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Making sense of future uncertainties using real options and scenario planning



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ABSTRACT

Healthcare across the world is facing many uncertainties. In Dutch healthcare, a recent policy change is forcing health organizations to deal more efficiently with their real estate, and this increases the need for real estate strategies that are more flexible. In order to support managers in incorporating flexibility in their decision-making over the design of new healthcare facilities, we have developed a method that combines scenario planning and real options. Scenario planning enhances sensemaking over the consequences of future uncertainties, and real options should help in addressing flexibility in decision-making through weighing the pros and cons of flexibility measures. We illustrate the sensemaking process by applying the method to a hospital, to a forensic clinic and to a care organization for vulnerable citizens. Data collection took place through interviews and workshops. We found that the identity and characteristics of the workshop participants influenced the sensemaking process. The method proved a useful means of making sense of abstract uncertainties that influence an organization, aspects that are normally outside the scope of real estate managers. The real options approach offered a more structured way of balancing the costs and benefits of strategies in dealing with future uncertainties.

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1. Introduction

Healthcare provision is changing rapidly due to demographic changes, financial pressures, medical-technological developments and policy changes. Governments and healthcare providers across the world are looking for ways to cope with booming healthcare costs in a time of decreasing public budgets. To address these challenges, governments have introduced competition among healthcare providers. Marketization in the health sector is seen as essential in limiting costs. In various European countries, marketization has received an impulse from new policies that demand a more business-like operation of health organizations, resulting in increasing importance being given to efficient and professionalized real estate management. This implies a need for the strategic management of real estate that meets both current and future demands within the organization. Further, real estate managers have to deal with the different interests of the various stakeholders within the organization.

An important challenge for healthcare decision-makers is how to achieve the flexibility necessary because of the uncertainties surrounding healthcare [1–3]. The real options theory [4] is a promising approach for providing a more differentiated insight into how flexibility can be created, its value and the consequences. A real option is defined as a right,

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but not an obligation, to exercise an option [5]. Myers [6] applied options to *real* investments: so-called real options [7–10]. Real options provide value through the ability to be flexible, and the importance of this increases as uncertainty increases. The literature on real options tends to focus on the quantitative valuation of real options [11]. In our research, the real option concept is used to stimulate practitioners to think more strategically about flexibility, and to indicate the type and extent of flexibility that is needed. Flexibility refers to changing the configuration of an asset in order to enable adaptation to future changes in demand [2]. For instance, a hospital can be designed in a way that an expansion of the hospital can take place incrementally, by leaving sufficient space on the site to meet possible future needs. An important issue is the right amount of flexibility to invest in. Too much flexibility makes real estate unprofitable, while too little flexibility may hinder the primary process.

We studied how real option thinking could support decision-making over the design of new healthcare facilities. For this purpose, we combined the scenario planning approach with real options theory. Scenario planning is used to structure and guide thinking on future uncertainties. Real options imply that one creates flexibility by investing in an option. If an uncertainty develops in a certain way, one can decide to exercise the option or not. One should weigh the consequences of a strategy with and without the real option under different scenarios, i.e. different ways in which the uncertainty(-ies) might develop. Various types and techniques of scenario planning exist [12–14]. We used contextual scenarios to enhance awareness of the uncertainties that influence healthcare in general and the organization in particular.

By recognizing plausible futures, a more resilient real estate strategy, one that is able to adapt to various organizational goals, can be developed. This combination of real options thinking and scenario planning was suggested by Miller and Waller [15] because both approaches have complementary strengths and weaknesses for managers making strategic decisions under uncertainty. The approach requires managers to make their assumptions about contingencies that affect real options values more explicit, and challenges managers to develop coherent approaches to risk management [15].

In studying the usefulness of our approach, we used the sensemaking concept as our analytical framework. Sensemaking is a social process during which members of an organization interpret their environment in and through interactions with others, thus constructing observations that allow them to comprehend the world around them and to act collectively [16]. In our study, sensemaking involves the process needed to turn the awareness of a requirement for flexibility into concrete real estate strategies. Consequently, the aim of our study was to develop an understanding of how managers make sense of future uncertainties and the options open to them. We therefore formulated the following research question: *Do real options thinking and scenario planning enhance collaborative sensemaking in dealing with future changes and strategic options?* In order to answer this question we organized three workshops: in a hospital, in a forensic clinic and in a care centre for the elderly and those mentally at risk. These three health organizations all had to make major real estate decisions that could have far-reaching consequences. A workshop was thought to be the most suitable experimental setting to investigate the sensemaking process. Here, various stakeholders can be brought together to think about and discuss strategies and decision-making with regard to their real estate management. In the workshops, we applied the concept of real options thinking in combination with scenario planning. The results of these workshops are presented in this paper.

This article is structured as follows. First, in the theoretical framework section, the basic characteristics of sensemaking are related to concepts of real options thinking and scenario planning. Next, in the method section, we elaborate on the operationalization of sensemaking, through real options thinking and scenario planning, which we then addressed in interviews both before and after each workshop. The case findings are presented in the results section. A cross-case analysis is presented in the subsequent section. We conclude with recommendations on the application of real options as an approach for managers faced with strategic decisions under uncertain conditions.

2. The sensemaking framework

Through sensemaking, individuals give meaning to the events and actions taking place in an organization. Sensemaking is undertaken by individuals in interaction with others, each having their own socially constructed reality based upon their experiences. Collective sensemaking takes place when individuals discuss their insights and knowledge obtained by individual sensemaking. In this way, tacit knowledge of individuals becomes more explicit and usable. Individuals communicate this knowledge to convince other members of the organization to act upon the new knowledge. Using arguments might lead to collaborative or organizational sensemaking which leads to action [17]. Weick [18] makes a distinction between belief-driven and action-driven sensemaking. Belief-driven sensemaking is a result of combining argument and expectations. Arguing can result in collaborative sensemaking since people challenge each other with their beliefs and in that way clarify new ideas. These beliefs are then embedded in expectations that guide interpretation. The process of arguing and forming expectations results in collaborative frames that influence what people see and how events unfold. Events unfold in a certain way because people believe it to be that way. During action-driven sensemaking, organizational members tie this belief to actions [18]. Actions have to follow belief if the desired event is to happen.

In our research, we wanted to find out if there was a shared belief over the important decisions to be taken regarding real estate in which flexibility played a role in dealing with uncertainty. This would be the starting point for belief-driven sensemaking regarding flexibility. Action-driven sensemaking, in the form of commitment, starts with an action for which

someone is responsible. In this research, we focused on belief-driven sensemaking since our focus was on the decision-making rather than on the implementation of that decision or action.

Sensemaking takes place within a sequence of actions in which *cues* are recognized. Meaning is given to these cues through framing. *Frames* influence how people act and how they make sense of cues. “The content of sensemaking is to be found in the frames and categories that summarize past experience, in the cues and labels that snare specifics of present experience, and in the ways these two settings of experience are connected” [18]. In this section, we will describe the cues and frames features of sensemaking in more detail and explore how these features can be related to real options and scenario thinking.

2.1. Cues and frames

When individuals interact with others, each with their own socially constructed realities based on their experiences, sensemaking takes place. Sensemaking is a process which starts by people noticing cues. Cues are seen as those observable events that are inconsistent with people’s expectations and require further attention because they generate for the people a certain level of discomfort. Sensemaking involves the noting of cues, their interpretation, and then externalizing these interpretations through concrete activities. People can only absorb a certain number of cues without reacting, after which they experience a ‘shock’ that initiates the sensemaking process [18]. The two most common sensemaking events that generate shocks are ambiguity and uncertainty.

In terms of scenario thinking, past cues have meaning for future developments and are, in that sense, used in scenario thinking. Gioia et al. [19] argue that making sense of the future is possible by ‘retrospectively’ looking at events that need to happen in order to reach a future situation (a process known as backcasting). Godet and Roubelat [20] propose using multiple imaginary futures to make people aware of important future phenomena and interrelationships and then to act upon. Boland [21] found that people gain a better understanding of actual past events if they have an understanding of what had been done in an imaginary future. Weick [18] also recognized that this meant that “sensemaking can be extended beyond the present. As a result, present decisions can be made meaningful in a larger context than they usually are and more of the past and future can be brought to bear to inform them” [18]. Wright [22] emphasizes scenario thinking as a tool to confront existing mental models and therefore create shocks to enhance sensemaking and strategizing. Prospective sensemaking requires “both an attitudinal and task response that involves acts of exploration and interpretation in an imagined future” [22].

Framing is used in labelling the meaning that individuals attach to events, something that is influenced by their context and experiences [23]. A frame influences how individuals act: they map events, with the causes and effects in which they have a role, interpret these and take action based on that map [24]. Frames “enable people to locate, perceive, identify, and label occurrences in their lives and world” [25]. As such, frames are the substance of sensemaking. Cues make sense within a certain frame and, because of this, a connection between the two is made.

2.2. Applying the sensemaking framework

In this study, we see cues related to real options thinking as past events that respondents notice and recognize as real options, such as investments that create a real option. Also, future events that the workshop participants identified as actions to create and to exercise real options are cues. In terms of scenario thinking, cues are events that respondents observe as having an uncertain or until then unforeseen impact on the organization and also on the identified potential future developments that form part of scenarios. As a result, people may feel ambiguous and uncertain about the future. Cues presented in the workshops challenge the participants’ understanding of what real options and flexibility are. Since the participants’ current frameworks are unsuited to giving meaning to a certain cue, the framework is adapted, by making sense of the new concept, to create a revised framework in which the real options concept fits. Cues presented in the workshops might create ambiguity and uncertainty by showing the organization to be insufficiently prepared for possible future situations. This might even create a shock that leads to action to deal with the uncovered ambiguity and uncertainty.

We focus on how people develop strategies through real options and scenario planning. Strategies are plans to achieve a certain goal, and therefore cause-effect relationships are important. Adopting the real options concept as a way of thinking means, for most organizations, a change in strategy since it is an uncommon approach. Sensemaking has to occur in order to change the frame. For example, perceiving real estate as a commodity for creating profit, or as a means to facilitate the primary process, are two different frames. A cue will then be a concrete action, such as adapting spaces to accommodate more or fewer people. Within our workshops, we tried to influence sensemaking by presenting the structure of real options thinking, which we further clarified by drawing examples from practice. We tried to evaluate whether structured thinking involving real options was understood and whether it occurred in practice.

Sensemaking through using scenarios occurs if participants in a workshop are able to agree on how certain plausible futures might evolve, i.e. which cause-effect relationships are likely to occur (see Table 1). Sensemaking is not necessarily reaching consensus about solutions: it is reaching consensus and raising awareness on important issues to find solutions for. Once consensus has been reached on a future frame, scenario-thinking assists in another aspect of sensemaking. Framing is an important concept in sensemaking since decisions cannot be made independently of their context. The contextual

Table 1
Sensemaking, real options and scenario thinking.

Sensemaking aspects	Elements of sensemaking with real options	Elements of sensemaking with scenario thinking
Cues	Recognize future cues in scenarios, and future decisions to be made to create real options in strategies	Future cues with consequences for scenario development
Frame	Real options recognized in past decisions/events Shared perception of need for flexibility Measures taken for flexibility Structured thinking with real options	Consensus on current uncertainties and future evolution in scenarios; cause–effect of uncertainties on organization
Belief driven sensemaking	Arguments used with regard to flexibility measures and real options	Arguments and way of reasoning with regard to scenarios and strategy development in backcasting

scenarios function as the frame in which decisions have to be made. The plausible futures, or scenarios, guide participants in making sense of their potential future need for flexibility, what type of flexibility this is and how it can be created. Using backcasting, participants deduce the future cues that need to take place in order to change from the current organization and accompanying real estate layout to the desired future real estate layout.

3. Structure of the workshops and interviews

In this section, we elaborate on the methods we have applied and provide a description of the contexts of the three case studies. First, the focus is on the set-up of the workshops and characteristics of the workshop participants. Second, we describe the operationalization of the sensemaking features that were addressed in interviews both before and after the workshops. Next, we explain how the success of the workshops, in terms of generating sensemaking over uncertainty and flexibility measures, is evaluated. Finally, we present the case organizations.

3.1. Structure of the workshops

We conducted workshops within three health organizations from August until December 2012. Each workshop took about three hours and contained three stages as illustrated in Fig. 1. Each health organization had at least one ongoing real estate project and was also struggling to cope with the current developments in healthcare. Observing the workshops is an important part of this case study research since belief-driven sensemaking takes place through arguments, which therefore need to be observed by the researchers. An external expert and two or three researchers, in addition to the employees of the organization concerned, participated in the workshops. One researcher functioned as workshop leader. The other one or two researchers were observers and took notes of the arguments used during the discussions. In addition, observations made in the workshop were confronted with statements by respondents in the *ex post* interviews. In this way, the data are triangulated. In the workshops scenario planning and real option thinking were combined. Most of the workshop participants had a long history of working in healthcare, and often in the same organization (see Appendix I). In most cases, the knowledge of the participants was sufficient for them to think on both abstract and strategic levels, something that is needed to translate strategic issues in real estate into concrete consequences.

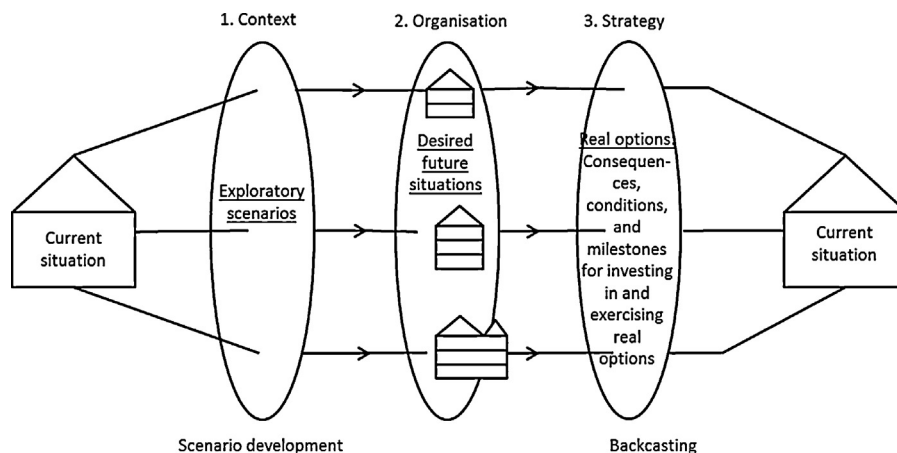


Fig. 1. Workshop stages.

The *first stage* of the each workshop consisted of discussing contextual scenarios. These scenarios were short narratives described on a PowerPoint slide based on key uncertainties or future developments that were mentioned by the participants in the interviews prior to the workshop. In other words, the results of the earlier interviews where respondents had elaborated on their perspectives on which developments will influence the organization were used. Sensemaking took place through discussion and argument to create scenarios on which consensus was achieved. Plausible scenarios on which participants agreed thus became shared frames of how the future might look and, based on which, strategies could be developed.

In the *second stage*, the workshop participants defined future situations that their organization might find itself in, such as providing healthcare under the different scenarios. Commonalities within these future situations had to be determined, which would then be the desired situation. The participants also determined the consequences of these various outcomes for the layout of their real estate. They evaluated whether this would require adaptation of the current situation, and hence whether there was the need to develop real estate strategies that provided for these adaptations.

Within the *third stage*, using backcasting and real options, a strategy was developed that incorporated flexibility measures to reach the desired future situation. Here, one reasons backwards in order to develop a strategy using real options as part of this strategy. In an analogy with sensemaking, a shared meaning is created among participants with their frames of reference now overlapping. In order to develop scenarios that the participants could agree upon, we chose to use only two main uncertainties on two axes. One can speak of participative backcasting where the involvement of stakeholders in the process of scenario development is a key feature [26]. This belief-driven sensemaking process should result in an action being taken in response to the sensemaking.

3.2. Interviews before and after the workshop

Since sensemaking is an ongoing process, the thinking about real options and scenarios is likely to change. In order to ‘measure’ these changes, the workshop participants were interviewed both a few weeks before and after the workshops to test whether the real options concept and scenario thinking was helpful and aided their sensemaking over future uncertainties. In addition, we used the information provided in the *ex ante* interviews as input for the workshops. The focus was on both the process and the content of sensemaking. The process of sensemaking deals with questions as to whether people make sense of flexibility measures to deal with future uncertainties through real options and scenario planning and, if so, how and why. The content of sensemaking deals with the question as to whether the workshop delivers useful insights for the participants. We opted for semi-structured interviews rather than surveys because interviews provide room for clarification of the answers and for greater insight into the sensemaking process, which is difficult to grasp from surveys.

In the interviews, we first discussed *cues*, or observable aspects, of events which challenge people’s current frames and beliefs. As such, a cue mobilizes a person’s sensemaking activities in order to make meaning of these events and eventually take action. Certain events could plausibly recur in the future, or evolve in a certain way, but how and to what extent is uncertain. Before the workshop, we asked about and discussed with workshop participants and experts the key uncertainties that they thought would have a large impact on the organization if they evolved in a certain way.

In the interviews before the workshop, in order to investigate current actions regarding flexibility, we asked about measures that had already been taken to create flexibility. We also asked the participants for their definitions of flexibility to see to what extent they agreed on the meaning we had assigned to flexibility, and consequently whether their frame corresponded to those of the other participants. A similar question addressed how they perceived the need for flexibility. After the workshop, in the second interviews, we asked the participants whether they now defined flexibility and the need for it differently as a result of the workshop.

We also used the real options thinking frame in the interviews, and the structure of the real options concept provides a theory of action on how to approach decisions regarding flexibility. Real options can be applied both in the process and the product [2], i.e. ‘on’ and ‘in’ large engineering projects, a description that fits many healthcare construction projects. Real options ‘on’ projects focus on accelerating or deferring projects whereas real options ‘in’ engineering systems focus on optimizing the technical design [2]. Various types of real options [27–29] are presented in Table 2 with concrete examples that are applicable to real estate management in healthcare.

Table 2
Types of real options.

Type of real options	Project management	Examples of application in healthcare real estate construction projects
Defer	‘on’ the project	When there is uncertainty over governmental regulations, the project might need deferral
Growth, switch function	‘in’ the project	Other demands can necessitate using the switch function to expand/shrink the real estate
Growth, scale up or down, switch function	‘in’ the project	When demands placed on the organization change: expand the building, scale up or down, or switch function
Abandon	‘on’ the project	When finance cannot be obtained, it should be possible to abandon the project
Select	‘on’ the project	Involve several architects to obtain knowledge, and then identify and select the best one
Stage	‘on’ the project	A construction project is often irreversible. By staging the project, go: no-go moments are created after each stage

Table 3
Sensemaking features identified in interviews prior to and after the workshop.

Interview topic	Measure prior to the workshop	Measure after the workshop
Cues	Key uncertainties influencing the organization as a result of past events	What uncertainties have not been sufficiently considered in construction project(s)?
Frame	Consequences of future uncertainties and past events Need for flexibility Flexibility measures taken Real options (reasoning) already unconsciously applied ^a	Shared perception of need for flexibility Statements on the use of scenario thinking and real options thinking Statements on the applicability of real options Intended use of real options as a result of the workshop

^a The workshop participants were not familiar with the concept of real options prior to the workshop. Here, we mean that people were using real options but not defining them as such.

We also asked respondents before the workshop if there were real options they could assign to investments they had previously made. After the workshop, we asked the participants whether the structuring of real options in the proposed framework made sense, and how it would be used in the future, by asking the respondents to reflect on various statements. We measured if sensemaking took place and how scenario planning and real options thinking influence the sensemaking process. Here, we used a five-point Likert scale to make it easier to compare results. We also obtained similar information on various subjects in a structured and more comprehensive way from the workshop participants. The operationalizations of the sensemaking properties measured in interviews before and after the workshops are presented in Table 3. In terms of Yin [30], the theoretical pattern derived from the sensemaking concept is confronted with empirical data from the workshops and the interviews.

3.3. Evaluation of the workshops

Burt and van der Heijden [31] propose evaluating futures studies using three elements identified by Vickers [32]: how people perceive reality, how they value this reality and which strategies and instruments they identify as suitable to eventually alter this reality. Judgments on these elements result from sensemaking. Vickers developed a system to analyze such a sensemaking process. We use this system to evaluate the success of the workshops in generating sensemaking on uncertainty and flexibility measures by analysing whether collaborative sensemaking took place. This evaluation involved the following three types of judgement identified by Vickers:

- *Reality judgements* that are based on sensemaking of the situation, by identifying problems and key uncertainties, or cues, that influence the organization. These judgments were formed during the preparation for the workshop when subjects for discussion arose and key uncertainties were identified as input for the scenario development within the workshop.
- *Value judgments* give meaning to reality judgments, “as a course gives meaning to a compass card” [32]. One values reality judgments based on their desirability, and possibly whether they demand corrective action. This element is present within the workshop when participants make sense as to which scenarios are plausible and what issues currently play a role in the organization. In addition, they make sense of the real estate consequences for the various scenarios and if these will require adaptation of the current real estate. Here, the opinions and worldviews of the workshop participants are challenged.
- *Instrumental judgements* imply strategic choices. If a situation is judged as undesirable, the instrumental judgement deals with the question as to whether something can be done about this. This is the stage where, by means of backcasting and real options, a strategy should be developed that includes flexibility measures. In an analogy with sensemaking, shared meaning is created among participants, and their frames of reference become overlapping. This belief-driven sensemaking process should result in an action.

3.4. The case organizations

The first case study involved a regional hospital that was built in 1975. Over time, the building had been extended on all sides and had become obsolete and inefficient. Historically, the catchment area has been very stable but the management expects the competition will increase in the future due to the construction of new and more modern hospitals in the vicinity. The initiative for a new local hospital dated from 2007 but, due to financing problems, construction has not started. Various new developments were forcing the hospital organization to reconsider the design. During the period that the research took place, construction was delayed due to financial constraints. A construction coordinator is in sole charge of managing the real estate, and a service centre is responsible for maintenance and technical support. Participants representing various functions within the organization participated in the workshop and they were all, to some extent, involved in the new project.

The second workshop took place in a forensic clinic that had merged with a large organization that owned 600 sites. The mother organization had recently started to establish an expertise centre on real estate development. Each location had its own service centre manager, responsible for maintenance and small renovations and adaptations, backed up by a service centre. The two participants in our workshop were the real estate project manager, who is in effect the one-person real estate department of the overarching organization, and a service manager from a clinic that was in need of renovation.

Table 4

The three scenarios discussed in the hospital workshop.

Trend scenario	Scenario A	Scenario B
Continuing mild recession in the Netherlands	Economic boom, European integration	Economic recession, European segregation
Increasing healthcare costs Ageing population, issues with diseases linked to modern society Gradual introduction of marketization. Lack of focus on prevention	Health costs increase in Europe Large demand for Dutch healthcare from the whole of Europe Europe-wide health system. More cross-border healthcare. More marketization. Less prevention Importance of patient orientation	Large income differentials in and between regions 'Brain drain' of doctors and personnel, healthcare worsens. Competition from other countries Poor healthcare provision. More government control on healthcare provision. Focus on prevention
More competition. Patient-oriented		Low efficiency: low level of cooperation among healthcare providers
Innovation in construction industry. Poor market for office buildings Lack of personnel	Advanced construction and medical technologies. Focus on lifecycle costing Greater efficiency: fewer personnel needed because of technology	Low construction costs, high maintenance costs. Low level of innovation Difficult to obtain loans from banks
More attention to lifecycle costs	Downscaling, locations in residential areas, home delivery of healthcare	Clustering of functions on outskirts of towns
More outsourcing of service tasks	Medical solution to dementia	Fewer diseases linked to modern society because of 'crisis menu' (people have less money for unhealthy food)

The organization had the aim, as a cost-saving measure, to professionalize the service centres and disband the overarching expertize centre. Over time, the clinic has developed a specific concept that was closely linked with the building's layout but this concept had become difficult to maintain as a result of a new policy regarding the healthcare system and safety norms established by the Ministry of Security and Justice.

The third case was a care organization for elderly and mentally disabled individuals that came about through a merger. It has around 250 locations in the northern part of the Netherlands and 4500 employees. Whereas the forensic clinic in the second case study had decentralized service centre managers, the care organization had centralized this function. Three years earlier, a separate corporate real estate department, as part of a facilities centre, had been set up which was solely responsible for maintaining and developing real estate. The financial situation of the organization was considered sound although governmental policy changes were forcing them to be more efficient.

4. Results

In this section, we describe for each case whether sensemaking had taken place during the overall process. [Appendix II](#) includes the responses to statements posed in the post-workshop interviews that assess both the content of the workshop and the methods used.

4.1. The hospital

The uncertainties in the scenarios developed (see [Table 4](#)), as events with cues that influence the organization, were recognized by the workshop participants although they felt that the researchers had missed one important uncertainty: the influence of health insurance companies. The participants seemingly shared a frame of reference with regard to future uncertainties and plausible scenarios, and the cues contained therein. In general, arguments were advanced to show that they were already consciously taking measures to deal with future uncertainties. All the participants agreed that ideas were triggered by issues raised in the workshop that they had not thought about. As such, belief-driven sensemaking took place more as a result of information exchange than through argument. In general, the existing flexibility in the construction process was more related to technical measures than to process measures. The flexibility measures mentioned in the initial interviews resurfaced in the workshop where they were exchanged with the other participants. The same was seen with the real options concept.

Examples of types of real options were presented (an example is shown see [Table 5](#)). Participants were asked to consider whether these options would be useful as a strategy to deal with the consequences of future scenarios. The option to grow

Table 5

An example of real options reasoning in the hospital workshop.

Uncertainty	Additional specialists who might want to be based at the hospital, extra patients
Possible strategies	Investing in foundations for an additional floor, or doing nothing
Consequences	If demand increases or a specialism is added, additional investment is needed in an extra floor. If additional foundations are not built then expansion elsewhere will be needed. What is it worth investing in this foundation? What are the potential costs and benefits?

had been already invested in through the stronger foundations built now to allow possibly an additional floor on top of the hospital in the future. However, one participant argued that the growth option would not be exercised since a need to shrink was much more plausible. The option to phase was thought to be a sign of bad leadership despite the workshop leader mentioning instances where the option would be applicable.

It was apparent that, during the long preparatory phase for the new hospital, a clear strategy for the future had been developed based on demands for real estate and new developments in the primary process. Actions considered with regard to flexibility differed among respondents. Each participant used the frame of their own individual function to make meaning of how one creates flexibility and which types of flexibility are important. The participants shared the belief that various real options presented in the workshop were already considered in the project before the workshop, although this was disputed by the construction coordinator. However, sensemaking did occur in the workshop in the sense that the participants agreed on concrete examples of real options. Further, it made sense to them that the consequences for stakeholders should be given more consideration when including flexibility measures.

As a potential new approach, scenario planning as method to estimate the need for future organizational flexibility was positively evaluated in the ex post interviews (see [Appendix II](#)). The concept of real options was positively valued as a means to communicate about flexibility within a project, and as a basis for negotiation. It was, however, poorly evaluated as a means of gaining greater insight into types of flexibility as the participants believed that they already sufficiently considered flexibility, and knew exactly how to create flexibility. The participants also saw little added-value in real options as a way to determine the conditions required to create and later exercise real options.

4.2. *The forensic clinic*

The respondents were clearly able to identify important cues that influenced their organization in advance of the workshop. However, when these cues were incorporated by the researchers in various scenarios and presented to the participants (see [Table 6](#)) this raised much discussion. When the participants were asked to react to the scenarios, and to use them to analyze their real estate, this led to much discussion and eventually resulted in sensemaking on the use and usability of scenario planning as a method to assess the consequences for real estate. The scenarios (see [Fig. 2](#)) that were developed during the workshop were appreciated by the respondents and became a shared frame on possible future developments. Developing multiple scenarios, each with two different dimensions, was seen as very useful to guide thinking on the consequences for real estate, and consequently to develop strategies.

In the second and third stage of the workshop, the discussion focused on a building of a clinic which was currently vacant. Current problems and decisions taken with regard to this building were discussed. The external expert suggested measures that could have been taken to increase flexibility, such as having multiple entrances for different stakeholders. The participants had learnt from this situation, and from the arguments used by the external expert: “Now, if we were to buy a property, we would explicitly choose a certain location, and then we would build differently. Then we would incorporate many real options. You have to create redundancy in the building by means of a second entrance, separated waiting rooms and separated desks which enable other parties and target groups to use the building”. The project manager commented that “if you look back at the projects, then we have considered these real options during the design process but not in a structured and thorough way”.

The arguments used by the external expert made sense to the participants and resulted in changes in their methods, with scenario planning and real options now used to deal with uncertainties and flexibility. Retrospective sensemaking on past projects was found to be easier than prospective sensemaking on the situation of a particular clinic that was due to be

Table 6
Scenarios presented in the workshop with the forensic clinic.

Trend scenario	Scenario A The punishment society	Scenario B The treatment society
Fewer patients due to decrease in use of placements under a hospital order	Placements under a hospital order are abolished: people are instead sentenced to life imprisonment	Shift from mental care to placement under a hospital order: more target groups for the clinic
Gradual introduction of marketization, uncertainty over remuneration for housing	Extramuralization of mental care is reversed	Further marketization: one will have to negotiate with health offices and the Ministry of Health
Increasing competition	Competition over other target groups	Less competition
Strict application of Ministry of Safety and Justice's rules on real estate	Performance indicators based only on money	Room for applying own vision to real estate
Patients become older and frailer	Harshening of society: people reject clinics in the city	Medication to treat aggression is discovered
Increased chain care; cooperation between care providers	Enduring economic crisis	Economic growth: more financial means but land becomes more expensive
Innovation in the construction industry	Construction costs are low	Construction costs rise
More attention to lifecycle costs	Strong competition in construction industry	Little competition in construction industry

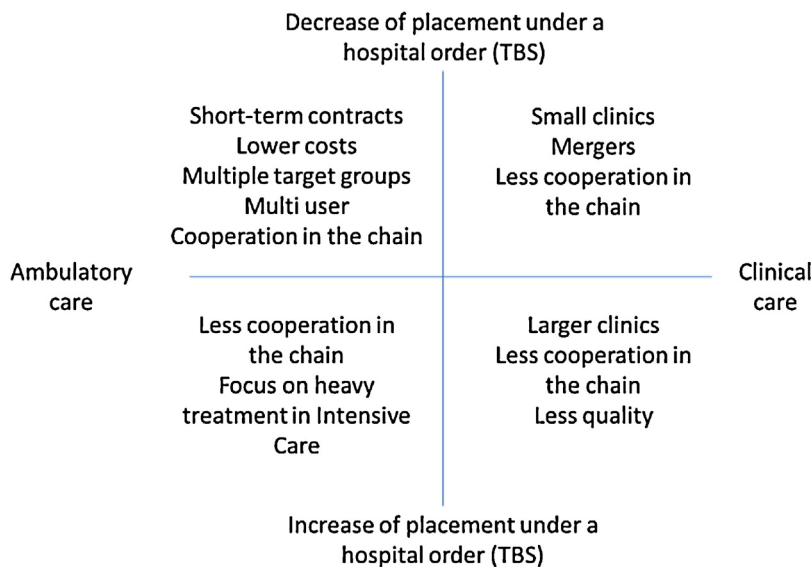


Fig. 2. Scenarios developed in the workshop with the forensic clinic.

renovated. The participants had problems in imagining the consequences of scenarios for that particular clinic and subsequently in developing strategies to deal with these consequences.

The belief-driven sensemaking was also influenced by expectations. In reflecting on the workshop, the participants said that they had previous experience with researchers who had developed checklists, and that this approach very much fitted with the daily practice of practitioners. From the discussions, we concluded that the respondents had been looking for such practical tools during the workshop. Consequently, the workshop and its output probably failed to match the expectations of the participants and this is maybe why many discussions on the method itself arose. Another statement by the respondents supporting this thought was that the real options concept was too abstract.

The workshop did “not really” change the need for flexibility (see [Appendix II](#)). It was concluded that most real options were already applied in various situations. Further, it was thought that real options thinking and scenario planning were complementary since scenarios legitimize the use of certain real options. As such, the real options concept was seen as a way of communicating consequences to other stakeholders in the organization.

4.3. The care organization

Various uncertainties were easily recognized by respondents in the pre-workshop interviews. These uncertainties had been recognized because they were events, or cues, with large impacts on the organization. Especially the new policy of financially separating healthcare provision and housing would have large consequences. While scenarios were being developed (see [Fig. 3](#)) by two sub-groups during the workshop, it was mainly the real estate director and the external expert from group 1 who were involved in the discussions. Power played a role in sensemaking here, with power creating an advantageous position because of the knowledge this brings. Both the real estate director and the external expert were used to thinking in more strategic terms than the other participants, and had more knowledge on the subject. This advantage allowed them to put their arguments forward. Character also plays a role since some people are more hesitant in putting arguments forward. Both groups eventually came up with similar scenarios and thus already had a shared frame on how current uncertainties would influence the organization and its real estate. Within the plenary component of the workshop, visualizing the organization’s locations on a map helped the participants see how functions were divided across the whole area.

In the third stage of the workshop, a vacant clinic was used to make sense on real options that could be implemented as a flexible strategy. The real options concept was presented in more detail (see [Table 7](#)). Discussing this particular case made the participants aware that they had not sufficiently considered potential target groups that could make use of the building, or what the market would be for that particular location. Keeping the clinic vacant would be a waste of capital. To prevent this, the participants argued that the time was right to think of alternative uses since the healthcare system was still in the initial phase of the transition to the new policy, and therefore the situation was not yet critical. The participants believed that real options are often not used because of the consequences for various stakeholders. For example, changing target groups also affects personnel since they work in other locations and this evokes resistance. So-called ‘soft’ and ‘emotional’ factors play a role when the organization makes decisions with regard to real estate. These issues were discussed without clear solutions. However, by re-raising these issues, their presence was recognized and given fresh attention, a starting point in

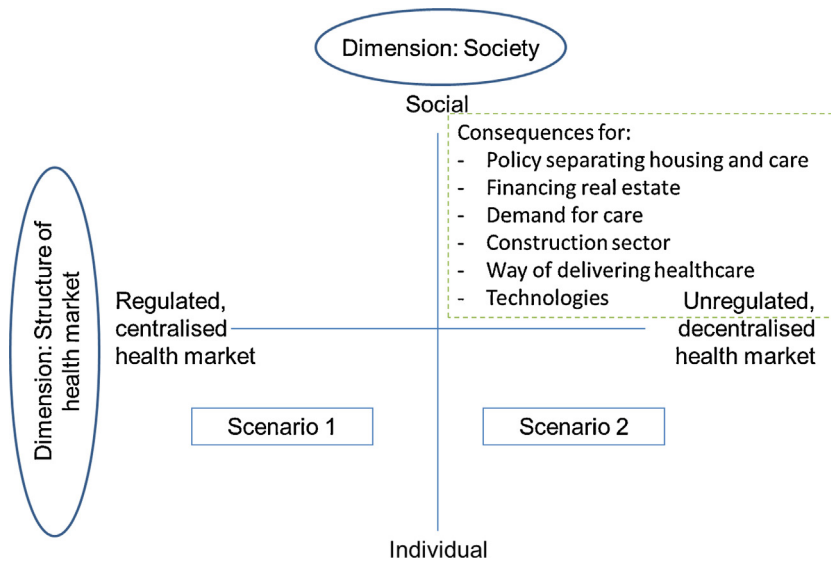


Fig. 3. Scenarios developed in the workshop with the mental and elderly care organization.

sensemaking. The discussion that followed did not result in sensemaking in terms of concrete strategies, but did in terms of acting as a forum to create new strategies.

In the initial interviews, many respondents already mentioned various measures to deal with uncertainties. Consequently, the workshop did not add much to the sensemaking on these actions. Rather, a contrasting conclusion of all the participants was that they recognized the usefulness of the workshop because of the discussion it instigated on strategies to deal with uncertainties. This differs to sensemaking in that, while they have a clear opinion on technical flexibility measures, they are unsure how to relate this to consequences in healthcare, and to the wider context of the housing market in the region. Given this situation, the real estate director made sense that such a workshop should be undertaken with other parts of the organization.

Real options were recognized as a useful method in communicating about flexibility in the development phases of real estate (see Appendix II). The workshop did not make the participants think more about how the future organization might look like since they were already doing this.

5. Evaluation of the workshops

The success of the workshops in generating sensemaking on uncertainty and flexibility measures is evaluated by analysing whether collaborative sensemaking took place in terms of the three types of judgement defined by Vickers [32]: *reality*, *value* and *instrumental* judgments. The differences in the approaches among the three workshops (see Table 8) resulted in different types of judgments (see Table 9).

Table 7

Structure of real options as presented in the workshop with the mental and elderly care organization.

Uncertain performance measure	A location is redundant because of changing care demands
Driver of performance uncertainty	A reason could be the newly introduced compulsory own contribution to costs resulting in a decreasing demand for healthcare
Reference strategy	The building is owned and should be sold
Alternative strategy	Investing in a relatively expensive rental contract that can be abandoned after five years
Signal for changing strategy (investing real option)	The expected demand for care decreases as a result of the announcement of a changing national healthcare policy
Conditions for strategy change (change is investing in real option)	The building is for rent, and the lessor should accept a short-term tenancy agreement
Actions required to obtain or retain flexibility (option premium)	Negotiating a short-term tenancy agreement
Action required to change strategy (exercising option)	Consider the notice period and consequences for the organization: what happens with the personnel and clients that are 'left' in the building, etc.?
Decision rule for changing strategy	IF (expected demand) < (capacity of building) THEN (short-term tenancy agreement) ELSE (keep the building)
Expiration of real option	The notice period

Table 8
Differences in the approaches among the three workshops.

	The hospital	The forensic clinic	The mental and elderly care organization
Scenario development	Researchers presented earlier scenarios developed with experts from the cure and care sectors using a Delphi survey	Researchers presented scenarios developed based on uncertainties mentioned by respondents. Then scenario axes with only two dimensions were developed in the workshop	Scenario axes with two dimensions were developed in the workshop. List of uncertainties mentioned by the participants handed out to support scenario development
Reason	Assumption that scenarios would be applicable – to save time in the workshop	Ambiguity and uncertainty on feasibility of scenarios. Creating ownership of scenarios	Experiences in previous workshop
Awareness raising of real options in advance	Statements with examples including a real option	Statements with examples including a real option	List with types of real options discussed
Reason	Thought to be easier for the respondents	Thought to be easier for the respondents	Less straightforward and more challenging for respondents. List allows more examples
Structure of real options presented in workshops	Simple structure with uncertainty, consequences and possible strategies	Simple structure with uncertainty, consequences and possible strategies	More detailed structure with all aspects of real options reasoning
Reason	Researchers believed clarifying basic idea of real options would be sufficient	Researchers believed clarifying basic idea of real options would be sufficient	Researchers expected this to enhance sensemaking of the real options concept

5.1. Reality judgement

In judging reality, people identify cues that, in their opinion, are important events. Reality judgement took place both before and during the workshop when people identified major cues in uncertain developments. Since most participants mentioned the same uncertainties before each workshop, reality judgments within the organizations were consistent and, therefore, there was only limited need for sensemaking since there was already agreement. During the first phase of the workshop, one could discuss proposed scenarios and whether these reflected the participants' ideas on the future reality. Through argument and discussion, agreement could be reached on these uncertainties and scenarios then developed which were plausible to the participants. In this process, people redraw their frames of reference and, provided sensemaking occurs, these frames will overlap. The scenarios developed in advance by the researchers either prompted further discussion or, in the hospital case, were directly accepted. To stimulate discussion, it was better to let the participants develop their own scenarios, and to divide them into smaller groups if there were many participants. On balance, the advantages gained by allowing time for scenario development outweigh the disadvantage of there being less time for other aspects of the workshop. In all the workshops, the participants shared common understandings of the uncertainties that influenced their organization.

5.2. Value judgement

Value judgement took place when participants had to evaluate the consequences for the organization of the perceived reality as represented in future scenarios. Belief-driven sensemaking took place through arguments used to convince one another. Sensemaking mainly took place in the workshops for the forensic clinic and for the care

Table 9
The three types of judgement in the three workshops.

	Reality judgement	Value judgement	Instrumental judgement
Hospital	Agreement with presented scenarios without discussion, one uncertainty added	Scenarios are accepted and judged rather negatively. No new insights on the consequences of the scenarios	Current course of action is evaluated as appropriate. No sensemaking on other strategies. Real options and scenario planning not seen as adding much value, only useful in communication/negotiation with contractors
Forensic clinic	Agreement on scenarios after arguing	More judgement of methods than of organizational strategy. Difficult to judge the consequences of scenarios	Little sensemaking on strategies. Real options valued positively as a way to communicate, and scenario planning as a means of stimulating thinking on future consequences
Care organization	Consensus on scenarios after discussion	Sensemaking by debating consequences for real estate of the scenarios	Current strategies evaluated as correct. Sensemaking successful on other strategies for flexibility. Abstract thinking about scenarios sometimes difficult. Real options valued positively as a way of thinking in assessing flexibility

organization since there was general agreement among the participants of these organizations that they had not sufficiently considered certain consequences. In the hospital workshop, little real discussion took place since participants concentrated on explaining why they had made certain decisions in dealing with uncertainties. In this instance, rather than reframing, they reinforced their existing frames by expressing their opinions, and so confirming their strategies. In the workshop with the forensic clinic, most of the sensemaking concerned possible methods for scenario planning and real options reasoning rather than *using* these methods. Ultimately, sense was made of the methods, and the participants recognized how the methods could be useful for them. Scenarios were developed, but the participants found it difficult to evaluate whether the consequences of these scenarios for the organization were desirable or not. It seemed easier to make sense retrospectively when considering past projects. Another insight from the forensic clinic workshop was that the real estate practitioners mostly responded to user demands. As such, questions on the consequences of a new policy for the organization should, in the first instance, be answered by users and policymakers. This aspect also played a role in the workshop for the care organization. There, the development of real estate strategies was handicapped by policymakers within the organization not being in a position to make statements on how the organization should proceed. In the care organization's workshop, evaluating the consequences of the various scenarios for real estate resulted in sensemaking that the real estate should be flexible, and that 'somehow' the real estate layout should guarantee an efficient primary process. As in the forensic clinic workshop, sensemaking appeared easier retrospectively when looking back at a completed project.

5.3. Instrumental judgement

Instrumental judgement refers to measures to be taken to deal with desirable or undesirable future situations. In contrast to the forensic clinic workshop, agreement on the method to be used was immediately reached in the other two workshops. In addition, the concept of real options had triggered some participants of the workshop in the care organization to think about this in advance, and they continued to reason along this line during the workshop. This was in contrast to the forensic clinic where the concept was less clear to the participants. To investigate existing instruments, we asked in the pre-workshop interviews about measures that the respondents took to deal with various uncertainties. In the hospital workshop, they generally reconfirmed the measures they were already taking and the real options structure did not seem to add much to sensemaking over how to look at flexibility. In the forensic clinic workshop, one participant valued the scenario planning in that it would help them think in a more structured way about the possible consequences for real estate. However, the real options concept was only thought to be useful as a means to communicate about flexibility with stakeholders, and not as a way of thinking about flexibility. One respondent stated that scenario planning and real options thinking were complementary since the real options "legitimize the scenarios. In scenarios, you think of the consequences, and suitable real options come from that." In the care organization workshop, as in the other organizations, the participants remained convinced of the validity of their, mainly technical, measures to deal with uncertainty. It appeared difficult for some participants to make sense, in developing scenarios, of more abstract trends both inside and outside the organization that would influence the organization. However, the workshop triggered participants to make sense of the idea that one should think on a more strategic level, involving all the stakeholders of the organization, about the consequences of future uncertainties as a starting point for developing strategies. The real options concept was recognized by some as a means of evaluating flexibility. A striking example was given of a nearby hospital that had invested in a very flexible building, flexibility that the participants suspected would never be used. In line with our intention to include consequences other than costs when introducing the real options concept, one participant did recognize that other aspects are also important in balancing flexibility, such as the attractiveness for employees given the decreasing working population. From various remarks made by respondents we concluded that a useful instrument would be one that balanced potentially needed flexibility, investment costs and the costs of exercising real options.

6. Conclusions

Health organizations face various uncertainties including policy and demographic changes that will have consequences for their real estate management. A failure to sufficiently consider these can have negative consequences for the organization as a whole. To address this danger, we developed a tool that combines real options thinking and scenario planning, and applied this within a workshop setting in three health organizations to see if it would enhance collaborative sensemaking among decision-makers in health organizations. The aim of our study was to develop an understanding of how managers assess the consequences of future uncertainties and whether real options could enhance sensemaking on flexibility measures that could be applied to cope with these uncertainties.

In the workshops held in the various organizations, we found that the degree of belief-driven sensemaking over strategies was dependent on the background of the workshop participants. The organizational identity and the identity of the various participants played a role in the sensemaking process. Unequal access to roles and positions puts people in unequally strong positions when it comes to influencing the construction of social reality [33]. Also the period over which the organization had been confronted with the consequences of the new policies that demand a more business-like operation of health organizations determines the degree of belief-driven sensemaking. These policies are being

gradually implemented across all healthcare sectors in the Netherlands. The hospital, the care organization and the forensic clinic were all struggling with various uncertainties, of which the new policies was the most important. The hospital had already been confronted with the new policies for several years and its existing sensemaking over current strategies was the strongest of the three organizations investigated. The care organization had only recently been confronted with the new policies, and a greater amount of new sensemaking took place in the workshop. The forensic clinic was expecting to be confronted with the new policies in the near future, and the participants wanted time to debate the usefulness and means of the tool rather than to discuss scenarios and real options that might be applicable to their organization.

Our evaluation of the workshops showed that real options combined with scenario planning enhanced sensemaking, although participants often needed further clarification on the real options concept. Overall, the real options concept appeared to be too complex to be immediately adopted, although it was recognized as a useful tool in negotiating with contractors over flexibility. Further, some people were better able to think in abstract terms than others.

No board members attended any of the workshops. This would have been interesting since the aim of scenario thinking is to think about strategic long-term issues and project these onto real estate and the operational level. It is probable that the most recent insights and strategic issues are discussed at the board level, which could therefore provide valuable input to such a workshop. Therefore, participation of board members in workshops is recommended. If board members were to participate in such a workshop, one could expect more sensemaking to occur between the strategic and operational levels on the consequences of strategic decisions for the operation of real estate management and vice versa.

Real options and scenario planning do offer the possibility to enhance sensemaking about flexible real estate strategies. Combining scenario planning and real options changes the mindsets of organizations and enhances understanding of the causal processes and logical sequences and so uncovers how a future state of the world may unfold [34]. However, the effectiveness of the workshop process we employed depends on the context of the organization and the backgrounds of the participants. Although respondents recognized real options as a useful concept in communicating about flexibility measures with other stakeholders, and as a means to negotiate with contractors over flexibility measures, many practitioners were not convinced about all aspects of the structure of real options reasoning and whether they would use them. Further, it takes time to gain an understanding of the real options concept before it can be used in sensemaking. Recommendations for future workshops would also be to spend more time on developing scenarios and to involve more stakeholders. Consequently, we believe that follow-up workshops are a necessary part of an ongoing process to enhance sensemaking and that any actions taken based on sensemaking further enhance this process. As concluded in recent research, organizational dialogues (in our study through workshops) are integral to learning and innovation through exchange of ideas, beliefs and assumptions [35].

In conclusion, although the real options approach seems promising, its actual application is lagging. Sensemaking is to an extent a result of bounded rationality [17,36] and when one cannot be provided with all the information required to make a rational decision, decisions have to be based on individual or group experience and interpretations of past events. Garvin and Ford [37] explain why bounded rationality is one of the reasons why real options have not been extensively applied. Essentially, engineering and construction projects are often very complex and, because many uncertainties are beyond the cognitive capacity of project managers, they prefer straightforward decision-support tools. Instead of offering complex quantitative tools, we have instead tried to provide another way of thinking and looking at flexibility that should limit the apparent complexity. Further, our approach tried to expand the borders of rationality of decision makers by expanding the context in which they think about the consequences for the organization and the need for flexibility beyond financial models. This study supports the results of recent research that scenarios, even in a condensed form, provided sufficient information to enable manager to engage in consequential reasoning about real options [35].

Appendix I

Workshop participants

	Function	Experience in healthcare (years)	Experience in organization (years)	Role	Role in decision-making on real estate projects
Hospital	Health entrepreneur	24	2.5	Responsible for strategic and financial areas of the hospital's oncology enterprise	Advises on real estate requirements
	Staff member technical services	8	8	Responsible for daily maintenance	No direct role
	Construction coordinator	20	9	Responsible for managing construction of new hospital	Part of project's steering group
	Patient council			Representing patients	No direct role, receive information on state of affairs
	Controller	9	9	Head of finance and control	Calculating financial consequences, documenting, discussions with banks
Forensic clinic	Project manager	14	3	Real estate project manager of overarching organization, advisor to local real estate managers in developing lists of requirements, determining consequences of real estate renovations. Process management	Supporting the board's decision-making by determining consequences of various scenarios for real estate, making business cases
	Manager service centre	?	17	Guiding small renovations and adaptations, responsible for technical services	Not involved in decision-making; board takes responsibility and informs
Care organization	Manager maintenance	20	13	Maintenance of buildings, responsible for safety	Maintenance plan for buildings. Responsible for buildings after delivery
	Project manager real estate	25	4	Project management from initiative to delivery. Focus on technical measures	Evaluating list of requirements using construction knowledge
	Director department real estate	26	18	Involved in health developments and decisions with regard to housing. Developing real estate strategies on the portfolio level	Aligning organizational needs with real estate on a strategic level
	Project manager real estate	18	18	Project management. Tries to implement innovative concepts such as cradle-to-cradle	Practical, day-to-day real estate management but within a strategic framework
	Staff member portfolio management	2	2	Mapping real estate portfolio for long-term real estate strategy	Supporting decision-making

Appendix II

Post-workshop views on the applicability and knowledge of real options and scenario thinking

Statements	Hospital					Forensic clinic	Care organization				
	Health entrepreneur	Staff member Technical service	Construction coordinator	Patient council	Controller	Project manager real estate	Manager maintenance	Project manager real estate	Director department real estate	project manager real estate	Staff member portfolio management
1.Scenario thinking is a good method to estimate the future need for flexibility in the organization	4	4	5	5	4	4	4	4	4	4	5
2. The workshop provided new insights into types of flexibility that can be used	2	4	2	5	3	2	4	2	3	2	4
3. The workshop made me think more on how the future organization might look	5	4	4	2	4	2	3	2	2	2	5
4. Flexibility has a value which increases as uncertainty increases	4	4	4	2	2	-	5	4	4	4	5
5. The concept of real options gave me greater insight into the types of flexibility that can be used	2	4	2	2	4	2	4	3	4	5	4
6. The concept of real options made me think (more) about the conditions necessary to create and exercise real options	3	4	2	2	4	4	4	3	3	3	4
7. The workshop made me think (more) about the costs and benefits of flexibility	4	4	4	3	2	2	3	3	3	4	3
8. The workshop made me think (more) about tuning rather than maximizing the flexibility needed in the future	2	4	2	4	4	2	4	2	3	3	3
9. The workshop made me think (more) about the consequences for various stakeholders when exercising real options	4	4	4	4	4	2	3	4	3	3	4

Appendix II (Continued)

Statements	Hospital					Forensic clinic Project manager real estate	Care organization				
	Health entrepreneur	Staff member Technical service	Construction coordinator	Patient council	Controller		Manager maintenance	Project manager real estate	Director department real estate	project manager real estate	Staff member portfolio management
10. Real options are a necessary means to communicate between various stakeholders within the organization and cooperating parties about flexibility when <i>designing</i> a new building	4	4	5	4	4	4	4	2	4	4	4
11. Real options are a necessary means to communicate between parties when <i>constructing</i> a new building	4	4	4	4	4	4	4	4	4	4	4
12. Real options are a necessary means to communicate between parties when <i>operating</i> a new building	4	4	5	4	4	4	4	4	4	4	4
13. I think that using real options would make negotiating over flexibility with contractors easier	3	4	2	5	4	4	4	4	3	3	-
14. The use of scenario thinking and of real options are complementary	-	4	4	4	4	4	4	4	4	2	5
15. The workshop did not bring any new ideas in relation to the future of the organization and flexibility	2	2	2	2	2	2	4	4	4	4	2
16. Flexibility has been considered too little in the plans for the new developments	1	2	3	2	3	2	2	2	2	3	1
17. There is too much flexibility in the plans	1	2	3	2	2	2	2	2	2	2	3

Legend: 1 = I totally disagree, 2 = I do not agree, 3 = neutral, 4 = I agree, 5 = I fully agree.

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