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ORGANIZING THE ARGUMENTATION FOR CHANGING THE DELIVERY SYSTEM USING CHOOSING BY ADVANTAGES (CBA)

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ABSTRACT

Megaprojects contain strategic decisions that must be approved outside of the project. A clear and understandable argumentation is required to communicate and push through such decisions. As shown in the literature, Choosing by Advantages (CBA) helps teams create a shared understanding regarding a decision resulting in a strong argumentation of the decision outcome. Therefore, this research aims to better understand how CBA helps to make a strategic decision that impacts all project levels and creates the argumentation to get the approval of the management board of the company. This paper describes why and how the Deutsche Bahn team of the project Munich main station proceeded with the decision to change the project delivery system from design–bid–build (DBB) to integrated project delivery (IPD) while the project was already in different design stages using the CBA tabular method. As all authors (consultant and client) were involved in the research, participatory action research was used as the research approach. The paper demonstrates how CBA (1) helped to create a shared understanding of IPD, (2) helped to understand the scope of the multiparty agreement, (3) helped to organize the argumentation, and (4) helped to create trust regarding the argumentation.

KEYWORDS

Choosing by Advantages, collaboration, Integrated project delivery, megaproject, Munich main station.

INTRODUCTION

When starting a project, the owner must explain how the project will be delivered to begin the procurement process and get stakeholders on board. In megaprojects, there is the challenge that the time between defining the delivery system at the beginning of the project and the point when all stakeholders are on board can be years or even decades. Additionally, there is the challenge that megaprojects might not benefit from new management approaches that did not exist when the project started. Because megaprojects contain many unforeseen challenges and risks (e.g.,

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Flyvbjerg & Gardner, 2023; Priemus et al., 2013) as the project proceeds, they require adaptation to new findings from research and development to achieve the project goal.

Changing the delivery system impacts all organizational levels of a project, from the strategic level to the operational level. This requires courage from the owner and a project team that stands behind the change. Therefore, every member of the owner's team must understand the content of a decision and why the change is necessary, with all its advantages and consequences, to change the existing project structure. As some strategic decisions need support outside the project, a stable and comprehensive argumentation is required to get approval from the management board. Obtaining this approval can be a struggle if certain aspects are not considered or if the argumentation is not presented understandably.

Choosing by Advantages (CBA) is a multicriteria decision-making system developed by Suhr (1999) that differentiates between alternatives based on the importance of advantages. The most applied method of the CBA system is likely the CBA tabular method. Figure 1 shows the different steps of the tabular method. Studies show that using the tabular method helps project teams make stable decisions based on a shared understanding by including different perspectives that can contain conflicting interests (Arroyo et al., 2022; Arroyo & Long, 2018; Martinez et al., 2016; Parish & Tommenlein, 2009; Schöttle et al., 2019; Schöttle & Arroyo, 2017). Thus, having a reliable decision-making process is especially important for megaprojects "because the interests and power relations [...] are typically very strong, [...] given the enormous sums of money at stake, the many jobs, the environmental impacts, the national prestige, and so on" (Flyvbjerg et al., 2003, p. 7).

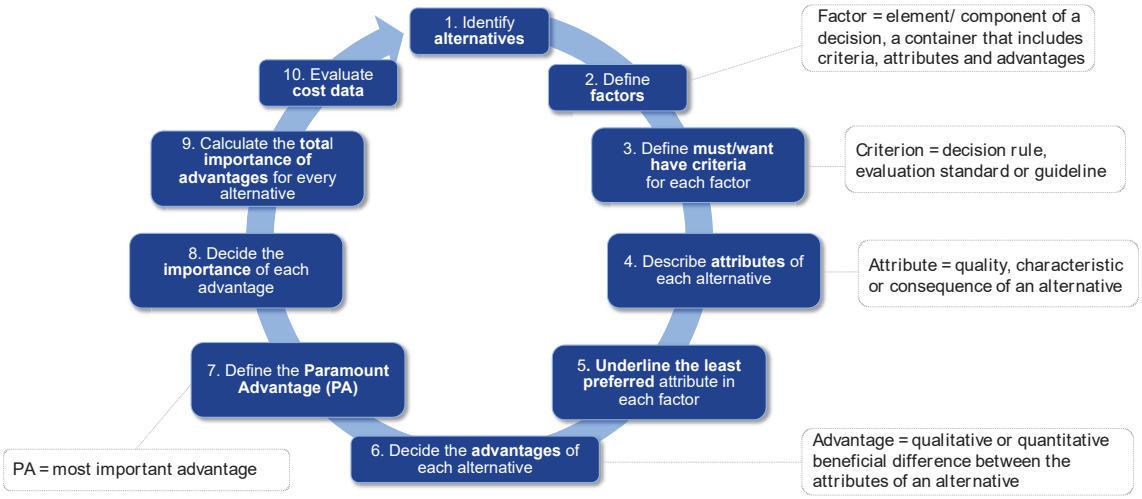

Figure 1: CBA Tabular Method (Schöttle et al., 2019, based on Arroyo, 2014)

A review of the literature shows that applications of CBA were explained in terms of tendering (Arroyo et al., 2022; Schöttle & Arroyo 2017; Schöttle et al., 2017) to decide between proposals, to decide between design alternatives (Arroyo et al., 2012; Arroyo et. Al. 2017; Arroyo & Long, 2018; Kpamma et al., 2017; Parrish & Tommelein, 2009), or for operational decisions (Martinez et al., 2016). Furthermore, all the papers mentioned above claim that the decision was made within the project and did not require approval outside of the project team.

This paper aims to show that CBA can help the project team organize their argumentation for a strategic decision that needs approval outside the project. First, the research method is explained, then the case will be presented, followed by an analysis and discussion of the collected data.

RESEARCH APPROACH

This research aims to better understand how CBA helps to make a strategic decision that impacts all project levels and needs to be approved by the organization. Therefore, the research question asks how CBA can help to reason the change in the delivery system.

Participatory action research was used as all authors (consultant and client) were involved in the research of changing the client system (Greenwood et al., 1993; Kindon, 2007; Tharenou et al., 2007). During the process, issues were identified and intervened on (Dickens & Watkins, 1999). **(1) Deciding to apply CBA:** The first author (A) briefly explained CBA to the project lead (H), then met with the project lead (B) and two cross-divisional leads (B, D) to explain the procedure of decision-making using CBA. In the meeting, the decision was made to apply CBA for a specific strategic question. **(2) Execution of workshops:** A series of workshops was executed to decide whether (Q1) integrated project delivery (IPD) should be applied and (Q2) which scope should be delivered using IPD to understand different perspectives better and, thus, create a strong argumentation for the approval process and the implementation of the decision. After each workshop, the participants defined the next steps for the following workshop. Because the workshops were assigned to two questions, there were two cycles. Due to availability and knowledge integration, there were different participants involved in the workshops. Table 1 gives an overview of the different participants involved. Overall, eight people from the project management team participated in the decision-making process. Figure 2 represents details regarding the position and the years of working experience of the participants. During the process, the first author (A) trained the team in CBA and guided them through the process. The second author (B) participated in all workshops. The third author (F) was partly involved in the second workshop and the final meeting. The fourth author (I) only discussed the decision outcome in the last meeting, and the last author (D) was partly involved in the workshops. The third and fourth authors were positively biased regarding IPD and therefore excluded themselves from the CBA workshops so as not to drive the discussion. **(3) Reflection of the procedure:** In February, the first author (A) briefly interviewed both project leads (F, I) regarding their experience as they were not or were only minorly involved in the workshops. At the beginning of April, an online survey with open-ended questions was carried out and answered by all eight participants to reflect on the procedure and to verify if the goal was achieved. The survey consisted of three parts. First, general questions were asked about the participants. Second, general questions were asked regarding strategic decision-making. Finally, questions were asked regarding the workshops. The first author decided to collect the reflection through a survey to minimize the biases such as anchoring or confirmation bias. Survey answers were analyzed based on content analysis (Mayring, 2010).

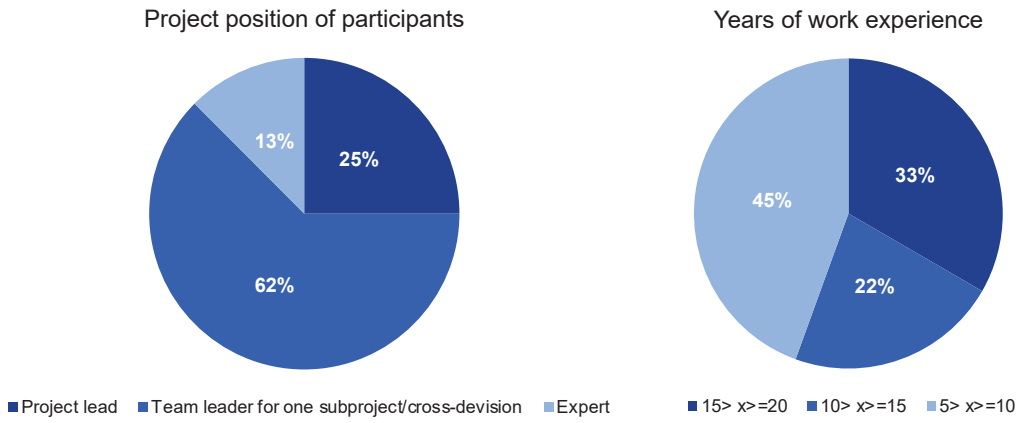

Figure 2: Details about Workshop Participants (excluding consultant)

Due to the degree of involvement in the workshops, all authors' knowledge regarding CBA was different. In short interviews, the second, third, and last authors were asked to give their opinion regarding the procedure of using the CBA tabular method and the outcome of the decision.

CASE STUDY

Due to the high traffic volume of the first core line of the city train (1.SBSS) in Munich, the line itself, as well as the main station, needs to be expanded. The 1.SBSS was opened in 1972, right before the Olympic Games, and was designed for 250,000 passengers per day. Today, up to 840,000 passengers per day (DB Netz, n.d.-a) use the line, often resulting in a two-minute *takt*, meaning that every two minutes a train is driving through the core line. This makes the 1.SBSS the busiest line in Europe. As the city, as well as the number of passengers using the line, will continue to grow, the line needs to be expanded by two more tracks parallel to the existing line called the second core line of the city train (2.SBSS) to overcome the bottleneck (see Figure 3). Both core lines contain underground stations at Munich's main stations. The addition of the 2.SBSS to the infrastructure system means the main station has to be extended and modernized. Munich's main station is one of the biggest infrastructure hubs in Germany, with 450,000 passengers per day, 34 tracks overground, and 8 tracks underground. The main station is a megaproject itself that includes overground and underground work. Only buildings of 1.SBSS, the subway lines U1, U2, U4, and U5, as well as the tracks for the trains, and the historically protected track roof, will be sustained and remain in operation throughout the whole construction phase (see Figure 4). All other existing buildings will be demolished or updated, and new buildings will be built, including services areas, areas for restaurants, shops, and office space. Furthermore, the project contains a precautionary tunnel for another subway line (U9), the complete renovation of the track hall roof, and a new cross-platform roof. The anticipated cost for the main station (overground) is estimated at €1.2 billion.

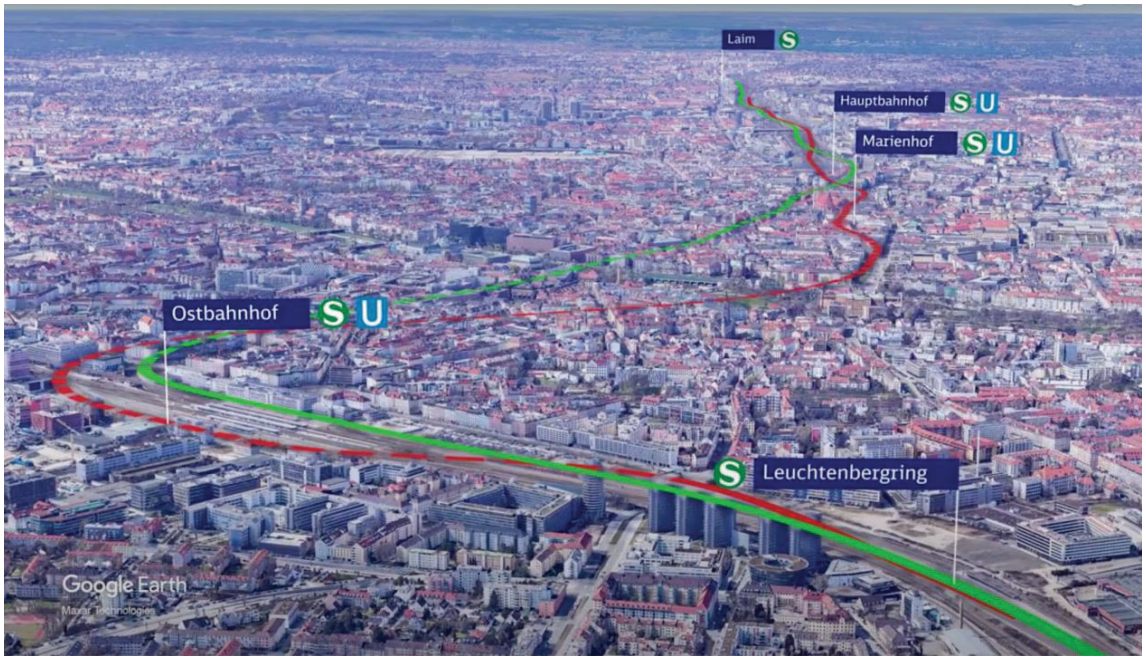

Figure 3: Routes of Both Core Lines (green represents the 1.SBSS, red represents the 2.SBSS) (DB Netz, n.d.-b).

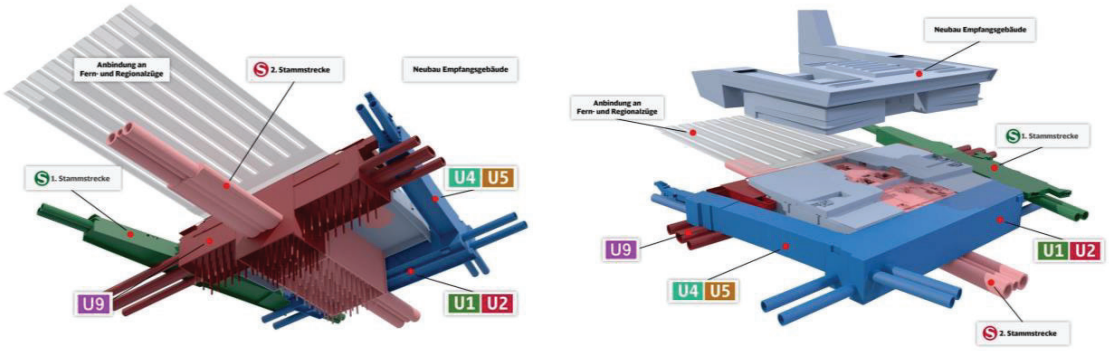

Figure 4: Visualization of Munich Main Station (left: underground system, right: overground buildings) (DB Netz, n.d.-c)

The owner's project team is currently organized based on a matrix structure with a cross-divisional project management level. The project delivery system is design–bid–build (DBB) with some early contractor involvement. Due to many interfaces, limited laydown and construction areas, many different design stages, and different financial funds, considerations were made that IPD could be the best way to deliver the project and achieve the overall goal of finishing the project on time. In addition, the project lead initially thought that IPD could help to reduce the interfaces and support communication across organizational borders operating as an aligned team. This should also help to handle change orders more quickly without the installation of a big claim management process and instead focus on finding solutions through innovation. At all times, the team was aware that due to the constraints imposed by public procurement law, it might be with great difficulty that the procurement process can be designed to include IPD with all its key features (multiparty agreement, modified reimbursement, an incentive system, a modified distribution of liabilities, modified risk allocation, etc.). However, there was a consensus that the greater effort involved in preparing and coordinating the procurement process is far outweighed by the benefits of a subsequently reduced effort for the management of contractors' claims and all the negative implications that come along with it.

In order to change the project delivery system to IPD, the team must analyze and define the scope of the multiparty agreement and be able to communicate the advantages of starting an IPD pilot project to the management board of Deutsche Bahn (DB).

DECISION QUESTIONS

The decision-making questions must be defined to decide if IPD should be applied to the projects. Based on a quick brainstorming, the team identified two questions:

- Q1: Should the project be delivered with DBB or IPD?
- Q2: Which work scope should be part of the IPD (multiparty agreement)?

Workshops were conducted using the CBA tabular method to answer the decision questions. If the decision outcome of the first question was not to do IPD and stay with DBB, then there would be no need for the second question. The second question focused on the scope of the IPD implementation.

OVERVIEW OF THE CBA WORKSHOPS

The workshops were executed with paper and post-its to drive the discussion among the participants and make the process as easy as possible, as it was the first time for the whole group to use CBA (see Schöttle et al., 2022). Before starting with the decisions, the team was introduced to CBA via a presentation and brief examples. During the first workshop, a core

group started to prepare the decision for the second workshop, which would have an extended group. Table 1 gives an overview of workshop execution and the progress the team made during the workshop.

Table 1: Overview of Workshop Execution

Workshop Date & Duration	Participants (incl. trainer)	Content
1 (10/06/2022) 3.0 hours	5 (A, B, C, D, E)	• Short introduction to CBA • Defining the decision steps based on questions • Defining factors, criteria, attributes, and advantages for Q1
2 (10/12/2022) 9.5 hours	8 (A, B, C, D, E, F, G, H)	• Building knowledge regarding CBA • Developing a common understanding regarding IPD • Identifying road stoppers for IPD • Clarifying the decision questions and the current organizational setting • Adjusting factors and criteria for Q1 • Defining attributes and advantages for Q1 • Identifying the Paramount Advantage (PA) and sequencing the importance of the highest advantages of every factor
3 (11/14/2022) 3.0 hours	6 (A, B, C, D, E, H)	• Defining the importance of advantages for Q1 • Writing down the argumentation • Defining the alternatives for Q2
4 (11/28/2022) 2.0 hours	4 (A, B, C, H, I)	• Defining factors, criteria, and attributes for Q2
5 (12/05/2022) 2.0 hours	3 (A, B, C, I)	• Determining the advantages for Q2 • Defining the importance for Q2
6 (01/26/2023) 1.0 hour	7 (B, C, D, F, J)	• Presenting the outcome of the tabular method • Reflecting on the tabular • Making the final decision

Answering Question 1

The alternatives DBB to IPD were compared to answer the decision question based on the project context. The factors and criteria were quickly set up using the nominal group technique. The attributes were described, and the advantages were defined (see Figure 5). During the reflection of the defined advantages, the team recognized that there were four factors that were already included in other factors, and thus, decided to eliminate these factors from the CBA tabular. Answering the first question was important for the team to create awareness regarding the difference between DBB (scores of 240) and IPD (scores of 600) and to create a common understanding of IPD. Furthermore, the team identified challenges that need to be considered: (1) convincing stakeholders to do IPD, (2) financing rules based on the different funding, and (3) influences of public procurement law that can impede the successful awarding of contracts containing (key) components of IPD (incentive system, modified risk-allocation, a modified distribution of liabilities, inspection and notification requirements, etc.). Based on the decision outcome (see Figure 6) of the table, the team formulated their argumentation for IPD based on the tabular:

- Significantly higher joint identification with the project goal due to a multiparty contract and the joint definition of the project goals and team goals
- Significantly higher reliability to achieve milestones due to shared goals, transparency, and shared responsibility
- Better decision-making based on the early integration of project participants and their knowledge
- Higher willingness to innovate due to diverse perspectives on a problem
- The complexity of the claim management decreases significantly due to the jointly agreed target costs
- Mutual consideration leads to a higher execution quality due to the overall project view.

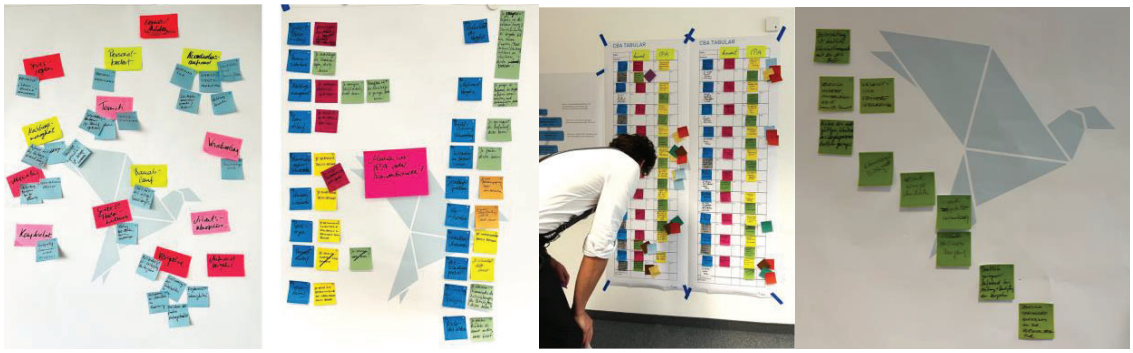

Figure 5: Progress of Workshops 1 and 2 to Answer Q1

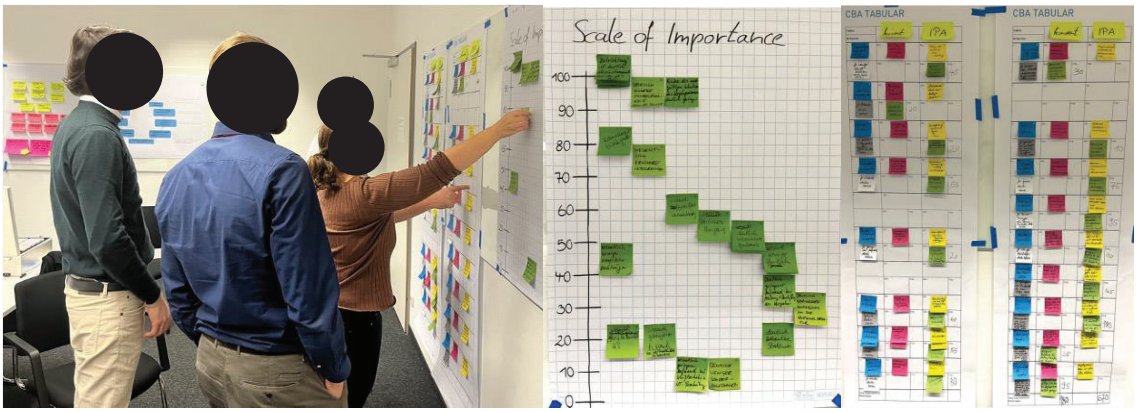

Figure 6: Progress of Workshop 3 to Answer Q1

ANSWERING QUESTION 2

The second question consisted of five alternatives that were identified based on the work scope:

- Alternative 1: Civil engineering underground
- Alternative 2: Civil engineering underground plus building construction (overground)
- Alternative 3: Technical building equipment and interior for over- and underground
- Alternative 4: Building construction (overground) plus technical building equipment and interior for over- and underground
- Alternative 5: Civil engineering underground plus building construction (overground) plus technical building equipment and interior for over- and underground

As the team understood the method better, the second table was quickly set up, and the importance of advantages was assigned (see Figure 7). For better communication, the table was transferred into an Excel spreadsheet to present at the final meeting. Figure 8 shows the completed tabular.

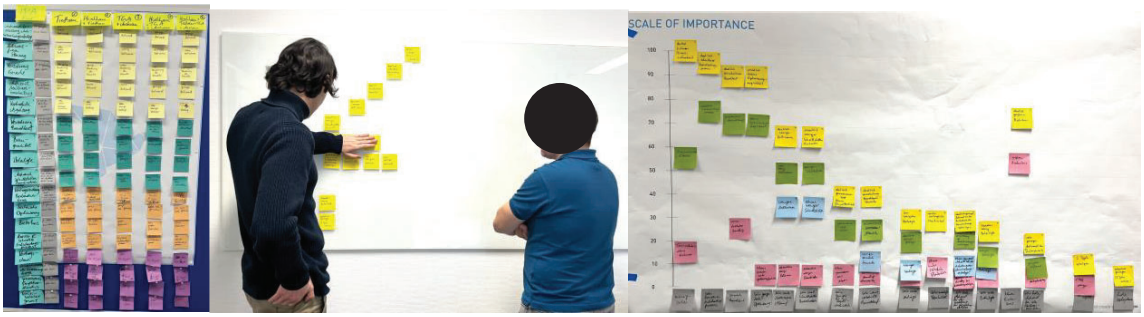

Figure 7: Progress of Workshops 4 and 5 to Answer Q2

Factor / Criteria	Alternative 1: Civil engineering underground		Alternative 2: Civil engineering underground plus building construction (overground)		Alternative 3: Technical building equipment and interior for over- and underground		Alternative 4: Building construction (overground) plus technical building equipment and interior for over- and underground		Alternative 5: Civil engineering underground plus building construction (overground) plus technical building equipment and interior for over- and underground	
Effort for the preparation of tender documents	Very significant effort		Significant effort		Average effort		Low time and effort		Low time and effort	
Less effort for preparation is better.			Insignificantly low time and effort in the preparation of tender documents	5	Somewhat low time and effort in the preparation of tender documents	10	Insignificantly low time and effort in the preparation of tender documents	25	Significantly low time and effort in the preparation of tender documents	30
Collision-free planning	Lots of collisions		Very many collisions		Few collisions		Minimal collisions		No collisions	
Fewer collisions is better.			Imperceptibly fewer collisions	5	Fewer collisions	35	Few collisions	50	Significantly fewer collisions	65
Interlocking of trades	Very little interlocking of the disciplines		Lower interlocking of the disciplines		Average interlocking of the disciplines		High interlocking of the disciplines		Maximum interlocking of the disciplines	
The more interlocked the trades, the better.			Somewhat more interlocked trades	5	Less interlocked trades	10	More interlocked trades	25	Significantly more interlocked trades	40
Time and effort for supplementary processing	Very significant time and effort		Significant time and effort		Significant time and effort		Low time and effort		Low time and effort	
Less is better.			Less time and effort in the subsequent processing		Less time and effort in the subsequent processing	5	Less time and effort in the subsequent processing	10	Very low time and effort in the subsequent processing	20
Contractual delimitation	Very many contracts		Many contracts		Few contracts		Very few contracts		Practically a contract	
The less contracts, the better.			Insignificantly fewer contracts	5	Fewer contracts	10	Significantly fewer contracts	20	The least contracts	30
Interlocking construction process	Very minimal interlocked construction process		Little interlocked construction process		Little interlocked construction process		Moderately interlocked construction process		Completely interlocked construction process	
The more interlocked the construction process, the better.			Somewhat interlocked construction process	25	Somewhat interlocked construction process	25	More interlocked construction process	70	Significantly more interlocked construction process	90
Participants	Very many participants		Many participants		Moderate number of participants		A low number of participants		Very few participants	
The less participants, the better.			Imperceptibly fewer participants	5	Slightly fewer participants	10	fewer participants	15	Particularly few participants	25
Time and effort for interface coordination	Very many interfaces		many interfaces		A moderate number of interfaces		Few interfaces		Very few interfaces	
The less interface coordination, the less time and effort, and the better.			Imperceptibly less interface coordination	5	Slightly less interface coordination	35	Less interface coordination	50	Significantly less interface coordination	65
Contract change of existing contracts	Change in civil engineering (moderate flexibility)		Change in civil engineering (moderate flexibility)		Change technical building equipment + interior (low flexibility)		Change technical building equipment + interior (low flexibility)		Change civil engineering + technical building equipment + interior (very low flexibility)	
The greater the contractual flexibility, the better.	More contractual flexibility	30	More contractual flexibility	30	Somewhat more contractual flexibility	10	Somewhat more contractual flexibility	10		
Technical optimization potential	Very low technical optimization		Low technical optimization		Very low technical optimization		High technical optimization		Very high technical optimization	
More optimization potential is better.			A little bit more optimization potential	5			Higher optimization potential	70	Much higher optimization potential	90
Number of bidders	Very large group of bidders		Very large group of bidders		Large group of bidders		Very large group of bidders		Small group of bidders	
The more bidders, the better.	Significantly larger group of bidders	75	Significantly larger group of bidders	75	Larger group of bidders	55	Significantly larger group of bidders	75		
Fast decision-making process	Very slow decision-making process		Very slow decision-making process		Fast decision making process		Fast decision making process		Very quick decision making process	
The faster, the better.					Quicker decision-making process	75	Quicker decision-making process	75	Significantly faster decision-making process	95
Contract duration	Short contract duration (approx. 6 years)		Long contract duration (approx. 11 years)		Long contract duration (approx. 10 years)		Long contract duration (approx. 10 years)		Long contract duration (approx. 12 years)	
The less, the better.	Significantly less (6 years less)	5								
Interconnection of the financing pots	2 pots (UG + UG)		3 pots (UG + UG + building construction)		3 pots (UG + building construction + XXX)		3 pots (UG + building construction + XXX)		4 pots (UG + UG + building construction + XXX)	
The less pots, the better.	2 pots less	15	1 pot less	5	1 pot less	5	1 pot less	5		
A common understanding of the project	Very low understanding of the project		low		low		A high understanding of the project		A very high understanding of the project	
The more common and clearer, the better.			Somewhat more common and clearer	5	Somewhat more common and clearer	5	More common and clearer	25	Significantly more common and clearer	40
Total scheduling security	Not very safe		Secure		Somewhat secure		Secure		Very secure	
The more secure, the better.			More scheduling security	55	Scheduling security somewhat more secure	15	More scheduling security	55	Significantly safer scheduling security	100
Total importance of advantages		125		230		305		580		690

Factor / Criteria	Alternative 1:		Alternative 2:		Alternative 3:		Alternative 4:		Alternative 5:	
Number of bidders	Very large group of bidders		Very large group of bidders		Large group of bidders		Very large group of bidders		Small group of bidders	
The more bidders, the better.	Significantly larger group of bidders	75	Significantly larger group of bidders	75	Larger group of bidders	55	Significantly larger group of bidders	75		
Fast decision-making process	Very slow decision-making process		Very slow decision-making process		Fast decision making process		Fast decision making process		Very quick decision making process	
The faster, the better.					Quicker decision-making process	75	Quicker decision-making process	75	Significantly faster decision-making process	95
Contract duration	Short contract duration (approx. 6 years)		Long contract duration (approx. 11 years)		Long contract duration (approx. 10 years)		Long contract duration (approx. 10 years)		Long contract duration (approx. 12 years)	
The less, the better.	Significantly less (6 years less)	5								

Figure 8: CBA Tabular for Q2 and Exemplary Extract

The most important advantages of the decision were significantly higher schedule reliability, the advantage of much faster decision-making, the advantage of having significantly higher technical optimization possibilities, and the advantage of a significantly more integrated/interlinked construction process.

On January 26, 2023, the team came together to reflect on the tabular to finalize the decision. By doing so, they recognized that a certain condition needed to be considered. As the second city train line is connected to the main station, the underground works of the main station have to reach a certain point in their structural work so that the schedule of start-up and commissioning of the second line can be achieved. Thus, the civil engineering of the underground needs to be executed as quickly as possible and cannot wait for the delivery system change as this could result in a delay in the completion of the 2.SBSS. This risk must be mitigated by proceeding with the structural underground work as soon as possible, resulting in exclusion from the IPD scope. As the technical building equipment must work as one system for underground and overground and because there is enough time between the start of installation and changing the delivery system, the equipment for the overground buildings, as well as the underground buildings, will be included in the IPD to avoid producing a big interface. Therefore, although alternative 5 (score of 690) achieved the highest overall importance of advantages, the team decided to apply alternative 4 (score of 580) due to the strategic consideration on start-up and commissioning.

The next step in moving forward with the IPD approach is a conceptual presentation by the final decision-making team outside the project team, as this will be an outstanding pilot project for the DB. Furthermore, the funding stakeholders, the city of Munich, the Free State Bavaria, and the federal government must agree too.

FINDINGS FROM DATA COLLECTION

FINDINGS FROM SURVEY

General questions regarding strategic decision-making

To better understand the baseline, the survey participants were first asked why the preparation of the decision was important. Paraphrasing, the following answers were given: (1) Setting the strategic direction/structuring the overall project and the procurement process, (2) transparent/comprehensible documentation of the decision and the decision-making process, (3) argumentation support/decision preparation for the approval process, (4) determination of synergies and potential savings, (5) collaborative, objective, and fast-track decision-making. Participants were then asked what it takes to push through and communicate such a strategic decision. The answers can be clustered into four factors: **(1) Conviction**—vision, courage, confidence, will of everyone, interest in doing something new, keeping focus in the event of backlash, political openness, discourse with IPD, collaborative mindset, consent of those involved, and convincing important stakeholders. **(2) Unity**—close coordination with the procurement and legal department, strong network within the company's management level, and secured financial funding. **(3) Knowledge**—knowledge-building CBA and IPD at a very high decision-making level, basic knowledge of all project phases and trades, and experience in megaprojects. **(4) Documentation and communication**—considering the different perspectives, good preparation, structured way, traceability of decision, informative presentation (including risks and opportunities)/reasoning of the benefits and explaining the why.

Questions regarding workshops

Participants were asked if the application of CBA helped to reason the change of the project delivery system. Seven of the participants said yes, and one participant (I) said no. The negative response could be an indicator of lack of training as the participant missed the first workshops, which set the basis and gave clarity regarding the process.

Retrospectively, the participants observed that the team made the decision together and achieved fast consensus by discussing different interests openly and honestly. Working with

the tabular created information symmetry easily, although it showed the complexity of the decision. Moreover, one participant responded that factors were considered that would not have arisen in classic decision-making. The method promotes the consideration of different perspectives and therefore represents the multitude of topics and different interests of the project. Nevertheless, due to the lack of consistent participation and the degree of involvement, the decision result might include a bias due to the assignment of importance (scoring). One participant reflected that the result was not fully objective. This response aligns with previous findings that decisions always contain subjectivity by nature (Schöttle et al., 2020; Suhr, 1999).

In summary, participants answered that CBA helped to communicate and enforce the decision within the project team to onboard stakeholders and achieve commitment to proceed with the decision. As participant (J) stated, "Involving a large number of people in the discussion is exhausting, but necessary and faster in the end since everyone is involved, and all issues are directly discussed."

Findings from Short Interviews

During the short interview, participant (J) said that the tabular structures all relevant aspects. Participant (F) mentioned in his interview that the tabular was very comprehensible and contained more aspects than he anticipated. Furthermore, participant (F) stated that the degree of detail was more than he expected and that the detailed analysis of the alternatives helped to understand the decision resulting in confidence and reliability regarding the outcome. Participants (F) and (J) observed that the team stood behind the outcome and showed confidence, as different perspectives were integrated through the process, and the team worked together on the decision. Thus, stakeholders that were not involved in the decision-making process and stakeholders that might be joining the project can understand why the delivery system must change to IPD without asking the same questions that came up during the workshop. This is an important indicator for the project lead that they developed a stable and comprehensible argumentation as stakeholders outside the project need to give their approval.

Participant (J) stated: "CBA fits great with IPD because decisions can't be made in the same manner as before. [...] We need to make decisions collaboratively to include different perspectives." The findings also show that the team already has a collaborative mindset necessary for the change. As the owner knows, the lack of experience on all ends in the owners, architects, engineers, and contractors (OAEC) industry in Germany regarding IPD will require a joint learning process from all stakeholders.

DISCUSSION AND CONCLUSION

The process created clarity regarding the alternatives that should be considered in the decision-making process. The process showed the team which advantages are more important and which differences between alternatives are less relevant to the decision. Moreover, the tabular gives a clear overview of where the highest importance of advantages is located so that the team was able to make a sound decision. As the difference between alternatives 4 and 5 of the second question was not as big as the other alternatives (Alternative 1: 125 scores, Alternative 2: 230 scores, Alternative 3: 350 scores, Alternative 4: 580 scores, Alternative 5: 690 scores), the team was questioning whether to go with alternatives 4 or 5 by taking certain conditions into account.

Furthermore, the transparent and easily understandable documentation helped them to communicate the decision outcome. For example, seeing the CBA tabular for the first time at the final meeting and without any knowledge regarding CBA, the fourth author was able to understand the tabular but needed to get a further explanation about the way the scores were assigned. Using the method the first time, the second author (B) was able to present the tabular and answered questions regarding the procedure to the group. This shows that with an open mindset, training, and a coach guiding the team to use the method correctly, CBA can be easily

learned, and although CBA was new to the team, the time spent working on the decision was short. Thus, it was important that a facilitator guided the team through the process and helped participants to voice their thoughts.

Based on the presented case, it can be stated that the CBA tabular method helped to (1) create a shared understanding of IPD, (2) understand which scope should be part of the multiparty agreement, (3) organize the argumentation, and (4) create trust regarding the argumentation. In this context, the CBA tabular method was not only used to make the decision but was also used to create a common understanding of IPD and the difference between IPD and DBB. Within a short time, the team was able to share their understanding regarding IPD and discuss the consequences of the system change. Moreover, determining the advantages showed the team the differences regarding the work scope that should be part of the multiparty agreement and supported the identification of constraints that the team was not aware of from the beginning. CBA is an enabler for conversations in a structured and productive way while focusing on the relevant facts. In doing so, CBA helped to reason the change in the delivery system.

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