2009), or banks and research institutes (Konaté & Zaraté, 2011).

From the perspective of a wicked problem framework (Balint, Stewart, Desai, & Walters, 2011), CE makes the wicked problems that have uncertain technical knowledge and low consensus amongst stakeholders more manageable. These wicked problems can be in any domain. The techniques in CE reveal disagreements, clarify them and supports targeted discussion on topics of low consensus. It provides guidelines for practitioners to manage conflicts and bridge gaps between stakeholders. This moves the wicked problem more towards a situation with an emphasis on expert deliberation with periodical stakeholder reviews. There may be gaps in the state of knowledge. CE does not directly address knowledge gaps but can guide the group towards the next steps on how to acquire appropriate knowledge. CE can iteratively strike a balance between acquiring knowledge and reaching some kind of consensus. This makes decision making more routine.
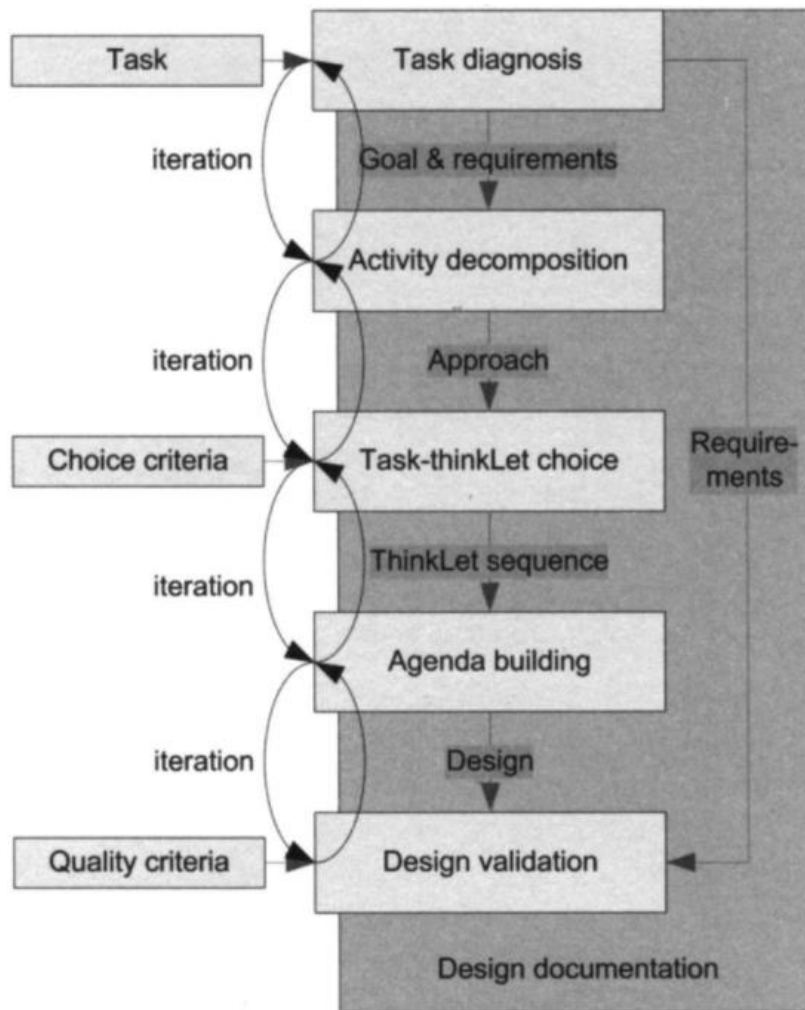
Figure 2: Overview of a Collaboration Process Design Approach

The Collaboration Engineering approach designs a procedure of activities from scratch. This study looks at the spatial collaborative activities in retrospect. No thinkLets were applied on activities, this research studies if thinkLets could have been applied.

The Collaboration Process Design Approach consists of five steps, as shown in Figure 2 (Kolfschoten & de Vreede, 2009). This approach aims to design and develop an effective procedure to guide a group towards a precisely defined goal. This procedure contains specific results to be achieved, processes to be executed, and resources to be used.

Step 1 ('Task Diagnosis' step) analyses the requirements and constraints of the collaboration process. It consists of determining the goal and deliverables and a description of what will be done after completing the process.
Step 2 ('Activity Decomposition' step) determines the specific steps of the process to reach the goal. An outline of the specific steps is the outcome of this step. This study calls these specific steps 'fundamental steps'.

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Step 3 ('Task-thinkLet choice', also called the 'thinklet choice method' in this study) 'matches' thinkLets to these specific steps. This is a detailed procedural method to execute a step. Choosing a proper method (i.e. thinkLet) depends on different characteristics determined in Step 2. The aim is to describe every fundamental step in terms of a thinkLet.

Step 4 ('Agenda building' step) operationalizes the steps by defining specific questions and instructions, planning breaks and presentations, and make a schedule.

Step 5 ('Design Validation' step) checks if the designed approach answers the initial goals and deliverables defined. This consists of pilot testing, simulations, and expert evaluation to validate the process.

Collaboration Engineering codifies the expertise and best practices from these collaboration professionals in such a way that practitioners (i.e. domain experts) can achieve similar results as the experts can achieve with limited training; one or two days of training (de Vreede, Massey, & Briggs, 2009)(page 5). The codification of expert collaboration expertise is done through a concept called thinkLets. In the early stages of this field, the best practices were captured as tacit knowledge in professional facilitators' minds. This tacit knowledge is captured by in-depth interviews where they were asked questions like, "*What do you do when you have got a group that's badly polarized, and they just cannot move forward?"* Researchers have extracted a pool of the techniques that later came to be called thinkLets (Briggs & de Vreede, ThinkLets: Building Blocks for Concerted Collaboration, 2001).

2.3 ThinkLets

"A thinkLet is a named, scripted technique for predictably and repeatedly invoking known effects among people working together toward a goal." (de Vreede, Massey, & Briggs, 2009). ThinkLets are designed in such a way that they can invoke similar patterns of collaboration every time they are used. A complete example of a thinkLet is given in Appendix 3: Complete example of a thinkLet. The strength of thinkLets lies in the repetitiveness. Once a thinkLet sequence is designed for collaborative activity, this design can essentially be used for similar activities. This results in streamlining recurring processes with limited resources. ThinkLets are also used as a language to communicate concepts among collaboration engineers quickly. Currently, about 80 thinkLets have been developed (Briggs & de Vreede, ThinkLets: Building Blocks for Concerted Collaboration, 2001).

The conceptualization all thinkLets are designed in a specific manner which has changed over the years. The most recent conceptualization can be found in Appendix 30: Elements of used thinkLet conceptualization, and is primarily adapted from (de Vreede & Briggs, 2018).

2.3.1 Matching thinkLets to activities

These thinkLets need to be matched to collaborative activities. The concept of an 'activity' can both refer to a multi-day workshop or a single meeting. Both are referred to as 'activities', but they operate on different timescales, and they may have a different complexity of deliverables. Furthermore, an activity can consist of different smaller activities. ThinkLets primarily work on activities where the deliverable of that activity cannot be broken down further (Kolfschoten, Briggs, de Vreede, Jacobs, & Appelman, 2006). In order to clearly and effectively communicate what kind of 'activity' we are talking about, and if this is at a similar 'level' the thinkLet operates on, the term 'fundamental step' is introduced. This term is coined in this study for the first time to distinguish between the levels of detail of an 'activity'.

A fundamental step generally describes a single 'pattern of collaboration'. A sequence of fundamental steps, which make a complete activity, consists of several patterns of collaboration. Such a pattern of collaboration is *"an observable regularity that teams go through during a period time"* (de Vreede & Briggs, 2018). ThinkLets are categorized into six 'patterns of collaboration':

Generate, Reduce, Clarify, Organize, Evaluate and Build Commitment (in literature sometimes referred to as 'Build Consensus'). 'Reduce' and 'Clarify' is combined into 'Converge' in some CE literature (Kolfschoten, Briggs, Appelman, & de Vreede, 2004) (de Vreede & Briggs, 2018). An activity does not necessarily have to encompass all six categories. An activity can be described by a sequence of thinkLets, which is called a module (Kolfschoten, Briggs, Appelman, & de Vreede, 2004)(page 7).

Matching fitting thinkLets to a fundamental step is an essential but challenging task. Several factors need to be taken into account before matching a thinkLet to a fundamental step:

Table 1: Some factors to consider when matching a thinkLet to a fundamental step

Design Process step	What are the goals of this step?
Task Diagnosis	Defining the collaboration processes' goals
	Defining the deliverables
	Establish the stakeholders' commitment with respect to these goals and deliverables
Stakeholder Analysis	Gain a deeper understanding of the group that will execute the collaboration process in terms of their roles, interrelationships, and individual interests
	Identify group size, participants' age, sex, culture, educational background, level of organization
	Identify if stakeholders have congruent or conflicting interests
Resource Analysis	Determine the time frame of the activity, technology and budget
Facilitator Analysis	Determine the practitioners' skills, experience, domain expertise or personality

Table 1 presents some factors to be taken into account when matching thinkLets to a fundamental step, adapted from (Kolfschoten & de Vreede, 2009).

Every thinkLet can be matched based on the 'pattern of collaboration' and comes with a guideline on the scope and context for its use. Every thinkLet contains a description of when to choose a certain thinkLet and when not to choose it. This is called 'selection guidance'. Based on these statements, the facilitator can decide if the thinkLet fits the situation (Kolfschoten, Briggs, de Vreede, Jacobs, & Appelman, 2006). For example, if a thinkLet is more suitable when the activity has more than 6 participants, this is mentioned in the 'selection guidance'.

Additionally to the selection guidance, some insights into the thinkLet and a success story are provided, which resents an example of a successful implementation of a thinkLet. When designing a sequence of thinkLets it is smart to use the output of one thinkLet is as the input to the next thinkLet. This results in some thinkLets combinations being good, others challenging, and others impossible. A choice map is presenting such best practices. An example of these combinations in a choice map is given in Figure 3,

adapted from (Kolfschoten & de Vreede, 2009). The symbol in each cell indicates whether the combination is good (*), possible but tricky (^), or impossible (-). The black cell shows a FreeBrainstorm thinkLet, followed by a OnePage thinkLet is an impossible combination.

Pattern: Generate	Result: Input	ThinkLet combination: Good= * Tricky = ^ Impossible = –	FreeBrainstorm	OnePage	Comparative	LeafHopper	DealersChoice	PlusMinus	TopFive	BranchBuilder	TheLobbyist
FreeBrainstorm	FreeBrainstorm										
OnePage	OnePage										
Comparative	Comparative										
LeafHopper	LeafHopper										
DealersChoice	DealersChoice										
PlusMinus	PlusMinus										
TopFive	TopFive	**Workshop kickoff**	*	*	*	*	*	–	–	*	–
BranchBuilder	BranchBuilder	**FreeBrainstorm**	–	■	*	^	–	^	–	^	*
TheLobbyist	TheLobbyist	**OnePage**	–	–	^	^	^	*	–	*	*
DimSum	DimSum	**Comparative**	–	–	–	^	^	^	–	^	*
PointCounterPoint	PointCounterPoint	**LeafHopper**	–	–	–	*	*	*	–	^	*
	StrawPoll	**DealersChoice**	–	–	–	*	*	*	–	^	^
	MultiCriteria	**PlusMinus**	–	–	–	^	^	^	–	^	*
	CheckMark	**TopFive**	–	–	–	–	–	^	^	^	*
	StakeholderPoll	**BranchBuilder**	–	–	–	–	–	^	–	^	*
	BucketVote	**TheLobbyist**	–	–	–	–	–	–	–	–	–

Figure 3: Pattern and Result classification and Choice map example

The choice of a thinkLet is based on 1) the scope and context of the activity (i.e. characteristics) 2) the pattern of collaboration of the fundamental step, 3) the selection guidance, and 4) choice map. The collaboration engineer matches a thinkLet to a fundamental step. More detailed approaches for finding a fitting thinkLet will be given in section 3.2.2 ThinkLet Choice Method.

Chapter 3: Research Methodology

This chapter describes the methods used to address the research objective and corresponding research questions. The first section presents the research design and an overview of the DEALS program. The second section describes the Activity decomposition Method and ThinkLet choice method from Collaboration Engineering. The third section elaborates on the methods for data collection and analysis, per research objective. The fourth section discusses the assumptions made in this study. The last section goes through ethical considerations.

3.1 Research Design

The study uses a single embedded case study (Yin, 2003) from one of the city deals from the VNG-I DEALS program (DEALS is more extensively described in section 3.1.1 City deal case study). This study follows a case study strategy to gain an extensive understanding of some spatial collaborative activities and their context. A complete picture of these activities is necessary to allocate appropriate thinkLets and to test them. According to (Morris & Wood, 1991), if you wish to gain a rich understanding of the research context and the processes being enacted, a case study strategy may be fitting. Also, a case study is used often in exploratory research.

(Yin, 2003) distinguishes between 4 types of case study strategies: *single case* vs. *multiple cases* and *holistic case* vs. *embedded case.* This research uses a single case study approach. The single case study is defined as all activities from a single city deal from the DEALS program. A single city deal's limitation is that it must be representative; this research is not a representative case if it is an outlier. This study checks if it is an outlier. A single city deal is assumed to have multiple spatial collaborative activities that may differ in spatial nature. Due to time constraints to thoroughly investigate multiple city deals, this study fully investigates a single city deal. This means that for a single city deal the spatial collaborative fundamental steps are characterized and the researcher proposes some thinkLets, which are assessed by practitioners. To test its representativeness, this study identifies the spatial collaborative fundamental steps of three different city deals. This allows for comparison and gives some insight into the chosen case study's representativeness. The third research objective analyzes documentation of spatial collaborative activities in other case studies (i.e. other DEALS city deals) (Saunders, Lewis, & Thornhill, 2007).

This case study consists of both spatial and non-spatial activities. The boundaries of a spatial collaborative activity are not clearly defined. The search for several different spatial collaborative activities that act as a sub-unit within the case study makes this an embedded case study. The spatial collaborative activities are the sub-units of the case study that will be investigated in more detail. The information about these subunits can be found in different domains, like interviews with DEALS practitioners or DEALS documentation. The documentation review can be found in Appendix 5: Method for documentation review and interview rounds. This embedded approach allows for data triangulation to better validate this study. These methods will be described extensively in section 3.2 Collaboration Engineering methods.

The researcher and practitioner find proper subunits within the case study by identifying spatial collaborative activities based on the definitions given in section 2.1 Conflicts in spatial activities. They break these activities down into fundamental steps (i.e. when the deliverables of an activity cannot be broken down further) (Kolfschoten & de Vreede, 2009)(page 17).

The interview method is preferred over performing a survey. The fundamental steps and their characteristics can be retrieved by administering a survey, as this information is suitable for multiple-choice questions combined with some open questions. The complexity and size of new information and concepts (e.g. thinkLets, fundamental step, spatial) for the respondent are hypothesized to be of such an extent that a survey would be prone to miscommunication and possibly cognitive overload. An interview setting lowers the bar to ask for clarification (for researcher and practitioner), and discussion may enrich the answers to the questions. An interview can also encourage the interviewee to dig beyond anecdotes of the spatial collaborative activities. Two interview rounds are planned with a minimum of two practitioners involved per city deal, allowing to compare their answers to similar questions to represent different perspectives. These interviewees are practitioners (i.e. domain experts) and do not necessarily have expertise in Collaboration Engineering. They are put forward by VNG-International, who coordinates the DEALS program.

3.1.1 City deal case study (DEALS)

This section introduces the DEALS program and the considered city deals. The city deal is defined as*; 'an agreement between stakeholders to commonly address a certain problem within a city'*. The city deal case study looks for existing collaborative spatial processes. The city deals in the VNG-I DEALS program occur in diverse environments and deal with a broad range of topics (see Table 2).

Table 2: Cities and topics addressed in the DEALS program

City - Country	Topic
Beira - Mozambique	Improving land administration and finance management
Kumasi – Ghana	Decongesting traffic
Manila – Philippines	Preserve the natural conditions through the construction of infrastructure
Pathein – Myanmar	Urban poor in flood-prone areas
Pereira – Colombia	Inclusive Waste Management
Sèmè-Podji - Benin	Inclusive environmental management system

Table 2 shows that VNG-I operates solely in low and middle-income countries, via the DEALS program. People who earn less than 1.25 USD are given special attention within the projects (Vereniging Nederlandse Gemeenten International, 2020). VNG-I supports local urban governments that deal with rapid urbanization in their transition by improving the local government's performance. They do this by providing expertise and guidance. In a city deal, they get relevant stakeholders to work together on specific issues that need improvements towards a smoother transition to a more urbanized city. Since the issues are complex and show many interdependencies, many stakeholders involved are affected or can influence the issue.

DEALS' global impact is to contribute to the realization of UN SDG 11: to make cities and human settlements inclusive, safe, resilient and sustainable. The impact of the DEALS program is to improve the quality of life of poor urban residents. The program outcome is to improve urban governments' performance in inclusiveness, safety, resilience, and sustainability.

This study considers three DEALS city deals; Kumasi, Pathein and Pereira. They all take place in different settings. These three city deals are considered because they have a significant amount of relevant documentation, have documentation recorded in English and have easily accessible local practitioners. These city deals are almost concluded during the research period (September 2020 – June 2021).

The Kumasi city deal considers traffic decongestion in the market area in the Central Business District (CBD) of the Kumasi Metropolitan Area (KMA) and slum development. This leads to economic opportunities and tangible improvements for slum inhabitants through a circular economy (VNG International, 2020). Figure 4 shows the traffic zones within the KMA.
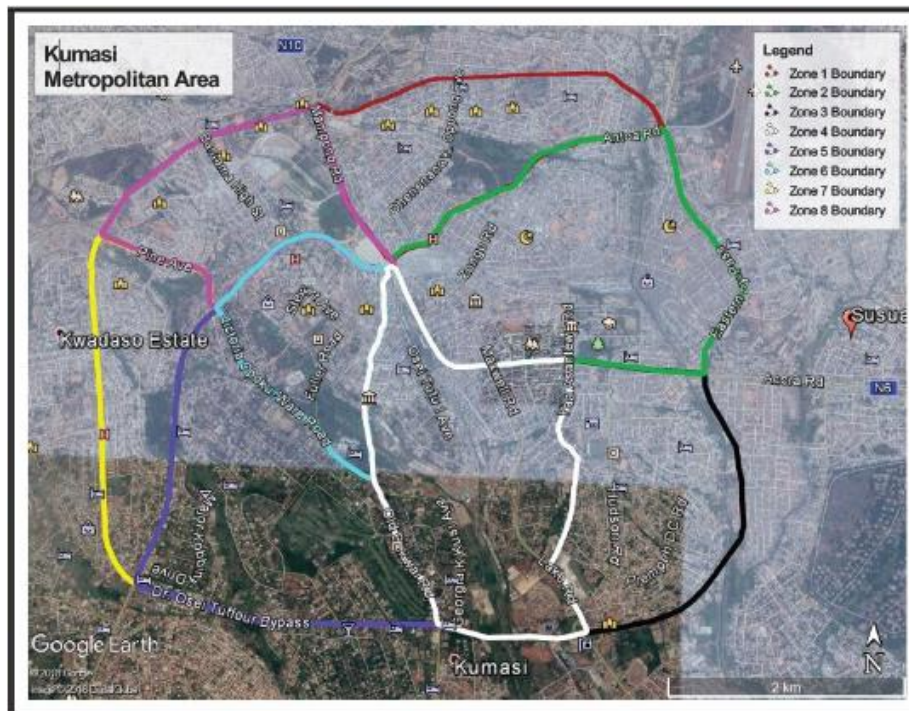
Figure 4: Demarcation of the center of the city of KMA into traffic zones

Figure 5: Urban sustainability challenge in Pathein

The Pathein city deal considers sustainable water and waste management for poor urban communities in flood-prone areas (i.e. wards). Leading to reduced environmental impact and enhanced living conditions

for residents in flood-prone areas (VNG International, 2020). Figure 5 shows how informal settlements, frequent flooding and inadequate solid waste management are a challenge in Pathein.

The Pereira city deal considers increasing waste recycling rates and improving waste management for informal solid waste pickers and recyclers, leading to responsive integrated municipal policies to formalize informal solid waste workers (VNG International, 2020).

3.2 Collaboration Engineering methods

This section presents the Activity Decomposition Method and thinkLet Choice Method from Collaboration Engineering. Not all steps from the Collaboration Process Design Approach (see Figure 2) are presented here. Only two steps are essential for reaching the research objective.

The 'Activity Decomposition Method' characterizes the fundamental steps. The 'ThinkLet-choice method' supports the selection of fitting thinkLets for the spatial collaborative fundamental steps. These methods coincide with step 2 and step 3 of the Collaboration Process Design Approach as presented in section 2.2 Collaboration Engineering. The 'Task Diagnosis' step is not used in its original form since it is designed to develop goals and deliverables from scratch. This study considers the goals and deliverables of past activities and identifies them in an interview with practitioners. These are identified and clarified via checking documentation and verifying it in interview round#1. These goals and deliverables must follow steps 2 and 3 to match fitting thinkLets to fundamental steps.

This study does not investigate the 'Agenda Building' step since this step creates a specific timeline for the designed activity, which is not relevant for matching thinkLets. The 'Design validation' step requires testing thinkLets in real-life activities, while this study looks in retrospect. The original steps and theories are presented here. Section 3.3 Data Collection Methods and Analysis presents the precise execution of these methods.

3.2.1 Activity Decomposition Method

The 'Activity Decomposition Method' originates from (Kolfschoten & de Vreede, 2009). This method is part of the Collaboration Process Design Approach and is preceded by the 'Task Diagnosis' that provides the goals and deliverables and is followed by the 'Task-thinkLet choice' where a fitting thinkLet is matched to the requirements of the fundamental step. These steps are part of a Collaboration Process Design Approach (Kolfschoten & de Vreede, 2009), which designs activities from scratch.

This study uses this approach but is adapted for analyzing past activities and testing if thinkLets could have worked in past spatial collaborative processes. This method changed over the years. The version from 2009 is used. The adapted Activity Decomposition Method consists of three parts:

1. The activity must be decomposed into its fundamental steps

A fundamental step is defined as the level of detail of an activity where the deliverable cannot be made any smaller. This level of detail is required for thinkLets to work on. "A thinkLet is meant to be the smallest unit of intellectual capital required to be able to reproduce a pattern of collaboration among people working toward a goal" (Kolfschoten, Briggs, de Vreede, Jacobs, & Appelman, 2006). The smallest unit of intellectual capital may be the activity where the deliverable cannot be broken down further. How the activities are filtered and broken down is shown in Figure 6.
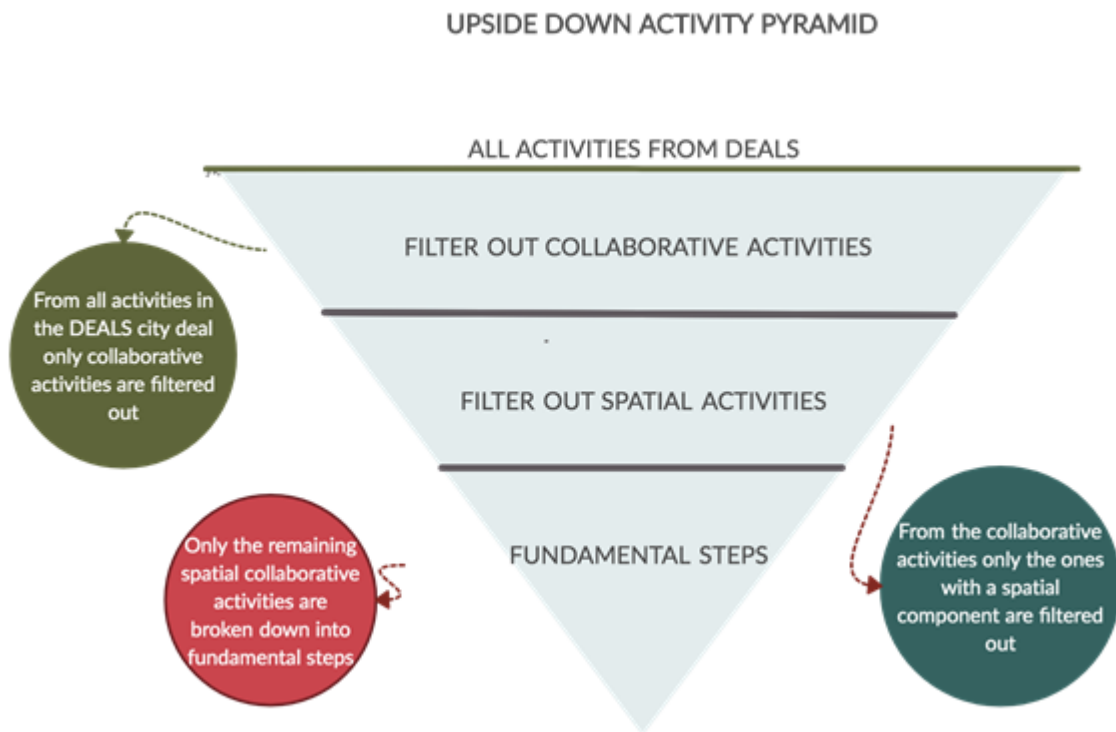
Figure 6: Breaking down the activities considered in the research into fundamental steps

2. Identification of the pattern of collaboration

Every fundamental step aims to evoke a certain pattern of collaboration among the group members (de Vreede & Briggs, 2018). The theory identifies six patterns of collaboration, shown in Table 3:

Table 3: Categories of Patterns of Collaboration

Pattern of Collaboration	Definition
Generate	Move from having fewer to having more concepts in the pool of concepts shared by the group.
Reduce	Move from having many concepts to a focus on fewer concepts that the group deems worthy of further attention.
Clarify	Move from having less to having a more shared understanding of concepts and of the words and phrases used to express them.
Organize	Move from less to more understanding of the relationships among concepts the group is considering.
Evaluate	Move from less to more understanding of the relative value of the concepts under consideration.
Build Commitment	Move from having fewer to having more group members who are willing to commit to a proposal.

A fundamental step only evokes a single pattern of collaboration. A sequence of fundamental steps makes up an activity. In an activity, several, but not necessarily all six patterns of collaboration are used.

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3. Identification of the characteristics of the result decomposition

Every fundamental step has characteristics based on the task (i.e. deliverables) and resources (e.g. time, effort, knowledge, tools) (Kolfschoten & de Vreede, 2009). This is adapted to include some characteristics of the stakeholders and facilitator, shown in Table 1. This is combined with the pattern of collaboration as a characteristic. All characteristics are presented in Appendix 4: Characteristics Adapted Activity Decomposition Method**.

All spatial collaborative fundamental steps are characterized by identical characteristics. These are collected in an online Excel file during interview round #1.

The characteristics come from the "Pattern Decomposition Method" and "Result Decomposition Method" (Kolfschoten & de Vreede, 2009). In literature, these two methods break down the deliverables of the activities and eventually design a sequence of thinkLets (i.e. module) that describes the whole activity. In this study, these methods give insight into the context of the fundamental steps of activities that do not need to be designed (since they are past activities). Therefore, the pattern decomposition method and result decomposition method are modified from their original form (Kolfschoten & de Vreede, 2009) to test if thinkLets could have been helpful for past fundamental steps. The researcher added some attributes to the characteristics (e.g. data quality, type of spatial activity). All attributes of the characteristics are named and described in section Appendix 4: Characteristics Adapted Activity Decomposition Method.

3.2.2 ThinkLet Choice Method
The thinkLet Choice Method originates from (Kolfschoten & de Vreede, 2009)

The Result decomposition from the adapted 'Activity Decomposition Method' shows some characteristics of the fundamental step. These can be linked to the required characteristics of certain thinkLets. The thinkLets are then matched based on the following factors (in no particular order):
   1. The pattern of collaboration
   2. Selection guidance of a thinkLet
   3. Characteristics from the result decomposition
   4. The output of the previous thinkLet generally serves as the input of next thinkLet

A pattern of collaboration characterizes all fundamental steps, and most thinkLets have a dominant pattern of collaboration. Patterns of collaboration have a fuzzy boundary; some fundamental steps can be described with thinkLets coming from different patterns of collaboration. The selection guidance presents when (not) to choose certain thinkLets. It also provides some insights and success stories of the thinkLet discussed. In the original thinkLet choice method, the previous and subsequent thinkLets need to be considered. The activities are analyzed in retrospect; some practitioners used parts of thinkLet techniques. Others did not, but could have used specific thinkLets. The practitioners were not aware of the thinkLet theory. Therefore, there are no previous and subsequent thinkLets to base the thinkLets on.

This study uses an adapted thinkLet choice method, because the original method is to be used for designing an activity from scratch. This study looks at past activities (i.e. in retrospect). This adaptation allows practitioners to give their input and experience if thinkLets could have worked on spatial collaborative activities. ThinkLets are not matched based on desired but on identified past patterns of collaboration and results. Originally, one chooses a thinkLet (partly) based on the previous and next thinkLet. No thinkLets were used in the case study, so this part of the thinkLet choice method is avoided.

3.3 Data Collection Methods and Analysis

The research objectives, sub-objectives and research questions are presented and discussed in section 1.3 Research objective. This section presents the research data collection methods, and how the methods introduced in the previous section are adapted for this study. It also presents how the data collected is analyzed. The data collection methods and data analysis methods are categorized per RO (Research Objective).

Research Objective 1:

RO1 determines the spatial collaborative fundamental steps and their characteristics. An overview of the methodological steps for RO1 is given in Figure 7. The data comes from the documentation and interview round #1. The data retrieved for RO1 is divided into three parts:

1a) *which activities are spatial and collaborative*

1b) *breaking down the spatial collaborative activities into their fundamental steps*

1c) *getting the characteristics of these fundamental steps*
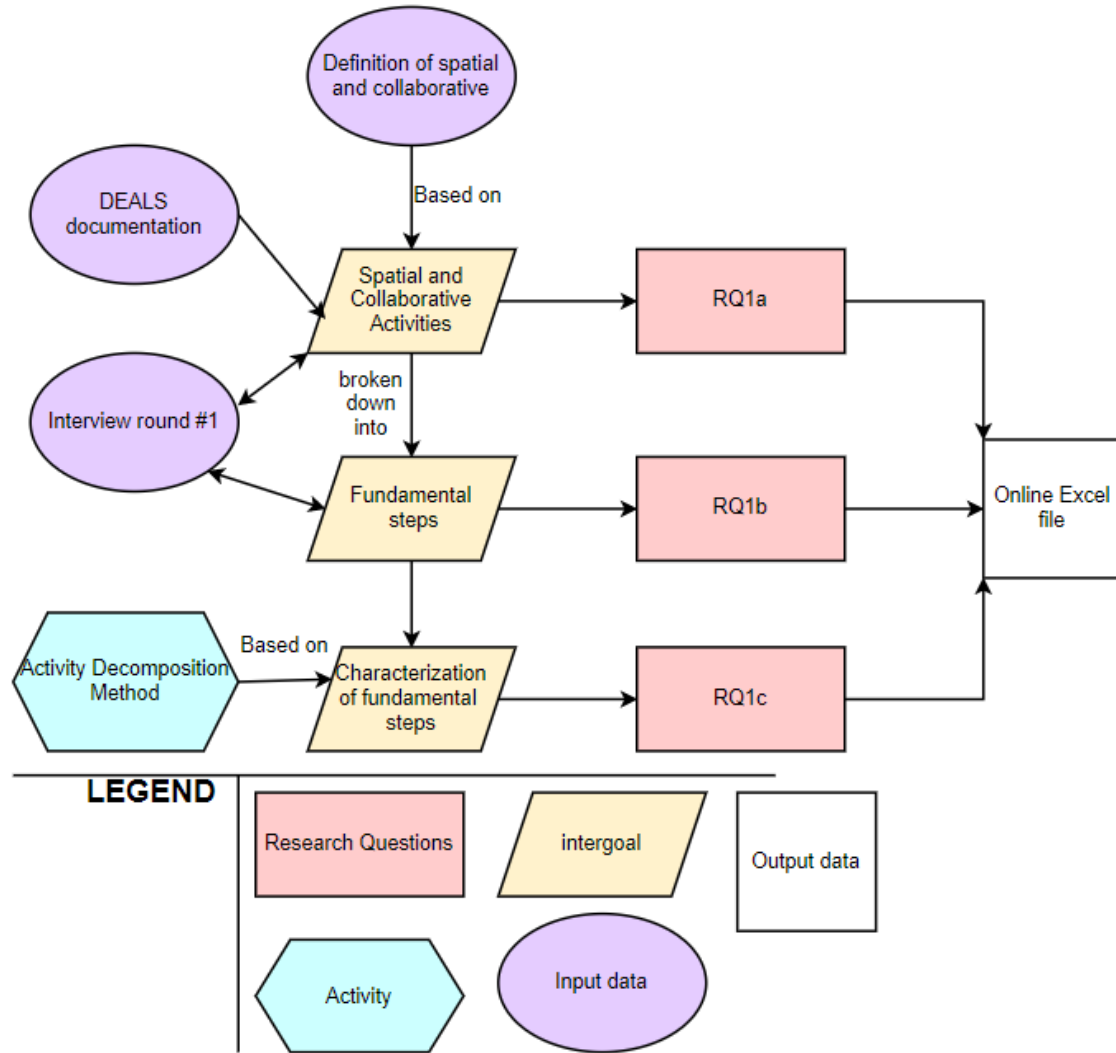
Figure 7: Overview of research methods for the first research objective

The data from the three city deals are collected and analyzed as follows:

1a) The definitions of 'spatial' and 'collaborative' provided by literature are presented in section 2.1 Conflicts in spatial activities to give boundaries to what a 'spatial collaborative activity' is. This study does not aim to define a 'spatial collaborative activity' but only finds activities that fit such a concept. In interview round #1, the practitioners identify what a 'spatial collaborative activity is in discussion with the researcher, resulting in a list of all identified spatial collaborative activities results. This happens in three ways:

	Identified in documentation	Proposed by practitioners
	No	Yes
	Yes	Yes
	Yes	No

1b) The practitioner and researcher break the deliverables of spatial collaborative activities down until no further possible, in interview round #1. This level of detail of an activity is called a 'fundamental step'. Some activities are not necessarily wholly spatial and collaborative; they may contain parts that fulfil the criteria of being "spatial" and "collaborative". This means that a spatial activity can consist of spatial and non-spatial fundamental steps. Depending on time and energy in interview round #1, as many spatial collaborative activities as possible are broken down into their (spatial) fundamental steps.

1c) After the spatial collaborative activities are broken down into the spatial fundamental steps, these fundamental steps are characterized. All spatial collaborative fundamental steps are characterized on identical characteristics. These characteristics are determined with an <u>adapted</u> version of the "Activity Decomposition Method". This method and its adaptation are explained in section 3.2.1 Activity Decomposition Method. All characteristics discussed, and their description can be found in Appendix 4: Characteristics Adapted Activity Decomposition Method. The practitioners initially decide how to characterize the fundamental steps, then the researcher discusses their choices with them. The spatial collaborative fundamental steps and their characteristics are collected in an online Excel file. This spreadsheet is shared with the practitioners, who go through this spreadsheet during interview round #1 and can change their answers afterwards.

The data quality is different per identified and characterized spatial collaborative fundamental step and is added to the characteristics of a fundamental step. The practitioners were more confident in describing and characterizing some activities compared to other activities. This may be the case because they were not facilitating, it was long ago, or their memory of that particular activity was not very vivid. Per result, this data quality is indicated in three qualitative categories; poor, average, good.

Research Objective 2:

RO2 determines to what extent spatial collaborative fundamental steps in city deals can be covered systematically with existing thinkLets. An overview of the methodological steps is given in Figure 8. The data retrieved for RO2 is divided into three parts:

2a) *determining which spatial collaborative fundamental steps have matching characteristics with existing thinkLets*

2b) *verifying for which spatial collaborative fundamental steps the practitioners identify suitable existing thinkLets*

2c) *detecting which gaps can be identified in listed spatial collaborative fundamental steps for which there is no suitable thinkLet*

The data comes from literature, documentation, interview round #1 and interview round #2. RO2 continues with the list and characteristics of several spatial collaborative fundamentals steps and their characteristics.
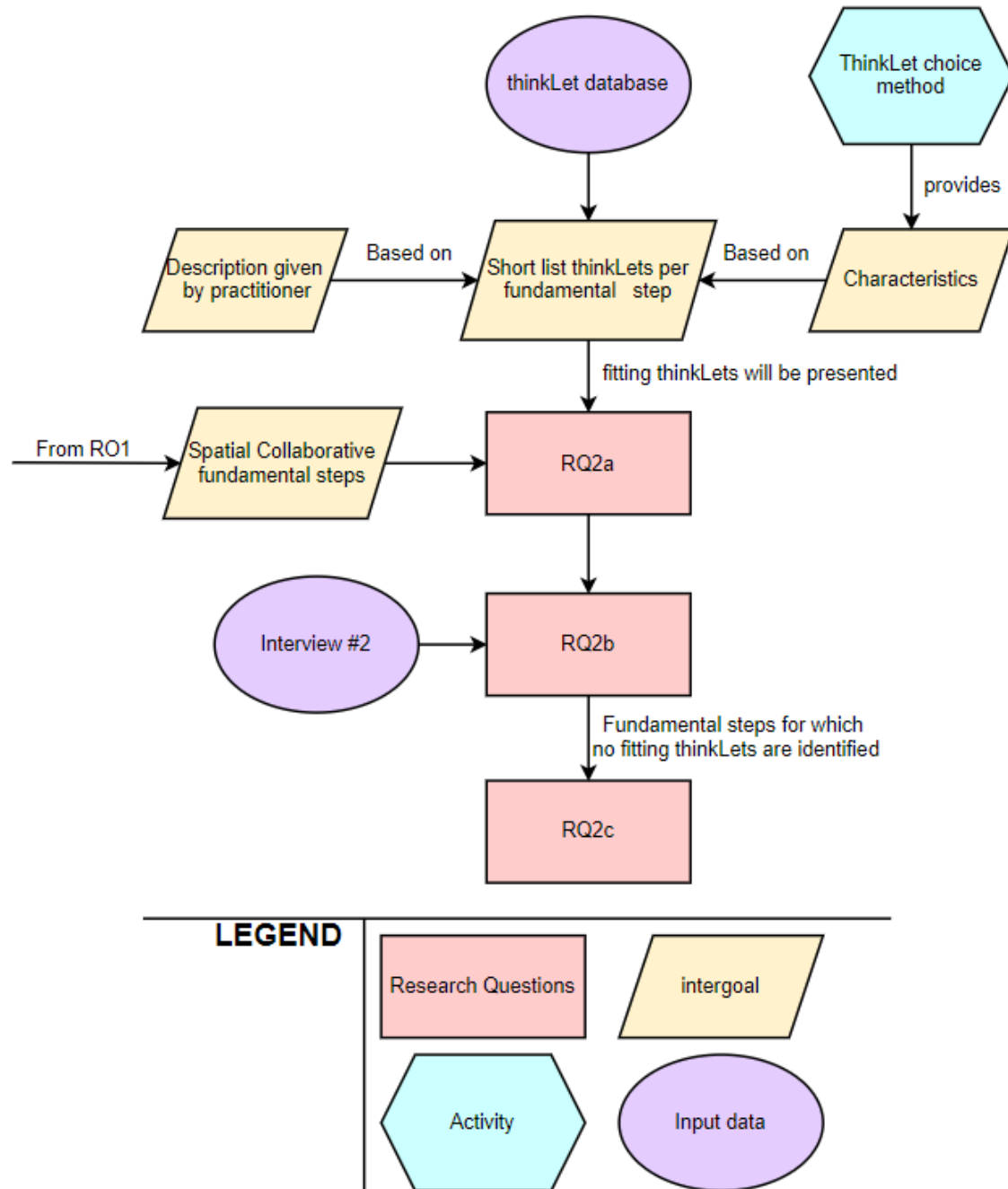
Figure 8: Overview of methods for the second research objective

RO2 builds upon the results from RO1, where the practitioner and researcher identified some spatial collaborative fundamental steps and corresponding characteristics.

The data is collected and analyzed as follows:

2a) The first research question of RO2 aims to find fitting thinkLets to the identified fundamental steps. The thinkLets to be considered come from a thinkLet database (Briggs & de Vreede, 2001). The researcher filtered and prioritizes the thinkLets based on the description of the activity given by the practitioner in

interview round #1. The indicators for prioritization come from an adapted version of the thinkLet-choice method (see section 3.2.2 ThinkLet Choice Method). The researcher considers all thinkLets when matching them to the identified fundamental steps. These thinkLets are first filtered on all characteristics from the thinkLet choice method, then all thinkLets that do not fit these fundamental steps are removed. A shorter list remains. Then the researcher removes all thinkLets that do not fit based on the practitioner's description in interview round #1. The remaining potential thinkLets can be applicable to the activity and are presented per spatial collaborative fundamental step to the practitioner in interview round #2.

2b) Some practitioners who participated in interview round #1 are interviewed a second time. They are presented with the most promising thinkLets (i.e. the remaining shorter list) of the identified spatial fundamental steps. The practitioners have practical experience with these spatial collaborative fundamental steps and can discuss if, according to their expertise, the thinkLets presented could have been used in the activities. Not all spatial collaborative fundamental steps are discussed on possible fitting thinkLets. Due to time constraints within the interview and the risk of cognitive overload, a selection of spatial fundamental steps are further investigated. This selection contains various types of spatial activities (e.g. spatial decision, map-reading, site evaluation). This ensures that different types of spatial activities are tested on thinkLets.

ThinkLets are not presented as single entities but as sequences of thinkLets. Most descriptions of thinkLets indicate which thinkLets should precede or follow them. Literature suggests that thinkLets are the smallest units of intellectual capital, whereas fundamental steps are the smallest units of an activity, these cannot always match one-on-one. The researcher presents the practitioners with, for example, a single thinkLet with different options of subsequent thinkLets. This is indicated with Boolean operators (i.e. AND, OR). So, thinkLet 1 AND thinkLet 2 OR thinkLet 3 are suggested to the practitioners. This allows checking multiple thinkLet(s) (sequences) and argument against them.

The researcher asks two closely related questions: 1) <u>was</u> this thinkLet used in the past activity? (i.e. the extent to which a thinkLet they are now introduced with has similarities to the past fundamental step) and 2) <u>would you</u> have used this thinkLet in past activities? (i.e. would you like to have used the thinkLet you are now introduced to). The first question aims to check which existing thinkLet (sequence) is most closely related to the past activity. The second question aims to check if they would have preferred to use thinkLets in the past activity. If the practitioners give a low score (i.e. 1,2,3), this thinkLet is considered poor. If the practitioners give an average score (i.e. 4,5,6,7), this thinkLet is considered average. If the practitioners give a high score (i.e. 8,9,10), this thinkLet is considered good. Apart from this categorization, the thinklets are also relatively better or worse, instead of in absolute terms.

2c) The analysis of fitting thinkLets reveals where the practitioners see possible gaps. This shows for which spatial collaborative fundamental steps some thinkLets may not work. The reasons the thinkLet may not work in a particular case are discussed with the practitioners and are noted down. After the interview, these notes are analyzed and explained.

Research Objective 3:

RO3 is to determine if the single city deal investigated is representative of other city deals and other spatial collaborative activities. The data collected in interview round #1 is the primary source for this RO. An overview of the methodological steps is given in Figure 9. The data retrieved for RO3 is divided into two parts:

3a) *determining which collaborative spatial fundamental steps can be found in different DEALS city deals*

3b) *determining which collaborative spatial fundamental steps from other city deals have matching characteristics to existing thinkLets*
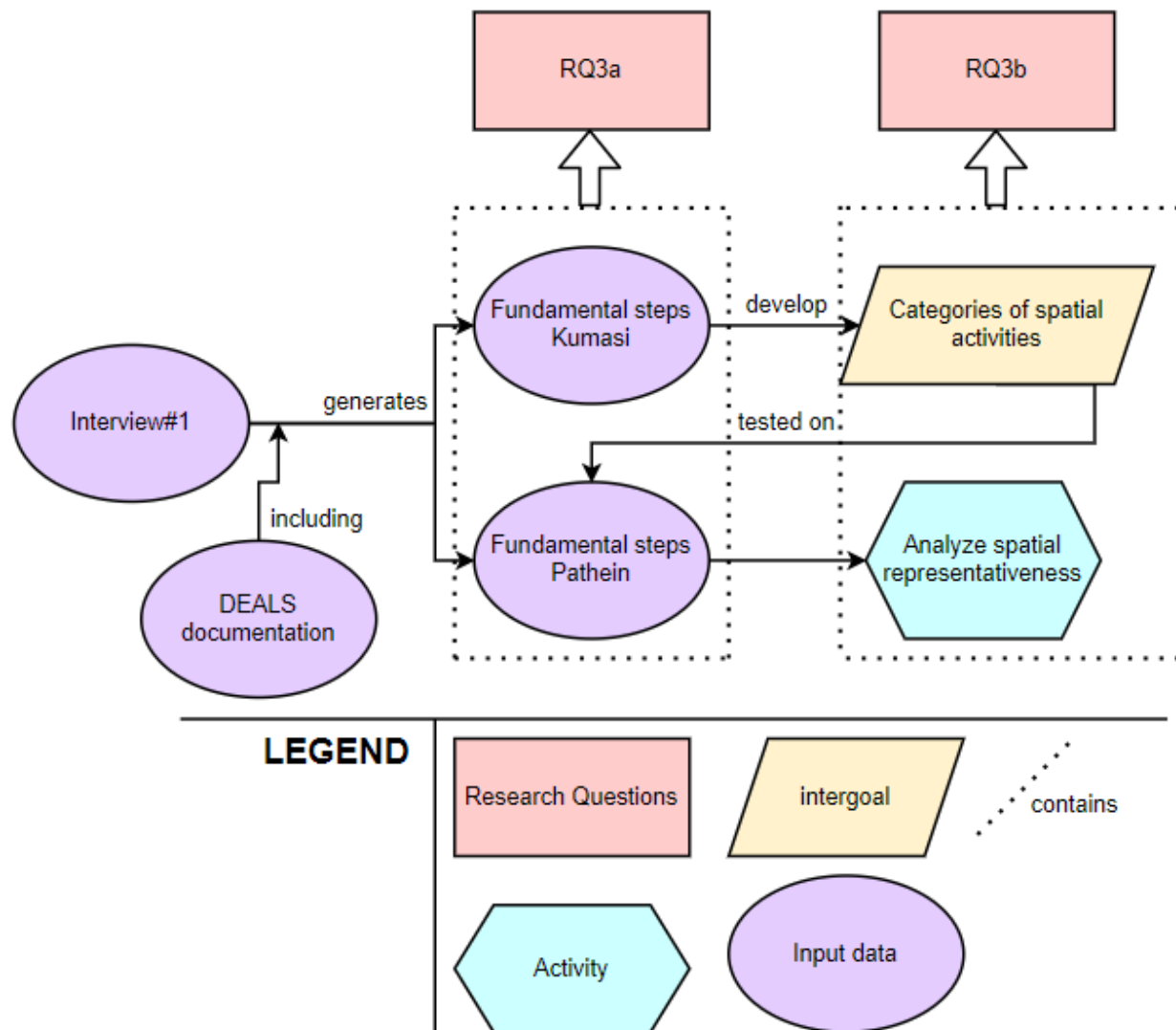
Figure 9: Overview of methods for the third research objective

The data is collected and analyzed as follows:

3a) Interview round #1 identifies spatial collaborative fundamental steps in three different city deals. One of the city deals (i.e. Kumasi) tests thinkLets to some spatial fundamental steps for RO2. The other two city deals (i.e. Pathein and Pereira) have identified spatial collaborative fundamental steps and corresponding characteristics in interview round #1. No thinkLets are tested on these two city deals. These are listed to be analyzed on the type of spatial activity they encompass.

3b) The identified spatial collaborative fundamental steps are categorized on, to be determined, types of spatial activity. These 'spatial' categories are developed based on the identified spatial fundamental steps to compare spatial fundamental steps between city deals. Imagine thinkLets are suitable for map reading

activities according to one researched case. Then it can be argued that thinkLets can be applied to other activities that involve map reading due to the general applicability of thinkLets. This allows comparing how representative the matched spatial fundamental steps are. This study explores which spatial activities can(not) be described with thinkLets. Therefore, it is primarily interesting to determine if similar spatial fundamental steps can be found in different city deals. If spatial problems are relatively similar, this study can more strongly show that spatial activities can be described with thinkLets.

The methods for documentation review and the methods and context of the interview rounds can be found in Appendix 5: Method for documentation review and interview rounds*.*

3.3.1 Research Design Matrix
The Research Design Matrix (see Figure 10) shows an overview of how the research objectives and questions are structured, and how data is collected to answer a particular research question. Then it presents how the collected data is analyzed, and in what form it is expected to be. Lastly, the sources of data or the methods used are shown. Although the methods are presented sequentially, there is an iterative nature of how the research is performed.

| Research Objective	Research Sub Objectives	Research Questions	Data Collection Method	Method of Analysis	Anticipated Results	Source
To determine to what extent existing thinkLets can systematically assist practitioners in guiding a group of stakeholders in spatial collaborative activities and identifying potential gaps	To determine what the spatial collaborative fundamental steps and its characteristics are in city deals	Which activities from a DEALS city deal are both spatial and collaborative?	**Primary data:** Semi-structured interviews with DEALS practitioners **Secondary data:** DEALS lists and descriptions of activities	Analysis if activities comply with definition	Fewer than 10 activities are expected to be collaborative AND spatial	VNG-I documents + expertise + interviewround #1
		What are the fundamental steps in these spatial, collaborative activities?	**Primary data:** Semi-structured interviews with DEALS practitioners **Secondary data:** Descriptions and reports about DEALS activities	Apply 'Activity Decomposition' method on the spatial collaborative activities	Smaller components of the activity	Kolfschoten,2009, p.15 + interviewround #1
		What are the corresponding characteristics of these fundamental steps?	**Primary data:** Semi-structured interviews with DEALS practitioners **Secondary data:** 1. Descriptions and reports about DEALS activities 2. Literature Review	Fill in Excelsheet on characteristics of the fundamental steps	An online Excel sheet the DEALS practitioners filled in, guided by the researcher	Kolfschoten,2009, p.16-19 + interviewround #1
	To determine to what extent spatial collaborative fundamental steps can be covered systematically with existing thinkLets	Which spatial collaborative fundamental steps have matching characteristics with existing thinkLets?	**Primary data:** Semi-structured interviews with DEALS practitioners **Secondary data:** Literature Review	Apply adapted 'thinkLet choice method' on the characteristics of the spatial collaborative fundamental steps	A list of several fitting thinkLets per fundamental step	Kolfschoten,2009, p.18-19
		For which spatial collaborative fundamental steps does the practitioner identify suitable existing thinkLets?	**Primary data:** Semi-structured interviews with DEALS practitioners	Analyzed by the practitioner, reviewed by the researcher	List of thinkLets and reasoning why it may (or may not) be suitable	Interviewround #2
		Which gaps can be identified in listed spatial collaborative fundamental steps for which there is no suitable thinkLet?	**Primary data:** Semi-structured interviews with DEALS practitioners **Secondary data:** Literature Review	Analyzed by the practitioner, reviewed by the researcher	List of thinkLets and reasoning why it may (or may not) be suitable	Interviewround #2
	To determine to which extent the collaborative spatial fundamental steps covered systematically with existing thinkLets are representative for different city deals	Which collaborative spatial fundamental steps can be found in different DEALS city deals?	**Secondary data:** DEALS lists, reports and other descriptions of activities	Analysis if activities comply with definition	A characterized list of spatial fundamental steps	Interviewround #1
		Which collaborative spatial fundamental steps from other city deal have matching characteristics to existing thinkLets?	**Secondary data:** 1. DEALS lists, reports and other descriptions of activities 2. Literature Review	thinkLet choice method + spatial analysis	An analysis how the spatial nature of the fundamental steps differs between city deals	Interviewround #1

Figure 10: Research Design Matrix

3.4 Assumptions

City deals are a conceptual jungle and are defined differently, such as in (O'Brien & Pike, 2019). The city deals in this study are in low and middle-income countries. They focus on bringing stakeholders together to work on a particular problem and are facilitated by one specific party. This case study provides spatial collaborative activities, and its underlying fundamental steps are assumed to be universal and representative of the fundamental steps in other city deals. The practitioners involved in these city deals characterize the fundamental steps. It is assumed the practitioners can recall most characteristics of past activities and their memories are not clouded. Also, the practitioners are assumed to have no prior experience in Collaboration Engineering. The spatial modules of thinkLets are assumed to be sufficiently generic to be applied for any area/location. The practitioners reflected on the fitness of proposed thinkLets which may suit spatial collaborative fundamental steps, without applying them. This expert judgement is assumed to be of sufficient quality to state that a corresponding thinkLet can describe the discussed spatial collaborative fundamental steps.

3.5 Ethical considerations

All sources from literature are properly acknowledged, and if adapted in any way for this study, this is mentioned. The data collected from practitioners and documentation is anonymized, so it cannot be traced back to individuals. The data is stored on Google Drive and is shared with supervisors. Possible unintended disadvantageous effects of this research are that 1) the method aids in making professional facilitators obsolete. 2) the research transfers power from the facilitator to the Collaboration Engineer, who builds the framework. This gives the Collaboration Engineer more responsibilities. Both the Collaboration Engineer as the practitioner acting as a facilitator should be aware of this.

Chapter 4: Results and observations

This chapter presents the results and observations per sub research objective and discusses the results. The first section presents and analyzes the retrieved and characterized spatial activities and fundamental steps. The second section evaluates suitable thinkLets and presents the practitioners' analysis. The third section shows the representativeness of the analyzed city deal. The specific discussion examines the specific influences, circumstances, limitations and technicalities on how the sub research objectives are answered. The Discussion chapter examines how the results and observation fit in the broader context.

4.1 Spatial collaborative fundamental steps and characteristics from DEALS

4.1.1 Results

This section presents the outcome of the first research objective on what spatial collaborative fundamental steps are.

First, the researcher identified 9 activities that may have a spatial component, based on documentation. Sometimes it was not very clear from the documentation if these activities have a spatial component. Second, in interview round #1 the practitioners provided a context description allowing the researcher to judge if the activities have a spatial component. This leads to a list of 6 unique activities with a spatial component discussed with the practitioners. This differs slightly from the 9 activities from documentation. Some activities turned out to not be spatial, and the practitioners also proposed some new spatial activities (not found in documentation).

Third, the practitioners and the researcher broke the 6 unique spatial activities down into their fundamental steps. Some fundamental steps have a spatial component, some not. From this, 13 unique spatial fundamental steps are listed, and only these are characterized by researcher and practitioner.

Based on DEALS documentation, the researcher listed the following 9 activities that seem to have a spatial component. This is divided per city deal, the documentation names are adopted.

Table 4: Spatial activities from documentation

City Deal	Name of activity from documentation
Kumasi	Scenario planning workshop for land use planning of markets and Zongos
	Land use planning, compliance and enforcement
	Multi-stakeholder meetings at pilot sites
	Mapping of functions and social amenities in Central Market and Abinkyi Market
	Kumasi Design Sprint
Pathein	Workshop pilot project ward selection
	Multi-stakeholder training
Pereira	Workshop on Inclusive recycling
	City forum

These 9 potential spatial activities are used as input for interview round #1. Table 4 shows the identified spatial activities from documentation. The green highlight shows which activities remain having a spatial component after consultation with practitioners involved (i.e. after interview round #1). The red highlight shows the activities that turned out to not have a spatial component, or the interviewed practitioners were not involved in these activities. These activities may have been spatial, but could not be reconstructed by the practitioners, hence are not considered for further analysis.

During interview round #1 the practitioners elaborated on the activities found from documentation. The researcher validated with the practitioners if spatial activities from documentation were spatial. The practitioners also suggested some activities with spatial components the researcher did not find in the documentation. The practitioners provided context on activities they were involved in, the researcher made the call if the suggested activities were in line with the given definitions, in discussion with the practitioners. Table 5 presents spatial collaborative activities which the practitioners identified during interview round #1 (VNG - International, 2021). These are divided per city deal, and the responses of the two practitioners interviewed are merged. The practitioners named the activity, the official name in documentation is given as reference.

Table 5: Identified spatial collaborative activities and fundamental steps after discussing them with practitioners

City Deal	Spatial Collaborative Activities	Official name	Spatial collaborative steps identified per activity	Spatial collaborative steps discussed
Kumasi	Selecting slum areas [1]	Mapping of functions and social amenities in Central Market and Abinkyi Market	1. Identifying slum areas from KMA formal meeting (K1) 2. To select slum areas tackled by the project based on indicators (K2) 3. Selection process for slum areas (K3)	idem
	Scenario planning workshop [2]	Scenario planning workshop for land use planning of markets and Zongos	1. Agreeing with group on what scenario to present (K4)	idem
	Consultation meeting	n/a	1. Mixed group in brainstorming session (K5)	idem
	Slum community selection [1]	Mapping of functions and social amenities in Central Market and Abinkyi Market	1. Review of the slums (K6) 2. Collation of rankings (K7)	idem
	Selection of markets [2]	Scenario planning workshop for land use planning of markets and Zongos	1. Using maps markets were located (K8) 2. Review of the markets 3. Collectively rank the markets	1. Using maps markets were located
	BRT component	n/a	1. Identification of key traffic zones (K9) 2. Mapping out key traffic zones (K10) 3. Creation of the traffic zones (K11) 4. Selection of drop off points (K12)	idem
Pathein	Ward selection workshop	Workshop pilot project ward selection	1. Reviewing of the criteria (P1)	Idem
	Multi stakeholder workshop [3]	Multi-stakeholder training	1. Group discussion on prioritize issues to conduct in pilot wards (P2)	Idem
	Multi stakeholder workshop [3]	Multi-stakeholder training	1. Considered current situation and resources (P3) 2. Come up with activities how, who, when, what they can do (P4)	idem
Pereira	n/a		n/a	n/a

	Identified in documentation	Proposed by practitioners
	No	Yes
	Yes	Yes
	Yes	No

[X] refers to identical activities discussed with different practitioners, possibly under different names

Table 5 shows spatial collaborative activities and spatial fundamental steps identified by the practitioners in interview #1. Four activities from the documentation review come back in this new list and are highlighted. Because (at least) two practitioners were interviewed per city deal (see Table 15) they could independently suggest identical activities. In Kumasi this happened for two activities (i.e. [1] and [2]), in Pathein once (i.e. [3]). This makes 6 unique spatial activities in total. Table 5 shows in the 2nd column which activities are identical with the same numbers in brackets.

The practitioners reproduced some other activities, which were not identified as 'spatial collaborative' activites, and are therefore not included in Table 5. The name of the spatial collaborative activities (in the 2nd column of Table 5) the practitioners came up with themselves and which were not identified (or not documented) after documentation review are presented <u>without highlight</u>. The name of the spatial collaborative activities the practitioners came up with themselves which were also identified as such by the researcher after documentation review are presented in <u>light blue</u>. The name of the spatial collaborative activities the researcher suggested to the practitioners after documentation review and with which they agreed that it is a spatial collaborative are presented in <u>orange</u>.

In interview round#1 the practitioners broke the 6 unique activities with a spatial component down into its fundamental steps, of which some are spatial. The 4th column presents 18 spatial fundamental steps, 16 of them are discussed because in the interview in Kumasi there was no time and energy left to characterize two of three spatial fundamental steps in the 'selection of markets' activity (see 4th and 5th column). All 16 discussed spatial fundamental steps are itemized from K1-K12 (K for Kumasi) and P1-P4 (P for Pathein) to distinguish between the steps and to quickly refer to them. The activity 'consultation meeting' in Kumasi only has a single spatial fundamental step, and this means that the other fundamental steps from this activity are not spatial and collaborative.

The practitioners identified no spatial collaborative activities for the Pereira city deal. After the practitioners provided more context the researcher found the potential spatial activities from documentation turned out to not fit the given definitions of 'spatial' and 'collaborative'. In discussion with the practitioners, no other collaborative spatial activities could be identified. Both practitioners could reconstruct <u>non-spatial</u> collaborative activities. These are not of interest to this research.

Table 6 summarizes the 16 spatial collaborative fundamental steps identified by the practitioners in interview round #1. The number in brackets shows which fundamental steps, identified by different practitioners, refer to an identical fundamental step (i.e. K2 and K6, K3 and K7, and P2 and P4). This leads to 13 <u>unique</u> fundamental steps. Table 6 shows the description, the corresponding pattern(s) of collaboration, and the deliverable per fundamental step per city deal — all defined by documentation and the practitioners.

Table 6: Overview of identified spatial collaborative fundamental steps

City Deal	Spatial Collaborative Fundamental step	Pattern(s) of Collaboration	Deliverable
Kumasi			
K1	Identifying slum areas from KMA formal meeting	Generate	To identify all the slum areas in the Kumasi Metropolis
K2	To select slum areas tackled by the project based on indicators [1]	Evaluate	To validate the information provided from KMA data
K3	Selection process for slum areas [2]	Reduce	To select two slum areas to work with on the DEALS project
K4	Agreeing with group on what scenario to present	Build Commitment	To present a scenario as an option for the Congestion issues of the CBD
K5	Mixed group in brainstorming session	Generate	Causes, effects, direction for solutions
K6	Review of the slums [1]	Evaluate*	Validating the indicators
K7	Collation of rankings [2]	Evaluate*	Identify which slums you select for interventions
K8	Using maps markets were located	Clarify	Knowing which market locations would suit the criteria
K9	Identification of key traffic zones	Generate	To help give spatial identity to the zones
K10	Mapping out key traffic zones	Reduce	Delineate the boundaries
K11	Creation of the traffic zones	Evaluate	List the zones for intervention
K12	Selection of drop off points	Build Commitment	Define were to restrict entry into the city center
Pathein			
P1	Reviewing of the criteria	Reduce, Clarify, Evaluate	List of criteria's by informing
P2	Group discussion on prioritize issues to conduct in pilot wards [3]	Generate, Build Commitment	3 prioritizes issues for each ward
P3	Considered current situation and resources	Organize	Refer back to the data findings and the presentation of DAC
P4	Come up with activities how, who, when, what they can do [3]	Build Commitment	Specific activities in ward 7 & 12 with particular time
Pereira	*No spatial collaborative activities identified (see discussion in section 4.1.2 Specific discussion and remarks)*	-	

*pattern of collaboration written down by researcher based on the explanation given by the practitioner

[X] refers to identical activities discussed with different practitioners, possibly under different names

In second interview round some fundamental steps from the Kumasi city deal were considered. Kumasi has most identified spatial collaborative fundamental steps, including a variety of spatial activities, Pathein has fewer fundamental steps to consider, and Pereira none.

In the second interview round, only a few fundamental steps could be dealt with because this was the first time the practitioner encountered thinkLets, and due to time constraints. Only fundamental steps K3/K7 (selecting slum areas), K4 (presenting scenario), K5 (traffic causes, effects and solutions) and K8 (market maps) from Table 7 are presented to the practitioners. Since it takes some time to familiarize with thinkLets, the researcher preferred a more in-depth approach over presenting the practitioners with all fundamental steps from interview round 1, in interview round 2.

The researcher proposes potential thinkLets to a selection of identified spatial fundamental steps due to time constraints. An overview of more interesting (1st column) and less interesting (2nd column) fundamental steps are presented in Table 7. This table also presents reasons why some fundamental steps are not further analyzed for matching with thinkLets. An overview and explanation of all fundamental steps from Kumasi and Pathein, which were not matched, can be found in Appendix 9: Less interesting matched spatial collaborative fundamental steps.

Table 7: Reasons to consider a selection of fundamental steps for further analysis

More interesting matched thinkLets		Less interesting matched thinkLets	Why less interesting matched thinkLets?
K3/K7 (selecting slum areas)		K1	ThinkLets only complicate this activity
K4 (Agreeing with group on what scenario to present)		K2/K6	This activity was not facilitated
K5 (traffic causes, effects and solutions)		K9	"Using maps markets were located" (K8) was prioritized over "Identification of key traffic zones" (K9) because market mapping is considered better to fit 'spatial' and 'collaborative', has better data quality and the researcher has a poor overview of the context of this activity due to connection issues during the interview
K8 (market maps)		K10, K11, K12	The researcher skips these activities due to poor data quality because of a poor internet connection
		P1, P2, P3, P4	In Pathein, and not used for the second interview round

For a descriptive overview of the fundamental steps named by the acronym, see Table 6

The following section presents the fundamental steps from Kumasi matched with thinkLets. A single fundamental step (i.e. K3/K7 – selecting slum areas) is fully described, the other three fundamental steps (i.e. K4 - Agreeing with group on what scenario to present, K5 - traffic causes, effects and solutions, and K8 - market maps) have their complete description and characterization in Appendix 10: Full characterization of fundamental step K4 (Agreeing with group on what scenario to present), K5 (traffic causes, effects and solutions), and K8. Because the analysis of all four fundamental steps follows the same structure, a single fundamental step is shown in the main text. Fundamental step K3/K7 (selecting slum areas) is presented in the main text because it is identified by two practitioners separately, leading to high data quality due to triangulation.

Kumasi

4.1.1.1 Explanation of fundamental step K3/K7 - Selection process for slum areas

K3/K7 consists of two identical fundamental steps separately identified and discussed by the practitioners (i.e. K3 and K7). In this fundamental step, two slums were selected from a larger set, where the DEALS program would intervene. This fundamental step was performed after different team members went validating data in the slums. They shared their experiences (i.e. evaluated the field visit), and based on that outcome, two slums were selected (i.e. reduced). Therefore, the input of the fundamental step is both informative (sharing experiences) and reflective (based on the output of that field visit). One practitioner did identify this as a 'reduce' pattern of collaboration, while the other identified it as an 'evaluate' pattern of collaboration. The researcher agrees with both interpretations, because from a list of slum areas two slum areas are selected (i.e. reduce), which is based on the feedback of the field visits where they validated data (i.e. evaluate). Table 8 presents an overview of how two different practitioners describe the characteristics for fundamental step 'selecting slum areas' in Kumasi. The explanation of the characteristics can be found in Appendix 4: Characteristics Adapted Activity Decomposition Method. The practitioner could sometimes not remember certain characteristics, indicated by a dash.

Table 8: Characteristics of fundamental step K3/K7 (selecting slum areas)

Fundamental steps	K3 - Selection process for slum areas	K7 - Collation of rankings
Activity name	Selecting slum areas	
Characteristics		
Type of spatial activity	Making a selection based on spatial criteria	
Pattern of collaboration	Reduce	Evaluate
Time of activity (in minutes)	180	-
Deliverables	To select two slum areas to work with on the DEALS project	identify which slums you select for interventions
Preparation needed	Slum visit	-
Homework given	-	-
Cognitive capacities	Normative and cognitive	Normative and cognitive
Task complexity	2	2
Technologies used	Flipcharts, excel sheet	-
Experience facilitator	Experienced	-
Input type	Informative and Reflective	Informative
Structure type	A ranking of concepts based on some criterion	A ranking of concepts based on some criterion
Focus type	A scope in which the boundaries for a collection of constructs are formulated	A selection where only a few concepts are chosen by the group
Shared understanding type	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge
Type of commitment	A consensus in which all critical stakeholders commit to a proposal.	A decision which can be made based on majority or on other decision-making rules
Empathy type	A team bond in which mutual goals are pursued	A team bond in which mutual goals are pursued

| Data Quality | Good | Average |

The researcher made some observations about fundamental step K3/K7 (selecting slum areas):

The practitioners are largely on the same page describing an identical activity, and this gives confidence that the data quality is good. The different identified patterns of collaborations indicates a fundamental step can have more patterns of collaboration or that this fundamental step could be broken down further.

The raw unprocessed Excel sheets, filled in every interview, can be found in Appendix 8: Summarized raw Excel sheets interview round #1. The characteristics and their explanation can be found in Appendix 6: Protocol Interview round #1.

In interview round #1 Pereira – practitioner A, no spatial collaborative fundamental steps were identified. Non-spatial collaborative fundamental steps were discussed on if thinkLets could be applied. The outcome is that non-spatial collaborative activities were seen as useful in a city deal context by the practitioner. In interview round #1 Pereira – practitioner B, again, no spatial collaborative fundamental steps were identified. Some non-spatial collaborative activities were characterized to see if thinkLets could be applied in the context of a city deal.

*Results of fundamental steps K4 (*Agreeing with group on what scenario to present)*, K5* (traffic causes, effects and solutions) *and K8* (market maps) *are in Appendix 10*: Full characterization of fundamental step K4 (Agreeing with group on what scenario to present), K5 (traffic causes, effects and solutions), and K8*.*

4.1.2 Specific discussion and remarks

The researcher provided the definitions of 'Spatial' and 'Collaborative' (see section 2.1 Conflicts in spatial activities) to define the boundary of a spatial collaborative activity. The DEALS project leader invited the interviewees, and this project leader gave some examples of what a spatial collaborative activity may be. It was communicated that the activities to be looked for "*1) were about spatial decisions, for example the selection of pilot areas in the city and 2) group processes, for example multi-stakeholder workshops".* In the interview protocol some examples were also presented to the interviewee to illustrate the difference between an activity and a fundamental step. These practicalities may have biased the interviewees to look into these specific examples of what a spatial collaborative activity can be.

The researcher did not provide a pre-defined definition of a spatial collaborative activity. This may result in false positives of some activities and corresponding spatial collaborative fundamental steps (i.e. identified by the practitioner to match with the provided definitions of 'spatial' and 'collaborative', but were 1) misunderstood or 2) ignored. There may also be spatial fundamental steps that were performed but not identified as spatial and collaborative; false negatives. These false negatives are assumed to be without consequence for the research to see if thinkLets can be applied to them. Due to the nature of this case study this research aims to find if thinkLets can be applied to some spatial collaborative fundamental steps. It is impractical to test thinkLets to all identified activities because of resource constraints.

Considering the definitions of 'spatial' and 'collaboration', the definition of 'spatial', appearing in section 2.1 Conflicts in spatial activities, contains the term 'spatial relations', which is an unfortunate choice. In some interviews the definition of 'spatial' was broadened to 'making a decision on a spatial topic' because the interview got stuck on the limited first definition of 'spatial'. No exact definition of a 'spatial collaborative activity' is the output of this study, only examples of activities that are identified as such are presented.

Another shortcoming of only looking for 'spatial' and 'collaborative' fundamental steps is that in interview round #1 the fundamental steps that fit these definitions do not necessarily have a facilitator. This is a shortcoming since thinkLets have been developed for collaborative activities facilitated by a facilitator, presenting a boundary of the scope of this collaboration theory. The practitioners proposed spatial collaborative activities that did not necessarily have a facilitator. These were discarded for further analysis.

During the discussion on why a fundamental step is spatial, the researcher sometimes argued against the practitioners' reasoning why it was spatial and collaborative. The interviewees then discarded some activities and/or fundamental steps that they initially deemed to fit the given definition of a 'spatial' and 'collaborative'. The practitioners always went along with the researchers' arguments. The practitioner may have gone along with the researcher due to some authoritative position on this new topic. This results in not all spatial collaborative fundamental steps being analyzed on characteristics, and therefore thinkLets were not tested on these fundamental steps. Also, the possible biases of the researcher influence which fundamental steps are seen as spatial, and hence are considered.

In interview round #1 for Pereira both practitioners came up with several activities that may fit the spatial collaborative activity. After discussing these suggestions, the researcher found these activities were spatial in the sense that 1) practitioners would spread information door to door to educate local people, and 2) were discussing an action plan on how to deal with waste management. These interpretations of spatial resulted in discarding these suggestions since they are 1) not primarily a spatial activity but its results make an impact on spatial issues or 2) were not facilitated by a facilitator guiding a group actively through an activity but rather a coordinator who organizes the smooth flow of an activity. This study does not define how to distinguish between a practitioner and a coordinator.

The Activity Decomposition Method's characteristics gave some directions on which thinkLet may suit a specific fundamental step, but were incomplete. The selection guidance requires some insight into the stakeholders and their stakes, the reasons for participation, what they expect and if they will accept specific results. The characteristics in the selection guidance are generally of a more detailed nature than the Activity Decomposition Method's characteristics. In Collaboration Engineering, the aspects that make up the characteristics are considered before designing an activity. This study looked in retrospect, up to three years after an activity took place. The practitioners could not always recall the exact circumstances of these group processes, or their memories were clouded, resulting in lower data quality. Sometimes the practitioners' cognitive load was already on the high side in the interview to further clarify some characteristics. This results in not all characteristics, needed to reconstruct an activity and to match a fitting thinkLet, have been identified. This was not a big problem since the characteristics are a guideline to find fitting thinkLets, an incompletely characterized fundamental step can still enable the researcher to propose potential thinkLets. When choosing thinkLets, the researcher aimed to think along with the practitioners' data, and sometimes thinkLets in a different pattern of collaboration than indicated in interview round #1 appeared to be better fitting. The researcher considered all thinkLets to propose, as explained for research question 2a in section 3.3 Data Collection Methods and Analysis.

Only 4 fundamental steps are further analyzed on if they could be matched with thinkLets because of time constraints in interview round 2. This provides opportunities to deepen this study into the discarded

fundamental steps. Discarded fundamental steps are already characterized. It may be that some could benefit from thinkLets (e.g. K9), some probably do not (e.g. K1, K2/K6).

In the interview protocol, one of the questions is if the practitioners were experienced facilitators. Most practitioners interviewed were facilitators of most activities discussed. When asking about their experience, they would be hesitant to acknowledge if they were inexperienced. Therefore these questions were reformulated to how comfortable they were in facilitating and if they had followed any kind of training in facilitation.

The different patterns of collaboration in fundamental step K3/K7 as identified by the practitioners may either indicate that some fundamental steps can have several pattern of collaboration. It may also be that the activity is slightly differently perceived by the practitioners. The 'reduce pattern of collaboration' comes from the practitioners himself, while the 'evaluate' pattern of collaboration is an interpretation of the researcher in discussion with the practitioner. This may be prone to errors and is prone to subjectivity. The 'reduce' pattern of collaboration seems most fitting, because this fundamental step has to se-lect/identify slums from a greater list (Table 8). Looking at the deliverable it tends to be more towards 'reduce'. The process to reduce this list is based on an evaluation of a preceding validation activity. It can be argued that this fundamental step has components of an 'evaluate' pattern of collaboration. This may also indicate this fundamental step actually is not fundamental, but can be broken down further. For ex-ample into an evaluation part, which provides the group with new information on which the reduction is based.

The answers from interview round #1 are gathered in an Excel sheet. The Excel sheet enabled giving a single example for a pattern of collaboration from a dropdown menu. Some practitioners interpreted this as having to write down the primary pattern of collaboration, while activities may touch upon multiple. By brute-forcing the Excel sheet, sometimes the researcher or practitioner wrote down several patterns.

The researcher presented the choices of progressing characteristics, like 'shared understanding type' se-quentially to the practitioners. This may have biased the practitioners since they often were aware of this progressing nature of choices. A random order may have made this effect less prevalent since it requires more focus and work from the practitioner to identify the choices as such.

4.2 Covering spatial collaborative fundamental steps with matching thinkLets

4.2.1 Results

This chapter presents the outcome of the second research objective on which thinkLets may or may not fit certain spatial collaborative fundamental steps. Results are 1) an overview of all thinkLets that fit this activity based on their characteristics for spatial collaborative fundamental steps coming from the adapted thinkLet choice method, 2) the thinkLets the practitioner identified as suitable for those funda-mental steps, 3) spatial collaborative activities for which no fitting thinkLets were identified. Only the matched thinkLets for fundamental step K3/K7 (selecting slum areas) are presented. The proposed and discussed thinkLets for the other three fundamental steps can be found in Appendix 11: Full overview of matched thinkLets for fundamental step K4 (Agreeing with group on what scenario to present), K5 (traffic causes, effects and solutions), and K8 (market maps).

Only a selection of fundamental steps is considered, as explained in Table 7. Section 3.3 Data Collection Methods and Analysis describes how potential thinkLets are selected. The matched thinkLets are pro-posed per fundamental step with an explanation on why these thinkLets may fit the fundamental step. A

brief description of all thinkLets, which is identical to the one presented to the practitioners, can be found in Appendix 12: ThinkLets as presented to practitioners in interview round#2.

All fundamental steps, matched to thinkLets are presented to show which thinkLets are considered and how the practitioners reviewed these thinkLets. Examining multiple potential thinkLets for multiple fundamental steps exposes recurring or frequent observations. This may reveal systematic features of thinkLets working in the spatial domain.

Fundamental step K3/K7 - Selection process for slum areas/Collation of rankings

A summary of this fundamental step can be found section 4.1.1.1 Explanation of fundamental step K3/K7 - Selection process for slum areas. The patterns of collaboration which the practitioners identified are 'reduce' and 'evaluate'.

Table 9: Proposed thinkLets for fundamental step K3/K7 (selecting slum areas)

Potential thinkLet	What does it do?
Plus-Minus-Interesting	This thinkLet can help the group express the pros, cons and insights about their visit to the slum to share with the group. (followed by a Lobbyist(?) to let them advocate for their position.
AND	
Strawpoll	to get a sense of where the group stands on what to choose
OR	
MultiCriteria + Straw-Poll + Crowbar	to rate the slums against criteria, then measure where the group stands and then see where there is low consensus
OR	
MoodRing	to discuss and change opinions until some sort of consensus is established

Table 9 shows the potential (sequences) of thinkLets proposed to the practitioner, and how these thinkLets relate to the fundamental step. The Boolean operators indicate how the sequence is constructed, as explained in section 3.3 Data Collection Methods and Analysis. A brief explanation with 'overview' and 'steps' of each potential thinkLet can be found in the corresponding appendices:

Appendix 23: Plus-Minus-Interesting
Appendix 27: StrawPoll
Appendix 21: MultiCriteria
Appendix 16: Crowbar
Appendix 20: MoodRing

Since this fundamental step is described and analyzed by two practitioners, the two individual responses are shown. These responses are compared for triangulation purposes.

Table 10: Assessment of proposed thinkLets of fundamental step K3/K7 (selecting slum areas) by practitioner 1

Potential useful thinkLets	Which techniques from these thinkLets were used?	Could this thinkLet be applied? (1-10 scale)	Why?	Would you use this thinkLet? (1-10 scale)	Why?	How could the thinkLet be changed to be useful?
Plus-Minus-Interesting	This was used during the setting of criteria for the selection of the slum. A number of indicators could have been selected but it guided us in the selection	6	This is because having the projects objective in mind you are able to use the pros and cons as a guide to set the criteria	6	This is because you are guided once you identify the pros and cons	May be it can be twicked depending on the type of activity and expected results
AND						
TheLobbyist	Not so much of this technique was used because we knew our objectives which guided us in setting criterias to reduce bias	2	This is because there was no need to lobby having known what we were looking for	2	It is not too suitable	It could be used in a different situation
StrawPoll	There was no need to use this technique because we had agreed on set criteria based on the projects objectives	2	There was no need to vote during this process	2	It is not suitable for this activity	It could be used in a different situation
OR						
MultiCriteria	This technique was used heavily because in arriving at the slums we wanted we had a number of criterias guiding us	6	It enables you to use a number of criterias so you evaluate and settle on the one to use	6	It gives participants the opportunity to evaluate criterias	n/a
StrawPoll	**Not filled in because already treated**					
Crowbar	This technique was not used because largely all group members knew the projects objectives and we only worked	1	There was no need to use this	1	It is not suitable	n/a
OR						
MoodRing	Votes were not used in this process because all participants had a clear mind about the	1	There was no need	1	It is not suitable	n/a

Table 10 shows the results of the thinkLets matched to fundamental step K3/K7 (selecting slum areas) discussed by practitioner 1. Practitioner 1 does not differentiate between if the thinkLet could be applied and if the practitioner would use a thinkLet. The practitioner indicates that some thinkLets could fit this particular fundamental step (i.e. Plus-Minus-Interesting, MultiCriteria) and are given a score of 6 (i.e. average). While all other thinkLets are rated very low and are seen as non-suitable. Let's look at the highest-rated thinkLets in more detail:

Plus-Minus-Interesting:
The pros, cons and interesting findings were shared in the group, but not in such a structured fashion as the thinkLet describes. The practitioner finds these pros and cons could have been used to set the criteria for selecting slum project areas. It may be that this thinkLet is rated relatively high because this was the first thinkLet presented, and the practitioner had to develop still a sense of perspective on where the thinkLets should be on the 1-10 scale.

MultiCriteria:
The group used several criteria for choosing a slum project area, so the practitioner indicates that this thinkLets could be used for this fundamental step.

The practitioners perceived all other proposed thinkLets as being not applicable for the practitioners' purpose. They indicated some of these thinkLets as not applicable because they aid in certain situations (e.g.

low consensus), which could occur in such an activity. Due to retrospect nature, such thinkLets are rated low.

Table 11: Assessment of proposed thinkLets of fundamental step K3/K7 (selecting slum areas) by practitioner 2

Potential useful thinkLets	What techniques from these thinkLets were used?	To what extent could this thinkLet be applied in this activity? (1-10 scale)	Why?	To what extent would you use this thinkLet in such an activity? (1-10 scale)	Why?	How could the thinkLet be changed to be useful?
Plus-Minus-Interesting	The need to observe the indicators and their applicability	4	The approach used was collectively decided on hence did not allow individuals to add or subtract from the set indicators	2	It would apply morw to when we are making a choice about a service to provide for the community	It can remain as it but in its current state it has low applicability to the activity we did
AND						
Lobbyist	It does not apply for this activity becausde the members of the prject team had no interest in which community got selected hence used a scientific process that was less value laden	1	The project team had no interest in which community got selected hence used a scientific process that was less value laden	1	May be for an activity that involves groups and parties who have positions and interest in a matter	To get parties to express their positions overtly or covertly in a arriving at a project decision
StrawPoll	The rating component is highly applicable	6	The objective of the decision was to rank the communities based on the collective rankings	6	It allow a decision to be reached and the outcome discussed	It is okay as it for reaching a decsion based on ranking
OR						
MultiCriteria	Using multiple criteria	5	The development of the indicators developed provided the basis for ranking	5	Allows for the introduction of varied perspectives into decsion making and selection of options	It is okay for its purpose
StrawPoll	It was to a limited extent by asking the team members to make their judgement evident	2	With the exception of the element that required that the team do an independent ranking	4	If we require independent position to be statet while ensuring anonomity	It is okay for the stated purpose
Crowbar	There was consensus on this ocassion	6	If there happen to be disagreeement	6	If we need to agree on a subject matter before proceeding to the next item	It well serves its current purpose
OR						
MoodRing	There was no opportunity for a change in opinion in this case	1	Once the decision was made collation was done and decision reached	4	It would be used if we refining a number of positions or decsions earlier reached	For the stated purpose it should be okay

Table 11 shows the results of the thinkLets matched to fundamental step K3/K7 (selecting slum areas) discussed by practitioner 2. Practitioner 2 sometimes differentiates between if the thinkLet <u>could be</u> applied and if the practitioner <u>would use</u> a thinkLet (changes indicated by the red/green highlight). The practitioner rates three thinkLets a 5 or higher (i.e. StrawPoll, MultiCriteria and Crowbar) and indicates that all thinkLets are useful for their purpose. Let's look at the highest-rated thinkLets in more detail:

StrawPoll:
Even though the practitioner indicates the StrawPoll technique is highly applicable, it is 'only' rated with a 6 (i.e. average). This is mainly due to the general nature of this thinkLet; the lack of specific/concrete application of the thinkLet resulted in not giving a higher rating.

MultiCriteria:
The principle of considering multiple criteria was not new for the practitioner; only the structure was new. Because the structure was different in the activity is was awarded a 5 (i.e. average).

Crowbar:
This activity had a consensus between the stakeholders, and the practitioner could see that if this would not be the case, this thinkLets could come in handy.

The practitioner wrote down the following general remark about thinkLets:

"The thinkLets are all uniquely useful. They can be applied in many different settings and contexts, a good number of them are applicable even if the participants do not have high reading ability.''

Table 12: Comparison of assessments of proposed thinkLets for K3/K7 (selecting slum areas) by both practitioners

Potential useful thinkLets	To what extent could this thinkLet be applied in this activity? (1-10 scale)			To what extent would you use this thinkLet in such an activity? (1-10 scale)		
	Practitioner 1	Practitioner 2		Practitioner 1	Practitioner 2	
Plus-Minus-Interesting	6	4		6	2	
AND						
TheLobbyist	2	1		2	1	
StrawPoll	2	6		2	6	
OR						
MultiCriteria	6	5		6	5	
StrawPoll		2			4	
Crowbar	1	6		1	6	
OR						
MoodRing	1	1		1	4	

Table 12 compares the answers of the practitioners, who assessed the same fundamental steps with the same proposed thinkLets. There appears to be a consensus between the practitioners that 'The Lobbyist' and 'MoodRing' are not suitable for this fundamental step. MultiCriteria is perceived as a suitable thinkLet. The other thinkLets have no consensus. The 'Crowbar' has a particular low consensus, as one practitioner rates this thinkLet a '1' and the other a '6'. This is because this thinkLet was not suitable in this case due to actual consensus between the stakeholders, while this thinkLet addresses reasons for lack of consensus. One practitioner indicates this thinkLet might have been helpful for the activity in case of low consensus. The first StrawPoll (as part of the combination The Lobbyist – StrawPoll) shows low consensus between the practitioners. The practitioners did interpret this thinkLet differently. The first practitioner saw no applicability of this thinkLet because the criteria were perceived as being objective, and therefore no 'polling' techniques were needed. The second practitioner perceived some subjectivity in the criteria set, and therefore getting a sense of what the group thinks was seen as a logical step in the process. The Plus-Minus-Interesting had average consensus.

Results, specific observation and discussion of fundamental steps K4 (Agreeing with group on what scenario to present), K5 (traffic causes, effects and solutions), and K8 (market maps) are in Appendix 11: Full

overview of matched thinkLets for fundamental step K4 (Agreeing with group on what scenario to present), K5 (traffic causes, effects and solutions), and K8.

The researcher makes some overall observations from the assessment of matching the thinkLets to fundamental step K3/K7.

All analyzed fundamental steps have matching characteristics with some thinkLets. Not all characteristics match necessarily with a thinkLet, as some thinkLets do not mention specific characteristics. The practitioners noticed most thinkLets could be useful in certain situations, but often not in their particular case. It proved to be challenging to show the practitioners how they are not a stand-alone technique but can be used sequentially. Practitioners found thinkLets easy to understand and simple in nature as a single technique. It became clear that some fundamental steps would only become more complicated applying thinkLets (i.e. K1, see Appendix 9: Less interesting matched spatial collaborative fundamental steps). The strength of thinkLets lies in guiding complex tasks or situations. These thinkLets can be very relevant in case a facilitator gets stuck on guiding a group. That is where thinkLets can be used as guidelines. This is where the gaps are. ThinkLets have limited applicability for all collaborative activities, but they can greatly aid the facilitator for the more complex ones. The identification of which activities or fundamental steps are spatial is not relevant to see if they can be covered with thinkLets. It is difficult to define what 'spatial' means in this context exactly. The fitness of a fundamental step to have matching thinkLets seems to be independent of being spatial.

4.2.2 Specific discussion and remarks

The practitioners assessed the proposed thinkLets and gave reasons why that thinkLet could (not) suit a past spatial fundamental step. They gave no reasons dealing with the spatial nature of either fundamental steps or thinkLets. Most reasons dealt with the status of consensus or procedural conflicts (e.g. no lobbying was needed, no voting procedure was desirable, see Table 10). This suggests the spatial elements are not relevant when matching fundamental steps to thinkLets. It is hypothesized the general descriptions of the thinkLet procedures facilitate a broad implementation of thinkLets in various contexts, including a spatial one.

The researcher was in the role of a Collaboration Engineer when proposing suitable thinkLets for identified spatial collaborative fundamental steps as is required by the thinkLet choice method. The researcher declares this was the first attempt to take on such a role and was inexperienced and learning while doing so. The researcher had to be a bit subjective when prioritizing which thinkLets could fit best, based on the indicators as provided by the thinkLet choice method. The researcher interpreted how the activities were performed and how thinkLets could work. The researcher presented the practitioners with the most promising thinkLets. The practitioners were asked to indicate if they deem these thinkLets applicable. Some potential thinkLets are proposed which did not match with the pattern of collaboration. Even then, its content seemed to be quite suitable. For example, practitioner 1 gave 'Plus-Minus-Interesting', a thinkLet with a 'divergence' pattern of collaboration, a 6 (i.e. average) (see Table 10). Fundamental step K3/K7 is either a reduce or evaluate fundamental step (see Table 8). Another example from the same fundamental step is where practitioner 2 gave 'Crowbar', a 'Building consensus' thinkLet, a 6 (see Table 11). There was little consensus between the practitioners on the suitability of these thinkLets (see Table 12). Also, due to the large variety of thinkLets and the researcher's relative novelty, it may have occurred that when constructing a list of suitable thinkLets based on the characteristics, some thinkLets were

overlooked or discarded and therefore not presented to the practitioner. This may disturb this study's conclusions since not all possible thinkLets were presented and discussed.

The 'thinkLet-choice' method presents some guidelines on how to choose the most fitting thinkLets by looking at 1) the available design patterns, 2) the scope and context of its use, combined with success stories, 3) the pattern of collaboration and 4) matching with preceding and subsequent thinkLet. These guidelines can reduce the choice's complexity but are not complete and always need to be interpreted. The researcher asked the practitioners to assess potentially suitable thinkLets. Due to this study's retrospective nature, no thinkLets were used in the activities considered (in a thinkLet form) and guideline 4 (i.e. matching with preceding and subsequent thinkLet) therefore cannot be used. However, the practitioners did sometimes use techniques that can also be found in thinkLets. To still use preceding and subsequent fundamental steps in the assessment of the suitablility of a thinkLet, the practitioners used the deliverables of the preceding fundamental step as input of the thinkLet. The practitioners could assess the output of this thinkLet by looking at the input for the next fundamental step.

Matching the thinkLets to spatial collaborative activities is done solely on theory, past activities and hypothetical situations for the practitioner. The activities are analyzed in retrospect, and the presented techniques that thinkLets hold are new for the practitioners (in that format).The practitioners encountered a particular situation. For example, in their case, there was a high consensus. Some thinkLets are only helpful in case of low consensus, which the practitioners did not encounter. It has proven to be challenging to let the practitioners analyze some hypothetical situations for past activities. No thinkLets were applied or tested in real-life spatial collaborative activities. It was advantageous the characteristics, needed to match the fundamental step to thinkLets, were known, due to retrospect activities. It must be noted the applicability of the thinkLets to spatial collaborative processes is indicative.

The practitioners generally gave thinkLets low grades, indicating a poor fit. The highest score given is a '8', the lowest a '1'. In past activities, they did not use thinkLet techniques, so it makes sense no '9' or '10' scores are given in interview round #2. They considered how similar thinkLets are compared to past activities, rather than considering the extent to which thinkLets could have been applied to past activities. The hypothesis is that thinkLets are rated lower due to the retrospect nature because looking at activities in retrospect is challenging. This activity was performed in a particular way, and reviewing the thinkLet techniques ask the practitioners to imagine how these thinkLets could have been implemented. The researcher provided a selection of potentially suitable thinkLets, based on discarding all thinkLets that definitely did not suit. For fundamental step K3/K7 practitioner 1 (see Table 10) rated 4 out of 6 thinkLets a 2 or lower (on a 1-10 scale). This discrepancy shows the adapted thinkLet choice method does not fully capture the suitable thinkLets for the activities.

The practitioners did sometimes see some of the techniques of a thinkLet in their activity. It is argued that when they identify a particular representation of a technique, they did not consider the rest of the thinkLet anymore but were satisfied they found a similarity. This may have biased the practitioners' assessment of the thinkLets, because they ceased to consider the full thinkLet procedures.

No complete thinkLets are presented to practitioners in interview round #2. Only the 'overview' and the 'steps' section of thinkLets are presented. This thinkLet summary aims not to overload the practitioners with information but only show the essential parts. When asking practitioners to what extent a thinkLet could be useful, they only based it on this summary. It generally took them no more than 3 minutes before they scored a specific thinkLet. This 'overview' sometimes refers to other thinkLets, with which the

practitioners are not familiar with. This may have led to an incomplete understanding of the working of a thinkLet.

In interview round #2 it is aimed to show sequences of thinkLets (at least while designing the interview) as they are sequential of nature. During the interview, it was found practitioners tended to look at techniques within a single thinkLet. This indicates thinkLets are not perceived as being the smallest possible technique. Practitioners found it hard to see a thinkLet in the larger context since they ignored how the output of one thinkLet serves as the input for the next thinkLet. This indicates thinkLets are perceived as standalone techniques. This is the opposite of what CE literature suggests, where whole activities consist of a various thinkLets.

The first thinkLet presented to both practitioners was 'Plus-Minus-Interesting'. The practitioners were not yet familiar with the concept of thinkLets, so it was decided to use the first thinkLet as a test thinkLet (not when designing the interview, but during the interview). The practitioners could then get used to the format of a thinkLet. Practitioners need some time and energy to grasp what they can do with thinkLets.

For DEALS in particular, this program is working on capacity building and provides tools to municipalities abroad. The municipalities can be in different stages of development (i.e. some municipalities are more extended, have more resources than others). For example, the municipality of Pathein has ca. 70 employees, in both executive as the legislative branch for a municipality of ca. 250.000 residents. Therefore, implementation of thinkLets may not be as high of a priority for all municipalities in the DEALS program.

4.3 Representativeness of matched thinkLets in other city deals

4.3.1 Results

This section considers how representative the identified and matched spatial collaborative fundamental steps from the Kumasi city deal are. The Kumasi spatial fundamental steps are compared to the ones from Pathein. They are compared on the type of spatial activity. This section consists of three parts: 1) develop categories of fundamental steps on a 'type of spatial activity' and 2) make a complete overview of all fundamental steps and assign them in spatial categories 3) identify potential overlap between the categories and discuss the categories made, and further analyze the representativeness. Part 1 and 2 are performed iteratively. This development of categories is based on the identified spatial fundamental steps in an iterative way.

The fundamental steps are categorized on what makes them 'spatial'. These categories are mainly based on the discussion with the practitioners. The researcher decided how these fundamental steps are considered spatial, in discussion with the practitioners. Table 13 shows the categorization of the spatial fundamental steps. All identified spatial fundamental steps are grouped into categories developed on the identified fundamental steps. These categories are made from scratch. They illustrate the variety of spatial fundamental steps which may be managed using existing thinkLets. The researcher checked if assessed thinkLets may be used in spatially similar fundamental steps in other city deals, which reveals the extent to which the analyzed Kumasi city deal is spatially representative.

The proposed spatial categories differ from thinkLets in that thinkLets are a packaged facilitation technique, while the practitioners assessed thinkLets for these spatial categories in this study.

These spatial categories could suit as an additional attribute of the characteristics of the Activity Decomposition Method. They may provide a guideline to classify activities. However, the previous results indicate

being spatial is irrelevant for finding a fitting thinkLet. Adding this as an additional attribute may therefore be unnecessary.

Table 13: Proposed categorization of spatial categories of spatial fundamental steps

Type of 'spatial'	Explanation
Spatial decision	Where the group needs to make an informed choice based on valid information in a spatial domain. For example, land use/resource development negotiations, site selection, choice of environmental and economic strategies, and urban/regional development (Jankowski & Nyerges, 1997).
Site evaluation and validation	Where the group physically visit an area to inspect if the data and representations discussed beforehand are factual on the ground.
Map reading	The group needs to perform an exercise where visualizations of spatial data are used as a tool for discussion. The information from the tool needs to be extracted and interpreted by the group. An example of such a tool that visualizes spatial data is a map.
Mapmaking	The group has to define interests and lines of areas on a map. They create new categories and put attributes into the newly set categories. The group defines what is relevant and how to transfer information to their future selves or other stakeholders.
Spatial scenario	Where the group had to bring creative ideas and develop a visionary plan to combat any type of problem by planning or zoning.
Generating spatial parameters	Where the group identifies creative, informative, visionary or reflective input to create an overview of a spatial problem. This overview aids in generating a common picture of what the problem is and what alternatives are to help solve it.

These categories are based on the identified fundamental steps from Kumasi. It may exclude other types of spatial fundamental steps which were not encountered in this study. How the fundamental steps are categorized can be found in Table 14.

Table 14: Categorized fundamental steps by their spatial category

City Deal	Spatial Collaborative Fundamental step	Deliverable	Type of Spatial activity
Kumasi			
K1	Identifying slum areas from KMA formal meeting	To identify all the slum areas in the Kumasi Metropolis	Spatial decision
K2	To select slum areas tackled by the project based on indicators [1]	to validate the information provided from KMA data	Site evaluation and validation
K3	Selection process for slum areas [2]	To select two slum areas to work with on the DEALS project	Spatial decision
K4	Agreeing with group on what scenario to present	To present a scenario as an option for the Congestion issues of the CBD	Spatial scenario
K5	Mixed group in brainstorming session	causes, effects, direction for solutions	Generating spatial parameters
K6	Review of the slums [1]	validating the indicators	Site evaluation and validation

K7	Collation of rankings [2]	identify which slums you select for interventions	Spatial decision
K8	Using maps markets were located	knowing which market locations would suit the criteria	Map reading
K9	Identification of key traffic zones	To help give spatial identity to the zones	Generating spatial parameters
K10	Mapping out key traffic zones	Delineate the boundaries	Mapmaking
K11	Creation of the traffic zones	List the zones for intervention	Spatial decision
K12	Selection of drop off points	Define were to restrict entry into the city center	Spatial decision
Pathein			
P1	Reviewing of the criteria	List of criteria's by informing	Site evaluation and validation
P2	Group discussion on prioritize issues to conduct in pilot wards [3]	3 prioritizes issues for each ward	Spatial decision
P3	Considered current situation and resources	refer back to the data findings and the presentation of DAC	Spatial decision
P4	Come up with activities how, who, when, what they can do [3]	specific activities in ward 7 & 12 with particular time	Spatial decision
Pereira	*No spatial collaborative activities identified (see Discussion in section 4.1.2 Specific discussion and remarks)*		-

The definitions of developed spatial categories are quite broad, and it is possible to characterize some types (e.g. spatial decision) into a smaller category. This study only considered a selection of spatial fundamental steps. When considering more spatial fundamental steps categorized in "spatial decision", the nuances can become more apparent, leading to more specific categories. Due to the limited considered spatial fundamental steps, it is decided to categorize the spatial fundamental steps in these broader, more elementally different categories.

The practitioners from Kumasi discussed the applicability of thinkLets on some fundamental steps (i.e. K3/K7 (selecting slum areas), K4 (Agreeing with group on what scenario to present), K5 (traffic causes, effects and solutions), and K8 (market maps)). It is interesting to see which spatial categories reappear in Pathein. There are no spatial fundamental steps in Pathein which do not fall under a spatial category from Kumasi. This gives an indication that the Kumasi City Deal provides representative spatial fundamental steps (compared to Pathein).

RO2 shows being spatial is not a significant reason why a fundamental step can be described with thinkLets. No practitioners did identify this as the limiting factor. Therefore considering the type of spatial activity of a fundamental step provides a first attempt to categorize activities. There are no existing thinkLets that directly relate to a type of spatial activity.

4.3.2 Specific discussion and remarks

Based on the identified spatial fundamental steps in Kumasi, the researcher developed 6 categories of spatial activities, see Table 13. The identified spatial fundamental steps from Pathein could all be placed within the developed categories. This means the categories are broadly defined and all identified spatial fundamental steps from Kumasi are representative. A limitation is the small number of spatial fundamental steps to compare it to. Pathein has three unique spatial collaborative fundamental steps.

RO3 aims to determine if the spatial collaborative fundamental steps that have a fitting thinkLet represent other city deals. This research shows the extent thinkLets can be used for spatial collaborative activities in city deals. This study only looks into city deals, while many different sectors have spatial collaborative activities. This study does not tell to what extent thinkLets can be used there. This study tells having a spatial component is irrelevant for matching thinkLets.

The researcher developed the categories of what 'spatial' encompasses are, based on the practitioners' discussion in interview round #1. Most types fall into the category of a 'spatial decision'. It could be that this category could be divided further to show nuances within this category. The categories are not entirely mutually exclusive since some fundamental steps have traits of different categories. It is aimed to create categories that have fundamentally different definitions, but some overlap remains. The fundamental steps are therefore placed in the categories they fit in most. This assigning is subjective.

Chapter 5: General discussion

The interpretations, opinions and effects of choices made in the methodology are discussed in the 'specific discussion and remarks' section in the Results chapter. This Discussion chapter consists of two parts. Part 1 reflects on the existing framework of Collaboration Engineering and the theory of thinkLets and brings new perspectives to this. Part 2 considers how the results of this study add to the knowledge of the spatial domain of thinkLets.

Part 1: Collaboration Engineering

The researcher distinguishes seven insights of the Collaboration Engineering approach and the theory of thinkLets:

First, the term 'fundamental step' is introduced in this study to distinguish the levels of detail of an activity/task. This is needed to communicate clearly the level of detail of an activity required to attach a thinkLet to. An activity can be a multi-day workshop or a single meeting. In literature (Kolfschoten & de Vreede, 2009)(page 16-17) already described on what level thinkLets work: "*Decomposition based on results is based on further analysis of the deliverables to come up with the elementary activities to create the deliverables. Decomposition should lead to a level of activities where deliverables of each activity cannot be decomposed anymore*.". To effectively communicate this concept, this level of detail of an activity is now called a fundamental step. It is unknown if this is the optimal level of detail of an action to match thinkLets to.

Second, after the literature review and before the interview took place, the researcher saw thinkLets as techniques which could be matched to a fundamental step in its entirety since a thinkLet would be the smallest unit of intellectual capital needed. This seems not to be the case. Some fundamental steps use different or (parts of) the techniques of a thinkLet. This may be because the level of a fundamental step is not suitable. Practitioners often identify a part of a thinkLet to be suitable, and this may indicate that 1)

practitioners do not recognize all steps in a thinkLet procedure are essential or 2) thinkLets are not the smallest step. Contrary to the first idea, thinkLets appear to be no separate mutually exclusive entities. Some thinkLets can be part of another thinkLet. For example, the 'Concentration' may be a part of the 'BucketWalk'. This further complicates the list of thinkLets to be proposed.

Third, the aspects considered in the Activity Decomposition Method and the ThinkLet-choice method do not match, restraining the options to match thinkLets to an activity effectively. Homogenizing the aspects, which make up the characteristics, may streamline the matching process. This matching can probably not be automized since not all aspects are entirely objective. Coupling the aspects may provide better guidance for matching. The researcher developed a tool which aids collaboration engineers (and practitioners) to quickly find potential thinkLets for every fundamental step. This tool is described in Appendix 29: Decision tree for thinkLets.

Fourth, the proposed thinkLets are retrieved from an overview of 40 thinkLets in a book (de Vreede & Briggs, 2009) and an online document (Briggs & de Vreede, ThinkLets: Building Blocks for Concerted Collaboration, 2001). However, literature states that there are about 60 thinkLets codified. It is unknown where the other 20 thinkLets are. These were not considered for this study.

Fifth, some thinkLets require a particular software tool (e.g. DealersChoice with Topic Commenter, or BranchBuilder with GroupOutliner). The document with all thinkLets originates from 2001 (book from 2009); since then, many (free) online tools have been developed that replace these suggested tools. Also, some tools proposed then may be outdated.

Sixth, thinkLets rarely describe an activity where a decision is made, predominantly the steps that precede the decision, such as generating alternatives, ensuring that everyone is on the same level of abstraction or revealing preferences, opinions and hidden agendas.

Seventh, thinkLets can be used well while dealing with conflicts within teams working on complex problems. Not all activities or fundamental steps are sufficiently 'complex'. ThinkLets can also complicate easy activities (e.g. fundamental step K1 – Identifying slum areas from KMA formal meeting, see Table 7). It is yet unknown which criteria an activity must have reached to be sufficiently complex. Some situations go without conflict; often, when the activity is simple, the stakeholders hardly encounter conflict. No practitioners used a particular Decision Support System for their activities.

Part 2: Spatial thinkLets

The researcher distinguishes three insights on the spatial nature of thinkLets:

First, thinkLets work on managing conflicts in group work. Due to the general nature of the thinkLet procedure, these procedures can be freely executed for spatial information and spatial processes. This makes the concept of spatial thinkLets irrelevant, as any thinkLet could be used in the spatial domain. Also, no thinkLets, which are significantly better suitable for the analyzed spatial activities were found. The existing thinkLets can be promising in managing spatial conflict as well. The practitioners did not give high scores on the applicability of thinkLets for past activities, while they indicated that all proposed thinkLets could be used under certain circumstances, and some for the discussed past activity. The researcher argues the techniques from these thinkLets can be used as a guideline for managing the (spatial) conflicts. Due to the novelty of thinkLets, practitioners did not give a high score. The practitioners are enthusiastic about the techniques in thinkLets. This indicates that they may score them higher when activities are designed with

thinkLets from the beginning. How well thinkLets perform when managing spatial conflicts is to be determined.

Second, thinkLets are matched to a specific activity based on characteristics of that activity, description of that activity, presence of a facilitator and complexity of the conflicts. It is yet unknown if there are particular software tools that can support managing spatial conflicts within Collaboration Engineering. It may be that some (Spatial) Decision Support Systems can be used for this purpose.

Third, matching the thinkLets to spatial fundamental steps is a difficult task. This has several reasons, for example: thinkLets are not mutually exclusive, aspects needed for matching are not entirely objective, aspects of the activity decomposition method and thinkLet choice method are not identical, and even the summarized thinkLet document is over 100 pages long. The characteristics are the main source guiding a practitioner in finding suitable matching thinkLets. Besides the (sometimes subjective) characteristics, there remains some subjective interpretation of the context of the activity. This is why the researcher presents a selection of potential thinkLets to the practitioners. The selection suggests there are multiple ways to choose thinkLets to match an activity. To better streamline and substantiate the selection of potential thinkLets the researcher developed a tool which provides an overview and filtering option of several thinkLet selection criteria. The user can decide which criteria are relevant in their specific case. A description of this tool can be found in Appendix 29: Decision tree for thinkLets.

Chapter 6: Conclusions and Recommendations

6.1 Conclusions

This chapter presents the conclusion of this study, divided into the conclusions of the separate sub research objectives leading to the general conclusion of the research objective.

SRO1: To determine what the spatial collaborative fundamental steps and their characteristics are in city deals

Practitioners from Kumasi, Pathein and Pereira City Deals from the VNG-I DEALS program identified 6 unique spatial activities (see Table 5) and 13 unique spatial fundamental steps (see Table 6). Only spatial fundamental steps from Kumasi and Pathein are identified. The practitioners selected these fundamental steps based on literature definitions of 'spatial' and 'collaborative' (see section 2.1 Conflicts in spatial activities). Besides being spatial and collaborative this study found it is essential to include a third requirement to characterize spatial activities to match proper thinkLets; if a facilitator facilitates the fundamental steps. These three requirements (i.e. spatial, collaborative and facilitator) combined suggest more suitable characterizations of fundamental steps. The thirteen unique spatial fundamental steps are characterized (see Table 8) with an adapted version of the Activity Decomposition Method (see section 3.2.1 Activity Decomposition Method). This method is adapted to provide new characteristics when decomposing an activity due to this research' interest in the spatial nature. Applying this method on activities in retrospect proved to be difficult but manageable. Similar characteristics can be retrieved when designing a procedure from scratch, and when considering past activities. On the one hand, applying this method in prospect ensures more uncertainty of the characteristics which will actually emerge. For example, one may expect low consensus, but it may turn out differently. On the other hand, looking in prospect allows to actually test thinkLets on an activity. The concept of a fundamental step is introduced to communicate clearer and more precise about the level of detail of an activity with practitioners (see section 2.3.1

Matching thinkLets to activities). This assists the collaboration engineer in using the Activity Decomposition Method.

SRO2: To determine to what extent spatial collaborative fundamental steps in city deals can be covered systematically with existing thinkLets

This study decomposes some (see Table 7) of the fundamental steps with a spatial component to see if thinkLets could describe these (for an example, see Table 8). Besides being spatial, other traits (like group consensus, task complexity, or type of facilitator) are significantly more relevant for choosing some thinkLets with the thinkLet-choice method (see section 4.2.2 Specific discussion and remarks). The Activity Decomposition Method's characteristics form an incomplete basis to match thinkLets since many thinkLets from other collaboration patterns are sometimes a better fit for the practitioner. Many characteristics are influenced by the social context and require the facilitator to sense the social situation and find a fitting thinkLet. The facilitator must have some grip on the variety of thinkLets to choose from to apply fitting techniques (see Appendix 30: Elements of used thinkLet conceptualization). The researcher proposed some potential thinkLets for the fundamental steps (see Table 9), which the practitioners could assess (see Table 10, Table 11, Table 12). Using thinkLets is not a simple technique. It does not need to be used on all levels of an organization, and not all need to be aware of it. ThinkLets do make complex tasks less complex, but not all tasks are 'complex enough'. Not all (spatial) collaborative activities with a facilitator should be matched to a thinkLet, since they may complicate the activities, too (see Appendix 9: Less interesting matched spatial collaborative fundamental steps).

SRO3: To determine to what extent the collaborative spatial fundamental steps covered systematically with existing thinkLets are representative for different city deals

The 13 identified spatial collaborative fundamental steps are categorized into 6 types of spatial (see Table 13). The Kumasi city deal has all 6 different categories of spatial activities and Pathein 2 (see Table 14). No fundamental steps from Pathein demanded the development of a new type of spatial activity. The Kumasi and Pathein city deal are representative from the perspective of what spatial activities took place.

Overall conclusion:

So, this study explores to what extent conflicts in spatial collaborative activities can be managed with thinkLets. The term of a fundamental step is introduced, enabling more precise communication on the level of detail of an activity. Due to the general description of thinkLet procedures, this study finds thinkLets can be used in spatial and non-spatial domains. The assessment of practitioners shows the spatial component is irrelevant in matching activities to thinkLets. This does not mean that thinkLets can always be applied to all spatial activities. Matching thinkLets to spatial activities follow the same rules as matching non-spatial activities. Some guidelines on how to match spatial (and therefore non-spatial) activities to thinkLets are presented in this study (see section 2.3.1 Matching thinkLets to activities).

6.2 Recommendations
This research provides several general recommendations and leads for further research on thinkLets in the spatial domain:

- To truly test if thinkLets can be used for spatial processes, it is recommended to design an activity based on a sequence of thinkLets with a practitioner and try it out in reality. This allows to check if thinkLets can be used for (e.g. map reading, spatial decision) activities.
- Look into some type of uniform hybrid version of a Collaboration Engineering approach. The strength of the thinkLets approach is that it gives facilitators guidelines on what to do in certain situations. This study shows that sometimes thinkLets can complicate activities (see fundamental step K1, in Appendix 9: Less interesting matched spatial collaborative fundamental steps). A hybrid version could provide a uniform solution where fundamental steps suitable for thinkLets can be put in sequence with fundamental steps that are not.
- Consider other sectors that have to make spatial decisions (e.g. construction, built environment, zoning, Air Traffic Control, supply chain). Check to what extent their definitions of what a spatial collaborative activity differs.
- In some activities, there was an overlap in the function of the practitioner. They were both facilitators as well as coordinator. It is yet unclear to what extent these functions are distinguishable and their effect on the applicability of thinkLets.
- When considering activities and fundamental steps in any domain, always keep in mind that a facilitator has the task to guide a group of people. In this study, the researcher found out along the way that this is an essential precondition for thinkLets. It is better to be aware of this beforehand. This resulted that spatial fundamental steps which did not have a facilitator are not further analyzed (see Table 7).
- ThinkLets are generally used for high-value tasks. Additionally, this study shows that some (parts of) organizations may find thinkLets too advanced (see section 4.2.2 Specific discussion and remarks). It may be interesting to identify in an organization when thinkLets can be best implemented. The hypothesis is that thinkLets may be more beneficial for higher management (because their time is valuable). Also, the conditions for collaboration must fit the requirements of thinkLets.
- For every organization, it may be helpful to introduce thinkLets to all employees facilitating shortly because everyone uses parts of the thinkLet procedures, while often they are unaware. Introducing employees to the existence of the thinkLet database shows how to place their techniques and where to look for them in case of need. This is like showing facilitators where to find an encyclopedia of where to search.
- It may be interesting to weigh which characteristics are more important than others for finding a fitting thinkLet. It may be that this is situation-specific, but maybe some characteristics can be identified as essential characteristics.
- The role of thinkLets in GeoDesign may be interesting to investigate. GeoDesign consists of methods and tools to aid designers to make better informed spatial decision (Steinitz, 2012). Is there overlap in what thinkLets do? Can these two theories be combined or learn from each other?
- The interviewed practitioners were not familiar with the structure and content of a thinkLet. Before interviewing people not familiar with thinkLets it would be nice to show them an unrelated 'dummy' thinkLet to help them familiarize themselves with its structure. This increases the understanding of how to read a thinkLet.
- Even though a spatial component is irrelevant for matching thinkLets to fundamental steps, it may be interesting to use this new perspective to develop new thinkLets based on spatial conflicts; it is unknown if experts have been interviewed who facilitate activities in the spatial domain. This

may result in the development of more mututally exclusive thinkLets as an addition to the existing thinkLet database.

- The Seven-Layer-Model of Collaboration (Briggs, et al., 2009) provides seven key areas of concern for designers of collaboration support systems. How these seven areas can be considered to match thinkLets to activities should be investigated in further research. This may provide a more meta context for designing collaborative activities.

Epilogue

This epilogue presents my insights that were not directly related to the thesis's objective but maybe worthwhile to consider when working with thinkLets in the spatial domain.

I had some time to familiarize myself with the thinkLets, only with the descriptions in literature, because I never actually used them. The literature predominantly discussed how to present these experts techniques to people who are not familiar with facilitating and group conflicts. ThinkLets seem great guidelines for developing techniques to address conflicts. I don't think these thinkLets are mutually exclusive, which leads to considering different options and decide which fits best in your situation based on your own interpretation of it. This matching of activities to the best suitable thinkLets was not as easy as I hoped when I started researching. The descriptions are quite extended and this provides different leads to match them to activities, like the pattern of collaboration or the insights of a thinkLet. Some subjectivity remains, which is fine, because social interactions (which involve people) cannot completely be made objective. Originally, the activities the practitioner facilitates are made from scratch with thinkLets in mind. I look from a retrospect perspective. I do not know how easy it is to make an activity based on thinkLets. The patterns of collaboration give an idea on the sequence of thinkLets to move forward with a project. I found some activities may encompass multiple patterns of collaboration, indicating one should look broader than a single pattern of collaboration. Therefore, making the matching easier may simplify and speed up the implementation of thinkLets in organizations, lowering the bar.

I have been researching thinkLets for almost a year and I do not know all the ins-and-outs of the thinkLets. The tool helps to bring some order in the chaos and hopefully kickstarts discussion on how to practically choose the proper techniques. This research tries to match the activities to the thinkLets based on the characteristics found in the activity decomposition method with the thinkLet choice method. The thinkLets seem to be described by various writers, since the vocabulary of similar concepts differ. Some homogenization may make the thinkLet-choice method easier to use. A balance between how true it stays to what a technique achieves and how similar concepts can be categorized needs to be made. A similar homogenization of aspect of the two methods would make the comparison more powerful.

The city deals present different types of spatial activity and that thinkLets should not always be used to manage a fundamental step, but can also complicate it for the facilitator.

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Appendices

Appendix 1: Literature Review Spatial ThinkLets

This appendix presents a literature search for the existence of techniques, close to thinkLets used for spatial collaborative activities. Since 'thinkLets' is not a commonly used term the characteristics of thinkLets were looked for; describing a process that is recurring.

This literature review is performed using three literature databases: Web of Science, JSTOR and Scopus.

Web of Science:

	Domain 1		Domain 2		Domain 3		Domain 4
What are the spatial tools for collaboration in city deals?							
Defining search terms							
	Domain 1		Domain 2		Domain 3		Domain 4
a	Tool	AND	Collaborative	AND	Spatial	AND	Repetitive
	OR		OR		OR		OR
b	Tools		Collaboration		Spatially		Repetition
c	Process				GIS		Reoccurring
d	Processes				geospatial		Repeated
e							Recurring
Showing number of hits							
41							
Listing of Filename of paper				Notes			
	Hopfer_2007_Leveraging the potential			A communication theory perspective on de			

JSTOR:

JSTOR		Second attempt					
What are the spatial tools for collaboration in city deals?							
Defining search terms							
	Domain 1		Domain 2		Domain 3		Domain 4
a	Tool	AND	Collabora1	AND	Spatial	AND	Repetitive
	OR		OR		OR		OR
b	Tools		Collaboration		Spatially		Repetition
c	Process				GIS		Reoccurring
d	Processes				geospatial		Repeated
In Domain 4 'recurring' is left out due to limit to characters allowed							
Showing number of hits							
16066							
Further re Only abstract							
2							
Listing of Filename of paper				Notes			

Scopus:

Scopus		Second attempt					
What are the spatial tools for collaboration in city deals?							
Defining search terms							
	Domain 1		Domain 2		Domain 3		Domain 4
a	Tool	AND	Collaborat	AND	Spatial	AND	Repetitive
	OR		OR		OR		OR
b	Tools		Collaboration		Spatially		Repetition
c	Process				GIS		Reoccuring
d	Processes				geospatial		Repeated
							Recurring
Showing number of hits							
	33						
Listing of **Filename of paper**					**Notes**		
Mensah_2019_Framework for Spatial-Temporal Cros					Case of a collaborative planning tool with		

Appendix 2: Literature Review city deal thinkLets

This Appendix presents a literature search on if Collaboration Engineering and/or thinkLets have been used in city deals. This literature review is performed using three literature databases: Web of Science, JSTOR and Scopus.

Web of Science:

Web of Science					
Is collaboration engineering/thinklets used in city deals?					
Defining search terms					
	Domain 1		Domain 2	Domain 3	Domain 4
a	City Deal	AND	Collaboration Engir AND	local government	case study
	OR		OR	OR	OR
b	City OR Deal		Collaboration	government	
c	City AND Pact		ThinkLet	stakeholders	synonym 2
d	City AND Agreement		ThinkLets		
e	City AND programme		Tool		
f	City		Tools		
Showing number of hit number of hits					
D1a + D2a	0				
D1a + D2b	0				
D1a + D2c	0				
D1a + D2d	0				
D1a + D2e	0				
D1a + D2f	1				
D1b + D2a	1				
D1b + D2b	5419	Way to broadly defined			
D1b + D2b + D2c	0				
D1b + D2b + D2d	1				
D1f + D2a	1	same results as previous line (D1b + D2b + D2d)			
D1f + D2c	0				
D1f + D2d	0				
D4a + D3b + D2a	1	Paper already found and saved in another database			
D4a + D3b + D2c	1	Paper already found and saved in another database			
D4a + D3b + D2d	0				
Listing of most intersti **Filename of paper**				**Notes**	
D4a + D3b + D2a	Kolfschoten_2014_A Transferable ThinkLet Base			CE approach case study in government for integrity risk assessment	

JSTOR:

Jstor								
Is collaboration engineering/thinklets used in city deals?								
Defining search terms								**NOTE**
	Domain 1		Domain 2		Domain 3	Domain 4		
a	City Deal	AND	Collabor:	AND	local government	case study		
	OR		OR		OR	OR		
b	City OR Deal		Collaboration		government			
c	City AND Pact		ThinkLet		stakeholders	synonym 2		
d	City AND Agreeme		ThinkLets			synonym 3		
e	City AND programn		Tool			synonym 4		
f	City		Tools			synonym 5		
g						synonym 6		
h								
Showing nun	number of hits							
D1a + D2a	0							
D1a + D2b	15							
D1a + D2c	0							
D1a + D2d	0							
D1a + D2e	22							
D1a + D2f	29							
D1b + D2a	17							
D1b + D2b	227802	Too broadly defined						
D1b + D2b + D2	1							
D1b + D2b + D2	12							
D1f + D2a	9							
D1f + D2c	1	city as part of capacity :(						
D1f + D2d	5							
D4a + D3b + D2	4							
D4a + D3b + D2	6							
D4a + D3b + D2	3							
Still to be researched								
Combining s	**number of hits**		**Search term as used online**					
Search terms 1-	number of hits		(optional)					
Search terms 1-	number of hits		(optional)					
Search terms 2	number of hits		(optional)					
Et cetera								
Listing of mo	**Filename of paper**			**Notes**				
D1b + D2a	Tavella_2015_Novice facilitators and t			Research on the use of scripts for novice facilitators				

74

Scopus:

Scopus									NOTE	
Is collaboration engineering/thinklets used in city deals?										
Defining search terms									**NOTE**	
	Domain 1		Domain 2		Domain 3	Domain 4				
a	City Deal	AND	Collabora	AND	local government	case study				
	OR		OR		OR	OR				
b	City OR Deal		Collaboration		government					
c	City AND Pact		ThinkLet		stakeholders	synonym 2				
d	City AND Agreeme		ThinkLets			synonym 3				
e	City AND programn		Tool			synonym 4				
f	City		Tools			synonym 5				
g						synonym 6				
h										
Showin	number of hits									
D1a + D2	0									
D1a + D2	1									
D1a + D2	0									
D1a + D2	0									
D1a + D2	3									
D1a + D2	3									
D1b + D2	2									
D1b + D2	11880									
D1b + D2	2									
D1b + D2	2									
D1f + D2a	1									
D1f + D2c	1									
D1f + D2c	1									
D4a + D3	1									
D4a + D3	1									
D4a + D3	0									
Still to be researched										
Combin	**number of hits**		**Search term as used online**							
Search t	number of hits		(optional)							
Search t	number of hits		(optional)							
Search t	number of hits		(optional)							
Et cetera										
Listing	**Filename of paper**			**Notes**						
D1a + D2	Evers_2020_Illuminating the Black Bo			On the network governance of Dutch city deals						
D1b + D2	Konate_2011_Collaborative decision r			Two case studies in a bank and research institute on thinkLets						
D4a + D3	Kolfschoten_2014_A Transferable Thi			CE approach case study in government for integrity risk assessment						

Appendix 3: Complete example of a thinkLet

The following example comes from an overview of existing thinkLets in 2001. It shows a copy from the document to give an impression what a complete thinkLet looks like (Briggs & de Vreede, ThinkLets: Building Blocks for Concerted Collaboration, 2001). From about 40 thinkLets the 'OnePage' thinkLet is presented as it is one of the less complex thinkLets.

OnePage

Choose this thinkLet...

... to generate a few (less than 80 or so) comments on one topic
... when 5 or fewer or fewer people will brainstorm together
... when 6 or more people will brainstorm for fewer than 10 minutes.
... when there aren't likely to be very many comments generated on the topic under discussion.
... to support back-channel communication among distributed team members.

Do not choose this thinkLet ...

... when you expect more than 80 or so comments because it may cause information overload. Consider FreeBrainstorm or ComparativeBrainstorm instead.
... when more six or more people will brainstorm until they run out of ideas. Consider FreeBrainstorm or ComparativeBrainstorm instead.
... when the team must address more than one topic at a time. Consider LeafHopper or Dealer's choice instead.

Overview

In this thinkLet, team members will all contribute comments simultaneously to the same electronic page or list at the same time.

Inputs

The brainstorming question or prompt.

Outputs

A set of comments in response to a brainstorming question or prompt.

How to use OnePage

Setup

1 Open a single list or comment window in Topic Commenter, Vote, Group Outliner, or Categorizer.
2 Match views with participants to open the same list or card on their screens.

Steps

1　Make sure the participants understand the brainstorming question or prompt. Say this:
　　a　If you have any questions with respect to the brainstorming question or assignment, please speak up.
2　If necessary, facilitate a verbal discussion to address any understanding difficulties. If necessary, re-formulate the question or prompt.
3　Inform the participants of time limits, if any.
4　Let the participants contribute comments until they run out of ideas or until you call time.

Insights on OnePage

OnePage is the simplest of all the thinkLets. It's magic is mainly for groups of five and smaller. If you put a small group into FreeBrainstorming, they sometimes feel like nothing much is happening. It doesn't feel quite as lively as when a big group does it. When the same group uses OnePage, all their contributions appear on the same shared page, which makes it feel quite lively as one idea after another pops onto the screen.

The obvious danger of OnePage is information overload. When a page gets about 100 comments on it, people's lower lips begin to tremble. When the page gets 200 ideas their eyes roll back in their heads. When it gets to 300 they begin to suffer seizures and heart attacks. It's just too much stuff to wade through on a screen. Now consider that if 10 people contribute one line of comments per person per minute for 40 minutes (a fairly common situation) the group will produce 400 lines of comments. Many teams working online together have 15 to 20 people. In these cases it's far more effective to use FreeBrainstorming which mitigates all information overload.

OnePage Success Stories

OnePage is often incorporated into other, more complex thinkLets like Could-Be-Should-Be and BranchBuilder. It also comes in handy for many other tasks. A chat room, for example is really an instance of OnePage. The first time we scheduled a real a same-time-different-place activity that included people ship at sea, the OnePage thinkLet unexpectedly became the key to success. The activity linked people on the ship with others in three laboratories, and two universities so they could develop specifications for an experimental network. The participants had a voice link via telephone and radio, and they had a GroupSystems link via the Internet and satellite hook-up. As the activity got under way, the team leader (who was on the ship) told the participants that if the voice links went down, they would continue their activity using a OnePage to replace the voice link. Within 30 seconds the ship's voice link failed. With 15

seconds the leader established a OnePage thinkLet and invited the group to join. For the rest of the activity they managed all their transitions from thinkLet to thinkLet by handling all instructions for and questions from the participants via the OnePage.

What's in a Name?

This thinkLet is called OnePage because all participants make their contributions to the same page. In FreeBrainstorming every participant starts on a different page, and pages are traded around among the players, which prevents them from going into information overload.   With OnePage all contributions appear on the same page, which creates a feeling of fast action.

Appendix 4: Characteristics Adapted Activity Decomposition Method

The following attributes were retrieved from the practitioner during interview round #1. The practitioners were given the same options and set of definitions for these exact attributes. These attributes are largely based on the Activity Decomposition Method, but adapted for this study (Kolfschoten & de Vreede, A Design Approach for Collaboration Processes: A Multimethod Design Science Study in, 2009). It consists of a pattern decomposition, results decomposition and additional decomposition (including attributes adapted for this study). All attributes combined make up the characteristics.

Pattern decomposition: Generate, Reduce, Clarify, Organize, Evaluate and Build Commitment

1 . Generate: Move from having fewer to having more concepts in the pool of concepts shared by the group.

2. Reduce: Move from having many concepts to a focus on fewer concepts that the group deems worthy of further attention.

3. Clarify: Move from having less to having more shared understanding of concepts and of the words and phrases used to express them.

4. Organize: Move from less to more understanding of the relationships among concepts the group is considering.

5. Evaluate: Move from less to more understanding of the relative value of the concepts under consideration.

6. Build consensus: Move from having fewer to having more group members who are willing to commit to a proposal.

Result decomposition

Attribute name	Description of attribute
Time of activity (in minutes)	How long did the fundamental step last?
Deliverables	The activity can be broken down in smaller components, how long did each of these last? What were the deliverables of each activity?
Preparation needed	Were the participants required to prepare for the activity?
Homework given	Did the participants have to do 'homework' after the activity?
Cognitive capacities	What are the cognitive capacities of the group members? Are they public or informed stakeholders? Normative and/or cognitive competence? *Normative = with reference to whatever kind of interests and concerns; holding relevant opinions, preferences, principles, and values Cognitive = with reference to knowledge*
Task complexity	On a 1-10 scale, how complex was the task to be performed for the group?
Technologies used	What technology was used in the activity, was it paper-based or were there online/digital tools? What software was used?

Experience facilitator	*Did the facilitator feel comfortable in leading the group towards a common goal? To what extent did the facilitator experience having grip on the group?*
Input type	*What was the type of input of the activity;* *1) creative: ideas or solutions* *2) informative: facts and experiences* *3) visionary: future requirements, scenarios or visions and trends* *4) reflective: comments, preferences or opinions*
Structure type	*What type of structure was the input structured:* *1) A cluster of related concepts* *2) A ranking of concepts based on some criterion* *3) A model in which more complex relations can be indicated* *4) A sequence in which the timely relationship of concepts is indicated*
Focus type	*What is the focus of the results from the activity?* *1) A selection where only a few concepts are chosen by the group* *2) A summary in which concepts with similar meaning are integrated without removing unique input* *3) A scope in which the boundaries for a collection of constructs are formulated* *4) A direction in which concepts that fit a specific cause of action are taken into account*
Shared understanding type	*What type of shared understanding is strived for in the activity?* *1) Shared knowledge followed by shared meaning about the knowledge available in the group.* *2) Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge.* *3) Mutual differences and disagreements can be revealed to gain an understanding of different types of conflicts.*
Type of commitment	*What type of commitment is made by the group members?* *1) A decision, which can be made based on majority or on other decision-making rules.* *2) An agreement, for instance, to spend an amount of resources or to create a specific deliverable.* *3) a consensus, in which all critical stakeholders commit to a proposal.*
Empathy type	*To what extent was there empathy on the following points:* *1) Respect for other stakeholders* *2) Consideration when participants take other's stakes into account* *3) Shared stakes when participants accommodate the interests of others among their own* *4) A team bond in which mutual goals are pursued*
Added attributes	
Data quality	*The practitioners were more confident on describing and characterizing some activities compared to other activities. This may had to do that they were not facilitating, that it was long ago or that their memory of that particular activity was not very vivid. Per result this is indicated in three categories; poor, average, good. Data quality is added to the characteristics of a fundamental step.*
Type of spatial activity	*The fundamental steps are categorized on what makes them 'spatial'. These categories are mainly based on the discussion with the practitioners. The researcher*

	did decide how these fundamental steps are considered spatial in discussion with the practitioners.

Appendix 5: Method for documentation review and interview rounds

Documentation review

VNG-I shared documentation of DEALS city deals via Teams. This documentation consists of, for example, project proposals, project updates and monitoring and summaries of activities. The documentation is secondary data and presents activities and fundamental steps. The documentation is used as input for interview round #1. Some activities the researcher identifies as spatial from the documentation is presented and discussed with the practitioner. If there is no sufficient information on the activities to determine their spatial aspect, this is discussed with the practitioner.

Interview setup

Interviews generate primary data, not present in the documentation, and for triangulation purposes and validating the practical application of thinkLets (Bryman, 2012). This study contains two interview rounds with a minimum of two practitioners involved in the same case study. These practitioners are involved within (certain parts of) the DEALS program. Some are leading the city deal, and others are experts flown in to bring their expertise on specific topics. These practitioners can reconstruct activities and recognize if thinkLets could be applied. All interviews are held online.

Interview round #1

Interview round #1 has three objectives: 1) to identify spatial collaborative activities, 2) to break down spatial collaborative activities into fundamental steps and, 3) to find characteristics of spatial collaborative fundamental steps.

The number of practitioners interviewed differs per city deal, see Table 15.

Table 15: Number of interviewed practitioners in interview round#1

Number of practitioners	City deal involved	Role
2	Pereira	1 local project leader, 1 Dutch advisor
3	Pathein	1 Dutch advisor, 2 local experts
2	Kumasi	1 municipal expert, 1 local project leader

Per interview, there were 2 hours scheduled per practitioner. The practitioner gave input to all questions, but the researcher ensured that the correct terms were filled in Excel. The interview starts with an introduction and has two parts.

In part 1, the definitions of 'spatial' and 'collaborative' are presented. The researcher asks what activities that fit these definitions they can think of. If they recall any, these are discussed. If not, some potential spatial activities identified from DEALS documentation are presented and then discussed.

In part 2, some spatial activities are broken down into all fundamental steps. Some of them may be spatial, some not. The spatial fundamental steps are characterized based on the 'Activity Decomposition Method'. All characteristics and explanations presented to the practitioners during interview round #1 are given in Appendix 4: Characteristics Adapted Activity Decomposition Method**.** The interview protocol can be found

in Appendix 6: Protocol Interview round #1. The interview protocol is tested beforehand by trying out how long it takes for one fundamental step to be characterized. The protocol has changed after the first interview iteratively.

The output of this interview is combined with the output of documentation analysis. This is combined into several Excel tabs that presents all (relevant) characteristics identified by the practitioners, per identified spatial collaborative fundamental step per city deal. In discussion with the practitioner, the Excel sheets were filled in, see Appendix 8: Summarized raw Excel sheets interview round #1.

Interview round #1 also serves as input for RO3, some spatial collaborative fundamental steps from three city deals were reconstructed. ThinkLets will be tested on only some fundamental steps from a single city deal. All other data then serves to see if the outcome of RO2 is representative for the other identified spatial collaborative fundamental steps.

Interview round #2

Interview round #2 has three objectives: 1) to present the fitting thinkLets to practitioners, 2) to let the practitioners identify suitable thinkLets for specific spatial collaborative fundamental steps, and 3) identify possible gaps of spatial collaborative fundamental steps that lack a suitable thinkLet. Table 16 shows the number of practitioners interviewed in interview round #2.

Table 16: Number of interviewed practitioners in interview round #2

Number of practitioners	City deal involved
2 (the same as in interview round #1)	Kumasi

The input of interview round #2 is a selection of matched thinkLets to the spatial collaborative fundamental steps. For example, both practitioners from Kumasi identified the "selection process for slum areas" as a spatial collaborative fundamental step in interview round #1. They provided characteristics during interview round #1. Based on these characteristics from the "thinkLet choice method", a list of matching thinkLets is compiled. The researcher considered all thinkLets to match identified spatial fundamental steps and filtered them as described in section 3.3 Data Collection Methods and Analysis. In interview round #2, only the 'overview' and the 'steps' sections presented in the thinkLet overview (Briggs & de Vreede, ThinkLets: Building Blocks for Concerted Collaboration, 2001) are presented to the practitioners. Per interview, there were 2 hours scheduled per practitioner. The practitioner first reads the description of the thinkLets to familiarize and then, in discussion with the researcher, can give a score on how well thinkLets could be applied. The complete setup of interview round #2 can be found in Appendix 7: Protocol Interview round #2.

The output of this interview is a scale on which practitioners can tell to what extent they think the thinkLets presented could have been used for a particular spatial collaborative fundamental step. The practitioners could give a score on a 1-10 Likert scale on how likely they would use the techniques of the thinkLet for identical activities. Also, reasons, why they (do not) think these techniques fit are identified.

Appendix 6: Protocol Interview round #1

This Appendix presents the latest version of the interview protocol. This protocol has iteratively been improved after applying it in an interview.

Introduction (5 minutes)

Getting to know each other/ small talk introduction

Purpose of the interview is to reconstruct activities from the city deal. But not all activities, we are looking for collaborative activities (i.e. where multiple people actively work on something), but only the ones that have some spatial component. So, spatial collaborative activities. I can give you definitions of spatial and collaborative, but not a definition of a 'spatial collaborative activity'; together we will go through different activities and develop our own definition of 'spatial collaborative activities'. The interview will consist of three parts. I will try to give you an overview.

In case they seem interested give them the overview below, if not start with Part 1

First we will go through and discuss some activities that we think fit the term of a 'spatial collaborative activity'. It is also fine if parts of the activity are collaborative and spatial. If we have found several of them we will pick the ones that are best fitting this term, we will take the three best out. That will be the first part of this interview: finding all activities that we think fit the term of a 'spatial collaborative activity' and then choose our 3 most fitting, in no particular order of preference. I expect this to take a maximum of 15 minutes.

In the second part we will break down these three activities. For this we need to distinguish the level of detail of an activity. When we talk about an activity, the activity can be a one day workshop, multiple day visit or a single meeting. But a one day workshop, for example, can have a part of it that has a spatial component. This spatial collaborative part is what we are looking for. When breaking down an activity, like a one day workshop, into smaller parts the level of detail of these smaller parts is where the output/deliverable of an activity cannot be broken down anymore. This level of detail of an activity is called a fundamental step. So, an activity contains several fundamental steps. We will again choose the 3 most fitting spatial collaborative fundamental steps. These three spatial collaborative fundamental steps we will then reconstruct. I just sent a link to an online Excel spreadsheet. This is where we will reconstruct the three spatial collaborative fundamental steps. I expect this to take a maximum of 30 minutes.

In the third part these three identified spatial collaborative fundamental steps will be characterized. We will fill in the characteristics of the fundamental step, I will explain what is meant with these characteristics. This will take about 20 minutes per fundamental step. I will explain in more detail when we get there.

Do you have any questions at the moment?

Yes: *Answer questions*

No: *In case any questions will come to mind at any point, do not hesitate to ask them*

What type of interview will it be: quite informal, going through the activities together in online Excel and in case of a spatial collaborative activity is found break it down into smaller parts (fundamental steps) and attach characteristics to them. These can be changed afterwards, too.

How long will it last? Maximum 2 hours

All answers will be anonymized in the research and only presented per city deal, not by name. Are you ok with that?

Part 1:

Let's start with the first part: finding spatial collaborative activities in the city deal. Keep in mind that parts of the activity may have a spatial component. The terms 'spatial' and 'collaborative' are defined as follows. (also shared in the Excel file for textual input)

Spatial is defined as: *"a location's geographical coordinates and spatial relations (i.e., proximity, overlap, containment, distribution pattern)"*

Collaborative is defined as: *"Interaction and cooperation among the stakeholders involved"*

What spatial collaborative activity can you think of in the (state city name) city deal?

Answer: *What is it, and why is it a spatial collaborative activity? Were you facilitating this activity?* **No clue:** *I have found some activities that may be spatial and collaborative, (name some of these activities) are you familiar or were you involved in any of these activities? Do you recall this activity? Were you facilitating this activity? → these activities differ per city deal and are shown in a separate document, based on the midterm reports*

What is this activity and why is this a spatial collaborative activity? What parts of the activity are spatial and collaborative?

What other spatial collaborative activities can you think of?

List the activities for maximum 15 minutes or until we run out of ideas. Then choose the best three activities, based on:

- Fitting the term 'spatial collaborative activity'
- The interviewee was preferably facilitator or involved in this activity
- The interviewee remembers this activity best

When the three activities are chosen we go filling in the Excel file. *Now we have recalled parts of the activities and I would like to ask you to fill in the Excel sheet how you define a spatial collaborative activity.* The interviewee is asked again why each activity is a spatial collaborative activity.

Part 2:

Now we have three activities that we will break down into its fundamental steps. This is the level where the deliverable cannot be broken down anymore. Let's break down the three activities into these steps. Then we identify the ones that are spatial collaborative fundamental steps.

This will be done in the Excel file, where there are four tabs, the first gives an overview of all definitions, the other three are the three chosen activities that we will reconstruct.

List the fundamental steps for maximum 30 minutes or until we are done breaking them down. Then choose the best three fundamental steps, based on:

- *The interviewee was preferably facilitator or involved in this fundamental step*
- *The interviewee remembers this fundamental step the best*

Part 3:

Now we will characterize the three chosen fundamental steps in the Excel file. There are 14 columns with different characteristics per fundamental step that we will fill in. In the 'overview' tab of the Excel file you can find all definitions of these characteristics, for now I will guide you with these characteristics (since you are very familiar with some of them). If you wish to change anything after this interview, you are most welcome to do so in Excel.

Fill in the characteristic for the chosen three spatial collaborative fundamental steps. This will take a maximum of 20 minutes per spatial collaborative fundamental step.

Characteristics (all characteristics are per fundamental step) (Kolfschoten & de Vreede, 2009)

Retrieving the characteristics of the found collaborative spatial fundamental steps

Pattern decompositions

Generate, Reduce, Clarify, Organise, Evaluate and Build Commitment

1 . Generate: Move from having fewer to having more concepts in the pool of concepts shared by the group.

2. Reduce: Move from having many concepts to a focus on fewer concepts that the group deems worthy of further attention.

3. Clarify: Move from having less to having more shared understanding of concepts and of the words and phrases used to express them.

4. Organize: Move from less to more understanding of the relationships among concepts the group is considering.

5. Evaluate: Move from less to more understanding of the relative value of the concepts under consideration.

6. Build consensus: Move from having fewer to having more group members who are willing to commit to a proposal.

Result decomposition
How long did the fundamental step last?
The activity can be broken down in smaller components, how long did each of these last?

What were the deliverables of each activity?

Were the participants required to prepare for the activity?
Did the participants have to do 'homework' after the activity?

What are the cognitive capacities of the group members? Are they public or informed stakeholders? Normative and/or cognitive competence?

*Normative = with reference to whatever kind of interests and concerns; holding relevant opinions, preferences, principles, and values
Cognitive = with reference to knowledge*

On a 1-10 scale, how complex was the task to be performed for the group?

What technology was used in the activity, was it paper-based or were there online/digital tools? What software was used?

Did the facilitator feel comfortable in leading the group towards a common goal?
To what extent did the facilitator experience having grip on the group?

What was the type of input of the activity;
1) creative: ideas or solutions
2) informative: facts and experiences
3) visionary: future requirements, scenarios or visions and trends
4) reflective: comments, preferences or opinions

What type of structure was the input structured:
1) A cluster of related concepts
2) A ranking of concepts based on some criterion
3) A model in which more complex relations can be indicated
4) A sequence in which the timely relationship of concepts is indicated

What is the focus of the results from the activity?
1) A selection where only a few concepts are chosen by the group
2) A summary in which concepts with similar meaning are integrated without removing unique input
3) A scope in which the boundaries for a collection of constructs are formulated
4) A direction in which concepts that fit a specific cause of action are taken into account

What type of shared understanding is strived for in the activity?
1) Shared knowledge followed by shared meaning about the knowledge available in the group.
2) Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge.
3) Mutual differences and disagreements can be revealed to gain an understanding of different types of conflicts.

What type of commitment is made by the group members?
1) A decision, which can be made based on majority or on other decision-making rules.

2) An agreement, for instance, to spend an amount of resources or to create a specific deliverable.
3) a consensus, in which all critical stakeholders commit to a proposal.

To what extent was there empathy on the following points:
    1. *Respect for other stakeholders*
    2. *Consideration when participants take other's stakes into account*
    3. *Shared stakes when participants accommodate the interests of others among their own*
    4. *A team bond in which mutual goals are pursued*

Part 4:
If there is sufficient time/energy left: *Since there is some time left, it may be nice to look into other spatial collaborative fundamental steps. Which one shall we characterize?*

If there is no time/energy left:
This was the last part of the interview. We have identified some spatial collaborative fundamental steps and attached characteristics to them. If you wish to edit it afterwards, you can edit the Excel sheet. I will analyze the data and if needed I (or Irene) will contact you again. Is that ok by you? Do you have any questions?

Thank them for their time

**

It must be noted that in some interviews the spatial collaborative activities were first identified and then ranked in order. Then the activities were broken down into fundamental steps, and when a spatial collaborative fundamental step was identified the characteristics were discussed without ranking the fundamental steps first.

Appendix 7: Protocol Interview round #2

This document will provide a protocol with situational suggestions for questions and the sequence of the interview in the second interview round.

Days before the interview the interviewee did receive a mail with the following information on what the interview will contain:
- When it is (mind the timezone) and date
- How it will be held (e.g. Teams)
- Link to the online Teams
- What the interview will be about: The interview will be about testing if certain known techniques could be applied to the identified spatial collaborative fundamental steps

Remove their access to the Excel spreadsheet that was filled in, so they cannot base their thoughts on the outcome of the first interview to check for consistency.

Right before the interview:
Give the practitioner access to the Google Drive environment that includes the Excel spreadsheet for interview round #2 and a summary of the proposed thinkLets.

Structure:

Introduction (5 minutes)
Last interview we did reconstruct some activities that were both spatial and collaborative. We broke the activity down into its fundamental steps (where the deliverables could not be made smaller anymore). Then we characterized these fundamental steps on different characteristics.
We did this because I am researching a theory with techniques on how to facilitate group sessions. I want to check if some of these techniques could be used for spatial collaborative activities. Based on the information you gave me in the last interview some of these techniques may (or may not) be useful for the activities we did reconstruct.

This interview consists of two parts. In the first part I would like to get back to the activities and the spatial collaborative fundamental steps. So we remember what activities we are talking about. In the second part I want to present to you some thinkLets that need to be tested, but they are not necessarily for practical use. This is again done via an Excel sheet. I want to show you the thinkLets and how they work. Then I would like to know from you if you think it could have been used for the activity. I also will inquire about why you do (not) think this thinkLet may suit the activity.

Part 1: *Recalling the fundamental steps*

First, say the name of the activity and try to give minimum information about the activity, until they understand and can take over. Let them describe the activity again, to check if the first documentation is consistent with what they now describe and to check if we are talking about the same activity. In the new Excel Sheet the descriptions of the activities as a result of interview#1 are presented. They are then allowed to change the description as done in interview round #1. Say this: *From the last interview we did identify the activity as described in the Excel Sheet, if you want you can update this Excel sheet to better describe the activity.*

Part 2: *Presenting and discussing thinkLets*

Some options for thinkLets are proposed and the ones that seem most promising are worked out. Only the overview and the steps are presented of the thinkLets in an accessible google drive environment for the practitioner. Say this: *Based on the description and characteristics you gave me in the first interview I did look for some techniques that may be suitable for such an activity. I would like to go through these techniques with you.*

Present the thinkLets to them. (the proposed thinkLets per fundamental step are given below)

What techniques were used in this activity that you can see in this activity?

Ask to what extent on a 1-10 scale they think the techniques of each thinkLet could have been/were applied to the spatial collaborative fundamental step. Why?

Ask on a 1-10 scale how likely it is they would use these techniques of each thinkLet for identical activities in the future. Why?

Identify the reasons to (not) use these techniques? How can the thinkLet be changed to make it worthwhile.

Fundamental step K3/K7 - Selection process for slum area/Collation of rankings (Both)

In this activity two slums had to be selected ,from a larger set, where the DEALS program would intervene. One practitioner did identify this as a 'reduce' pattern of collaboration, while the other identified it as an 'organize' pattern of collaboration. This activity was performed after different team members went validating data in the slums. They shared their experiences (i.e. evaluated the field visit) and based on that outcome two slums were selected (i.e. reduced).The input of the activity is therefore both informative (sharing experiences) and reflective (based on the output of that field visit).

Plus-Minus-Interesting? - This thinkLet can help the group express the pros, cons and insights about their visit to the slum to share with the group. (followed by a Lobbyist(?) to let them advocate for their position. + EVALUATION THINKLET

Evaluation thinkLet:

Strawpoll - to get a sense where the group stands on what to choose

MultiCriteria + StrawPoll + Crowbar? - to rate the slums against criteria, then measure where the group stands and then see where there is low consensus

MoodRing - to discuss and change opinions until some sort of consensus is established

Fundamental step K4 - Agreeing with group on what scenario to present (Charles only)

K4 was an activity that followed a brainstorming session in smaller groups (6 people or so) in a scenario planning workshop. In that brainstorming session people had to come up with scenarios on how to best tackle the congestion issue in the Central Business District (CBD). The fundamental step K4 involves making a spatial decision (i.e. where to intervene to work on decongestion). The creative ideas of the group were used as input and the discussion was of medium complexity (6 is given on 1-10 scale). Although the task complexity is rated a 6, the activity took 20 minutes.

Plus-Minus-Interesting - This thinkLet can help the group express the pros, cons and insights about the different brainstormed scenarios. + EVALUATION thinkLet

Evaluation thinkLet:

MultiCriteria - evaluate the different scenarios to certain predefined criteria CheckMark - allow the group to check their favorite items and thereby get a feeling on how to prioritize the items

PointCounterPoint - in case of badly polarized group working towards a middle ground

ThinkLet 1: MoodRing to discuss and change opinions until some sort of consensus is established

Fundamental step K5 - Mixed group in brainstorming session (Charles only)

K5 was an activity where different stakeholders were invited and they were brainstorming about the causes, effects and directions for solutions on the topic of decongesting traffic. This is identified as a

complex task, which may indicate that the causes and effects are unclear. It is identified as spatial because the group had to think about the spatial relations of traffic flows within the city. An example given by the practitioner was that many residents of Kumasi want to go to the Central Business District (CBD) for shopping, work or visits, while some similar shopping markets (so called satellite markets), can be found across the city. This is indicated as a possible cause why the traffic is congested around the CBD.

FreeBrainstorm or OnePage - (depending on group size) brainstorm on all causes, effects and directions + FastFocus - to clean the list of redundancies,

PopcornSort - Put the items from the brainstorm in 'buckets', for cause, effect, solution

BucketWalk - clean up the items in the buckets

BucketShuffle - prioritize which items are more important causes, influential effects or more viable solutions

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ThinkLet 1: LeafHopper

ThinkLet 2: DealersChoice

Fundamental step K8 - using maps markets were located (Prince only)

K8 was an activity where they looked at the satellite markets in Kumasi to improve the attractiveness for people to shop there. Some criteria to choose which markets are suitable for investing have been determined in another activity. In this activity a group of informed stakeholders were sitting in a room and used a land use map to discuss the possible markets and show on the map why it fit the specified criteria. After this activity, when the markets and communities were selected the leaders of that community would be informed and a meeting held.

TheLobbyist - the stakeholders can advocate their positions possible markets on the maps.

Goldminer - can be used to quickly filter out the most promising locations for markets

PopcornSort + BucketWalk - To put a list of possible locations into 'buckets' where the buckets represent 'non-promising sites' and 'promising sites'. Then discuss if the sites are in the correct bucket.

MultiCriteria - from the 'promising' bucket the sites are evaluated on a set of criteria to prioritize the list of items.

+ RedLightGreenLight - to discuss until a sort of consensus is achieved on which markets to work on

ThinkLet 1: LeafHopper

ThinkLet 2: Plus-Minus-Interesting

ThinkLet 3: OneMinute Madness

Fundamental step K9 - Identification of the key traffic zones (Prince only)

K9 was a part of the Bus Rapid Transit (BRT) activity/project in Kumasi. This fundamental step is dealing with the identification of where such a system is feasible (regarding available space, need for transport, etc.). It is given a 'generate' pattern of collaboration as all key traffic zones had to be identified and thereby generating options on where to construct a BRT. There were only informed stakeholders in this activity and the complexity of the task is awarded a 4 out of 10. The input generated was of informative nature because the input was based on objective characteristics.

ThinkLet 1: TODO (similar to K1?)

Fundamental step K1 - Identifying slum areas from KMA formal meeting (Charles only)

K1 was a meeting with only the DEALS project members in Kumasi where they reviewed slum areas from available reports to generate a list of areas from which eventually few will have to be selected as a project area for DEALS. This was seen as a very simple activity; 1 on a 1-10 scale, where the list was made on a laptop. It is given a 'generate' pattern of collaboration, as the group generated a list of slum areas from existing documentation. The pattern of collaboration theory defines 'generate as 'Move from having fewer to having more concepts in the pool of concepts shared by the group.' The input for this activity was informative.

ThinkLets were chosen from the 'generate' pattern of collaboration. This pattern is divided into 'without seeds' and 'with seeds'. This shows the difference of if there is some kind of information beforehand (with seeds) or that the brainstorm is from scratch (without seeds). This fundamental step goes through the available reports and therefore primarily thinkLets (with seeds) are considered.

ThinkLet 1: ComparativeBrainstorm

This thinkLet comes from generate, but without seeds. This thinkLets is good "When you know in advance what the criteria will be for judging whether a solution is good or not" (Briggs, 2001). The input is a set of criteria for deciding which solutions are good and which are not so good. K1 deals with identifying the slums from documentation, this thinkLet may provide some prioritization on the wards to be selected based on the criteria and knowledge in the group.

This thinkLets can be used as follows:

1. Make sure the participants understand that we are looking to identify slums based on a set of criteria; write down the criteria in a place where all can read the criteria.
2. Say this:
    1. Please all get a sheet of paper and something to write on
    2. Please write down a single ward that you think needs to be selected
    3. When you finish writing down, cross your arms so the facilitator knows that you're done
3. Wait till all have finished writing their ideas, then say this:
    1. Now I will randomly swap pages
    2. Give me a slum area that is more likely to have stakeholders that want to cooperate than the one you have in front of you
    3. Swap pages randomly

4. Give me a slum area that is more likely to benefit more than the slum you have in front of you
　　　5. Swap pages randomly
　　　6. Give me a slum area that fits better in the DEALS program than the slum you have in front of you
　4. Repeat the pattern of swapping pages and responding until the group runs out of ideas or time

Did you use (parts of) this thinkLet? Which part(s)? How can the thinkLet be changed to fit the activity? Would you use this thinkLets as guidance on what to think of when preparing an activity? Why (not)?

ThinkLet 2: Plus-Minus-Interesting

This thinkLets is good "if you want to prepare the evaluation of one or more ideas by elaborating on them first. For example, this may be the case if your group is considering various courses of action in a strategy discussion, or evaluating a project that has recently been concluded" (Briggs, 2001). This thinkLet can reveal the pro's, con's and insights about the slums present to prioritize them. The input is one or more slums to be elaborated on, including a list of aspects or attributes that you want the group to consider separately. The output is a balanced set of considerations, organized by slum or by slum attributes.

The thinkLet can be used as follows:

Create an outline, consisting of the slums and three leafs for each slum, labeled "Plus", "Minus" and "Interesting". Allow participants to contribute comments only to the leafs of the outline.

1. Explain the items on the outline and make sure everyone in the group understands them.
2. Say this:
　　1. Let's look at these items in more detail before we further evaluate them.
　　2. I want you to share any positive or negative feedback on these items with the group.
　　3. Also, contribute any interesting observations that you have about these items.
3. Let the group brainstorm and contribute their feedback. For this, you may choose to use a Leaf-Hopper or DealersChoice thinkLet.
4. After the group has given their feedback, give them some incubation time by saying:
　　1. Please take a moment to read through the feedback that has been given.
5. Normally, there are some items in the "Interesting" category, so be sure to check this yourself while the group is reading.
6. After the group is done reading, ask if there are any issues that they want to discuss before moving them into the evaluation activity:
　　1. Were there any "Plus" or "Minus" contributions that you like to discuss at this point?
　　2. Are there any "Interesting" contributions that would impact the Plus or Minus of an item?
7. If you feel the group is missing critical issues that you found yourself, bring them to the groups attention.

It must be noted that the thinkLet may complicate the relatively easy process (as defined by the practitioner) of getting all slums from documentation. This activity is possibly too simple for thinkLets and may therefore be less interesting to test.

Fundamental step K2/K6 - To select slum areas tackled by the project based on indicators/ Review of the slums

This activity was an activity where the data/indicators provided by the municipality (KMA) had to be validated by field visits. You did characterize the 'evaluate' pattern of collaboration to this fundamental step, with the explanation that you were validating if the documentation of the municipality was correct and up-to-date. The pattern of collaboration theory defines 'evaluate' as 'Move from less to more understanding of the relative value of the concepts under consideration.' (Kolfschoten & de Vreede, 2009). *So, this explanation fits the definition.*

This activity is not very interesting, since this activity is not facilitated but rather coordinated.

ThinkLet 1: MultiCriteria

The 'MultiCriteria' ThinkLet lets participants rate each of a set of slums on two or more criteria. Results are sometimes aggregated, sometimes graphed. Results are usually used to provoke conversations. Occasionally they are used to make a decision. The input consists of 1) a list of items to be evaluated (the slums) and 2) a list of criteria for evaluating each slum.

Setup

1. Post the list of items to be evaluated as the Primary List in Alternative Analysis.
2. Post the list of criteria as the Secondary List in the same tool.
3. Select a polling method (See the Insights section of the StrawPoll thinkLet for discussion of polling methods).
4. Open ballots on the screens of the team members.
5. When the results are in, post the list of criteria weights in the results matrix of Alternative Analysis.

Steps

1. First make sure the group understands the items to be evaluated. Say this:
   a. If there are alternatives that you have clarifying questions about, please raise your hand.
2. If people raise their hand, facilitate a verbal discussion to address any understanding difficulties. If necessary, re-formulate the alternative concerned.
3. Make sure the group understands the criteria. Say this:
   a. If there are criteria that you have clarifying questions about, please raise your hand.
4. If people raise their hand, facilitate a verbal discussion to address any understanding difficulties. If necessary, re-formulate the criteria concerned.
5. Explain how to enter votes (it varies by polling method).
6. Explain how to submit ballots.
7. Allow the team to rate each alternative against each criteria, saying:
   a. If there are no further questions, let's get started. Please rate each alternative with respect to the criteria we have defined.
8. Review the results with the team, e.g. using Crowbar techniques.

It must be noted that the thinkLet may complicate the relatively easy process (as defined by the practitioner) of getting all slums from documentation. This activity is possibly too simple for thinkLets and may therefore be less interesting to test.

Appendix 8: Summarized raw Excel sheets interview round #1

This appendix shows the raw data retrieved during interview round #1 divided per city deal per interview. The complete raw Excel documents are added as attachment to this thesis.

Kumasi:

Interview A – Kumasi

	C&S?	Pattern of collaboration	Time of activity (in minutes)	Deliverables	Preparation needed	Homework given	Cognitive capacities	Task complexity	Technologies used	Experience facilitator	Input type	Structure type	Focus type	Shared understanding type	Type of commitment	Empathy type
Definition Spatial Collaborative activity = engaging stakeholders						Yes, ...	Yes, ...					Result decomposition					
Activity: Selecting slum areas			Deliverables		No	No	Choose	1-10 scale		Choose	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?
identifying slum areas from KMA formal meeting	Yes	Generate	50	To identify all the slum areas in the Kumasi Metropolis	Yes, review on the slum available reports	no	Both	1	laptop	Experienced	Informative	A cluster of related concepts	A selection where only a few concepts are chosen by the group	Shared knowledge followed by shared meaning about the knowledge available in the group	A consensus in which all critical stakeholders commit to a proposal.	Respect for other stakeholders
To select slum areas tackled by the project based on indicators	Yes	Evaluate	30	to validate the information provided from KMA data	Members were briefed on the guiding indicators befor the visits, hence every team member knew what was to be done	After each slum visit members were tasked to take note and appraise. After the visits to all the slums a meeting was held to collate results and agree on the slums to work	Both	4	no	Experienced	Informative	A ranking of concepts based on some criterion	A selection where only a few concepts are chosen by the group	Shared knowledge followed by shared meaning about the knowledge available in the group	A decision which can be made based on majority or on other decision-making rules	Consideration when participants take other's stakes into account
Selection process for slum areas	Yes	Reduce	180	To select two slum areas to work with on the DEals project	Slum visit		Both	2	Flipcharts, excel sheet	Experienced	Informative and Reflective	A ranking of concepts based on some criterion	A scope in which the boundaries for a collection of constructs are formulated	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge	A consensus in which all critical stakeholders commit to a proposal.	A team bond in which mutual goals are pursued

	C&S?	Pattern of collaboration	Time of activity (in minutes)	Deliverables	Preparation needed	Homework given	Cognitive capacities	Task complexity	Technologies used	Experience facilitator	Input type	Structure type	Focus type	Shared understanding type	Type of commitment	Empathy type
Definition Spatial Collaborative activity = It is so because the theme was looking at the CBD and its associated congestion issues and how we could use scenario planning to						Yes, ...	Yes, ...					Result decomposition					
Activity: planning workshop			Deliverables		No	No	Choose	1-10 scale		Choose	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?
Agreeing with group on what scenario to present	Yes	Build Commitment	20	To present a scenario as an option for the Congestion issues of the CBD			Both	6	flipcharts, markers	Experienced	Creative	A cluster of related concepts	A direction in which concepts that fit a specific cause of action are taken into account	Mutual differences and disagreements can be revealed to gain an understanding of different types of conflicts.	An agreement for instance to spend an amount of resources or to create a specific deliverable	Consideration when participants take other's stakes into account
Definition Spatial Collaborative activity = adjoining districts, community members, KMA, platform to brainstorm on strategies																
Activity: Consultation meeting																
Mixed group in brainstorming session	Yes	[Gen]erate	45	causes, effects, direction for solutions			Both	9	presentations, flipboard	Experienced	Creative	A cluster of related concepts		Shared knowledge followed by shared meaning about the knowledge available in the group		

Interview B- Kumasi

	C&S?	Pattern of collaboration	Time of activity (in minutes)	Deliverables	Preparation needed	Homework given	Cognitive capacities	Task complexity	Technologies used	Experience facilitator	Input type	Structure type	Focus type	Shared understanding type	Type of commitment	Empathy type
Definition Spatial Collaborative activity =			Deliverables		Yes, ...	Yes, ...	Choose	1-10 scale		Choose	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?
Activity: Slum community selection					No	No						Structure type	Focus type	Shared understanding type	Type of commitment	Empathy type
Rece to the slums	Yes		40	validating the indictors	the indicators		Both	2	pen and paper	Experienced	Informative	A ranking of concepts based on some criterion	A selection where only a few concepts are chosen by the group	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge	A decision which can be made based on majority or on other decision-making rules	A team bond in which mutual goals are pursued
Collation of rankings	Yes			identify which slums you select for interventions			Both	2			Informative	A ranking of concepts based on some criterion	A selection where only a few concepts are chosen by the group	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge	A decision which can be made based on majority or on other decision-making rules	A team bond in which mutual goals are pursued
Activity: Selection of markets																
using maps markets were located	Yes	Clarify	60	knowing which market locations would suit the criteria	markets and criteria	picked communities and meet the slum leaders	Both	3	city land use map	Experienced	Informative	A ranking of concepts based on some criterion	A selection where only a few concepts are chosen by the group	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge	A decision which can be made based on majority or on other decision-making rules	A team bond in which mutual goals are pursued

Activity	BRT component	Pattern of collaboration	Time of activity (in minutes)	Deliverables	Preparation needed	Homework given	Cognitive capacities	Task complexity	Technologies used	Experience facilitator	Input type	Structure type	Focus type	Shared understanding type	Type of commitment	Empathy type
	Slum community selection		Deliverables		Yes,…. No	Yes,…. No	Choose	1-10 scale		Choose	Result decomposition — What fits best?	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?
Identification of the key traffic zones	Yes	Generate		To help give spatial identity to the zones			Both	4	Interview guides and recorders	Experienced	Informative	A ranking of concepts based on some criterion	A summary in which concepts with similar meaning are integrated without removing unique input	Shared knowledge followed by shared meaning about the knowledge available in the group	An agreement for instance to spend an amount of resources or to create a specific deliverable	Respect for other stakeholders
Mapping out these area	Yes	Reduce		Delineate the boundaries			Both	4	Maps and GIS technology	Experienced	Reflective	A sequence in which timely relationship of concepts is indicated		Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge	A consensus in which all critical stakeholders commit to a proposal.	Shared stakes when participants accommodate the interests of others among their own
Creation of the traffic zones	Yes	Evaluate		List the zones for intervention			Both	4	Maps and GIS technology	Experienced	Visionary	A sequence in which timely relationship of concepts is indicated		Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge	A consensus in which all critical stakeholders commit to a proposal.	A team bond in which mutual goals are pursued
Selection of drop off points	Yes	Build Commitment		Define were to restrict entry into the city centre			Both	4	Maps and GIS technology	Experienced	Visionary	A ranking of concepts based on some criterion		Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge	A consensus in which all critical stakeholders commit to a proposal.	A team bond in which mutual goals are pursued

Definition Spatial Collaborative activity =

C&S = Collaborative AND Spatial

Pathein:

Interview A – Pathein

Definition Spatial Collaborative activity = the workshop included with multi-stakeholders such as Regional level government department, township level government department, Member of parliamentarian, ward administrator, ward supporting and cleaning group member, Civil socitey organization, Pathein university — Yes, ... — Yes, ... — **Result decomposition**

Activity: Ward selection workshop

C&S = Collaborative AND Spatial — Which fundamental steps can the activity be broken down into?

Activity	C&S?	Pattern of collaboration	Time of activity (in minutes)	Deliverables	Preparation needed	Homework given	Cognitive capacities	Task complexity	Technologies used	Experience facilitator	Input type	Structure type	Focus type	Shared understanding type	Type of commitment	Empathy type
				Deliverables	No	No	Choose	1-10 scale		Choose	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?
Reviewing of the criteria	Yes	Reduce, Clarify, Evaluate	60	List of criterias by informing	No	No	Both		1 ppt	Experienced	Informative and stakeholder	A ranking of concepts based on some criterion		Shared knowledge followed by shared meaning about the knowledge available in the group		

Activity: Multi stakeholder workshop

Activity	C&S?	Pattern of collaboration	Time of activity (in minutes)	Deliverables	Preparation needed	Homework given	Cognitive capacities	Task complexity	Technologies used	Experience facilitator	Input type	Structure type	Focus type	Shared understanding type	Type of commitment	Empathy type
Group discussion on prioritize issues to conduct in pilot wards	Yes	Generate, Build Commitment	90	3 prioritises issues for each ward	No		Both		1 Flipchart	Experienced	Reflective	A cluster of related concepts		Mutual differences and disagreements can be revealed to gain an understanding of different types of conflicts.	A decision which can be made based on majority or on other decision-making rules	Respect for other stakeholders

Definition Spatial Collaborative activity = Department of Development affir organization, development affair committee, MPs, department of irrigation, general administration department, WSCG, WA, Pathein industrial city company, NLD party

Activity: Water management of pilot ward

Interview B – Pathein

Activity: Multi stakeholder training — Deliverables — Yes, ... — Yes, ... — **Result decomposition**

C&S = Collaborative AND Spatial — Which fundamental steps can the activity be broken into?

Activity	C&S?	Pattern of collaboration	Time of activity (in minutes)	Deliverables	Preparation needed	Homework given	Cognitive capacities	Task complexity	Technologies used	Experience facilitator	Input type	Structure type	Focus type	Shared understanding type	Type of commitment	Empathy type
					No	No	Choose	1-10 scale		Choose	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?
Considered current situation and resources	Yes	Organize	20 mins	refer back to the data findings and the presentation of DAC	sit together and discuss	No	Both	7	Paper and pens	Experienced	Reflective	A model in which more complex relations can be identified	A direction in which concepts that fit a specific cause of action are taken into account	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge	A consensus in which all critical stakeholders commit to a proposal.	Respect for other stakeholders
Discuss the roles of public and DAC/DAC and CSOs and different deprartment	Yes	Organize	30 mins	Roles of stateksholders	brainstomring and discussion	No	Both	6	flipchart and markers	Experienced	Creative	A model in which more complex relations can be identified	A direction in which concepts that fit a specific cause of action are taken into account	Mutual differences and disagreements can be revealed to gain an understanding of different types of conflicts.	An agreement for instance to spend an amount of resources or to create a specific deliverable	Respect for other stakeholders
Come up with activities how, who, when, what they can do	Yes	Build Commitment	100 mins	specific activities in ward 7 & 12 with particular time	brainstomring and discussion	No	Both	8	flipchart and markers	Experienced	Visionary and Creative	A sequence in which timely relationship of concepts is indicated	A direction in which concepts that fit a specific cause of action are taken into account	Shared knowledge followed by shared meaning about the knowledge available in the group	A consensus in which all critical stakeholders commit to a proposal.	A team bond in which mutual goals are pursued

Pereira:

Interview A- Pereira

Activity: Landfill tax — Deliverables — Yes, ... — Yes, ... — **Result decomposition**

C&S = Collaborative AND Spatial — Which fundamental steps can the activity be broken down into?

Activity	C&S?	Pattern of collaboration	Time of activity (in minutes)	Deliverables	Preparation needed	Homework given	Cognitive capacities	Task complexity	Technologies used	Experience facilitator	Input type	Structure type	Focus type	Shared understanding type	Type of commitment	Empathy type
				Deliverables	No	No	Choose	1-10 scale		Choose	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?	What fits best?
Wastepickers discussion	No	Build Commitment					Both			Experienced				Shared knowledge followed by shared meaning about the knowledge available in the group	An agreement for instance to spend an amount of resources or to create a specific deliverable	Shared stakes when participants accommodate the interests of others among their own

Interview B- Pereira

	Planning 2021 action plan workshop		Pattern of collaboration	Time of activity (in minutes)	Deliverables	Preparation needed	Homework given				Result decomposition						
						Yes, ...	Yes, ...										
Activity				Deliverables		No	No	Choose	1-10 scale		Choose	What fits	What fits b	What fits best?	What fits best?	What fits best?	What fits best?
C&S = Collaborative AND Spatial		**Pattern of collaboration**	**Time of activity (in minutes)**	**Deliverables**	**Preparation needed**	**Homework given**	**Cognitive capacities**	**Task complexity**	**Technologies used**	**Experience facilitator**	**Input type**	**Structure type**	**Focus type**	**Shared understanding type**	**Type of commitment**	**Empathy type**	
Which fundamental steps can the activity be broken down into?																	
	C&S?																
Presentation on Deals	No																
Presentation ToC	No																
Presentation indicators	No																
Brainstorm on multiple topics	No	Generate	90		No	No	Both	3	Powerpoint	Experienced		A cluster of related concepts	A summary in which concepts with similar meaning are integrated without removing unique input	Shared knowledge followed by shared meaning about the knowledge available in the group	A decision which can be made based on majority or on other decision-making rules	Consideration when participants take other's stakes into account	
Live construction of action plan	No	Organize															

Appendix 9: Less interesting matched spatial collaborative fundamental steps

Kumasi

Explanation of fundamental step K1

K1 was a meeting with only the DEALS project members in Kumasi where they reviewed slum areas from available reports to generate a list of areas from which eventually few will have to be selected as a project area for DEALS. This was seen as a very simple activity; 1 on a 1-10 scale, where the list was made on a laptop. It is given a 'generate' pattern of collaboration, as the group generated a list of slum areas from existing documentation. The pattern of collaboration theory defines 'generate as '*Move from having fewer to having more concepts in the pool of concepts shared by the group.*' The input for this activity was informative. Table 17 presents an overview of how a practitioners describes the characteristics for fundamental step 'Identifying slum areas from KMA formal meeting' in Kumasi. The explanation of the characteristics can be found in Appendix 4: Characteristics Adapted Activity Decomposition Method.

Table 17: Characteristics of fundamental step K1 (identifying slum areas from KMA formal meeting)

Fundamental step	K1 - Identifying slum areas from KMA formal meeting
Activity name	Selecting slum areas
Characteristics	
Type of spatial activity	Spatial decision
Pattern of collaboration	Generate
Time of activity (in minutes)	50
Deliverables	To identify all the slum areas in the Kumasi Metropolis
Preparation needed	Yes, review on the slum areas from available reports
Homework given	No
Cognitive capacities	Normative and cognitive
Task complexity	1
Technologies used	Laptop
Experience facilitator	Experienced
Input type	Informative
Structure type	A cluster of related concepts
Focus type	A selection where only a few concepts are chosen by the group
Shared understanding type	Shared knowledge followed by shared meaning about the knowledge available in the group
Type of commitment	A consensus in which all critical stakeholders commit to a proposal.
Empathy type	Respect for other stakeholders
Data Quality	Good

Why no thinkLet?

K1 is not provided a thinkLet, because this is a very straightforward activity and using a thinkLets would only complicate the activity.

Explanation of fundamental step K2/K6

For Kumasi, two identical fundamental steps were separately proposed by the two practitioners. K2 and K6 was an activity where the data/indicators provided by the municipality (KMA) had to be validated by field visits. Both practitioners did characterize the 'evaluate' pattern of collaboration to this fundamental step, with the explanation that they were validating if the documentation of the municipality was correct and up-to-date. The pattern of collaboration theory defines 'evaluate' as '*Move from less to more understanding of the relative value of the concepts under consideration.*' (Kolfschoten & de Vreede, 2009). So, this explanation fits the definition. The practitioners did point out that one such activity with a deliverable that cannot be broken down further, often serves different purposes; like building commitment with the local residents. The time of the activity was quite similar, especially as this activity took place three years before this interview. The task complexity was indicated between 2-4. In technology, one practitioner did not recognize pen and paper as a technology, while the other did. Nevertheless, pen and paper was used to validate the indicators in the slums. The table shows a grey highlights for the attributes that differ per practitioner for identical activities. Table 18 presents an overview of how a practitioners describes the characteristics for fundamental step K2/K6 in Kumasi. The explanation of the characteristics can be found in Appendix 4: Characteristics Adapted Activity Decomposition Method.

Table 18: Characteristics of fundamental step K2/K6 (to select areas tackled by the project based on indicators/review of the slums)

Fundamental steps	K2 - To select slum areas tackled by the project based on indicators	K6 – Review of the slums
Activity name	Selecting slum areas	
Characteristics		
Type of spatial activity	Site evaluation and validation	
Pattern of collaboration	Evaluate	Evaluate
Time of activity (in minutes)	30	40
Deliverables	to validate the information provided from KMA data	validating the indictors
Preparation needed	Members were briefed on the guiding indicators before the visits, hence every team member knew what was to be done	the indicators
Homework given	After each slum visit members were tasked to take note and appraise. After the visits to all the slums a meeting was held to collate results and agree on the slums to work with	-
Cognitive capacities	Normative and cognitive	Normative and cognitive
Task complexity	4	2
Technologies used	No	Pen and paper
Experience facilitator	Experienced	Experienced
Input type	Informative	Informative
Structure type	A ranking of concepts based on some criterion	A ranking of concepts based on some criterion
Focus type	A selection where only a few concepts are chosen by the group	A selection where only a few concepts are chosen by the group

Shared understanding type	Shared knowledge followed by shared meaning about the knowledge available in the group	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge
Type of commitment	A decision which can be made based on majority or on other decision-making rules	A decision which can be made based on majority or on other decision-making rules
Empathy type	Consideration when participants take other's stakes into account	A team bond in which mutual goals are pursued
Data quality	Good	Good

Why no thinkLet?

K2/K6 is not facilitated by a facilitator, but in groups the project members went validating the data from reports and other documents. ThinkLets are to be used by a person who is guiding the group in the role of a facilitator. Something this fundamental steps does not have.

Explanation of fundamental step K9

K9 was a part of the Bus Rapid Transit (BRT) activity/project in Kumasi. This fundamental step is dealing with the identification of where such a system is feasible (regarding available space, need for transport, etc.). It is given a 'generate' pattern of collaboration as all key traffic zones had to be identified and thereby generating options on where to construct a BRT. There were only informed stakeholders in this activity and the complexity of the task is awarded a 4 out of 10. The input generated was of informative nature because the input was based objective characteristics. Table 19 presents an overview of how a practitioners describes the characteristics for fundamental step K9 in Kumasi. The explanation of the characteristics can be found in Appendix 4: Characteristics Adapted Activity Decomposition Method.

Table 19: Characteristics of fundamental step K9 (Identification of the key traffic zones)

Fundamental step	K9 - Identification of the key traffic zones
Activity name	BRT component
Characteristics	
Type of spatial activity	Generating spatial parameters
Pattern of collaboration	Generate
Time of activity (in minutes)	-
Deliverables	To help give spatial identity to the zones
Preparation needed	-
Homework given	-
Cognitive capacities	Normative and cognitive
Task complexity	4
Technologies used	Interview guides and recorders
Experience facilitator	Experienced
Input type	Informative
Structure type	A ranking of concepts based on some criterion
Focus type	A summary in which concepts with similar meaning are integrated without removing unique input
Shared understanding type	Shared knowledge followed by shared meaning about the knowledge available in the group

Type of commitment	An agreement for instance to spend an amount of resources or to create a specific deliverable
Empathy type	Respect for other stakeholders
Data Quality	Average

Why no thinkLet?

Due to time constraints for presenting thinkLets to fundamental steps in interview round #2 the market mapping activity (K8 – market maps) was prioritized over the identification of key traffic zones (K9). This is done because K8 better fits the definition of being spatial and collaborative and it was smarter to discuss clearer spatial collaborative fundamental steps.

Explanation of fundamental step K10, K11, K12

The tables of K10, K11 and K12 are given underneath without an explanation since the practitioner did fill these in after the internet connection to communicate properly ceased to work. Therefore, the quality of the data is considered poor as it lacks context for the researcher. Table 20 presents an overview of how a practitioners describes the characteristics for fundamental step K10 in Kumasi. The explanation of the characteristics can be found in Appendix 4: Characteristics Adapted Activity Decomposition Method.

Table 20: Characteristics of fundamental step K10 (Mapping out key traffic zones)

Fundamental step	K10 – Mapping out key traffic zones
Activity name	BRT component
Characteristics	
Type of spatial activity	Mapmaking
Pattern of collaboration	Reduce
Time of activity (in minutes)	-
Deliverables	Delineate the boundaries
Preparation needed	-
Homework given	-
Cognitive capacities	Normative and cognitive
Task complexity	4
Technologies used	Maps and GIS technology
Experience facilitator	Experienced
Input type	Reflective
Structure type	A sequence in which timely relationship of concepts is indicated
Focus type	-
Shared understanding type	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge
Type of commitment	A consensus in which all critical stakeholders commit to a proposal.
Empathy type	Shared stakes when participants accommodate the interests of others among their own
Data Quality	Poor

Table 21: Characteristics of fundamental step K11 (Creation of the traffic zones)

Fundamental step	K11 - Creation of the traffic zones
Activity name	BRT component
Characteristics	
Type of spatial activity	Spatial decision
Pattern of collaboration	Evaluate
Time of activity (in minutes)	-
Deliverables	List the zones for intervention
Preparation needed	-
Homework given	-
Cognitive capacities	Normative and cognitive
Task complexity	4
Technologies used	Maps and GIS technology
Experience facilitator	Experienced
Input type	Visionary
Structure type	A sequence in which timely relationship of concepts is indicated
Focus type	-
Shared understanding type	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge
Type of commitment	A consensus in which all critical stakeholders commit to a proposal.
Empathy type	A team bond in which mutual goals are pursued
Data Quality	Poor

Table 22: Characteristics of fundamental step K12 (Selection of drop off points)

Fundamental step	K12 - Selection of drop off points
Activity name	BRT component
Characteristics	
Type of spatial activity	Spatial decision
Pattern of collaboration	Build Commitment
Time of activity (in minutes)	-
Deliverables	Define where to restrict entry into the city centre
Preparation needed	-
Homework given	-
Cognitive capacities	Normative and cognitive
Task complexity	4
Technologies used	Maps and GIS technology
Experience facilitator	Experienced
Input type	Visionary
Structure type	A ranking of concepts based on some criterion
Focus type	-
Shared understanding type	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge
Type of commitment	A consensus in which all critical stakeholders commit to a proposal.
Empathy type	A team bond in which mutual goals are pursued

Data Quality	Poor

Pathein

Explanation of fundamental step P1

P1 was a review meeting of criteria to select a ward for implementing the DEALS program. Looking at the criteria the number of wards could be reduced and this is seen as a simple (i.e. non-complex) task as the practitioner gave it a 1 on a 1-10 scale. This meeting was by presenting the criteria and the wards in a powerpoint and via discussion with the informed stakeholders simultaneously discuss the relevance of the criteria and reduce the number of wards under consideration.

Table 23: Characteristics of fundamental step P1 (Reviewing of the criteria)

Fundamental step	P1 - Reviewing of the criteria
Activity name	Ward selection workshop
Characteristics	
Type of spatial activity	Site evaluation and validation
Pattern of collaboration	Reduce, Clarify, Evaluate
Time of activity (in minutes)	60
Deliverables	List of criteria's by informing
Preparation needed	No
Homework given	No
Cognitive capacities	Normative and cognitive
Task complexity	1
Technologies used	PowerPoint presentation
Experience facilitator	Experienced
Input type	Informative and stakeholder
Structure type	A ranking of concepts based on some criterion
Focus type	-
Shared understanding type	Shared knowledge followed by shared meaning about the knowledge available in the group
Type of commitment	-
Empathy type	-
Data Quality	Good
Why spatial collaborative	the workshop included with multi-stakeholders such as Regional level government department, township level government department, Member of parliamentarian, ward administrator, ward supporting and cleaning group member, Civil society organization, Pathein university.

Explanation of fundamental step P2/P4

P2 was an activity to prioritize issues in the wards that now have been selected as project area. The outcome were 3 priority issues to be addressed in each ward. The group had to generate ideas on what the most prominent issues would be and the consensus within the group had to be monitored to see if all stakeholders could agree with the choices. The group was also tasked to define the activities to be

executed by every stakeholder. In this activity the tasks were divided amongst the stakeholders by brain-storming and discussion. The input given were opinions and preferences of the stakeholders present. These preferences were listed on a flipchart and the complexity of this task was considered low (1 on 1-10 scale). The Table shows a grey highlights for the attributes that differ per practitioner for identical activities.

The practitioner were describing the same activity, but perceive this activity very differently. The task complexity is given both a 1 and an 8. This difference is very large. Also, the input type is perceived as reflective, visionary and creative. This may indicate that this activity is not broken down far enough and is not yet on the level of detail for a fundamental step.

Table 24: Characteristics of fundamental step P2/P4 (Group discussion on prioritize issues to conduct in pilot wards/ come up with activities how, who, when, what they can do)

Fundamental step	P2 - Group discussion on prioritize issues to conduct in pilot wards	P4 - Come up with activities how, who, when, what they can do
Activity name	Multi stakeholder workshop	Multi stakeholder workshop
Characteristics		
Type of spatial activity	Spatial decision	
Pattern of collaboration	Generate, Build Commitment	Build Commitment
Time of activity (in minutes)	90	100
Deliverables	3 prioritises issues for each ward	specific activities in ward 7 & 12 with particular time
Preparation needed	No	brainstorming and discussion
Homework given	follow up meeting, ground site seeing, raise the awareness to the public in the pilot ward, prepared and submit the small grants, conduct the activity.	No
Cognitive capacities	Normative and cognitive	Normative and cognitive
Task complexity	1	8
Technologies used	Flipchart	flipchart and markers
Experience facilitator	Experienced	Experienced
Input type	Reflective	Visionary and creative
Structure type	A cluster of related concepts	A sequence in which timely relationship of concepts is indicated
Focus type	-	A direction in which concepts that fit a specific cause of action are taken into account
Shared understanding type	Mutual differences and disagreements can be revealed to gain an understanding of different types of conflicts.	Shared knowledge followed by shared meaning about the knowledge available in the group

Type of commitment	A decision which can be made based on majority or on other decision-making rules	A consensus in which all critical stakeholders commit to a proposal.
Empathy type	Respect for other stakeholders	A team bond in which mutual goals are pursued
Data Quality	Poor	Poor
Why spatial collaborative	Department of Development affir organization, development affair committee, MPs, department of irrigation, general administration department, WSCG, WA, Pathein industrial city company, NLD party	-

Explanation of fundamental step P3

P3 was an activity to get an overview of the current situation, running projects and available resources in the wards. It was part of a multi-stakeholder workshop. This was indicated as an 'organize' pattern of collaboration, because the relations among those concepts are made more clear. The input is informative and is reflected upon.

Table 25: Characteristics of fundamental step P3 (Considered current situation and resources)

Fundamental step	P3 - Considered current situation and resources
Activity name	Multi stakeholder workshop
Characteristics	
Type of spatial activity	Spatial decision
Pattern of collaboration	Organize
Time of activity (in minutes)	20
Deliverables	refer back to the data findings and the presentation of DAC
Preparation needed	sit together and discuss
Homework given	No
Cognitive capacities	Normative and cognitive
Task complexity	7
Technologies used	Paper and pens
Experience facilitator	Experienced
Input type	Informative and Reflective
Structure type	A model in which more complex relations can be identified
Focus type	A direction in which concepts that fit a specific cause of action are taken into account
Shared understanding type	Mutual differences and disagreements can be revealed to gain an understanding of different types of conflicts.
Type of commitment	A consensus in which all critical stakeholders commit to a proposal.
Empathy type	Respect for other stakeholders
Data Quality	Average

Appendix 10: Full characterization of fundamental step K4 (Agreeing with group on what scenario to present), K5 (traffic causes, effects and solutions), and K8 (market maps)

Appendix 10: Explanation of fundamental step K4 - Agreeing with group on what scenario to present

K4 is a fundamental step that followed a brainstorming session in smaller groups (6 people or so) in a scenario planning workshop. In that brainstorming session, people came up with scenarios on how to best tackle the congestion issue in the Central Business District (CBD). The fundamental step K4 involves making a spatial decision (i.e. where to intervene to work on decongestion). Its characteristics are presented in Table 26. The group's creative ideas were used as input, and the discussion was of medium complexity (6 is given on 1-10 scale). Although the task complexity is rated a 6, the activity took 20 minutes.

Table 26: Characteristics of fundamental step K4 (Agreeing with group on what scenario to present)

Fundamental step	K4 - Agreeing with group on what scenario to present
Activity name	Scenario planning workshop
Characteristics	
Type of spatial activity	Developing a spatial scenario
Pattern of collaboration	Build Commitment
Time of activity (in minutes)	20
Deliverables	To present a scenario as an option for the Congestion issues of the CBD
Preparation needed	-
Homework given	-
Cognitive capacities	Normative and cognitive
Task complexity	6
Technologies used	Flipcharts, markers
Experience facilitator	Experienced
Input type	Creative
Structure type	A cluster of related concepts
Focus type	A direction in which concepts that fit a specific cause of action are taken into account
Shared understanding type	Mutual differences and disagreements can be revealed to gain an understanding of different types of conflicts.
Type of commitment	An agreement for instance to spend an amount of resources or to create a specific deliverable
Empathy type	Consideration when participants take other's stakes into account
Data Quality	Good

Appendix 10: Explanation of fundamental step K5 - Mixed group in brainstorming session

K5 is a fundamental step where different stakeholders were invited, and they were brainstorming about the causes, effects and directions for solutions on the topic of decongesting traffic. Its characteristics are presented in Table 27. It is identified as a complex task, which may indicate that the causes and effects are unclear. It is identified as spatial because the group had to think about the spatial relations of traffic flows within the city. An example given by the practitioner was that many residents of Kumasi want to go to the Central Business District (CBD) for shopping, work, or visits. Some similar shopping markets (so called satellite markets) can be found across the city. This is indicated as a possible cause why the traffic is congested around the CBD.

Table 27: Characteristics of fundamental step K5 (Mixed group in brainstorming session)

Fundamental step	K5 - Mixed group in brainstorming session
Activity name	Consultation meeting
Characteristics	
Type of spatial activity	Generating spatial parameters
Pattern of collaboration	Generate
Time of activity (in minutes)	45
Deliverables	causes, effects, direction for solutions
Preparation needed	-
Homework given	-
Cognitive capacities	Normative and cognitive
Task complexity	9
Technologies used	Presentations, flipboard
Experience facilitator	Experienced
Input type	Creative
Structure type	A cluster of related concepts
Focus type	-
Shared understanding type	Shared knowledge followed by shared meaning about the knowledge available in the group
Type of commitment	-
Empathy type	-
Data Quality	Average

K8 is a fundamental step where they looked at the satellite markets in Kumasi to improve the attractive-ness for people to shop there. Some criteria to choose which markets are suitable for investing were de-termined in another activity. In this activity, a group of informed stakeholders was sitting in a room and used a land-use map to discuss the potential markets and show on the map why they fit the specified criteria. After this activity, when the markets and communities were selected, the community leaders would be informed, and a meeting held. Its characteristics are presented in Table 28.

Table 28: Characteristics of fundamental step K8 (Using maps markets were located)

Fundamental step	K8 - Using maps markets were located
Activity name	Selection of markets
Characteristics	
Type of spatial activity	Reading an interpreting maps
Pattern of collaboration	Clarify
Time of activity (in minutes)	60
Deliverables	knowing which market locations would suit the criteria
Preparation needed	markets and criteria
Homework given	picked communities and meet the slum leaders
Cognitive capacities	Normative and cognitive
Task complexity	3
Technologies used	City land use map

Experience facilitator	Experienced
Input type	Informative
Structure type	A ranking of concepts based on some criterion
Focus type	A selection where only a few concepts are chosen by the group
Shared understanding type	Mutual learning when participants might learn from each other and advance both their own knowledge and the group's knowledge
Type of commitment	A decision which can be made based on majority or on other decision-making rules
Empathy type	A team bond in which mutual goals are pursued
Data Quality	Good

Appendix 11: Full overview of matched thinkLets for fundamental step K4 (Agreeing with group on what scenario to present), K5 (traffic causes, effects and solutions), and K8 (market maps)

Fundamental step K4 - Agreeing with group on what scenario to present

Pattern of collaboration: Build Commitment

Overview fundamental step:

A summary of this fundamental step can be found in *Appendix* 10: Explanation of fundamental step K4 - Agreeing with group on what scenario to present (ctrl+ click to go to that section).

Proposed thinkLets:

Table 29: Proposed thinkLets for fundamental step K4 (Agreeing with group on what scenario to present)

Potential thinkLet	What does it do?
Plus-Minus-Interesting	This thinkLet can help the group express the pros, cons and insights about the different brainstormed scenarios. + EVALUATION thinkLet
AND	
MultiCriteria + CheckMark	evaluate the different scenarios to specific predefined criteria and allow the group to check their favorite items and thereby get a feeling on how to prioritize the items
OR	
PointCounterPoint	in case of a badly polarized group working towards a middle ground
OR	
MoodRing	to discuss and change opinions until some sort of consensus is established

Table 29 shows the potential (sequences) of thinkLets proposed to the practitioner, and how these thinkLets relate to the fundamental step. A brief explanation with 'overview' and 'steps' of each potential thinkLet can be found in the corresponding appendices:

Appendix 23: Plus-Minus-Interesting
Appendix 21: MultiCriteria
Appendix 15: CheckMark

Output interview:

Practitioner 1 reviewed these thinkLets.

Table 30: Assessment of proposed thinkLets for fundamental step K4 (Agreeing with group on what scenario to present) by practitioner 1

Potential useful thinkLets	What techniques from these thinkLets were used?	To what extent could this thinkLet be applied in this activity? (1-10 scale)	Why?	To what extent would you use this thinkLet in such an activity? (1-10 scale)	Why?	How could the thinkLet be changed to be useful?
Plus-Minus-Interesting	This was largely used because we were looking at different scenarios	7	It afforded us the opportunity to see diffrent sides of the issue at hand	7	It is a suitable for this activity	
AND						
MultiCriteria	Yes this was also used because after various options from group members other team members used this to settle on one	7	It best fit the purpose	7	It is suitable for this activity	
CheckMark	To some extent this was used during group presentations. After receiving various options from group members votes were cast to settle on one or two as the groups preferred solution	7	It best fit the purpose	7	It is suitable for this activity	
OR						
PointCounterPoint	This technique was not fully used however some presenters chose this path	6	It encourages different perspectives	7	It is suitable	
OR						
MoodRing	This was observed especially because we were looking at scenarios in addressing the issue of congestion	8	Depending on how a presenter presents his case one or two people may change their minds	8	It is suitable	

Observations:

Table 30 shows the assessment of the practitioner of the thinkLets matched to fundamental step K4. All thinkLets are rated relatively high. They were especially compared to the first reviewed fundamental step (i.e. K3/K7 – selecting slum areas). This may indicate that many thinkLets may suit this activity or that this activity is suitable for thinkLets. The practitioner did only differentiate between if the thinkLet could be applied and if the practitioner would use a thinkLet for 'PointCounterPoint', the reason is unknown. The practitioner found all thinkLets somewhat useful for this fundamental step. No suggestions were made to make it more useful because the practitioner finds all proposed thinkLets suitable when applying them in future activities. Let's look at the thinkLets in more detail:

Plus-Minus-Interesting:
In this activity, the participants had developed several scenarios in smaller groups, and one had to be chosen to be presented. Looking at the pros, cons and insights per scenario is perceived as a useful and used technique to decide which scenario to choose.

MultiCriteria:
The practitioner indicates that the scenarios were reviewed based on multiple criteria, which this thinkLets also deals with. This was not done in the structured manner as the thinkLet describes.

CheckMark:
The most promising scenarios were identified by a checkmark-like method.

PointCounterPoint:
This technique was hardly used. The practitioner indicates some presenters did argue favoring a scenario, but the practitioner cannot clearly reconstruct this. Therefore, the data quality for this thinkLet is low.

MoodRing:
A changing consensus based on a discussion is very close to what happened in this activity. Therefore, this thinkLets may suit well for (part of) the activity.

Fundamental step K5 - Mixed group in brainstorming session

Pattern of collaboration: Generate

Overview fundamental step:

A summary of this fundamental step can be found in *Appendix* 10: Explanation of fundamental step K5 - Mixed group in brainstorming session (ctrl+ click to go to that section).

Proposed thinkLets:

Table 31: Proposed thinkLets for fundamental step K5 (Mixed group in brainstorming session)

Potential thinkLet	What does it do?
FreeBrainstorm or OnePage	(depending on group size) brainstorm on all causes, effects and directions
AND	
FastFocus	to clean the list of redundancies
AND	
PopcornSort	Put the items from the brainstorm in 'buckets', for cause, effect, solution
AND	
BucketWalk	clean up the items in the buckets
AND	
BucketShuffle	prioritize which items are more important causes, influential effects or more viable solutions

Table 31 shows the potential (sequences) of thinkLets proposed to the practitioner, and how these thinkLets relate to the fundamental step. A brief explanation with 'overview' and 'steps' of each potential thinkLet can be found in the corresponding appendices:

Appendix 18: FreeBrainstorm
Appendix 22: OnePage
Appendix 17: FastFocus
Appendix 25: PopcornSort
Appendix 14: BucketWalk
Appendix 13: Bucketshuffle

Output interview:

Practitioner 1 reviewed these thinkLets.

Table 32: Assessment of proposed thinkLets for fundamental step K5 (Mixed group in brainstorming session) by practitioner 1

Potential useful thinkLets	What techniques from these thinkLets were used?	To what extent could this thinkLet be applied in this activity? (1-10 scale)	Why?	To what extent would you use this thinkLet in such an activity? (1-10 scale)	Why?	How could the thinkLet be changed to be useful?
FreeBrainstorm	This technique was largely used becuase we had identified the challenge and we were looking at the various available options to address it	7	It helps produce diverse strategies	7	It is suitable	
OnePage	This technique was not used	7	It could save time	7	It is suitable	
AND						
FastFocus	This technique was not used	3	Not sure it best fits this issue	3	Not suitable	
AND						
PopcornSort	This technique was not used	5	It could also save time depending on the participants	5		
AND						
BucketWalk	This technique was not used	5		5		
AND						
BucketShuffle	This technique was not used	5		5		

Observations:

Table 32 shows the results of the thinkLets matched to fundamental step K5 (traffic causes, effects and solutions). The practitioner rated the thinkLets in three categories for this fundamental step; not suitable (i.e. FastFocus), average (i.e. PopcornSort, BucketWalk and BucketShuffle) and suitable (i.e. FreeBrainstorm and OnePage). Only the ones identified as suitable have the pattern of collaboration described by the practitioner (i.e. Generate). The thinkLets will not be described in further detail because the practitioner became tired by now and had no energy left to dive into the exact working of the thinkLets properly.

Fundamental step K8 – Using maps markets were located

Pattern of collaboration: Clarify

Overview fundamental step:

A summary of this fundamental step can be found in *Appendix* 10: Explanation of fundamental step K8 - Using maps markets were located (ctrl+ click to go to that section).

Proposed thinkLets:

Table 33: Proposed thinkLets for fundamental step K8 (Using maps markets were located)

Potential thinkLet	What does it do?
TheLobbyist	the stakeholders can advocate their positions possible markets on the maps.
AND	
GoldMiner	can be used to filter out the most promising locations for markets quickly
AND	
PopcornSort + Bucket-Walk	To put a list of possible locations into 'buckets' where the buckets represent 'non-promising sites' and 'promising sites'. Then discuss if the sites are in the correct bucket.
AND	

MultiCriteria RedLightGreenLight	+	from the 'promising' bucket, the sites are evaluated on a set of criteria to prioritize the list of items. And to discuss until a sort of consensus is achieved on which markets to work on

Table 33 (markets maps) shows the potential (sequences) of thinkLets proposed to the practitioner, and how these thinkLets relate to the fundamental step. A brief explanation with 'overview' and 'steps' of each potential thinkLet can be found in the corresponding appendices:

Appendix 28: TheLobbyist
Appendix 19: GoldMiner
Appendix 25: PopcornSort
Appendix 14: BucketWalk
Appendix 21: MultiCriteria
Appendix 26: RedLightGreenLight

Output interview:

Practitioner 2 reviewed these thinkLets.

Table 34: Assessment of proposed thinkLets for fundamental step K8 (Using maps markets were located)

Potential useful thinkLets	What techniques from these thinkLets were used?	To what extent could this thinkLet be applied in this activity? (1-10 scale)	Why?	To what extent would you use this thinkLet in such an activity? (1-10 scale)	Why?	How could the thinkLet be changed to be useful?
Lobbyist	The criteria was clearly defined, besides the team members had no interest hence was as much as possible free of the subjectivew values of team members	2	The rule were clearly defined and made no room for subjective judgements	5	If a decison allow for stated postions or interest	If it meant for it is designed for then it is fit for purpose
AND						
GoldMiner	It was not applied in this case	2	The rules were well defined hence there was nedd for the gathering of nuggets	2	In case where the selection criteria is already determined scientifically there is no room for such nugget selection	If there was the need to brainstorm on a number of issues
AND						
PopcornSort	We had the markets on one hand and the criteria on the other, markets that met the criteria were seperated	4	It involved matching items with a defined criteria	5	It allows for matching items against criteria	It is fit for this purpose
BucketWalk	The opportunity to eliminate overlaps	5	Some of the markets could potentially have also passed for selection	5	It allowed for the refinement of the selection process	It is suitable for the above sais purpose
AND						
MultiCriteria	It was not applied in this activity	2	The end state was know and so were the parameters	5	It has the potential for use in making colective decisions and arriving at	In its current state it is idea for consensus buiding
RedLightGreenLight	The rules were well decided before the selection was done	2	It did not apply in this context	6	It will be useful in understanding the reasons for the diversity in opinion.	If it is meant to help in understanding the diffrences in opinion then it is ideal.

Observations:

Table 34 shows the results of the thinkLets matched to fundamental step K8 (market maps). The practitioner did not see these thinkLets used in the past activity but acknowledges some of them may be useful under certain circumstances. This shows in the almost structural difference where the second rating is higher than the first.

Appendix 12: ThinkLets as presented to practitioners in interview round#2

This appendix presents the "overview" part of a full thinkLets and a "steps" part. This is retrieved from (Briggs & de Vreede, ThinkLets: Building Blocks for Concerted Collaboration, 2001) and presented per thinkLet.

Appendix 13: Bucketshuffle

Overview

In this thinkLet, you prioritize a set of concepts that have already been organized into categories. After a PopcornSort or a LeafHopper, the team members review the contents of each category in turn. They orally discuss which items should be placed near the top of the list, and with items should be placed near the bottom of the list within each category. They do not haggle over specifics. This is a quick and dirty prioritization.

Steps

1   Open the first bucket on the participant screens
2   Say this:
    a   Which of the items in this bucket should be clustered near the top of the list, and which of these items should be clustered near the bottom of the list?
3   Drag-and-drop items into an order suggested by the team.
4   Repeat this pattern for each category bucket.

Appendix 14: BucketWalk

Overview

In this thinkLet, you verify an earlier organization process. After a PopcornSort team members review the contents of each bucket to make sure that all items are appropriately placed and understood. Moreover, cases of overlap between items are resolved.

Steps

1   Open the first bucket on the participant screens.
2   Say this:
    a   Is there anything in this bucket which does not belong here? If you find anything in this bucket that does not belong, raise your hand, and we'll discuss where to put it
3   If anyone raises a question about an item, moderate an oral discussion to choose in which bucket it should be placed.
4   Continue until the participants agree that all items are correctly placed.
5   Then, continue and say this:
    a   Are there items in this bucket which you feel are as good as describing the same idea? If you so, please raise your hand.
6   If anyone raises a hand, use the Concentration techniques to resolve overlap between ideas.

7   Continue until the participants agree that there is no more overlap in the category.
8   Finally, conclude with this:
    a   Are there items in this bucket which you feel are poorly formulated? If you so, raise your hand.
9   If anyone raises a hand, resolve the issue by requesting explanations from the group as well as alternative ways to formulate the item.
10 Continue until no-one points out poorly formulated items anymore.
11 Repeat this pattern for each category bucket.

Appendix 15: CheckMark

Overview

In this thinkLet, you give each participant a ballot, and allow them to checkmark their favorite items. Usually, you limit the number of items that can be marked on a given ballot.

Steps

1   Say This:
    a   Each of you has a ballot with all our brainstorming comments on it.
    b   Read through the ballot and place a checkmark next to your favorite items.
    c   You can checkmark no more than <maximum number> items on the ballot.
2   When all votes are in, say this:
    a   Here are the results. It looks like <x> of you agree that the first item is important. <y> of you agree that the second item is worth considering. <z> of you agreed that we should pay some attention to Item 3…

Appendix 16: Crowbar

Overview

This is thinkLet let's the group address the reasons for a lack of consensus on certain issues. The Crowbar is e.g. applied after completing a StrawPoll, when the team engages in a structured discussion of the items that showed the highest standard deviation over the set of scores.

Steps

1   Say this:
    a   The items near the bottom of the list are the ones upon which you have the most agreement.
    b   However, you do not have consensus about the items near the top of the list.
    c   Let's consider this first item. Some of you rated it quite high, while others of you rated it quite low.

d   Without telling me how you voted, what reasons might exist for rating this item quite high, and what reasons might exist for rating this item quite low?

e   Moderate a discussion about what reasons might exist for high and low ratings of an item. Repeat the crowbar prompt any time the discussion seems to be straying.

f   Keep track of and periodically repeat the reasons the group suggests on each side of the issue.

g   Repeat this process for any ballot item that seem worthy of such discussion.

Appendix 17: FastFocus

Overview

The team browses through the brainstorming contributions. Each team member in turn proposes aloud a key issue. The team discusses the meaning and the wording of a proposed item. The moderator posts well-framed items on the public list.

Steps

1   Explain clearly the kind of items that belong on the public list. If you want problem statements, give examples of problem statements. If you want solutions, give examples of solutions.

2 Say This:
   a   Each of you is on a different electronic page. Each of you has a different part of our brainstorming conversation on the screen in front of you.
   b   Please read the screen in front of you, and tell me the single most important issue represented in the discussion on your screen that should be included on this public list.
3 Call on each person in turn. Elicit one concept. Reframe the concept in as few words as possible. Check with the person to assure that your reframing captures the issue appropriately
4 When you have called on everybody in the group, say this:
   a   Now press the F9 key (or click the submit button) to swap pages. Each of you should now see a different page.
   b   Read the new page and raise your hand if there is an important issue on the new page that has not yet been posted to the public list.
5 Call on people who raise their hands. Discuss, condense, and add their issues to the public list.
6 Say this:
   a   *Now press the F9 key to swap pages again. Every page has now been seen by at least three pairs of eyes. Is there any issue on the screen in front of you that has not yet been posted to the public list?*
7 Continue the cycle of page swapping and elicitation until nobody can find any important issues to add to the public list.

Appendix 18: FreeBrainstorm

Overview

In this thinkLet the team members brainstorm ideas in response to a single question or prompt. The team members are working on separate pages that are circulating among them. They contribute ideas to the pages or reactions to previous ideas.
Inputs
   Clear understanding of the purpose for brainstorming.

Steps

1 Say This:
- a Please click the "Go" button. The system will bring you an empty electronic page.
- b Each of you now has a different electronic page. You will each start on a different electronic page.
- c You may each type one idea, up to 400 characters long onto that page. Then you must click the submit button to send the page back to the group.
- d The system will randomly bring you back a different page. That page may have somebody else's ideas on it.
- e When you see a page with somebody else's ideas on it, you may respond in three ways:
  - i You may agree with an idea by adding detail to it.
  - ii You may argue against an idea.
  - iii You may be inspired to contribute a completely new idea.
- f You may type exactly one idea on the new page. Then you must send that page *back to the group. The system will bring you a new page.*
- g We will continue swapping pages and submitting ideas (Until you run out of ideas; for X minutes).
- h Any questions? You may begin.

Appendix 19: GoldMiner

Overview

In the GoldMiner thinkLet, team members read through their brainstorming comments, and when they find a "nugget," they pick it up and move it into a holding area for future discussion.

Steps

1 Say this:
- a This bucket is our gold mine. Buried among all these brainstorming ideas are some gold nuggets. Gold nuggets are those concepts and ideas that so important, and so valuable that we must give them further attention.
- b Read through the comments in the gold mine, and when you find a nugget, click-and-drag it into the Fort Knox bucket. Fort Knox, Kentucky, is the place where the U.S. Government keeps all its gold reserves. We are going to put all our most valuable ideas into the Fort Knox bucket.

    c   Remember, we don't have time to address all these topics, so look for the very best, the very most important, the most valuable. Find the nuggets and put them into Fort Knox. Any questions?

2   Release the group to begin mining for gold.

Appendix 20: MoodRing

Overview

Participants register their opinion on a single topic, then begin an oral discussion. As they talk, if they hear something that changes their opinion either direction, they change their vote.

Steps

1   Make sure the group understands the issue. Say this:
    a   If you have any clarifying questions about the issue at hand, please raise your hand.

2   If people raise their hand, facilitate a verbal discussion to address any understanding difficulties. If necessary, re-formulate the issue at hand.

3   Say this:
    a   Please register your opinion in the Opinion Meter.
    b   Now let's talk about the issue. If you hear anything that changes your mind in either direction, shift your vote accordingly. We will keep talking until we've reached some sort of consensus on this issue.

Appendix 21: MultiCriteria

Overview

Participants rate each of a set of ballot items on two or more criteria. Results are sometimes aggregated, sometimes graphed. Results are usually used to provoke conversations. Occasionally they are used to make a decision.

Steps

1. First make sure the group understands the items to be evaluated. Say this:
   a. If there are alternatives that you have clarifying questions about, please raise your hand.
2. If people raise their hand, facilitate a verbal discussion to address any understanding difficulties. If necessary, re-formulate the alternative concerned.
3. Make sure the group understands the criteria. Say this:
   a. If there are criteria that you have clarifying questions about, please raise your hand.
4. If people raise their hand, facilitate a verbal discussion to address any understanding difficulties. If necessary, re-formulate the criteria concerned.
5. Explain how to enter votes (it varies by polling method).
6. Explain how to submit ballots.
7. Allow the team to rate each alternative against each criteria, saying:
   a. If there are no further questions, let's get started. Please rate each alternative with respect to the criteria we have defined.
8. Review the results with the team, e.g. using Crowbar techniques.

Appendix 22: OnePage

Overview

In this thinkLet, team members will all contribute comments simultaneously to the same electronic page or list at the same time.

Steps

1. Make sure the participants understand the brainstorming question or prompt. Say this:
   a. If you have any questions with respect to the brainstorming question or assignment, please speak up.
2. If necessary, facilitate a verbal discussion to address any understanding difficulties. If necessary, re-formulate the question or prompt.
3. Inform the participants of time limits, if any.
4. Let the participants contribute comments until they run out of ideas or until you call time.

Overview

In the Plus-Minus-Interesting thinkLet the team expresses the pros, cons, and insights about a set of concepts. The idea is that they give both positive and negative feedback on these ideas, while pointing out intricate aspects that a worth the group's attention. This thinkLet is especially useful if you are going to let the group take a vote on, for example, a set of solutions for a problem and you want them to look at all sides of the coin beforehand. Differently said, Plus-Minus-Interesting is a good way to prepare an informed decision.

Steps

1   Explain the items on the outline and make sure everyone in the group understands them.
2   Say this:
   a   Let's look at these items in more detail before we further evaluate them.
   b   I want you to share any positive or negative feedback on these items with the group.
   c   Also, contribute any interesting observations that you have about these items.
3   Let the group brainstorm and contribute their feedback. For this, you may choose to use a LeafHopper or DealersChoice thinkLet.
4   After the group has given their feedback, give them some incubation time by saying:
   a   Please take a moment to read through the feedback that has been given.
5   Normally, there are some items in the "Interesting" category, so be sure to check this yourself while the group is reading.
6   After the group is done reading, ask if there are any issues that they want to discuss before moving them into the evaluation activity:
   a   Were there any "Plus" or "Minus" contributions that you like to discuss at this point?
   b   Are there any "Interesting" contributions that would impact the Plus or Minus of an item?
7   If you feel the group is missing critical issues that you found yourself, bring them to the groups attention.

Overview

Participants engage in a three-step structured activity where they first enter their strongest argument in favor of their own position, second, the argue against somebody else's position, and third they build an argument to bridge between two seemingly mutually exclusive positions taken by others in the group.

Steps

1   Explain the debatable proposition to the group. Refine it if necessary.
2   Say this:
    a   Each of you has a different electronic page in front of you Notice that the \<debatable proposition\> appears at the top of your page.

    b   Please think carefully about that proposition. Then enter the single strongest argument you can make in favor of your position. You will only have 400 characters, so be concise. What is your single strongest argument in favor of your own position with respect to this issue?
    c   When you finish typing your single strongest argument, do not submit it to the group. Just cross your arms so I know you are done.
3   Watch for everybody to finish their first argument, then say this:
    a   Please press the F9 key to swap pages. Keep pressing F9 until you see somebody else's argument on the screen in front of you.
    b   Now read the argument in front of you.
    c   Regardless of your actual position, type the strongest single argument you can against the position you see on the screen.
    d   When you finish typing your single strongest counterargument, do not submit it to the group. Just cross your arms so I'll know you are done.
4   Watch for everybody to finish, then say this:
    a   Now press F9 to swap pages. Keep pressing F9 until you get a page with somebody else's argument and somebody else's counterargument.
    b   You should now each see a page containing an argument and a counterargument. If you have been doing your jobs well, those two arguments should be mutually exclusive.
    c   Now I want you to build a third argument that bridges between those mutually exclusive positions.
    d   When you finish, do not submit your third argument to the group. Just cross your arms so I know you are done.

5   Watch for everybody to finish. Then say,
        a   Now press F9 to swap pages again. Keep pressing F9 until
              you get a page that has none of your own contributions on it.
        b   Does anybody see any interesting point-counter-point-
              resolutions that they'd like to share with the group?
6   Moderate a discussion of the arguments and resolutions on
      people's screens. Focus attention of any common ground that
      emerges from this discussion.

Appendix 25: PopcornSort

Overview

Team members drag-and-drop comments from an unsorted list into a set
of electronic "buckets," each of which represents a category for related
concepts.

Steps

1   Make sure the group understands the meaning of each category.
2   Say this:
        a   In a few moments we are going to organize these comments
              into these categories.
        b   When I say "go" you will use your mouse to drag-and-drop
              comments from the blue list into the appropriate bucket.

        c   You'll have to work quickly, because while you are thinking
              about an item, someone else may grab it and drag it away.
        d   The screen is going to be popping like popcorn. It gets
              pretty lively, so have some fun, and work fast.
        e   Any questions? OK. On your mark, get set, GO!

Appendix 26: RedLightGreenLight

Overview

Participants render opinions or evaluations on one or more issues on one
or more criteria. They then try to explain why big differences of opinion
might have occurred. As the argument ebbs and flows, the participants
change their votes in real time. Discussion continues until the group
agrees they have sufficient consensus to proceed.

Steps

1   Say this:
        a   The group has more consensus in the cells that appear in
              green, and less consensus in the cells that appear in red.
        b   We are going to discuss the items in Red, where you have
              less consensus.

      c   As we talk, when you hear anything that changes your opinion one way or the other, please change your vote and re-submit your ballot.

      d   When we have achieved more consensus, the cell will turn green.

      e   We will keep discussing each red cell until it turns green. Then we will move on to the next red cell.

2   Open the cell summary chart and graph for the first red cell you will discuss.

3   Briefly articulate the pattern of votes.

4   Use the Crowbar script like this:

      a   Without telling me how you voted, what reasons might exist for rating <item name> high on <criteria name>, and what reasons might exist for rating <item name> low on <criteria name>.

Appendix 27: StrawPoll

Overview

In this thinkLet, participants gain a "sense of the group" by casting votes and reviewing results. They do this to start a discussion rather than to end it.

Steps

1   Say this

      a   We are going to take a straw poll. We are not making a final decision right now. We just want to get a sense of the group so we can focus our subsequent efforts where they should be focused.

      b   I've sent you a ballot containing a set of X items.

      c   Please rate each item on a scale from Y to Z.

      d   A rating of Y means…

      e   A rating of Z means…

      f   When you are done voting, click the SUBMIT BALLOT button that appears just above the ballot on the left.

Appendix 28: TheLobbyist

Overview

In this thinkLet, people advocate their positions on complex issues. When your group is facing a set of key issues, items, or ideas that they have to evaluate in a next activity, it may pay off to give everyone in the group a chance to take the floor and argue favorably for one of the items. This way, each participant in the group gets a fair chance to put forward his or her preferences based on the stakes they perceive. In addition, it will give the group a chance for some preliminary reflection on what they perceive are the key items.

Steps

1 Say this:
   a   Before we evaluate the ideas displayed on your screen, let's take a short moment to elaborate on them and see which ones you really like.
   b   You may express your personal preference as follows: Each of you may argue in favor of one of the items on the list.
   c   You may only argue in favor; you may not criticize an item.
   d   If the item that you prefer has already been argued for, say "I pass".
2 Let every participant have his or her say while making sure that nobody takes too much time.
3 When everyone has had their say, continue with the Evaluate thinkLet.

Appendix 29: Decision tree for thinkLets

This study presents that while thinkLets can be useful in many instances, the matching process is challenging. There are many guidelines on how to match thinkLets (e.g. based on the pattern of collaboration, when to (not) use a thinkLet). There is no overview or a decision-tree that aids practitioners to narrow down the potential thinkLets when designing an activity. ThinkLets have extensive descriptions on how they work and when they can be used best. This study presents a first version of a tool that eases this selection process.

The tool considers 39 thinkLets (Briggs & de Vreede, ThinkLets: Building Blocks for Concerted Collaboration, 2001) and is based on an analysis of all these thinkLets. From this source, all thinkLets and the circumstances under which they should (not) be used are arranged in an Excel file. The Excel file closely follows the preconditions of thinkLet from the thinkLet database and follow the same order, see Figure 11. The colors show the category of thinkLets, the gradation of colors show subtypes within patterns of collaboration. The pattern reveals that when going down the list new categories are added, illustrated by a diagonal line.

ThinkLet name	Maximum Team size	Minimum Team size	Time pressure or leisure	Do you expect information overload?	Criteria are known beforehand	Collective/separated	Does order matter?	Elaborate ideas	Poorly/well understood issues	Stakes important/not important	More/less focus	Items need to be categorized/are categorized	Generate acceptable single statement	Experts present	Cleaning up a list	Summarize topics	Creating a shared understanding	Obvious/not obvious categories	Measure consensus	Reveal patterns of (dis)agreement	Reveal patterns of agreement	Validation of comments	Prioritizing concepts within a	Provoke discussion	Making a decision	Do the stakeholders trust	Surface and examine assumptions	Shared information	Reveal hidden agenda	Address a single issue the time	Break an impasse	Find a common ground	Create a hierarchical outline
ThinkLets for Divergence – No																																	
FreeBrainstorming	6																																
OnePage				No																													
ComparativeBrainstorm			pressure		Yes																												
ThinkLets for Divergence – With																																	
LeafHopper						Separated																											
DealersChoice						Collective	Yes																										
Plus-Minus-Interesting								Yes																									
TopFive				Yes				No																									
BranchBuilder									Well																								
TheLobbyist								Yes		Important																							
ThinkLets for Divergence –																																	
OneMinuteMadness									Poor		More																						
ThinkLets for Convergence –																																	
FastFocus								Yes	Poor	Not important	More																						
OneUp			pressure		No			No	Poor																								
BucketBriefing											More	need to be																					
DimSum						Collective	No			Important			Yes																				
ThinkLets for Convergence –																																	
Pin the Tail to the Donkey				Yes		Collective			Well		More																						
Broomwagon				Yes			No			Important																							
GoldMiner				Yes							More																						
ExpertChoice			pressure									need to be		Yes																			
GarlicSqueezer				Yes						Not important				Yes																			
ThinkLets for Convergence –																																	
ReviewReflect												are categorized																					
ThinkLets for Organizing –																																	
Concentration															Yes																		
ThemeSeeker					No							need to be				Yes																	
RichRelations												need to be																					
ThinkLets for Organizing –																																	
PopcornSort				Yes								need to be				Yes																	
ChauffeurSort			leisure									need to be					Yes																
ThinkLets for Organizing –																																	
Evolution			leisure									need to be																					
ThinkLets for Evaluation																																	
StrawPoll																		Not obvious	Yes	Yes													
BucketWalk																						Yes											
BucketShuffle						Separate	Yes					are categorized									Yes												
MultiCriteria					Yes																Yes			Yes	Yes	No							
CheckMark				Yes, more than 100 items							More				Yes	Yes									No								
StakeholderPoll			pressure							Important				Yes					Yes	No		Yes			No			Yes					
BucketVote			pressure									need to be							No						No		Yes						
ThinkLets for Building consensus																																	
Crowbar																								Yes		Yes	Yes	Yes	Yes				
MoodRing						Separate													Yes						Yes								
PointCounterPoint																															Yes	Yes	
RedLightGreenLight											More								Yes													Yes	
ThinkLets for Combinations																																	
CouldBeShouldBe									Poor																								Yes
SevenUp			leisure	Yes											Yes	Yes				Yes	Yes												No

Figure 11: Overview of when to use a thinkLet

To see which thinkLets have many aspects on which they can be differentiated and which aspects reappear in numerous thinkLets the order is changed based on a count of filled cells per row and per column. Figure 12 shows a reordered list of thinkLets where thinkLets that can be differentiated on multiple aspects are on the top and the ones with a single aspects at the bottom. Aspects that reappear in the most thinkLets are on the left, and the ones that appear in a single thinkLets on the right. When there is a tie the original order is followed as closely as possible. Looking at the colors, indicating the pattern of collaboration, shows Evaluation thinkLets (shown in yellow) generally have many aspects between which they can be differentiated, closely followed by convergence thinkLets in blue. On the bottom divergence thinkLets (in grey) have few aspects to distinguish between thinkLets.

Figure 12 table:

ThinkLet name	Items need to be categorized/are categorized	Do you expect information overload?	Time pressure or leisure	More/less focus	Elaborate ideas	Poor/well understood issues	Stakes important/not important	Collective/separated	Measure consensus	Summarize topics	Criteria are known beforehand	Find a common ground	Prioritizing concepts within a	Provoke discussion	Experts present	Reveal patterns of (dis)agreement	Creating a shared understanding	Making a decision	Reveal patterns of agreement	Cleaning up a list	Does order matter?	Minimum Team size	Generate acceptable single statement	Obvious/not obvious single categories	Validation of comments	Do the stakeholders trust each other?	Surface and examine assumptions	Share unshared information	Reveal hidden agenda	Address a single issue	Break an impasse	Create a hierarchical outline
SevenUp		Yes	leisure							Yes		No				Yes				Yes	Yes											
CheckMark		Yes, more than 100 items		More						Yes			No			Yes			Yes													
MultiCriteria											Yes		Yes						Yes	No												
BucketVote	need to be		pressure						No				No												Yes							
FastFocus				More	Yes	Poor	Not important																									
OneUp			pressure		No	Poor								No																		
DimSum					No		Important	Collective															Yes									
Pin the Tail to the Donkey	Yes			More		Well		Collective																								
BucketShuffle	are categorized							Separate				Yes											Yes									
StakeholderPoll							Important		Yes						Yes	No																
MoodRing								Separate	Yes									Yes														Yes
Crowbar														Yes															Yes	Yes	Yes	
Broomwagon		Yes			No		Important																									
ExpertChoice	need to be		pressure												Yes																	
GarlicSqueezer		Yes					Not important								Yes																	
PopcornSort	need to be	Yes								Yes																						
ChauffeurSort	need to be		leisure															Yes														
ThemeSeeker	need to be									Yes	No																					
StrawPoll										Yes									Yes					Not obvious								
RedLightGreenLight				More						Yes		Yes																				
ComparativeBrainstorm			pressure							Yes																						
TheLobbyist					Yes		Important																									
TopFive	Yes				No																											
DealersChoice								Collective																	Yes							
OneMinuteMadness				More		Poor																										
BucketBriefing	need to be			More																												
GoldMiner		Yes		More																												
Evolution	need to be		leisure																													
PointCounterPoint										Yes																					Yes	
CouldBeShouldBe						Poor																									Yes	
FreeBrainstorming																						6										
OnePage		No																														
LeafHopper								Separated																								
Plus-Minus-Interesting					Yes																											
BranchBuilder						Well																										
ReviewReflect	are categorized																															
Concentration																									Yes							
RichRelations	need to be																															
BucketWalk																									Yes							

Figure 12: Overview of thinkLets based on frequency

Four categories are used to categorize the aspects. Three categories of conflict come from (Mostert, 1998) (i.e. Conflicting goals, Relational Aspects and Factual Disagreement). The fourth category deals with the process of the activity (e.g. previous fundamental steps, input needed for the activity, team parameters). These categories help the practitioner to find the thinkLets that address a certain type of conflict in the thinkLet database. This leads to the thinkLet overview as in Figure 13.

Figure 13 table:

Aspect Categories / ThinkLet name (Explanation of aspect)	Items need to be categorized	Do you expect information overload?	Time pressure or leisure	Collective / Separated	Summarize a topic	Criteria are known beforehand	A thinking of concepts within a category	Experts present	Making a decision	Cleaning up a list	Does order matter?	Obvious obvious categories	Address a single issue the time	Create a hierarchical outline	Min Team size	More/less focus	Elaborate ideas	Painful understanding issues	Validation of comments	Surface and examine assumptions	Share unshared information	Stakes important at important activity	Find a common ground	Prevent discussion	Reveal patterns of shared issues	Creating a shared understanding	Reveal patterns	Generate acceptable single statement	Measure consensus	Do the stakeholders trust each other?	Reveal hidden agenda?	Break an impasse
ThinkLets for Divergence – No																																
FreeBrainstorming															6																	
OnePage	No																															
ComparativeBrainstorm			pressure			Yes																										
ThinkLets for Divergence – With																																
LeafHopper				Separated																												
DealersChoice				Collective						Yes																						
PlusMinusInteresting	Yes																															
TopFive																Yes / No																
BranchBuilder																	Well															
ThinkHurist																Yes						Important										
ThinkLets for Divergence –																																
OneMinuteMadness																More		Poor														
ThinkLets for Convergence –																																
FastFocus							No									More	Yes / No	Poor				Not important										
CoupUp			pressure															Poor														
BucketBriefing	needs to be															More																
DimSum				Collective													No					Important			Yes							
ThinkLets for Convergence –																																
PinTheTailToTheDonkey		Yes		Collective												More	No	Well				Important										
Broomwagon		Yes																														
GoldMiner		Yes														More																
ExpertChoice	needs to be		pressure					Yes																								
GarlicSqueezer		Yes						Yes														Not important										
ThinkLets for Convergence –																																
ReviewReflect	are categorized																															
ThinkLets for Organizing –																																
Concentration							Yes																									
ThemeSeeker	needs to be			Yes	No																											
RichRelations	needs to be																															
ThinkLets for Organizing –																																
PopcornSort	needs to be	Yes		Yes																												
ChauffeurSort	needs to be		leisure																							Yes						
ThinkLets for Organizing –																																
Evolution	needs to be		leisure																													
ThinkLets for Evaluation																																
StrawPoll											Not obvious														Yes				Yes			
BucketWalk	are categorized			Separate				Yes		Yes									Yes													
BucketShuffle					Yes	Yes	No															Yes	No	Yes	Yes							
MultiCriteria		Yes, more than 100 items		Yes	Yes	Yes									More							Important	Yes	No	Yes	Yes	Yes					
CheckMark			pressure			Yes	No																No						Yes	No	Yes	
StakeholderPoll	needs to be																															
BucketVote																							Yes	Yes			Yes		Yes			
ThinkLets for Building consensus																																
Crowbar				Separate			Yes		Yes														Yes				Yes				Yes	
MoodRing																More											Yes		Yes			
PointCounterPoint																							Yes									Yes
RedLightGreenLight																		Poor					Yes				Yes					
ThinkLets for Combinations																																
CouldBe ShouldBe		Yes	leisure	Yes					Yes													No	Yes		Yes							
ScrewUp																																

Figure 13: Overview of thinkLets with categorized aspects

This overview gives the practitioner an overview of all thinkLets and allows to filter on three different dimensions.

The practitioner can have a look on what type of conflict needs to be addressed and filter out some thinkLets that may assist the practitioner. This categorization of aspects is organized per column.

The practitioner can consider the pattern of collaboration given in the different colors.

The practitioner can filter some thinkLets based on the previous two dimensions and an overview of all aspects the remaining thinkLets deal with is shows per row.

Appendix 30: Elements of used thinkLet conceptualization

This Appendix presents the structure of a thinkLets, coming from (de Vreede & Briggs, 2018).

''1. Name: an easy-to-remember mnemonic.

2. Capabilities: the affordances a collaboration tool would have to provide to support the procedure. ThinkLets attempt to be technology-independent and therefore describe the capabilities of a tool.

3. Actions: the individual participants must perform specific actions. The action a thinkLet incites falls in one of the following six categories: add, modify, associate, judge, aggregate, and delete.

4. Rules: in order for participants to achieve a certain pattern of thinking with the taken actions, the action each role should take using certain capabilities under specific constraints must be defined. A small change in the rules can invoke very different patterns of collaboration (Kolfschoten, Briggs, de Vreede, Jacobs, & Appelman, 2006).

5. Roles: describe the specific actions and rules that different actors in the team setting are responsible for. For example, a Devil's Advocate must perform different actions than a regular participant in an idea-tion task.

6. Parameters: This entails specified the information provided to the team to execute the thinkLet effec-tively. For example, a multiple topic brainstorm must provide the brainstorm question and the different topics.''