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THE GRIP METHOD FOR COLLABORATIVE ROADMAPPING WORKSHOPS

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Abstract

Technology roadmapping is a well-known tool for technology management, but practical advice for facilitating collaborative roadmapping workshops is relatively scarce. To cater for this need, we have designed a method for collaborative roadmapping, dubbed the GRIP method, for facilitating group work in TRM workshops. The design is based on establish best practices in facilitation and our experiences with the method suggest it is a feasible tool for technology managers. The benefits of the method are that it enables engaging a diverse group of individuals to the roadmapping process effectively even during a short workshop session and facilitates shared understanding on the technology management issues.

Keywords: Roadmapping, foresight, collaboration, workshop, facilitation

Introduction

Roadmapping is an established method for both Future oriented Technology Analysis (FTA) and innovation management. Roadmapping can be further used to integrate business planning and innovation or technology management in a way that the strategic and business objectives are met through controlled technology and new product development (Carvalho, Fleury, & Lopes, 2013; Cosner et al., 2007; Groenveld, 2007; Phaal, Farrukh, & Probert, 2004). In short roadmapping can be used either to plan for future operations, or to trickle down strategic objectives to operations, or both.

However, while the strengths of roadmapping as a tool for FTA and management tool are well recognized, the present literature is missing a practical framework to translate the high level goals to concrete actions. Most articles on roadmapping include a high level process description of the main tasks, which leaves the prospective workshop facilitator wanting for practical advice on the micro management of the roadmapping process (Carvalho et al., 2013; Price, Conway, Palmer, & Summers, 2004; Vatananan & Gerdsri, 2012). The existing literature point out that among the most important factors for successful roadmapping is the participation and integration of the right people from different departments, divisions or organizations to work for the common goal (Garcia & Bray, 1997).

Motivating people with different goals and diverse backgrounds is challenging, but problems can be averted through an explicitly defined and facilitated workshop. Thus, developing procedures and facilitation is helpful in an organizational setting to make execution of roadmapping and use of the results effective and efficient (Cosner et al., 2007; Price et al., 2004). Deviating from the perspective adopted in many previous contributions to roadmapping, the level of analysis here in our paper is the construction of the roadmaps and the tools by which the work can be facilitated. In short, the mission of this paper is to describe a design for a simple and effective method

which enables engaging a multidisciplinary group to roadmapping. Our contribution to roadmapping is the Goal Oriented Intuitive Roadmapping Process, or the GRIP-method, which aims to facilitate the group process and to raise the quality of results and productivity in workshops. The GRIP method has been to date piloted in different contexts from research planning to combined scenarios and roadmapping (e.g. Piirainen, Kortelainen, Elfvengren, & Tuominen, 2008). This paper describes an instantiation of the method in an international joint action plan or roadmapping exercise in an ongoing FP7-funded Coordination and Support Action "European Clusters for Offshore Wind Servicing (ECOWindS)".

As for the rest of this paper, we discuss the conceptual background for the GRIP-method in the second section. The third section describes the workshop design and the fourth sections an application case and evaluation of the method. The fifth and last section draws conclusions about the method and outlines the things we have learned.

Methodological approach

The methodological approach is Design Science Research (DSR) (Hevner, March, Park, & Ram, 2004; Piirainen, Gonzalez, & Kolfschoten, 2010). DSR is applicable to a range of domains when a new artefact (process, method, etc.) needs to be designed to solve a problem (Hevner et al., 2004). In this paper, we first describe the conceptual design of the artefact (the GRIP method) and further describe the evaluation of an instantiation of the method.

Conceptual framework – Overview to roadmapping literature

In short, TRM is a tool for managing the content, timing and role of future technologies and product releases (Carvalho et al., 2013; Cosner et al., 2007; Phaal, Farrukh, & Probert, 2001). Generally, a (technology) roadmap is a sort of upper level project plan, which illustrates a technology development plan and availability of technologies on a timeline, as well as the intended product platforms and products which are supposed to use the described technologies (Daim, Kocaoglu, Anderson, Phaal, & Muller, 2009; Groenveld, 2007; Phaal et al., 2001). Roadmaps are often illustrated as network diagrams, flowcharts and/or Gantt charts. Depending on the situation and requirements, roadmapping can start from existing capability and resource constraints (forecasting approach), effectively linking existing resources to strategic goals (Probert et al. 2003). The other, perhaps less used approach is roadmapping from the future needs (backcasting approach) (Bray, Garcia 1997).

To design an effective method, we are interested in the challenges and success factors for roadmapping. The literature has discussed success factors and barriers for successful roadmapping particularly in technology development context. The success factors include such items as "getting the right people involved", "clear and effective process", "effective tools/techniques/methods" and "effective facilitation". On the other hand, the major barriers are "distraction from short-term tasks", "needed knowledge not available", "lack of process" as well as "lack of tools/methods and lack of training" (Carvalho et al., 2013; Lee, Phaal, & Lee, 2011; Whalen, 2007). Groenveldt (2007) lists also different backgrounds, ways to work and cultures as challenges in constructing the roadmap, as a multidisciplinary effort is usually required. In a corporate-wide roadmapping effort additional challenge is integrating the different views and roadmaps between units, who may have quite different processes, customers, markets etc. (Cosner et al., 2007; Vatananan & Gerdsri, 2012).

Within the overall roadmapping process, our explicit focus is how to organize and facilitate a roadmapping workshop for satisfying results when working with multiple stakeholders and interests towards a common goal. For example Lee et al. (2011) found that effective roadmapping process, including the human factors, is an important determinant of roadmap

utilization. In fact it is argued that the dialogue during the process is as large a benefit for the organization as the roadmap itself (Vatananan & Gerdsri, 2012).

The review draws attention to a gap or an opening for a method description that alleviates the problems in group work in roadmapping as well as other goal-oriented planning tasks, and fills the need for practical and easy-to-follow guidance for practical roadmapping. Research on group work have found numerous reasons for poor teamwork: waiting to speak, domination, fear of speaking, misunderstanding, inattention, lack of focus, inadequate criteria, premature decisions, missing information, distractions, digressions, wrong people, groupthink, poor grasp of problem, ignored alternatives, lack of consensus, poor planning, hidden agendas, conflict, inadequate resources, and poorly defined goals (Balthazard, Mittleman, Briggs, Vogel, & Nunamaker, 1996; de Vreede, Davison, & Briggs, 2003). Our workshop design is aimed to alleviate these problems by facilitation design based on an existing and proven workshop design.

The design of the collaborative roadmapping process

The KJ method is an idea generation, problem decomposition and solving method developed by, and named after the initials of, Jiro Kawakita (Kameoka, Yokoo, & Kuwahara, 2004; Scupin, 1997). he KJ method can be used for idea generation, analysis and classification of data, problem solving or for example goal decomposition (Ibid.) The method aims to enhance group work and consensus building through facilitation and structure; the participants can focus on the issue at hand and the facilitator keeps the schedule and directs the work. The application of the KJ method to the design for the goal oriented intuitive roadmapping (GRIP) workshop process is elaborated below the summarizing Figure 2.

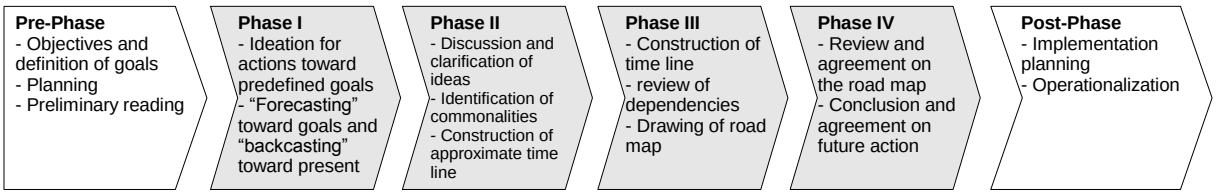

Figure 1. the GRIP method outline (adapted from Oshiro, Watahiki, & Saeki, 2003)

The GRIP process starts with stating the purpose and objective for the workshop, and presenting any necessary orientation to the topic. The group process starts with idea generation by posting ideas on posters. The whole group can see others' ideas and use them as a springboard for further ideas. The ideas can include both bottom-up and top-down perspectives to bridge the gap between the present and future goals with clear "action items" which are supposed to be on the path from the present to the goals. The items can be understood as intermediate sub-goals, deliverables or actions needed to achieve the goals.

The idea generation is followed by discussion and grouping the ideas. The ideas are discussed and grouped according to semantic and/or conceptual similarity. The ideas can form groups of three or less, so that the subtle differences in ideas are preserved, while aggregating the data to make it easier to handle. After discussion, the idea groups are assigned a headline which envelops the ideas in the group. The separate notes are piled up so that only the theme will show. Ambiguous wording of ideas or unclear thoughts can be rephrased and further ideas can be added during this phase. In this application, the worksheet is a timeline and the items are grouped according to similarity, and the theme groups are positioned in approximate order of occurrence to the timeline.

After the discussion, the group reviews the order of the action items. The worksheet gives the possibility to use the second, vertical, dimension to illustrate different levels of analysis. For

example, technology roadmaps may have e.g. strategic, market, technology, platform, and product levels. After the group reaches a consensus on the order of the items, the roadmap (-s) for the goal (-s) is drawn through the appropriate action items or groups of items. Lastly, the group prioritizes the ideas by giving points to the action items or groups in order of importance.

In the final stage the roadmap is reviewed. One of the participants may present the roadmap to others and the group discusses the results. The sticky notes can be also permanently glued to the worksheet or the chart may be digitized for further use.

Description of the instantiation of the design

Here we describe an instantiation of the GRIP method applied to roadmapping from an on-going EU FP7 CSA called “European Clusters for Offshore Wind Services (ECOWindS, 2012-2015, www.ecowinds.eu). The GRIP was used in a one-day workshop where altogether 31 stakeholders of Offshore Wind Service industry came together to develop a Joint Action Plan (JAP) for research, development and innovation specifically for offshore wind services. The group of stakeholders comprised representatives from organisations for R&D and education, policy makers and offshore wind industry. The workshop programme is presented in Figure 2.

The key objective for the workshop was to develop actions that support the future development of the Offshore Wind Service (OWS). The first third of the workshop was the introduction to the topic through presentation of the analysis of OWS industry in the regions around the North Sea and discussion on the objectives for research, development and innovation in OWS. The orientation ended with a round table discussion and prioritisation of objectives, i.e. Strategic Orientation, to focus the idea generation for RDI actions.

9:00 Welcome
- Introductions (Morten Basse)
- Project and Workshop overview

9:30 Results from the Regional Mapping
- SWOT
- Strategic Orientation
- International Cooperation Strategy
- Discussion on and prioritizing the strategic objectives
- + Coffee break

11:30 Idea generation – Actions to realize the strategy
12:30 Lunch
13:30 Discussion, analysis and grouping of the actions
15:00 Afternoon coffee
15:20 Organization of the actions to a timeline
- Organizing the ideas
- Prioritization of the actions
- Identification of dependencies, drawing a roadmap

16:20 Wrap-up discussion
- Summary comments and reflection on the results
- Next steps in the project

17:00 Workshop ends

Figure 2: Workshop programme outline

After the orientation, the group followed a variation of the generic GRIP process. The first phase was generation of ideas for action in three categories: policy actions for the framework conditions, business development actions and RDI topics to work on. The group was split to three sub groups according to own identification. Policy makers and representatives of public

administration was one group, representatives from the industry, another and representatives from research and education institutions the third, matching the themes for the actions.

The idea generation started with a few minutes of individual reflection of the orientation and idea generation, after which the participants were instructed to join their groups in front of their 'own' worksheets to continue. The groups did two rounds of idea generation around the worksheets, changing from one sheet to another, reading others ideas and adding their own until each group had visited each three worksheet twice.

In the analysis phase, the GRIP was adapted due to the volume of ideas and number of participants. The sub groups were tasked to collaboratively group or cluster the initial ideas on their 'own' worksheet, without direct influence from the facilitators. The groups were given rules to discuss and clarify unclear ideas, group similar ideas thematically into clusters, and develop headlines for the clusters on new notes. Some of the idea clusters are illustrated in Figure 3; henceforth the idea clusters are called 'actions'. In addition the groups were asked to select a spokesperson for placing the actions to the roadmap canvas.

Figure 3: Some clusters of raw ideas from the workshop (Colours indicate the group where idea came from, the opaque ideas are post-workshop adjustments to the clustering)

The drafting of the timeline was a plenary session. After the clustering was settled, the groups were tasked to select a spokesperson to position the actions (idea clusters) on the roadmap canvas. The spokesperson of each group placed the actions to the timeline, while giving a summary walkthrough of the logic of placing. Another adaptation to the generic GRIP was moving prioritisation before roadmapping. After placing the clusters, the participants had a time to prioritise the actions they thought to be the most important for the future of OWS. The prioritisation was done in practice with little stickers, which were glued to the idea clusters. The rules were that each participant had 8 stickers, and they could be distributed between the

actions any way the participants saw fit (Figure 4). The prioritisation was finished off with a quick round table discussion on the priorities.

Figure 4: Prioritised idea clusters on the timeline

The last phase in the work was drawing a critical path, the roadmap, for each group through the actions. The task given to the three groups was to illustrate a critical path between the actions towards achieving the goals selected at the start and give a three minute presentation on the logic of the critical path and key assumptions.

The workshop finished with the three groups' presentations on the critical paths and a wrap up presentation picking up the key goals and important themes on the discussion and finishing off with the next phases of the project and when the stakeholders could expect further communication. In post process, the results were analysed by going through the ideas individually, transcribing them to a presentation and the clustering was checked and adjusted slightly (Figure 3). The critical paths were also transcribed and votes were count. The participants were sent a thank you note with a presentation of the results, including the idea clusters, voting results and illustration of the action plan (Figure 5).

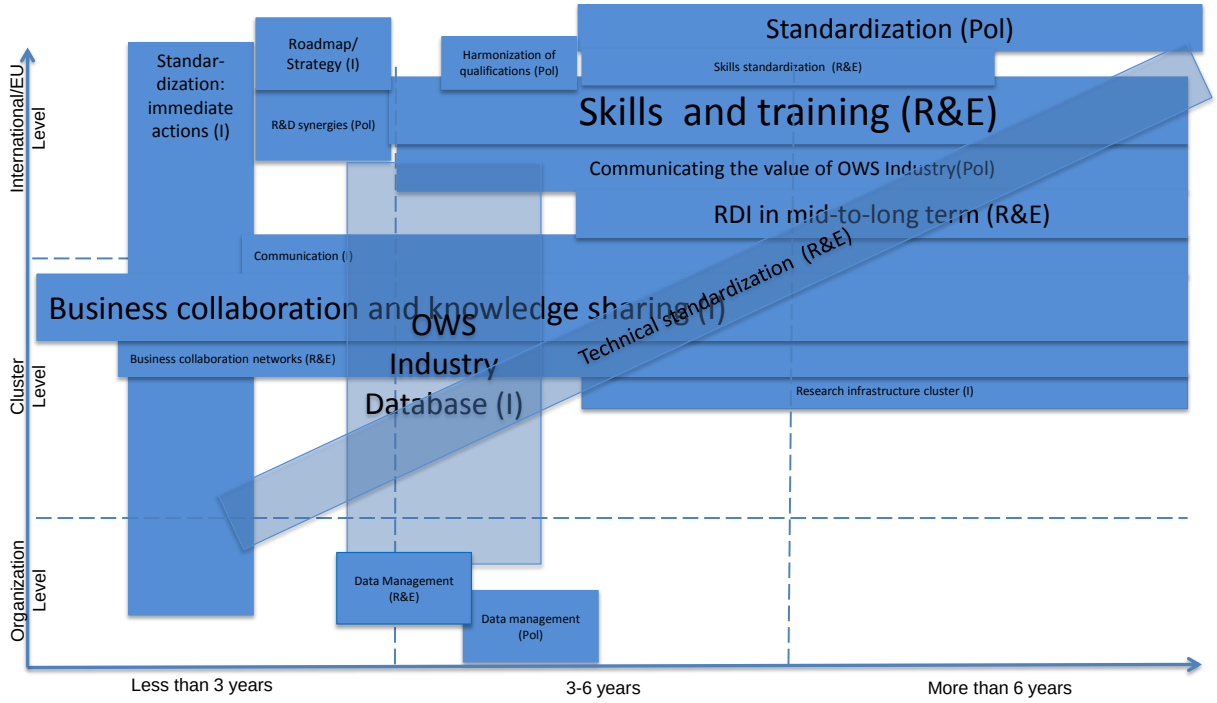

Figure 5: Draft JAP with initial clusters after the workshop (font size indicates number of votes received during prioritisation, size and position indicate timing and level of action, source group of the action indicated in parenthesis, key I=Industry; R&E=Research& Education; Pol=Policy-makers and agencies)

Results, discussion and implications

The evaluation of the GRIP in this context is based on workshop participant feedback. Feedback was sought through a post-test satisfaction survey. The rationale for this measurement was that satisfaction and trust to the method is a prerequisite for trusting the results. The actual impact of the JAP will be determined in part by the activities of the project, so here we try to isolate the effect of the method. The survey was distributed to all 31 participants, and 9 complete answers were retrieved, giving a response ratio of 29%. As a background, all of the participants reported they had participated in similar workshops ‘sometimes’ on average, or at least ‘rarely’. They reported that on average they believed that a systematic facilitated process will enable better results.

According to the survey the participants on average agreed with statements saying the goals of the workshop were clear, the goals were reached and that the method supported their work. Statements concerning trustworthiness, usefulness, and relevance of the results were rated between 4.33 and 4.4 (on the scale 1-5), indicating that the process succeeded in delivering relevant content to the JAP. The open ended feedback was scarce. Idea generation and prioritisation was said to be very useful, the transitions between phases and documentation of the workshop (on the spot) were proposed as the main thing to work on. Thus the open ended response support the proposition that the method itself is enabling effective roadmapping, as the critical comments are more focused on practical aspects of organisation of the workshop.

On a critical note, the participants indication that they are slightly more positive than neutral regarding the facilitated process can indicate a proportional positive bias in the evaluation. However, what is important in practical terms is that the participants were quite satisfied with the

actual results. The process and facilitation may need some refining, but the basic structure seems to serve the purpose of organising such a workshop. As for the sample properties, the participants were professionals from public sector, academia, educational institutions and industry, from the UK, Denmark, Germany and Norway, and their approximate age was between late 20s and 60s, the sample was predominately male. This gives a relatively good platform to generalize the findings such as they are to at least North European context. The findings are corroborated by the previous pilot runs with the method (Piirainen et al., 2008).

Conclusions

Summing up the main argument in this paper: While roadmapping is a well-known and researched tool for planning and management, practical advice for facilitating group work in these workshops is relatively scarce. To fill this gap, we have designed a method for collaborative roadmapping, dubbed the GRIP method, for facilitating group work in roadmapping workshops.

The contribution of this paper is the GRIP method for collaborative roadmapping. The GRIP can be used as a stand-alone workshop for example within a department of similar sub-unit, to kick-start a more exhaustive roadmapping process fast and efficiently, or GRIP workshops can be arranged sequentially to iterate roadmaps. The collaborative and democratic nature of GRIP makes it very well suited for stakeholder hearings side-by-side with a larger roadmapping effort using other methods.

To further outline the practical implications and potential benefits of the method we can consider the experiences described above. Overarching findings from the experimental GRIP workshops include that the method enables ‘democratic’ participation of a relatively large group of people with relatively small facilitation resources; the participants generally feel that the idea generation enables them to contribute their ideas and have a voice in the process. The method enables extracting a large number of innovative ideas from the participants.

Beside the basic roadmapping application, the GRIP can be developed further to be used in requirements engineering or goal decomposition (Bleistein, Aurum, Cox, & Ray, 2004; Ohshiro, Watahiki, & Saeki, 2005), and for example backcasting to create normative scenarios from future visions (Dreborg, 1996; Quist & Vergragt, 2006). General management or policy implementers can benefit from the method when upper management hands over strategic goals which need to be translated to action plans, strategic management can use the process for more abstract roadmapping and scenarios, and even on the project team level the group might benefit from creating a shared vision through the proposed process.

Now that we have designed a method for TRM, and proposed it is useful in practice, we must not forget what happens afterwards. What really makes of breaks a roadmapping project is including the results in management and ensuring they have the impact they deserve (e.g. Cosner et al., 2007). The GRIP can help in including a diverse group of stakeholders and managers to the process, and gaining quick results effectively, but one must not forget getting support for roadmapping and the internal PR and implementation work to really make the methods useful. To summarize, we have described the GRIP method as a design to aid in practical execution of roadmapping. We consider that our results are encouraging, and we would like to encourage trials and modifications to different contexts.

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