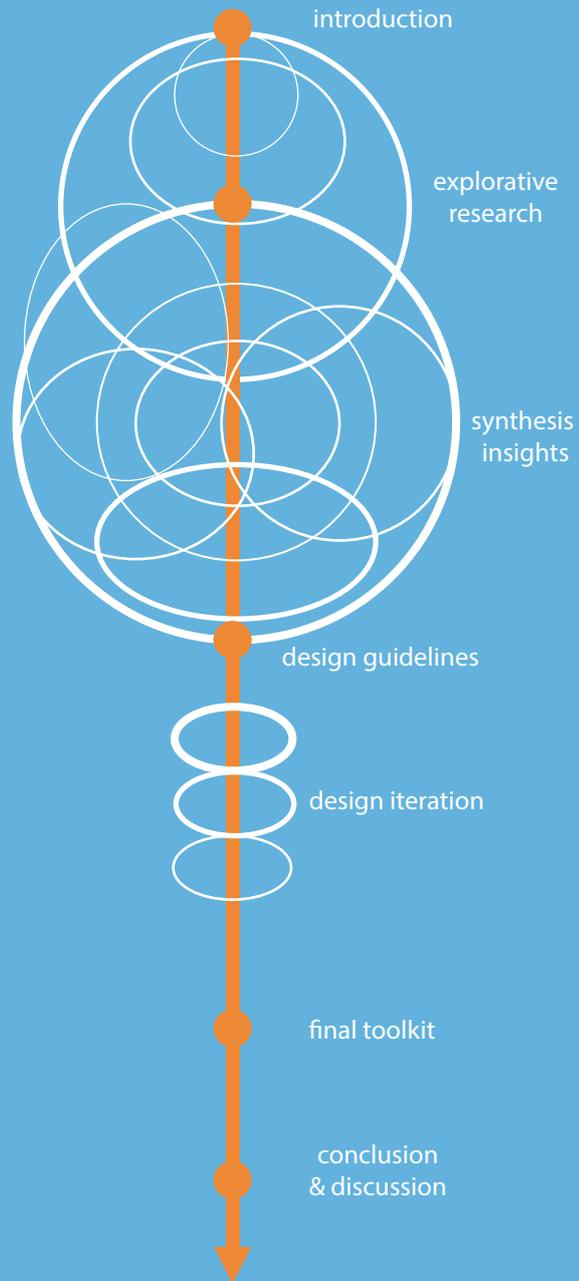


Designing a project selection toolkit

for Philips' value based care studios

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Designing a project selection toolkit for Philips' value based care studios

Master thesis
Delft, July 2019

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Preface

In front of you is my graduation thesis of the Strategic Product Design at the Delft University of Technology. Looking back on the two-year study in TUDelft, the learning journey is not only the expansion of research skills and design skills that makes me more professional. It is also the process that I step out of my comfort zone and exploring more potential of myself– sometimes tough but always valuable.

My learning ambition for this assignment is to challenge myself in doing a project which is different from my previous projects - testing and expanding my skills. In the early days of doing this project, sometimes I felt I was a drowning person who was trapped and felt helpless because of stress and self-doubt - eager to do this project well, which gave myself pressure while I was not so clear about what to do next when I was in an unfamiliar project, especially at the beginning.

Here I want to thank my supervisor team especially! Thank you for the trust and encouraging feedback throughout the whole project, especially in the early stage of the project where I was trapped.

Looking back now, I am delighted that I have chosen this assignment. I learned new skills in the assignment (research skills, new software skills, etc.) and I know more about myself - this experience encourages me to constant learning and growing into an excellent designer as my supervisors are.

Finally, there are still many people I want to thank. Thanks to Natalie, giving a lot of encouragement when I self-doubted in the early days. Thanks to huihui, who gave me a lot of useful suggestions. Thanks to all the interviewees I interviewed in the process. Last but not least, I want to thank my parents and my boyfriend - their support and love are always my biggest reliance.

Hope you enjoy this reading journey!

Yiting

Executive summary

Philips: transforming healthcare through innovation

The global healthcare system is under tremendous pressure. The desire to improve clinical outcomes, lower cost, and enhance efficiency has driven the adoption of value-based care. Value-based care emphasizes paying value rather than volume by motivating healthcare providers and other stakeholders to improve health outcomes while reducing care costs.

Philips believes understanding challenges and identifying opportunities in the healthcare field are essential. Under this background, Philips positions itself as a value-based healthcare technology provider.

The assignment

To transform towards value-based care, Philips collaborates with local hospitals to initiate value-based care studios. Identifying projects which are coming from daily hospital practice and selecting suitable projects to run from lots of possible projects are significant for studios while there is no guideline or toolkit to help project selection. This assignment is to design a project selection toolkit for Philips' value-based care studios.

The exploratory research

First exploratory research was conducted to explore opportunities, insights that could be used in toolkit design. Four kinds of research were carried out: MMC studio internal research, identifying design intervention opportunities, criteria summary, and current project selection method analysis. Based on the exploratory research, the general project selection journey in practice, two main design intervention opportunities, three determinant criteria, and 14 sub-criteria, as well as one most suitable project selection method were summarized. See chapter 2.

Design guidelines

Based on insights gained from exploratory research, six design guidelines were synthesized to guide the later toolkit design.

The toolkit should:



provide
agreed
criteria



create common
meanings



facilitate common
interests among
stakeholders



be transparent
& simple



facilitate
discussion



support both
holistic & detailed
comparisons

Based on identified design guidelines, the toolkit design should focus on providing suitable information in suitable time in the project selection process to support productive discussion and decision making. See chapter 3.

Project selection framework

A project selection framework was designed to facilitate the project selection process in Philips' value-based care studios. It contains the improved project selection journey and corresponding designed tools which facilitate each phase of the improved journey.

The original project selection journey contains three phases: project collection, selection meeting, and decision-making phase. Pre-selection meeting phase and preparation before the selection meeting phase were added in the improved project selection journey to make the project selection journey more transparent, efficient, and traceable. Also, some adjustments were made in the initial three phases to improve the journey. See chapter 4.

Additionally, corresponding tools were designed to support the work in the improved project selection journey. The final toolkit consists of one digital platform, one instruction booklet, and one guiding canvas to help the work healthcare professionals, research team, steering team, and facilitator do in different phases of the improved project selection journey. See chapter 5.

Reading guidelines

Important contents in the text are highlighted in color and made bold. At the end of each chapter, there are one-page key take-aways.



Term explanation

The content framed in blue explains the term/concept mentioned above.



Extra reading

Content framed in grey gives further reading supplements mentioned in the previous paragraphs.

Abbreviations used

MMC

Maxima Medisch Centrum hospital

VBC

Value based care

TUE

Eindhoven University of Technology

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<CHAPTER 1 >

INTRODUCTION

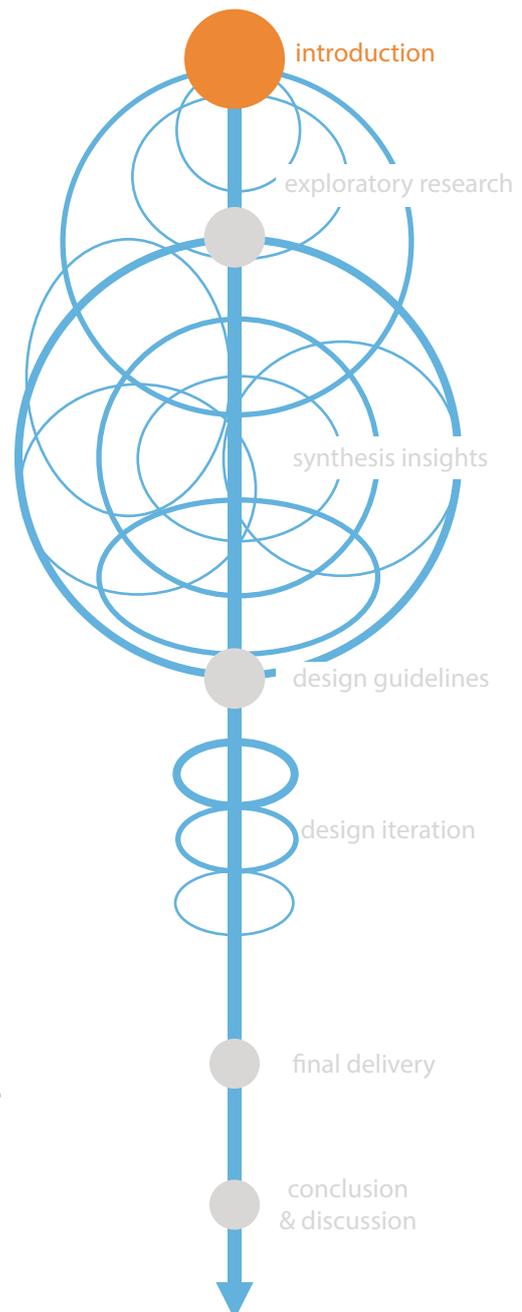
1.1 Philips: transforming healthcare through innovation

1.2 Philips' value based care studios

1.3 Overview of process and approaches

1.4 Key take-aways

This chapter explains the background story of the assignment and the structure overview of this assignment.



1.1 Philips: transforming healthcare through innovation

Philips is a leading healthcare technology company that provides innovative solutions to improve people's health. Philips' vision is to make the world healthier and more sustainable through innovation. And its goal is to improve the lives of 3 billion people every year by 2030 (Philips, 2019).

Economy paradigms

Philips believes that it is vital to have an in-depth understanding of economy paradigm trends to stay forward in the market. Insights about economy paradigm trends can guide development directions to help the company keep create real and sustainable value (Brand & Rocchi, 2011).

Four economy paradigms have been summarised by relevant papers in Philips (Brand & Rocchi, 2011; Deckers, 2019).

First is the industrial economy paradigm (Figure 1). Providing products to customers through effective mass-production yielded economic value. Then is the experience economy paradigm (Figure 2). Companies emphasized specific lifestyles through corresponding solutions to deal with the identity lost that many people experienced in the process of industrialization (Brand & Rocchi, 2011; Deckers, 2019).



Figure 1: industrial economy

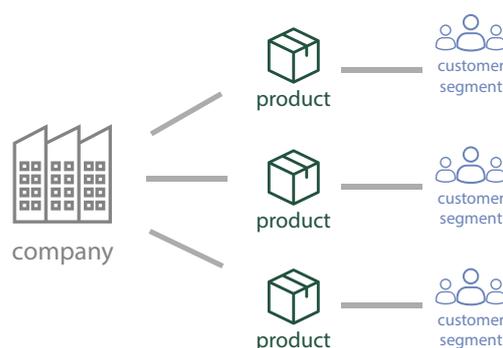


Figure 2: experience economy

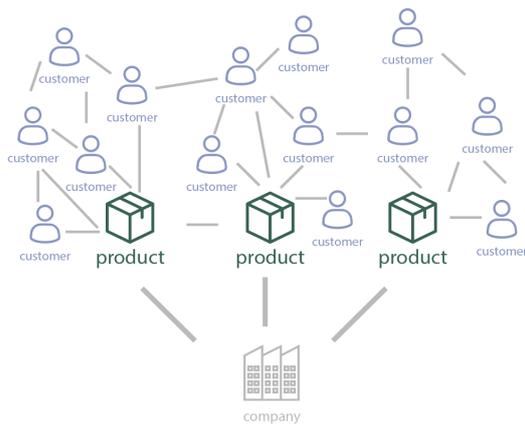


Figure 3: knowledge economy

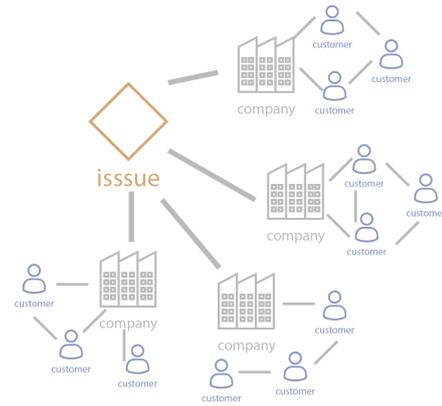


Figure 4: transformation economy

Now our society is in the paradigm of the knowledge economy, rather than relying on brands to seek identity. People are more willing to shape their own meaningful experience with the support of products. Companies that allow customers to form their personal product experience can stay ahead of the market. The LEGO plant, Philips Hue, are examples of the knowledge economy paradigm (Brand & Rocchi, 2011; Deckers, 2019).

Recently, the transformation economy is emerging. People now are more interested in living a meaningful life, contributing efforts to tremendous societal challenges like education, obesity, aging society, climate change, air pollution, etc. Under this background, a new opportunity for companies appears - turning social and environmental challenges into market opportunities. Instead of philanthropy, organizations not only create societal and ecological value for society, but they also gain long-lasting profits as well. The transformation economy is not mature. Developing relevant business models is vital through piloting collaborative ventures in specific contexts (Brand & Rocchi, 2011; Deckers, 2019; Philips, 2019).

As the trends show, to sustain future growth and profitability in the emerging transformation economy paradigm, understanding challenges and identifying opportunities in the healthcare field are essential for Philips (Brand & Rocchi, 2011).

Current healthcare situation facing a lot of challenges

As stated in the Philips position paper, the current healthcare field faces a lot of challenges (figure 5) - the aging population, increasing multiple chronic diseases, increasing burnout in healthcare professionals, increasing costs, etc. It needs disruptive innovations (Philips, 2019).

1. The aging population: According to world population projections, by 2050, the number of older people who are 60 years or older is expected to be twice (2.1 billion) in 2017 (962 million), and three times in 2100 (3.1 billion). The growing speed of old people is far ahead than young people (United Nations, 2019).

2. Increasing multiple chronic diseases: On the one hand, the aging world population contributes to the growing burden of chronic diseases. As people live longer, growing chronic illnesses become a significant global challenge (WHO, 2019). On the other hand, healthcare systems usually focus on acute diseases. Only limited efforts are put into prevention and chronic disease management. Additionally, the unhealthy lifestyle worsens chronic disease situations (Philips, 2019).

3. Burnout in healthcare professionals: The situation of employee burnout in the healthcare field is a bit worrying. According to a survey in the US in 2014, around 70% of family physicians and general internists regretted choosing this job (Kane & Peckham, 2019).

4. Increasing cost: On the one hand, global healthcare spending is expected to grow at an rate of 5.4% from 2017 to 2022 every year (2019 Global health care outlook, 2019). On the other hand, silos of healthcare system drive cost even higher. Silos of units result in clinical waste and unnecessary repeat procedures. According to the survey, 20%-40% of global health resources wasted by inefficient, uncoordinated care every year (Medtronic, 2019).

Under the extreme pressure of global health systems, transforming healthcare systems into integrated, patient-centric, and efficient care delivery models are urgently needed (Philips, 2019).

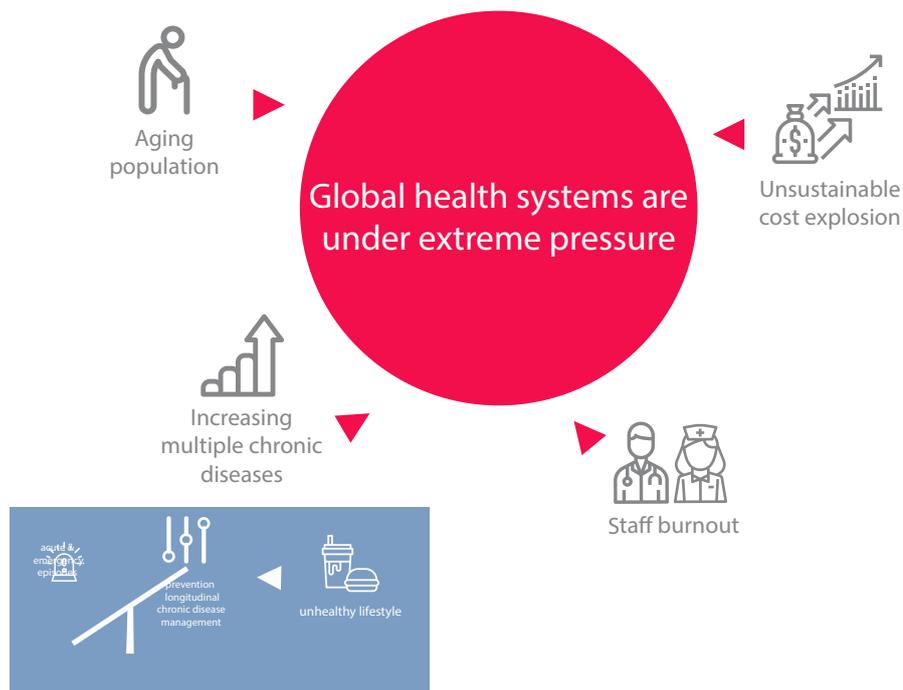


Figure 5: challenges in healthcare systems

Healthcare needs a transformation to value-based care

The desire for integrated, patient-centric and efficient care delivery models are driving the adoption of value-based care. Value-based care was first proposed by Michael Porter, with value defined as “the health outcomes achieved per dollar spent”. He proposes that the fundamental problem in the healthcare system is the value delivered by the delivery system. Value is defined as patient-focused, and the value created for patients should determine the return of all participants in the system (Porter, 2010). In contrast to traditional systems, value-based care aims to pay for value rather than volume, by encouraging providers and other stakeholders to improve healthcare services and healthcare outcomes while reducing the cost of care (Philips, 2019).

Philips also believes value-based care is the answer for future healthcare delivery systems. And Philips positions itself as the value-based provider of medical technology (Philips, 2019).

To make the “value-based care” goal more actionable, as explained in Philips annual report, **Philips transforms healthcare through integrated innovation guided by Quadruple Aim: improved patient experience, better health outcomes, improved staff experience, and lower cost of care** (Philips, 2019).



Term explanation

Quadruple aim

The Quadruple aim is widely accepted as guidelines to improve healthcare systems (Bodenheimer & Sinsky, 2014).

At first, it is the Triple aim. "Improving patient experiences," "improving health outcomes," "reducing the cost of healthcare" were first provided as a framework for delivering high-value care by Donald Berwick and his colleagues. Later the triple aim was adopted as the healthcare innovation compass for the healthcare system (Sikka, Morath & Leape, 2015).

A phenomenon that gradually caught the public's attention was that healthcare staff reported widespread burnout. And burnout could result in lower patient experience, worse health outcomes, and higher costs. Based on the situation, to guarantee the realization of Triple aim, Triple aim is expanded to the Quadruple aim - adding improving healthcare staff experience (Bodenheimer & Sinsky, 2014).



Extra reading

An example explains how Philips enables customers to implement value-based care strategies.

Philips eICU program (Philips, 2019).



- Philips eICU program lowered costs and improved patient outcomes in rural areas in the US.

- (Improving patient outcomes)The ICU reduced 11,000 beds and saved more than 260 lives in a year.

- (Lowering cost)\$ 62 million were saved through ICU reduction and shorten the length of stay each year.

1.2 Philips' value-based care studios

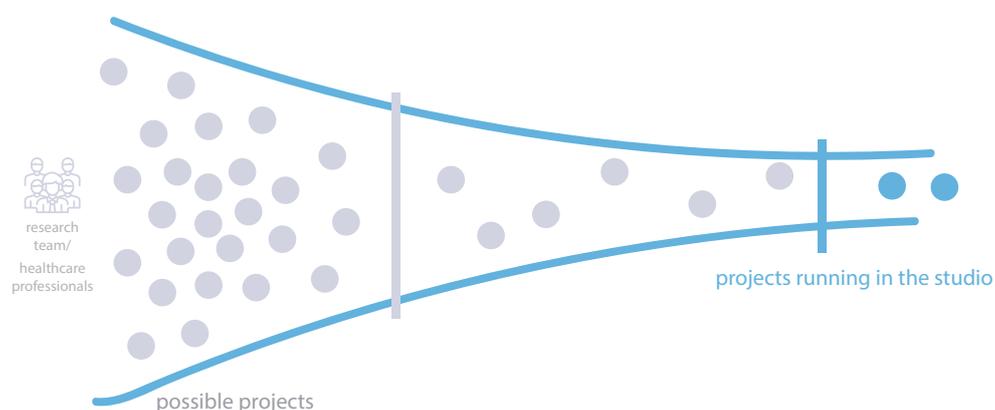
Philips initiates value-based care studios with local hospitals to explore and learn in the transformation towards value-based care and create systemic innovations in the heart of healthcare. For those value-based care studios, as explained by the relevant manager in one VBC studio, they have mainly three goals:

1. Identifying projects which are coming from hospital daily practice (incl. the broader health-care providers) and addressing them in the context with the direct involvement of patients, clinicians, and staff.
2. Exploring how to deliver on prioritized transformative projects which are in line with the transformation towards a value-based care system and addressing critical areas identified by the NL government and payers.
3. Measuring impact "on the floor" and improving.

For the development of those value-based care studios, applying limited resources (people, time, money and equipment) judiciously from lots of possible projects and achieving balance among critical factors, such as the need for social impact, good financial returns, probability of technical success are very important.

While identifying suitable projects is essential for value-based care studios, there is no existing guideline or toolkit in studios to facilitate the project selection process in value-based care studios. A toolkit to facilitate the project selection process is needed.

Based on this background, my graduation assignment is: **Designing a toolkit to help select suitable projects for Philips' value-based care studios.**



Assignment scope

So this assignment focuses on designing a project selection toolkit for Philips' value-based care studios. Healthcare professionals and research teams in value-based studios could propose lots of possible projects. What are the main hurdles, and what could be the main design intervention opportunities in the project selection process? **This assignment is to improve the project selection process and design the corresponding tools to help the improved project selection journey.** Different participants in different phases of the project selection journey - healthcare professionals, research team, steering team are the users of the toolkit.

To better experience the context and design the toolkit that suits Philips' value-based care studios, I worked in the Maxima Medisch Centrum value-based care studio during this assignment. The MMC value-based care studio is by Philips, hospital, and the Eindhoven University of Technology.

1.3 Process and Approach

The process of dealing with this assignment could be mainly divided into five phases (figure 8): exploratory research, synthesis insights, design iteration, final delivery and reflection.

Exploratory research

The first phase is exploratory research. Four kinds of research were carried out - MMC studio internal research; design intervention opportunities identification; criteria summary and project selection method analysis. The exploratory research aims to gain insights related to later toolkit design.

Synthesis insights

The second phase is the synthesis insights. Key insights gained in exploratory research were synthesized as six design guidelines, which serve as fundamental guides for later toolkit design.

Design iteration

The third phase is the design iteration phase. A project selection framework was made. It contains an improved project selection journey and corresponding tools in each phase of the

improved project selection journey. The project selection framework was designed based on design guidelines. Additionally, interviews and a workshop were carried out with experts from Philips and MMC hospital to collect feedback on the framework. Finally, a total of three versions of frameworks were iterated.

Final toolkit

The fourth phase is the final delivery phase. The ultimate toolkit- a digital platform, an instruction booklet, and a guiding canvas were designed to help the whole improved project selection journey.

Reflections

Limitations in the toolkit making process, as well as recommendations for further research, were reflected.

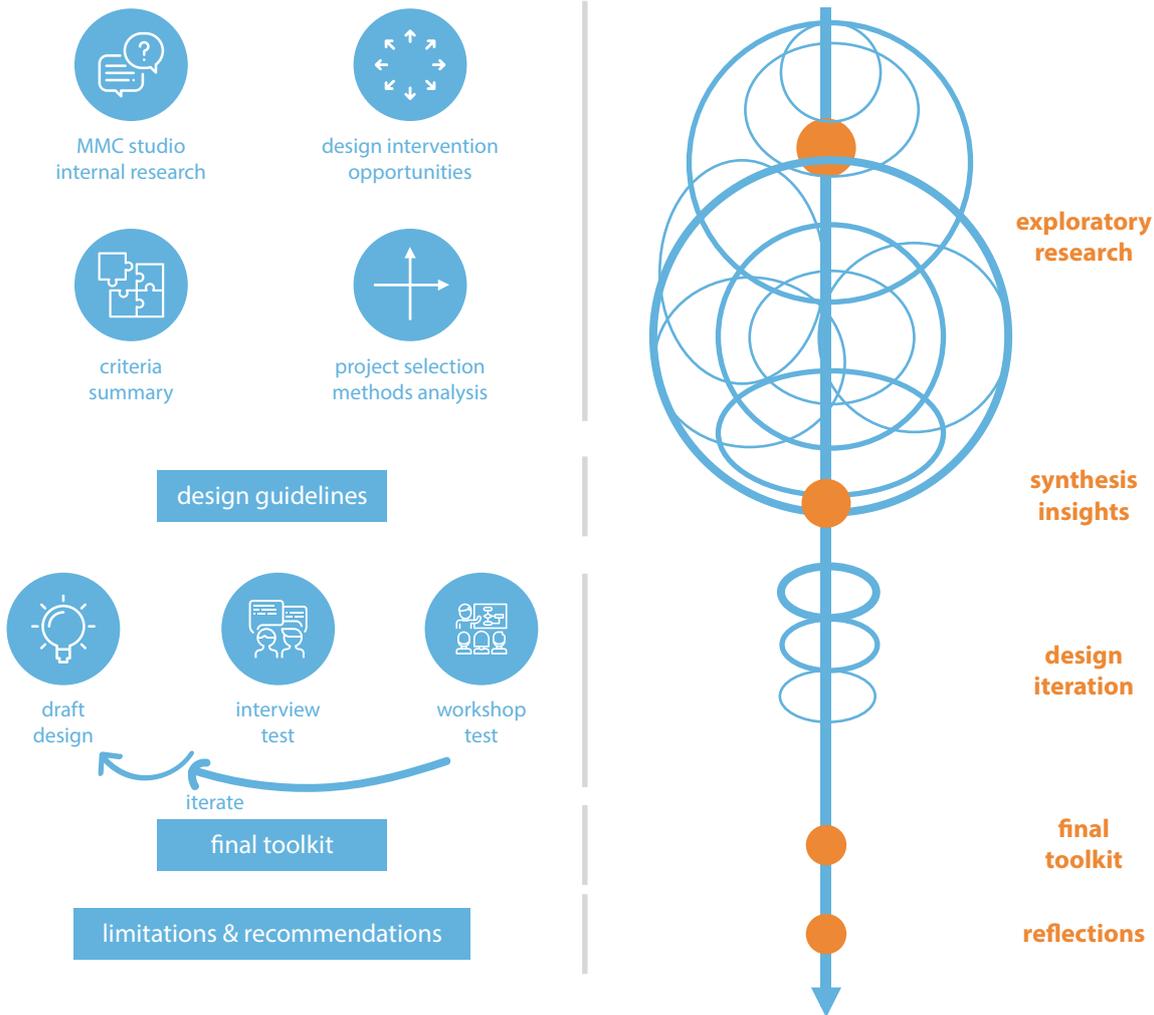


Figure 8 : the process in dealing with this assignment

1.4 KEY TAKE-AWAYS CHAPTER 1

Philips believes that in order to keep creating real and sustainable value for its stakeholders, it is crucial to have a deep understanding of trends of economy paradigm.

As the trends show, to transform towards transformation paradigm and sustain future growth and profitability, understanding challenges and identifying opportunities in the healthcare field are essential for Philips.



Challenges and opportunities in healthcare field

important for
PHILIPS

Global health systems are under extreme pressure



PHILIPS aims to transform towards VBC.

The current healthcare field faces a lot of challenges and needs disruptive innovations. Integrated, patient-centric, and efficient care delivery models are urgently needed.

Porter proposed value-based care concept under this background. Philips also believes value-based care is the answer for ideal healthcare delivery models. To stay ahead of the market, Philips positions itself as the value-based provider of medical technology.

Philips initiates value-based care studios with local hospitals to explore and learn in the transformation towards value-based care.

Identifying suitable projects from lots of possible projects is vital for value-based care studios, while there is no existing guideline or toolkit in studios to guide the project selection process. A toolkit to facilitate and guide the project selection process is needed.



VBC studios are initiated to explore and transform towards VBC.



Based on the above information, my graduation assignment was commissioned by Philips:

Designing a toolkit to help select suitable projects for Philips' value-based care studios.

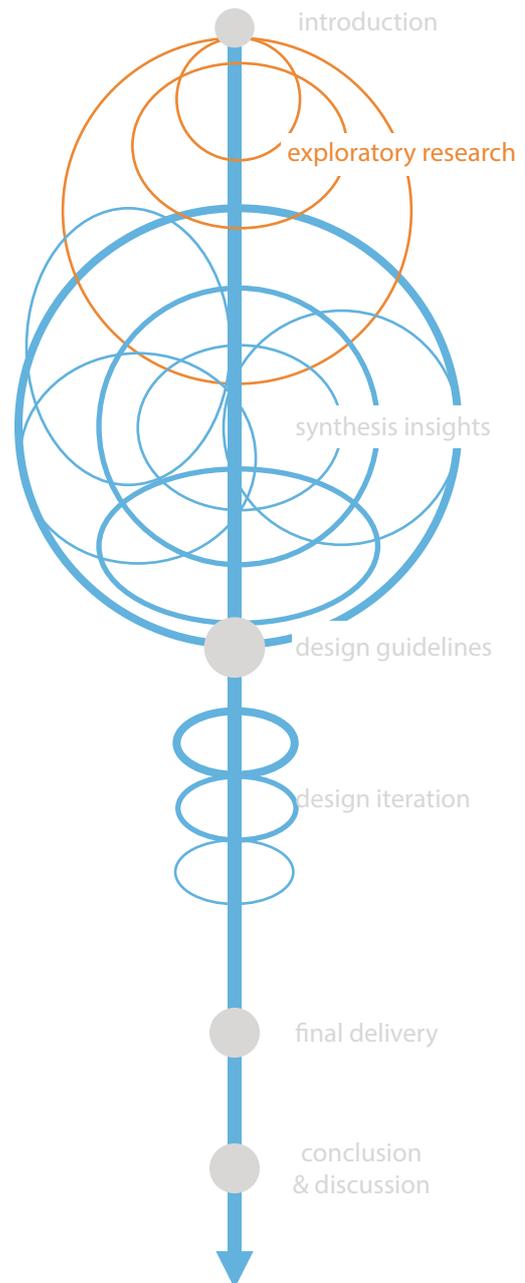
Five main phases were conducted to deal with this assignment: exploratory research, synthesis insights; design iteration, final toolkit, and reflection.

<CHAPTER 2 >

EXPLORATORY RESEARCH

- 2.1 Research set up
- 2.2 MMC studio internal research
- 2.3 Identifying main design intervention opportunities
- 2.4 Criteria summary
- 2.5 Current project selection method analysis
- 2.6 Key take-aways

This chapter introduces the exploratory research that was conducted to explore opportunities and insights that could be used in toolkit design. Four research carried out: MMC studio internal research, identifying design intervention opportunities, criteria summary, and current project selection method analysis. For each research, the research goal, approach, and findings were described.



2.1 Research set up

Exploratory research was conducted to gain insights relevant for later toolkit design (figure 9).

A total of four research was carried out. (1) MMC studio internal research was conducted to summarize the general project selection process in value-based care studios and identify expectations participants want in the project selection process.

Then based on the journey, (2) a literature review was conducted to identify the main barriers and corresponding design intervention opportunities in the general project selection journey. Additionally, validation interviews were conducted.

(3) Criteria summary was carried out to summarize relevant determinant criteria and sub-criteria for project selection in value-based care studios.

(4) The current project selection method analysis was also carried out to pick out the suitable method that could be applied in the later toolkit design.

Later in chapter three, these insights described in the following paragraphs were synthesized as design guidelines to guide toolkit design (figure 10).

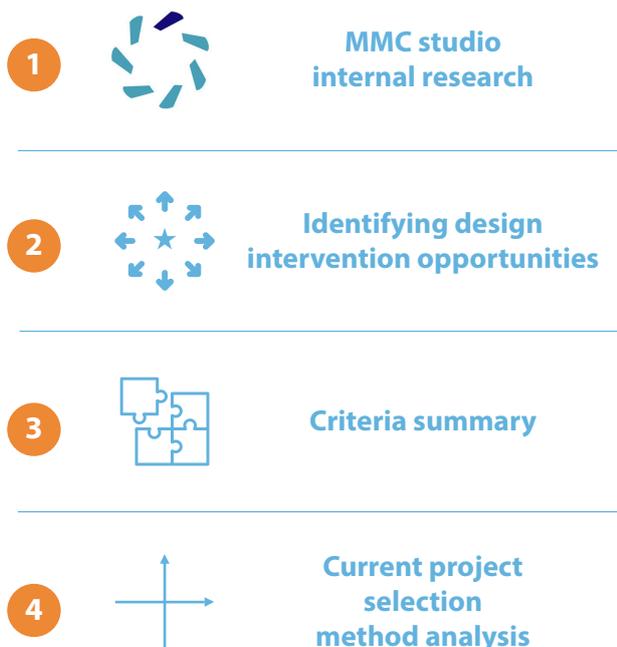


Figure 9: overview of exploratory research

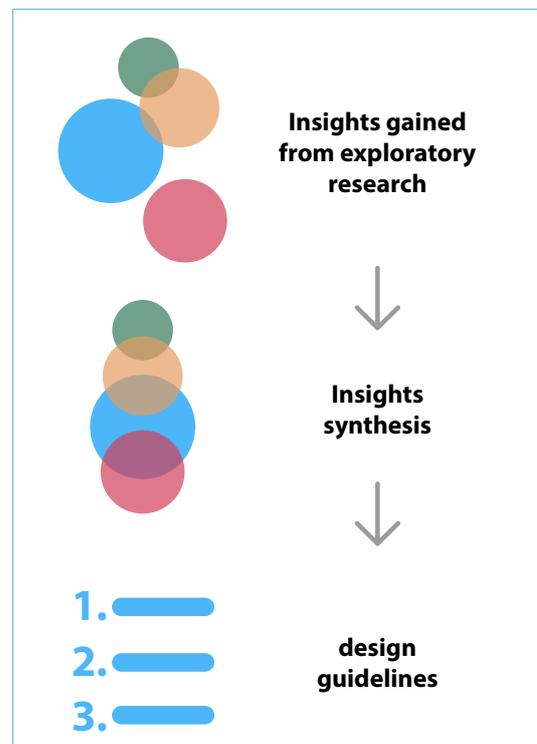


Figure 10: from insights to design guidelines

2.2 MMC studio internal research

Research goals

Driven by the following drivers, MMC studio internal research was conducted.

- To have a good understanding of the general project selection process in Philips' value-based care studios.
- To explore and summarize expectations that participants want in the project selection process.

Based on the research goals, the following research question was formulated:

What is the usual process in project selection, and what are the ideal toolkit participants want in value-based care studios?

Research approach

MMC value-based care studio was selected as a typical Philips' value-based care studio to interview.

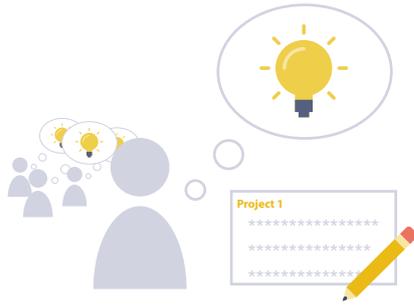
Totally four interviewees were conducted. They were a member from the Eindhoven University of Technology, two members from Philips and one member from MMC hospital. They all had experiences in project selection in value-based care studios. Two parts of questions were asked - what were the usual process for project selection and what were their expectations for the toolkit.

All interviews were audio-recorded. After each interview, the recorded audio were listened again, and the main insights were noted down.

Findings

Based on descriptions from interviewees, the general project selection process was made. It has mainly three steps: step 1- project collection phase where proposers note down ideas and write down relevant arguments; step 2- project selection meeting phase and step 3- decision-making phase (figure 12).

project collection phase



In the project collection phase, proposers note down ideas and collect related arguments.

project selection meeting phase



And then in the project selection meeting phase, different experts from different professional backgrounds will gather together to evaluate possible projects based on their expertise. Each participant has his criteria in project selection.

decision making phase



Finally, is the decision-making phase, participants in the project selection meeting achieve consensus on which projects to run in the short term and which projects to run in the long term.

Three expectations for the toolkit were summarized from interviewees.



Facilitating discussion

- The toolkit should provide structural and quick procedures to facilitate project selection discussion and sound decision making.

“The most important thing is how it(the toolkit) could facilitate discussion. Decision-makers are still people. Facilitate the discussion is the most important thing the toolkit should satisfy.”

- Philips senior director design innovation



Supporting both holistic & detailed comparisons

- The toolkit should provide holistic comparisons of projects while also support people to dive into detailed comparisons of the projects.

“Zoom in and zoom out. The toolkit could support the holistic comparison situations of projects, while it could also support detailed comparison in projects.”

- Philips senior director design innovation



Being transparent & simple

- The toolkit should be transparent and simple.

“The toolkit should be simple and easy to understand, also not time-consuming. Otherwise people will not use it no matter how you design it.”

- Hospital expert & Philips experts

2.3 Identifying main design intervention opportunities

Research goals

To design a toolkit that facilitates the project selection process, having an understanding of what are the main hurdles in the project selection process and what are the corresponding design intervention opportunities are essential.

Based on the research goals, the following research question was formulated:

What are the main hurdles in the project selection process, and what are the corresponding design intervention opportunities that could help solve those hurdles?

Research approach

As the identified general project selection journey shows, the project selection process is mainly related to arguments of projects, selection criteria, and shared decision making. So literature review about arguments of projects, selection criteria, and shared decision making was conducted to explore main hurdles and corresponding design intervention opportunities. Then validation interviews with relevant experts were conducted to validate whether those were the main barriers or not in practice.

Three relevant experts were interviewed. They all knew value-based care and had experience in healthcare innovation.



Figure 11: validation interviewees

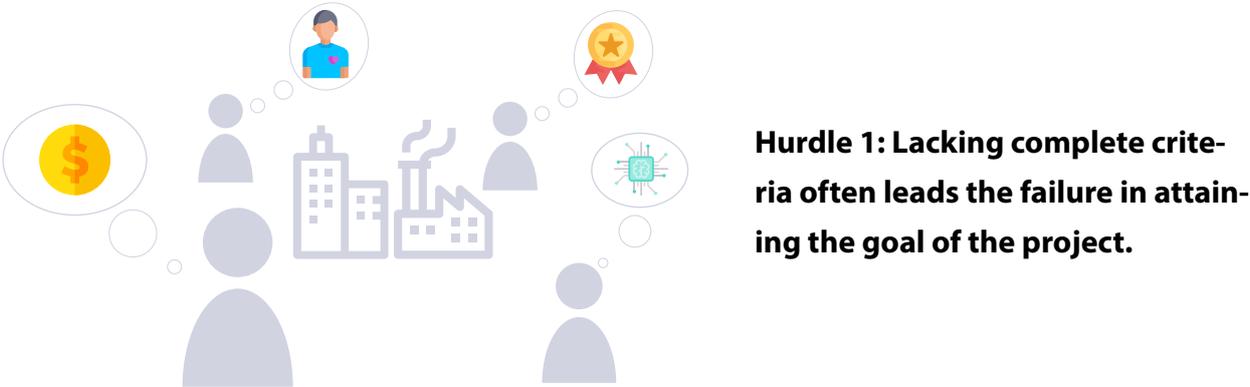
They are a healthcare consultant who has worked in the healthcare field for more than 25 years, a hospital expert related to value-based care studio, and a VBC economist expert from Philips.

An interview guide was prepared. Two parts questions were asked. What they thought were the main hurdles and corresponding design intervention opportunities in project selection, and what criteria they thought were important. The detailed interview guide was in appendix A.1. And the criteria they mentioned introduced in chapter 2.4.

All interviews were audio-recorded. After each interview, the recorded audio were listened again, and the main insights were noted down. The analysis was done based on those insights.

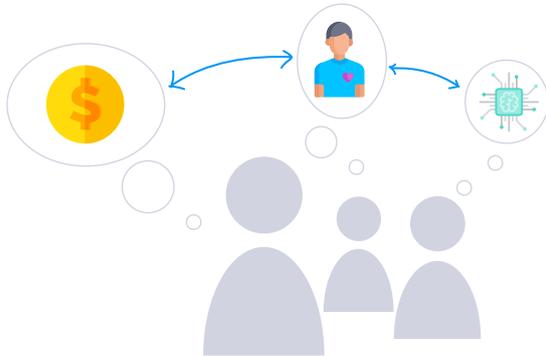
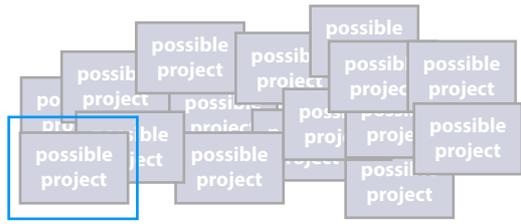
Findings

After the literature review, two main hurdles and corresponding design intervention opportunities in the project selection process were identified.



A clear definition of what criteria need to be considered is vital for project selection. There is no consensus on what criteria needed to be covered. As a result, in practice, many project managers pick criteria that they think are important in the context, while ignored or wrong criteria often lead the failure in goal achievement of the project (Dutra, Ribeiro & de Carvalho, 2014). Exploring the determinant criteria needed for project selection is necessary for the design of the toolkit.

Corresponding design intervention opportunity: Providing critical, holistic criteria could help the project selection process.



Hurdle 2: Sharing and assessing knowledge across professional boundaries is difficult.

Project selection needs different knowledge integration from diverse professional backgrounds. For example, economists need to assess financial aspects. Technologists need to evaluate whether the technology is mature. A chosen project should be selected not only because of the evaluation outcome of one aspect but should be evaluated holistically. To assess holistically, participants involved should share and evaluate each other's domain-specific knowledge in project selection, which is vital while also difficult (Carlile, 2004).

Sharing and assessing knowledge is difficult. Actors often have different interests, knowledge, and beliefs. Bucciarelli(1988) introduced the "object world": An object world contains individual beliefs, interests, knowledge, and experiences of an actor, as well as the methods and techniques the person can use(Bucciarelli, 1988). The existence of the object world prevents the actors from creating common meanings because the actors will interpret them in their own way.

Carlile proposes a framework to explain the difficulties and introduces suitable boundary objects which could help share and assess knowledge across professional boundaries (Carlile, 2004).

Three properties of knowledge are proposed by Carlile: difference, dependence, and novelty. "Difference" is in the amount of knowledge accumulated, "specialization knowledge". "Dependence" means two entities must take each other into account if they are to meet their goal, for example, dependence among activities and resources. "Novelty" means that in the novel circumstances, for each actor, there are novelties shared with others and novelties assessed from others. This is the most challenging aspect (Carlile, 2004).

When novelty arises, it is harder for the transfer, translation, and transformation of domain-specific knowledge because common knowledge is often not adequate. Carlile proposes three levels of boundaries based on different levels of novelty - syntactic boundary; semantic boundary and pragmatic boundary (figure 12) (Carlile, 2004).

Boundary objects are artifacts that facilitate domain-specific knowledge sharing across boundaries. Only when the artifacts are usefully integrated into the practice of actors working in different fields, they are boundary objects (Spee & Jarzabkowski, 2009).

In **syntactic boundary**, differences and dependencies between actors are apparent. A common lexicon is enough to share and evaluate knowledge on the border. This phase is only "information processing." Boundary objects like repositories could facilitate transferring information across different functional settings (Carlile & Reberntisch, 2003; Carlile, 2004).

In **semantic boundary**, novelty increases, and some differences and dependencies are unclear for every actor, different interpretations exist. In this boundary, common meanings are needed to be created. Boundary objects like standardized forms, methods could facilitate actors to have the same interpretations of those domain-specific knowledge (Carlile & Reberntisch, 2003; Carlile, 2004).

Pragmatic boundary occurs when actors have different interests as novelty increases. Common interests are needed to develop. Boundary objects like models and maps could facilitate a process for transforming knowledge (Carlile & Reberntisch, 2003; Carlile, 2004.)

One thing needs to be paid attention to is with the increasing of novelty, although more requirements for the boundary objects are required, capacities in the "lower novelty" situations are always needed. For example, a common lexicon is always necessary even in the semantic and pragmatic boundary. The only difference is that in syntactic boundary, it is sufficient while in the other two boundaries, it is not sufficient.

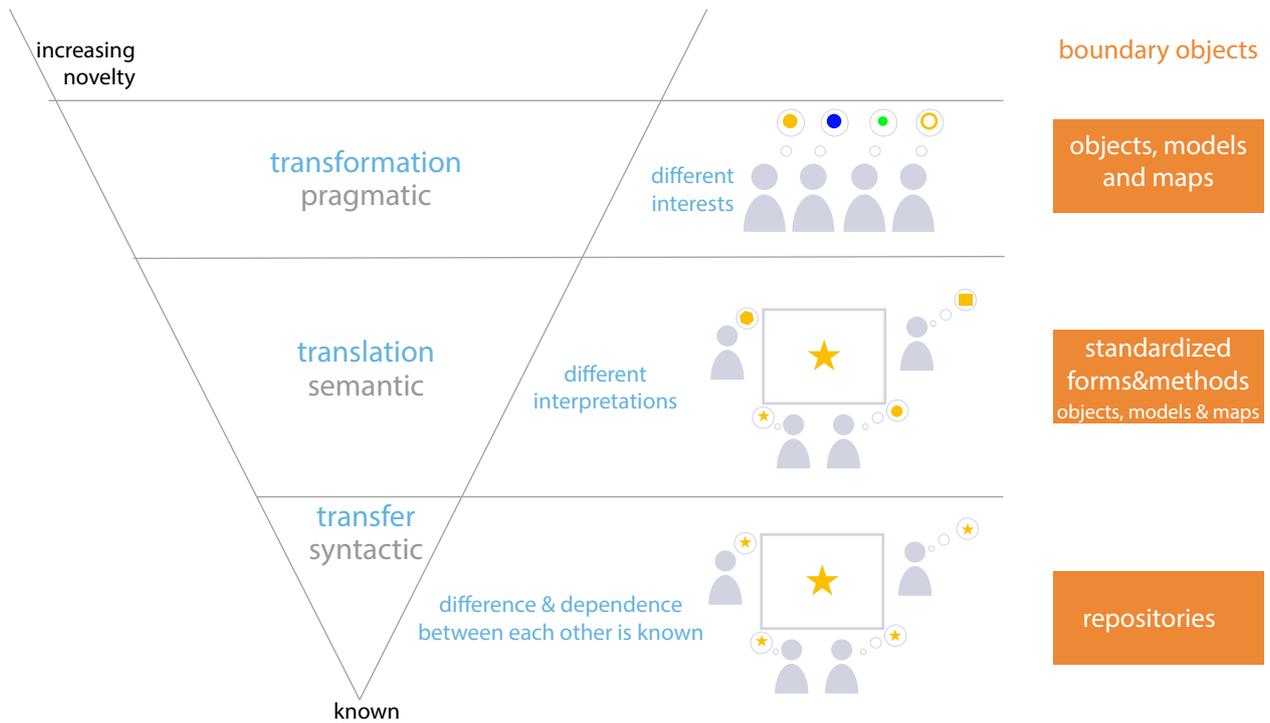


Figure 12: three levels of knowledge boundaries and corresponding boundary objects

Applying the principles to assignment context

When applying those principles to the assignment context, the situation is below (figure 13):

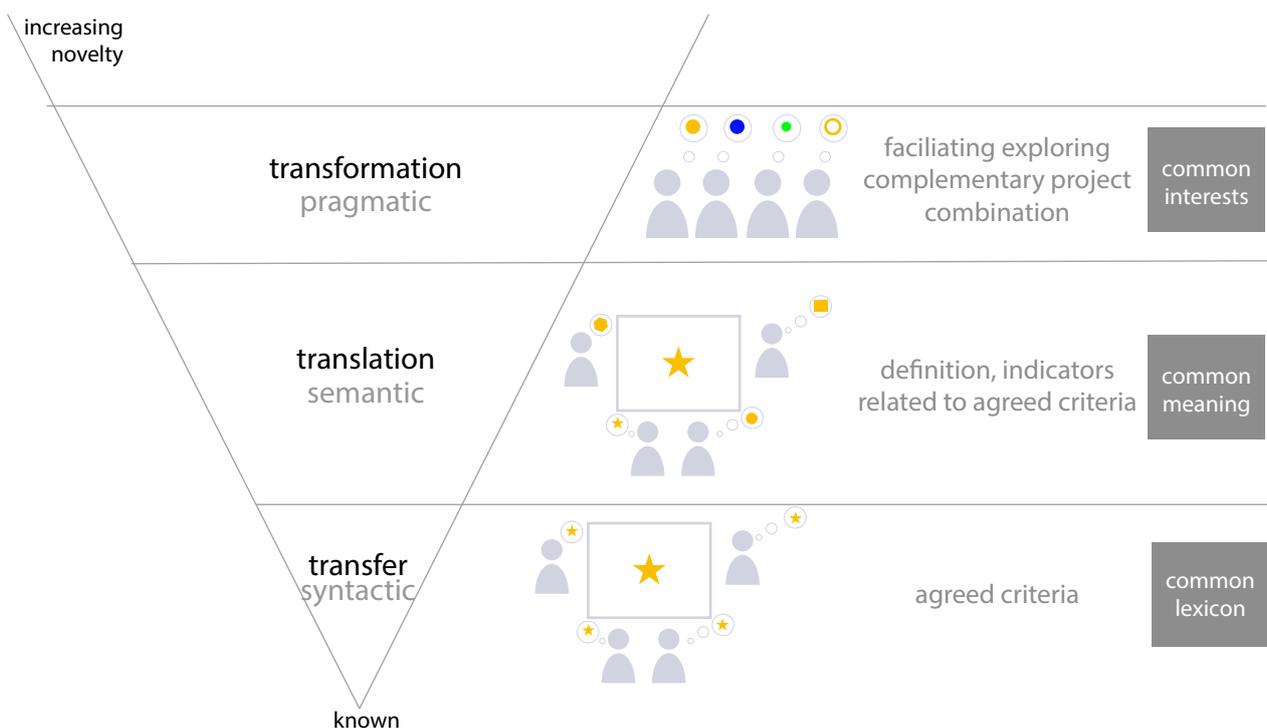


Figure 13: applying the principles to assignment context

To help better transfer knowledge, in syntactic boundary, agreed criteria are needed to serve as the “shared language” in transferring information in project selection and evaluation.

To help better translate knowledge, in semantic boundary, guidelines, descriptions, examples related to criteria should be made to facilitate participants in learning, understanding and assessing differences and dependencies among all criteria in project selection.

To help better transform knowledge, in pragmatic boundary, letting the main stakeholders, Philips and local hospitals, explore project combinations that could both satisfy their needs is essential. The toolkit should facilitate complementary combinations of projects in portfolio selection to create common interests for stakeholders.

In summary, to help share and assess knowledge across professional boundaries, the toolkit should not only serve as a common lexicon (agreed criteria collection), it also needs to create common meanings to all participants (guidelines, explanations, etc.), and also facilitate stakeholders to achieve common interests(facilitating them select combinations of projects which satisfy them). Then the toolkit could help the project selection process through helping transfer, translate, and transform knowledge across boundaries.

Corresponding design intervention opportunity: The toolkit should facilitate agreed criteria, common meanings, and common interests to help share and assess knowledge across professional boundaries.

Interviewees were conducted to check whether these two were main hurdles and whether interviewees thought the identified design intervention opportunities were useful. Additionally, check whether there were new hurdles identified in practice. Three experts all agreed that these two were the most significant hurdles and identified design intervention opportunities could really help project selection.

2.4 Criteria summary

Research goal:

Criteria summary was carried out to summarize determinant criteria and sub-criteria relevant to project selection in value-based care studios. The research question was:

What determinant criteria and sub-criteria are relevant to project selection in value-based care studios?

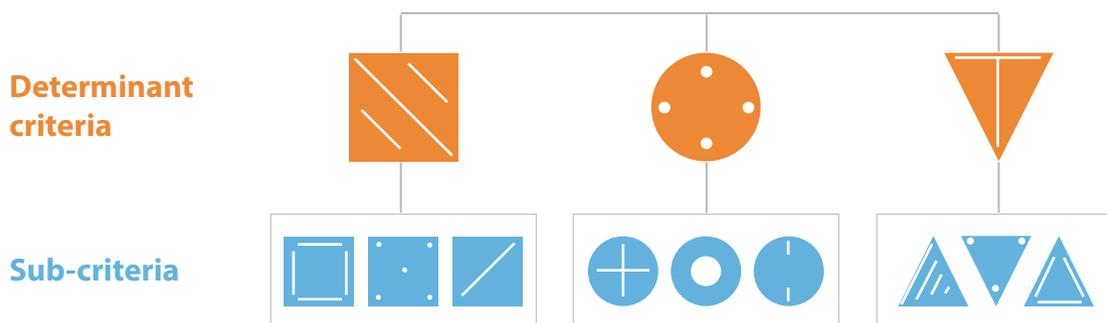


Figure 14: Example shows determinant criteria and sub-criteria

Research approach:



Figure 15: research approach

A literature review and expert interviews were conducted to explore and summarize determinant criteria and sub-criteria related to project selection (figure 15).

A literature selection mechanism was made to guide the search of related literature (figure 16).

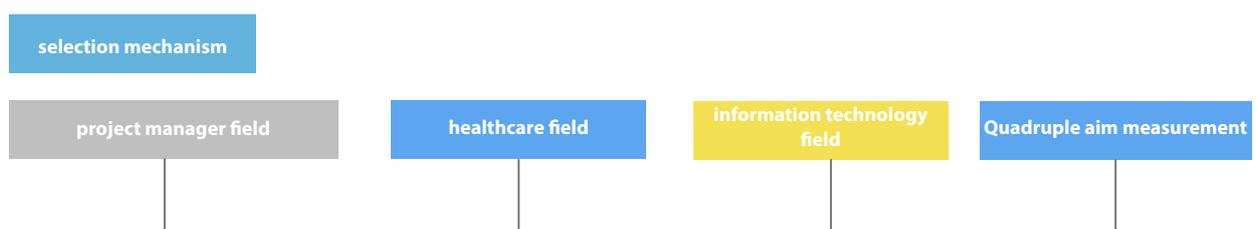


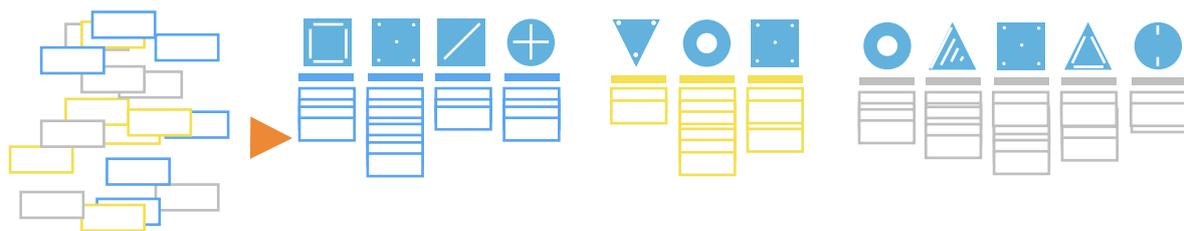
Figure 16: literature selection mechanism

- Searching literature from the project management field to see what criteria are usually critical in the project management field.
- Searching literature from the healthcare field to see what criteria are usually critical in the healthcare field.
- Searching literature from the information technology field to see what criteria are usually crucial in the information technology field.

As shown in the Philips position paper, health informatics, artificial intelligence, and digital innovation are essential building blocks towards value-based care (Philips, 2019). So related criteria from the information technology field are also relevant for project selection in the VBC studio.

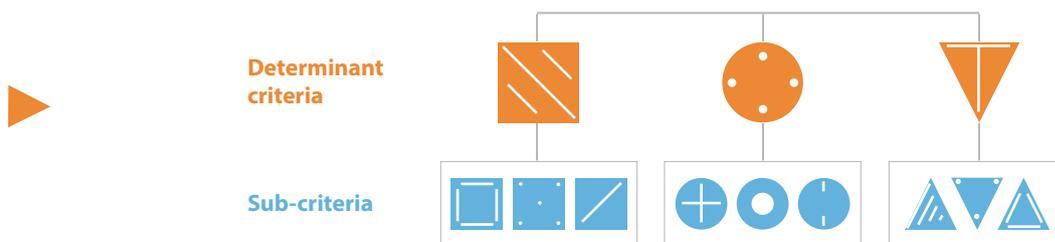
- Searching healthcare literature related to the measurement of Quadruple aim, like “what are the indicators of each aim,” “whether there are standards of measurements relevant to each aim.”

After the criteria from papers were collected, several steps were conducted to help summarize the criteria. So first, criteria identified from papers were categorized into groups based on the meanings of contents. Then still based on the meanings of contents, those groups were classified as sub-criteria into determinant criteria (figure 17).



Step 1: Criteria identified in literature from different fields

Step 2: Categorising criteria into groups in corresponding fields



Step 3: Classifying into determinant criteria

Figure 17 : the way in summarizing criteria

Except for the literature review, expert interviews were also conducted to check whether any criteria were critical in practice while not identified in the literature and whether those identified criteria were all crucial in value-based care studio context.

The interviewees were the same interviewees in identifying the main design intervention opportunities(chapter 2.3).

Findings:

Totally three determinant criteria and 14 sub-criteria were summarized.

Determinant criteria

Determinant criteria should support the holistic evaluation of projects. The determinant criteria for project selection in value-based care were adjusted from Tom Kelly's model (Kelley & Kelley, 2013). **Definitions and scopes of determinant criteria were modified to make them more suitable for the studio context.**

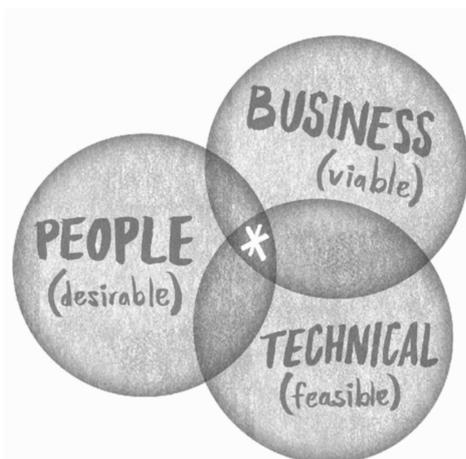


Figure 18 : Tom Kelly's model (Kelley & Kelley, 2013, p.57)



Term explanation

Tom Kelly's model

The most accepted way of accessing an ideal project is Tom Kelly's model (figure 18) - whether the project is desirable, feasible, and viable. A desirable project is one that your customers like. A feasible solution is based on your current operational capabilities. And a viable solution is one that gains profits, with a sustainable business model (Kelley & Kelley, 2013). These three determinant aspects show a holistic way of assessing whether the project is actionable and needed, whether the project has a high possibility of delivering deliverables successfully instead of failure in the process.

- Desirability evaluates whether or not the value of the project is attractive enough to users & stakeholders.

Usually, “desirability” means assessing whether innovation is needed for users (Kelley & Kelley, 2013).

However, in this assignment, the definition of desirability is not limited to only users. For value-based care studios, leveraging cooperation is necessary for tackling healthcare challenges. Societal challenges in the healthcare sector are “wicked problems” (Shaw & Magaldi, 2009). Those problems cannot be solved in isolation and need collaborating with complementary partners (Brand & Rocchi, 2011). In this situation, a ‘win together’ approach is required in strategic partnerships- creating value for all partners (Granados, 2012). So evaluating whether the project is attractive enough for all stakeholders is needed since if one project is not attractive for one crucial stakeholder. It is of a high probability that the stakeholder will not participate in, and the project will fail.

So in summary, in this assignment context, the definition of desirability is adjusted as “whether or not the value of project is attractive enough to users & stakeholders”.



Term explanation

Wicked problems

Wicked problem: complex issues that the values of many stakeholders and decision-makers are contradictory and the consequences of the entire system are completely confusing (Shaw & Magaldi, 2009).

- Feasibility evaluates whether or not the competence of organizations could complete the project successfully.

Feasibility in Tom Kelley diagram means technology feasibility (Kelley & Kelley, 2013). While in real situations, except technology feasibility, competence like staff expertise is also essential. So in this assignment context, feasibility is not limited to only technology feasibility. It is defined as evaluating whether or not the overall capabilities of organizations could complete the project successfully.

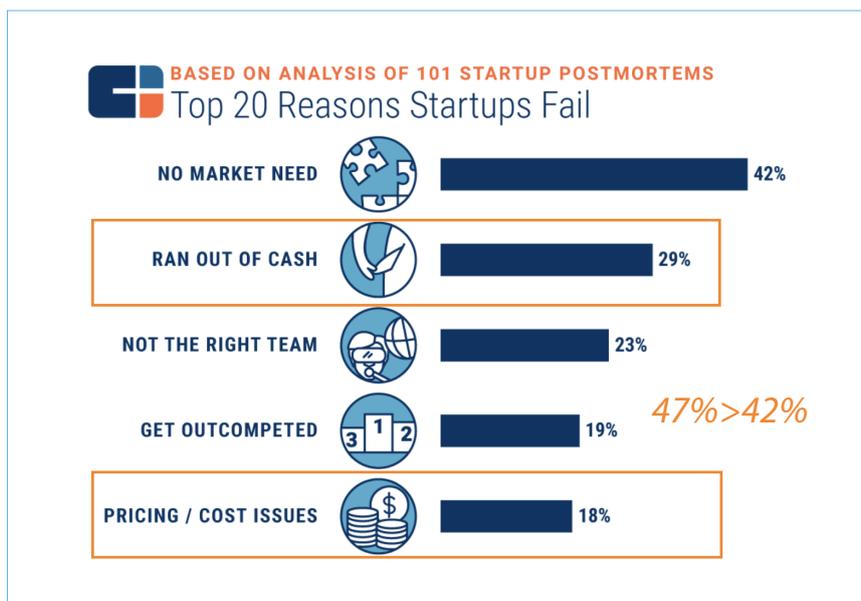


Figure 19: top 20 reasons startups fail (Cbinsights, 2018)

- **Viability evaluates whether or not the solution of the project could be produced and distributed in a financially viable way.**

Viability in Tom Kelley's definition evaluates whether the project is economically viable that allows the enterprise to thrive (Kelley & Kelley, 2013).

Financial sustainability is a big issue needed to be considered in project assessment. According to the table (figure 19), financial problems are the most significant factor (47%) lead to project failure (Cbinsights, 2018).

The definition of viability doesn't need to be adjusted a lot in this context. So viability is still defined as "viability assesses whether or not the solution of the project could be produced and distributed in a financially viable way."

Since the goal of value-based care studios is towards value-based care, evaluating in which level the project could contribute to the value-based care should also be considered in the determinant criterion.

In Philips position paper, Quadruple aim is mentioned as actionable principles towards value based care (figure 20) (Philips, 2019).

Also, according to value-based care expert from Philips, on a theoretical level, the impact of VBC could be examined against the Quadruple aim (figure 21):

- VBC provides care in a patient-centered way, which could be reviewed by “improved patient experience.”

- VBC is in more integrated & coordinated care, which could be examined by “improved staff experience.”

- VBC targets reducing the per capita cost of healthcare, which could be examined by “lower cost of care.”

- VBC requires for population health management, which could be examined by “better health outcomes.”

So Quadruple aim is suitable to be selected as criteria to evaluate whether or not the project could contribute to value-based care. And since Quadruple aim also shows value for users and stakeholders, I classify it under the “desirability” aspect.

Our approach to value based care

At Philips, we make value based care principles actionable by addressing the Quadruple aim.

Figure 20: Philips position paper: value based care

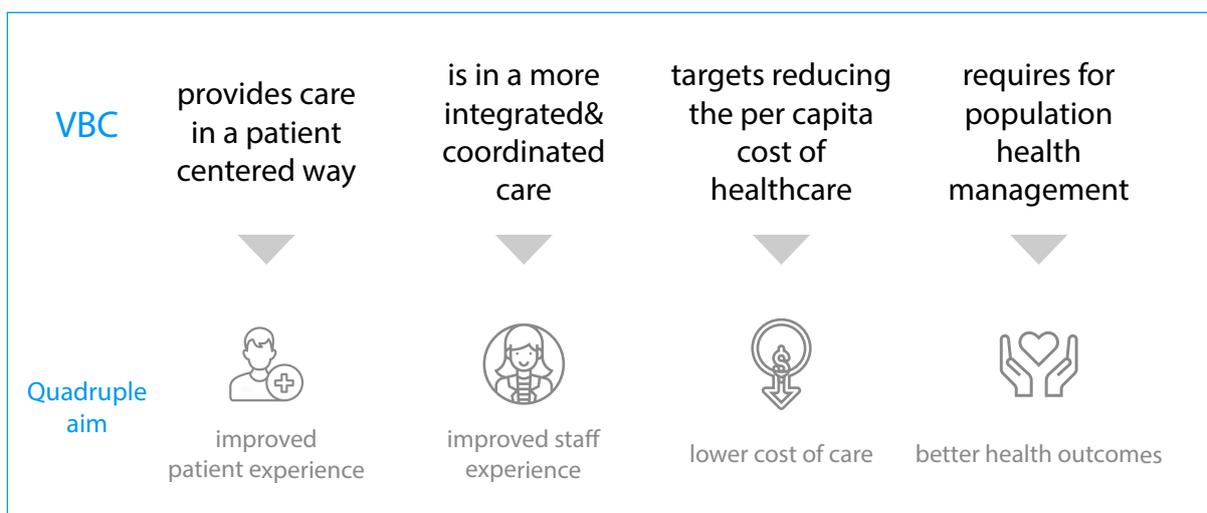


Figure 21: corresponding relationships between VBC and Quadruple aim

So, in summary, the determinant criteria for project selection in the studio are desirability, feasibility, and viability. Desirability evaluates whether or not the value of the project is attractive enough to users and stakeholders. The quadruple aim is also a big part of desirability. Feasibility assesses whether or not the competence of the organizations could complete the project successfully. Viability evaluates whether or not the solution of the project could be produced and distributed in a financially viable way (figure 22).

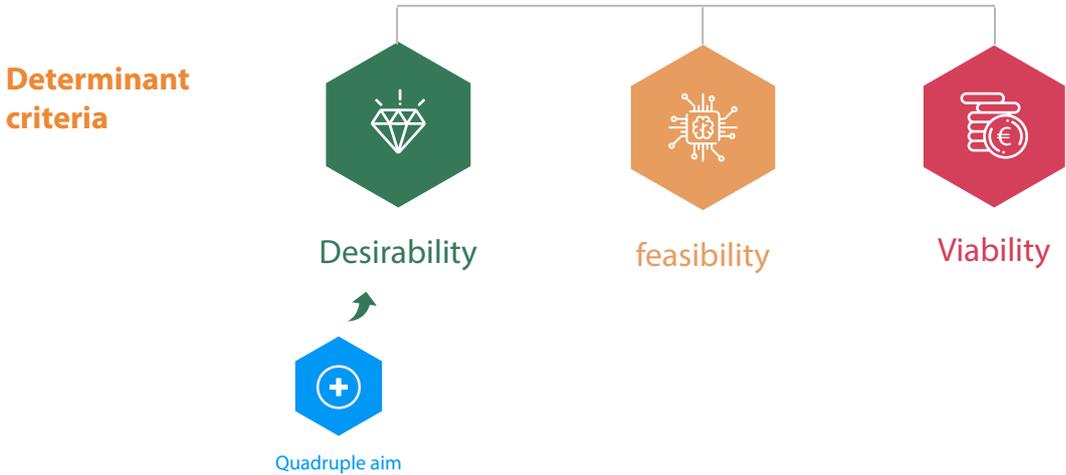


Figure 22: determinant criteria

Sub-criteria

An overview of papers which were read to collect related sub-criteria was as follows(figure 23 & 24). Each article has a corresponding code to represent it. Sub-criteria identified from that paper would have the same code in front of them.

Since lots of criteria were identified in the papers, to keep it clear, similar criteria are crossed out, and for one summarized sub-criterion, only definition and two examples are kept. The complete summary of sub-criteria could be seen in appendix B.1, B.2 & B.3.

In the following figures, each box explains a sub-criterion, related definition, and examples. What’s more, different colors represent which fields this sub-criterion is identified from. Grey represents the project management field. Yellow represents the IT field, and blue represents the healthcare field. For example, for the criterion “A3. environmental benefits”, it has grey and yellow colors, which means this criterion is both identified in the project management field and IT field, while not identified in the healthcare field.

Project manager field

Code	Writers	Paper	Main criteria from paper
■ A	Henriksen, A. D., & Traynor, A. J. (1999)	A practical R&D project selection scoring tool (Henriksen & Traynor, 1999)	<ul style="list-style-type: none"> - relevance - risk - reasonableness - return
■ B	Chan, S. L., & Ip, W. H. (2010)	A scorecard- Markor model for new product screening decision (Chan & Ip, 2010)	<ul style="list-style-type: none"> - risks/ uncertainty - logic & distribution strength - market potential/ attractiveness - needs - manufacturing compatiability - technology competence
■ D	Dinesh Kumar, U., Saranga, H., Ramirez-Márquez, J. E., & Nowicki, D. (2007)	six sigma project selection using data envelopment analysis (Dinesh Kumar, Saranga, Ramirez-Márquez & Nowicki, 2007)	<ul style="list-style-type: none"> - project cost - project duration - increase in productivity - number of black and green belts - financial impact - impact on business strategy - customer satisfaction - increase in sigma level
■ E	Verbano, C., & Nosella, A. (2010)	Addressing R&D investment decisions: a cross analysis of R&D project selection methods (Verbano & Nosella, 2010)	<ul style="list-style-type: none"> - economic return - strategic factors - risk and uncertainty - technological factors - portfolio optimisation - market factors
■ F	Cooper et al. (2008)	Perspective: The Stage-Gate Idea-to-Launch Process – Update, What’s New and NexGen Systems (Cooper, 2008)	<ul style="list-style-type: none"> - core competence leverage - strategy fit & importance - product & competitive advantage - market attractiveness - technical feasibility - financial reward verse risk
■ G	Meade, L. M., & Presley, A. (2002)	R&D project selection using the analytic network process. (Meade & Presley, 2002)	<ul style="list-style-type: none"> - technology factors - market factors - reconcile & integrate needs and desires of different stakeholders - organizational factors
■ K	Camila Costa Dutra, José Luis Duarte Ribeiro, Marly Monteiro de Carvalho(2014)	An economic–probabilistic model for project selection and prioritization (Dutra, Ribeiro & de Carvalho, 2014)	<ul style="list-style-type: none"> - strategic Benefits - technical difficulty - business benefits - financial costs
■ N	Ali Hosseini*, Ola Laedrebb, Bjorn Andersenc, Olav Torpd, Nils Olssonc, Jardar Lohnef(2015)	Selection criteria for delivery methods for infrastructure projects (Hosseini et al., 2016)	<ul style="list-style-type: none"> - innovation - technology availability - quality performance - owner willingness to take risk - owner’s available resources - political impact - life cycle cost - contractor’s capability - flexibility
■ H	Shamsiya Kudratova, Xiaoxia Huang*, Xiaoguang Zhou (2018)	Sustainable project selection: Optimal project selection considering sustainability under reinvestment strategy (Kudratova, Huang & Zhou, 2018)	<ul style="list-style-type: none"> - sustainability criteria as economy, society and environment.
■ M	Ricardo Simplicio, Jorge Gomes*, Mário Romão (2017)	Projects Selection and Prioritization: A Portuguese Navy pilot model (Simplicio, Gomes & Romão, 2017)	<ul style="list-style-type: none"> - gap value - degree of completion - level of political ambition - political priority

Figure 23

IT/computer based fields

Code	Writers	Paper	Main criteria from paper
C	Chen, K., & Gorla, N. (1998)	Information system project selection using fuzzy logic (Kuanchin Chen & Gorla, 1998)	<ul style="list-style-type: none"> - risks/ uncertainty - suitability to objectives - feasibility - alignment with strategic objectives - flexibility in time and project activities - acceptance and support of senior - alignment between team skills and project needs - technology requirements - complexity of the project - project transparency requirements - alignment of project manager skills to the project - innovation required - productivity improvement in target users - discount cash flow , total investment , return on investment , and pay back period - dependency to other projects - management - net present value of earnings - risk of project - ROI of project - implementation cost - innovation required
I	Hamed Jafarzadeh, Pouria Akbari, Babak Abedin(2018)	A methodology for project portfolio selection under criteria prioritisation, uncertainty and projects interdependency – combination of fuzzy QFD and DEA (Jafarzadeh, Akbari & Abedin, 2018)	<ul style="list-style-type: none"> - likely profit - pay back - similarity to existing business - investment - risk - investment - environmental impact - competition - flexibility - expected life - rate of return
J	Mohamed Abdel-Basset, Asmaa Atef, Florentin Smarandache(2019)	A hybrid neutrosophic multiple criteria group decision making approach for project selection(Abdel-Basset, Atef & Smarandache, 2019)	<ul style="list-style-type: none"> - organizational needs related criteria - technical related criteria - management support related criteria - competing environmental related criteria - risk related criteria - financial criteria
O	James J Jiang,Gary Klein,(1999)	Project selection criteria by strategic orientation(Jiang & Klein, 1999)	<ul style="list-style-type: none"> - organizational needs related criteria - technical related criteria - management support related criteria - competing environmental related criteria - risk related criteria - financial criteria

medical decision making

Code	Writers	Paper	Main criteria from paper
P	Miguel A Ortiz, Heriberto A Felizzola, Santiago Nieto Isaza(2015)	A contrast between DEMATEL-ANP and ANP methods for six sigma project selection: a case study in healthcare industry (Ortiz, Felizzola & Isaza, 2015)	<ul style="list-style-type: none"> - benefit cluster - opportunity cluster - cost cluster - risk cluster
Q	Henk de Koning, John P. S. Verver, Jaap van den Heuvel, Soren Bisgaard, Ronald J. M. M. Does (2006)	Lean Six Sigma in Healthcare (de Koning, Verver, van den Heuvel, Bisgaard & Does, 2006)	<ul style="list-style-type: none"> - strategic relevance - could be a business case - could be tracking - could be completed
R	Mehmet Tolga Taner,Bu lent Sezen, Jiju Antony(2007)	An overview of six sigma applications in healthcare industry (Tolga Taner, Sezen & Antony, 2007)	<ul style="list-style-type: none"> - safe - patient-centered - efficient - effective - timely - equitable

Figure 24

Desirability (excluding Quadruple aim)

Except for sub-criteria related to Quadruple aim, seven sub-criteria were summarized from the literature that influences the “desirability” determinant criterion (figure 25).

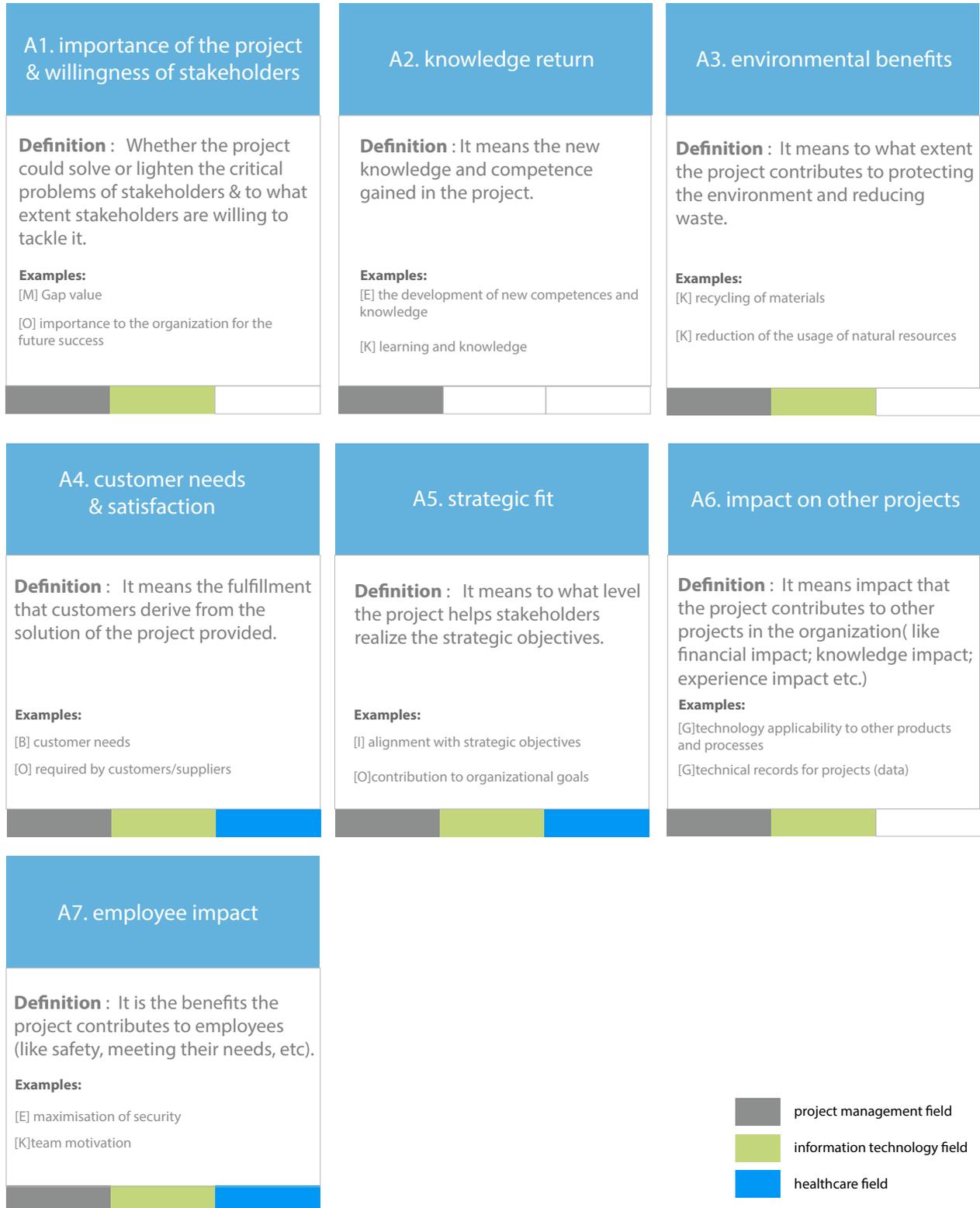


Figure 25: Seven sub-criteria related to “desirability” (excluding Quadruple aim)

Feasibility

Three main sub-criteria were summarized that influence the “feasibility” determinant criterion (figure 26).



Figure 26: Three sub-criteria related to determinant criterion - “feasibility”

Viability

Four main sub-criteria were summarized that influence the determinant criterion - viability (figure 27).



Figure 27: Four sub-criteria related to "viability"

Small adjustments were conducted on the names of sub-criteria to let those criteria more suitable for the studio context. For example, "patients' needs" replace "customer needs& satisfaction." Additionally, interviews with experts were carried out to filter out not important sub-criteria in the VBC studio context and add sub-criteria which were important in practice while not identified in the literature review.

Finally, three determinant criteria and 14 sub-criteria were summarized as relevant and vital for project selection in Philips' value-based care studios (figure 28). The detailed definitions, examples, and indicators for sub-criteria are in appendix B.4.

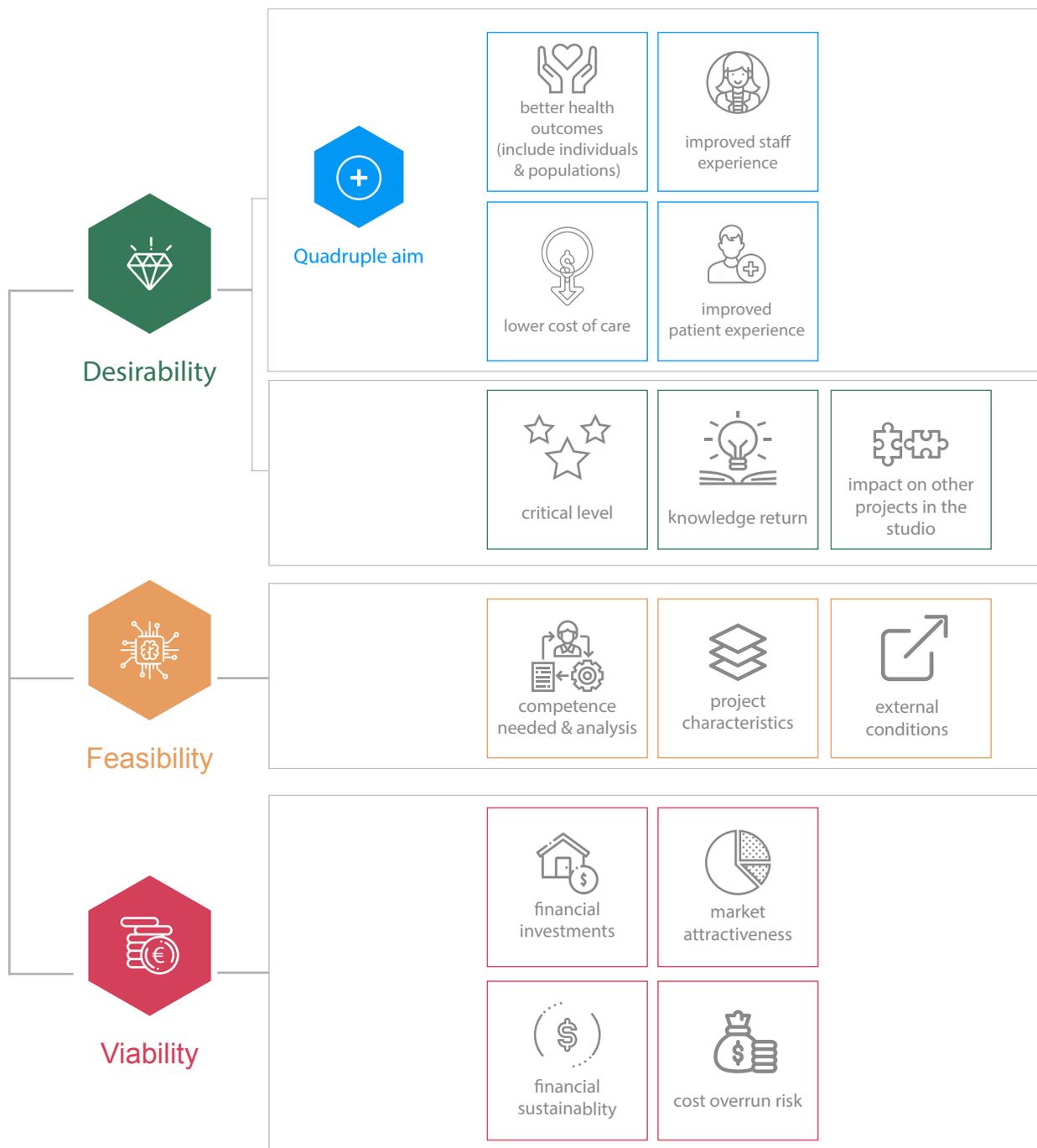


Figure 28: Summary of determinant criteria and sub-criteria

2.5 Current project selection method analysis

Research goal:

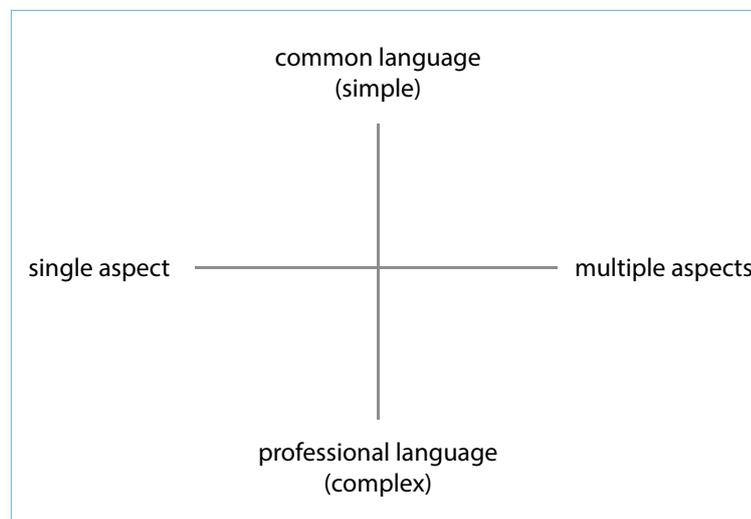
A literature review related to project selection methods was conducted to find out the method which uses multiple criteria to evaluate projects and could facilitate common meanings for all people from different backgrounds. The suitable method could be used in later toolkit design.

Based on the research goals, the following research question was formulated:

Which project evaluation method uses multiple criteria to evaluate projects and is easy-to-understand for people from different professional backgrounds?

Research approach:

Literature related to project selection methods were read. Project selection methods in literature were picked until saturated. The picked method was put into the analysis matrix (figure 29).



The X-axis evaluates whether the method could evaluate projects with a single aspect or multiple aspects. The Y-axis assesses whether the method is very complex and hard to understand (professional language in the corresponding field) or is easy to understand (using common language).

Figure 29: matrix for project selection method analysis

Findings:

Twelve project selection methods were picked out from literature. The detailed introduction for each method is in Appendix C.

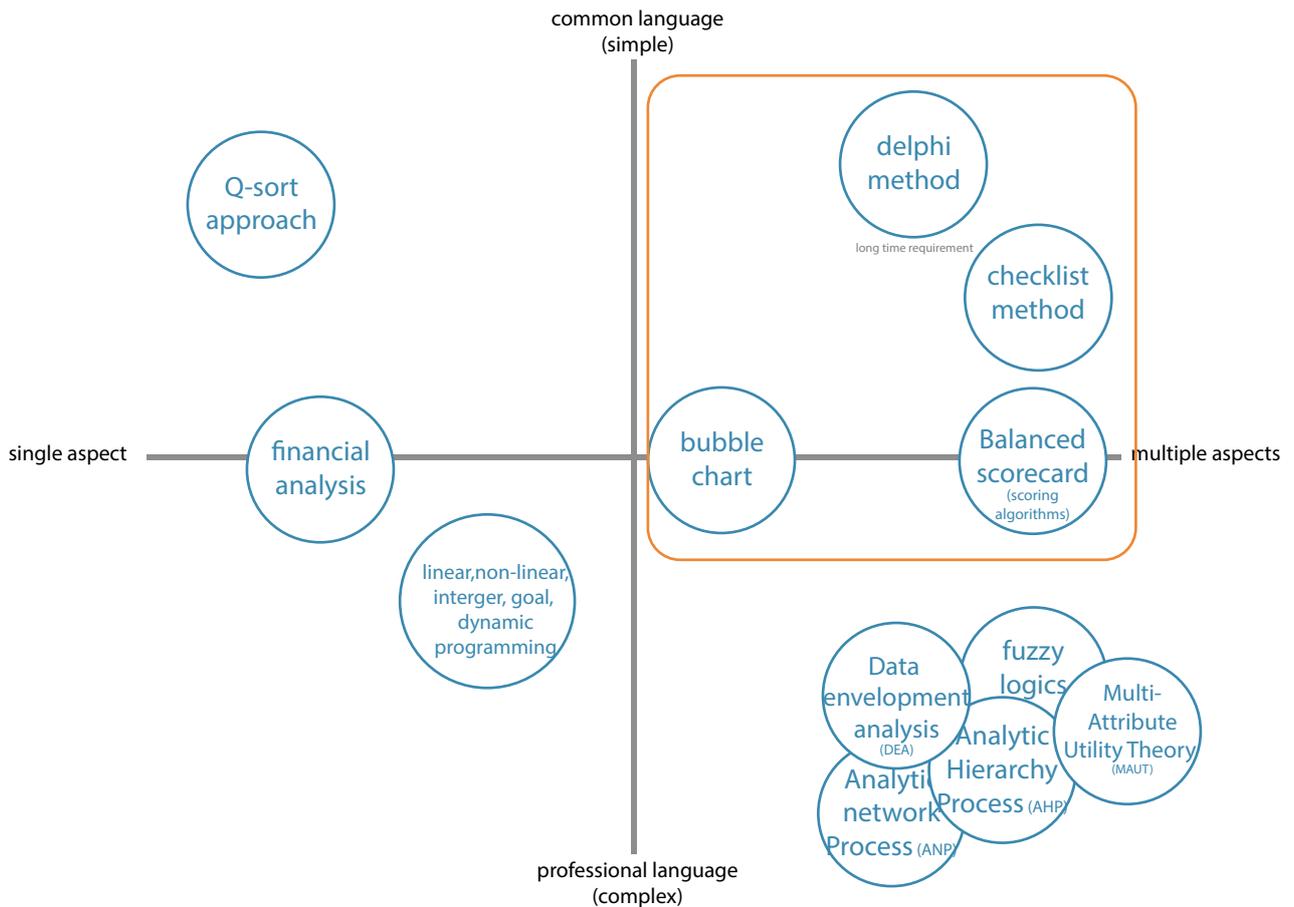


Figure 30: outcomes of current project selection method analysis

Four project selection methods were outstanding based on the matrix. They were the Delphi method, checklist method, balanced scorecard, and bubble chart. However, the bubble chart could only display outcomes based on three criteria. The Delphi method is too time-consuming. Checklist method and balanced scorecard are both scoring methods, and the only difference is the checklist assumed all criteria were the same important.

Based on the analysis, the scoring method was the most suitable method and could be used in the later toolkit design.



Introductions about the Delphi method, checklist method, balanced scorecard, and bubble chart:

- Bubble chart

Description : An information display & discussion tool. X & Y axes and the size of bubbles could display three criteria (Cooper, Edgett & Kleinschmidt, 2000).

Characteristics: Bubble chart assesses projects through three criteria. And it provides a visual overview.

- Delphi method

Description: Delphi is a method that finds the best situation through letting many experts answer questionnaires (Chan, Yung, Lam, Tam & Cheung, 2001).

Characteristics: This method is based on subjective analysis. It requires a long time and could cover many kinds of criteria.

- Checklist method

Description: This checklist approach examines whether all criteria are met. It assumes that all requirements are the same vital (Heidenberger & Stummer, 1999).

Characteristics: This method could cover many kinds of aspects.

- Balanced scorecard(scoring algorithms)

Description: The scoring algorithm assesses potential projects through a lot of criteria and uses a specific algorithm to give scores for proposals. Different weights could be given to different criteria to represent the different levels of importance. The five-point system is one of the most accepted scales (Henriksen & Traynor, 1999).

Characteristics: This method could cover many kinds of criteria. Compared with checklists, different weights are used to obtain final figures of projects.

KEY TAKE-AWAYS CHAPTER 2

Four research was conducted to gain insights that were useful and relevant for later project selection toolkit design.



MMC studio internal research

A general project selection journey and three expectations about the toolkit were summarized from MMC studio internal research. The general project selection journey contained three steps: project collection phase; selection meeting phase and decision-making phase.

Three expectations about the toolkit were identified:

- The toolkit should facilitate discussion.
- The toolkit should support both holistic and detailed comparison.
- The toolkit should be transparent and simple.



Criteria summary

A literature review and expert interviews were conducted to explore and summarize the criteria associated with project selection in value based care studios.

Three determinant criteria were summarized - "desirability," "feasibility," and "viability." Desirability evaluates whether the value of the project is attractive to patients and stakeholders. The quadruple aim is a big part in desirability, which estimates in which level the project could contribute to value-based care. Feasibility assesses whether the capabilities of organizations could complete the project successfully. Viability evaluates whether the solution of the project could be distributed and produced financially viable.

Additionally, 14 sub-criteria were summarized.



Identifying design intervention opportunities

Two significant design intervention opportunities were identified in the literature and validated by relevant experts.

The first design intervention opportunity is to provide vital holistic criteria and allow participants to agree on needed criteria, which helps the project selection process.

The second design intervention opportunity is that the toolkit should facilitate agreed criteria, shared meanings, and common interests to help share and assess knowledge across professional boundaries.



Current project selection method analysis

The current project selection method analysis was conducted to find the appropriate method that could be used in later toolkit design.

All project selection methods were analyzed to see whether the method used multiple criteria to evaluate the project and whether the method was easy to understand.

Finally, the scoring method was chosen as the most appropriate method that could be used in future toolkit design.

<CHAPTER 3 >

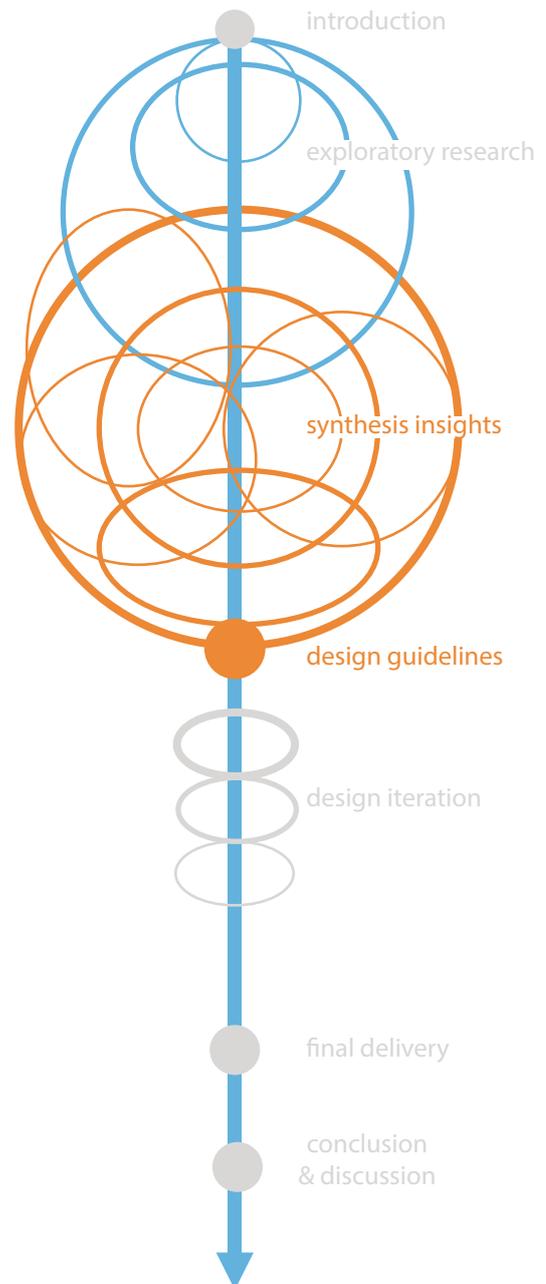
SYNTHESIS INSIGHTS

3.1 From insights to design guidelines

3.2 Design guidelines

3.3 Key take-aways

This chapter introduces design guidelines that are integrated from exploratory research. The design guidelines guide the toolkit design later.



3.1 From insights to design guidelines

Insights gained from MMC internal research, design intervention opportunities identification, criteria summary, and current project selection analysis were synthesized as design guidelines to guide the later toolkit design.

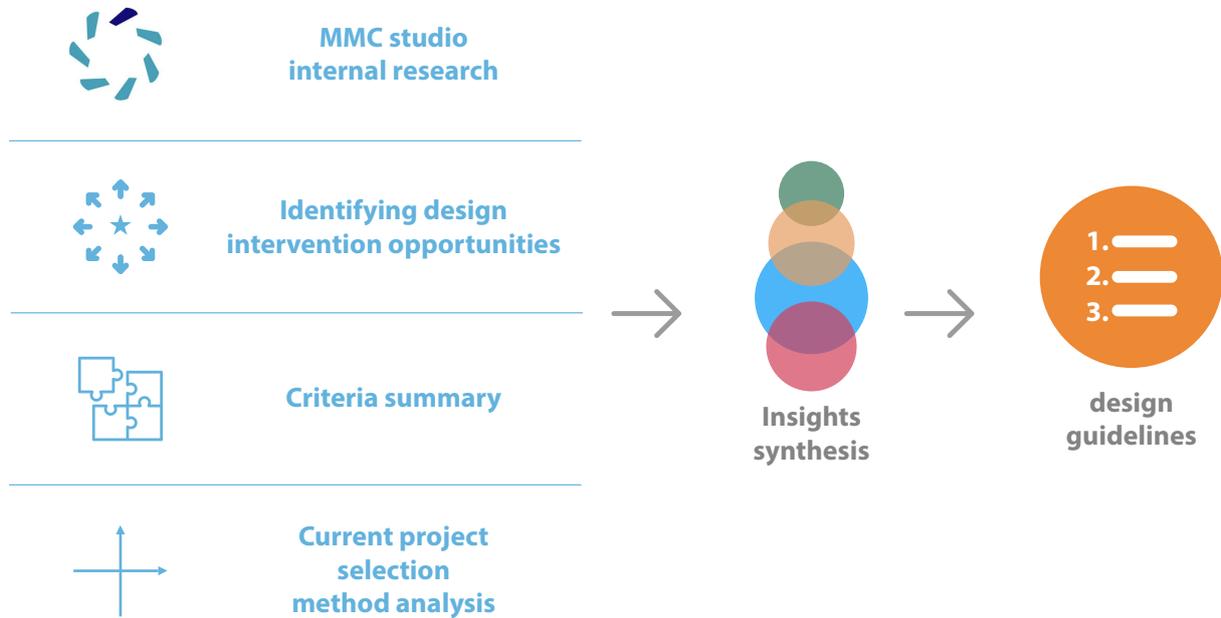


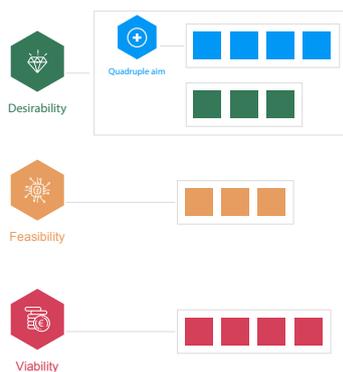
Figure 31: from insights to design guidelines

3.2 Design guidelines

Six design guides were integrated from exploratory research to guide later toolkit design. These design guidelines are described in detail in the following paragraphs.

Design guideline 1: The toolkit should provide critical, holistic criteria and facilitate participants to discuss needed criteria until achieving consensus.

Facilitating agreed criteria



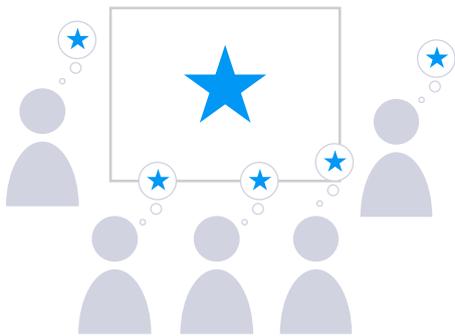
This design guideline was summarized based on design intervention opportunity 1 and design intervention opportunity 2.

Critical, holistic criteria could guarantee a high possibility of goal realization while insufficient or incomplete criteria often lead to the failure of attaining the goal. Additionally, agreed criteria are necessary for helping share and assess domain-specific knowledge across professional boundaries in the project selection process.

Three determinant criteria and 14 sub-criteria had already been summarized in exploratory research and could be used in the toolkit design.

Design guideline 2: The toolkit should create common meanings to let all actors understand differences and dependencies of determinant criteria and sub-criteria.

Creating common meanings



As mentioned in design intervention opportunity 2, creating common meanings among all actors is necessary for helping share and assess knowledge across boundaries.

In this aspect, the definitions, examples, indicators summarized for criteria in exploratory research could be used to facilitate shared understanding.

Design guideline 3: The toolkit should facilitate common interests among stakeholders.

Facilitating common interests

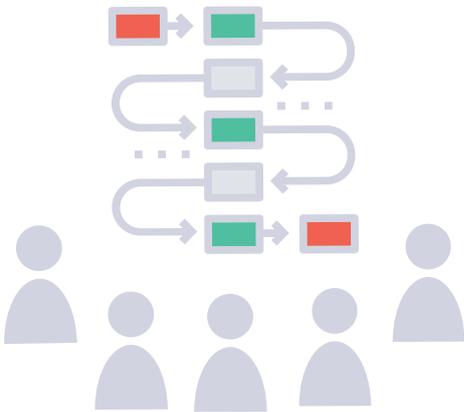


As mentioned in design intervention opportunity 2, in addition to facilitating agreed criteria and common meanings to help share and evaluate knowledge across professional boundaries, facilitating common interests among stakeholders is also the essential building block for the toolkit design.

Therefore, in the toolkit design, on the one hand, the toolkit should facilitate participants to see different interests of different stakeholders on the same project. On the other hand, the toolkit should assist participants in exploring the combined value of projects to ensure common interests.

Design guideline 4: The toolkit should be a transparent and easy-to-use toolkit.

Transparent & simple



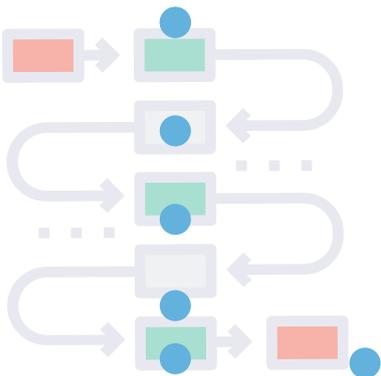
On the one hand, the boundary object literature shows that flexibility and simplicity can promote common understanding (Spee & Jarzabkowski, 2009).

On the other hand, when interviewing people in MMC VBC studio to understand their expectations for the toolkit, they also mentioned transparent and simple toolkit is essential.

Therefore, in the toolkit design, participants should have a clear and transparent understanding of the entire project selection process. Besides, the toolkit should be easy to use.

Design guideline 5: The toolkit should facilitate project selection discussion and sound decision making.

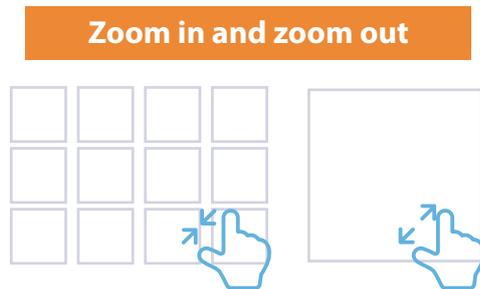
Facilitating discussion



● supporting key phases in journey

As mentioned from interviewees in MMC VBC studio, the most important thing is how the toolkit facilitates discussion. People position the toolkit itself as a tangible toolkit that promotes discussion and provides appropriate information to facilitate the discussion.

Design guideline 6: The toolkit should support both holistic and detailed comparisons of projects.



As mentioned by MMC VBC Studio interviewees, the toolkit can be flexibly zoomed in and out when comparing projects.

Based on design guidelines, the toolkit designed to facilitate project selection should have the following functions:

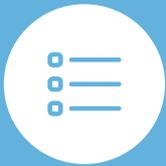
- Provide clear and easy-to-understand steps for the project selection process.
- Provide agreed criteria to facilitate project selection discussion.
- Provide holistic and detailed comparisons of projects to facilitate discussion.
- Facilitate stakeholders in achieving common interests.

So later the toolkit design should focus on providing suitable information in suitable time in the project selection process to support productive discussion and decision making.

KEY TAKE-AWAYS CHAPTER 3

Six design guidelines were synthesized from insights gained in exploratory research. They are as follows.

The toolkit should:



**facilitate
agreed
criteria**



**create
common
meanings**



**facilitate
common
interests**



**be
transparent
& easy-to-use**



**facilitate
discussion**



**support
both holistic
& detailed
comparisons**

So later the toolkit design focuses on providing suitable information in suitable time in project selection process to support productive discussion and decision making.

<CHAPTER 4 >

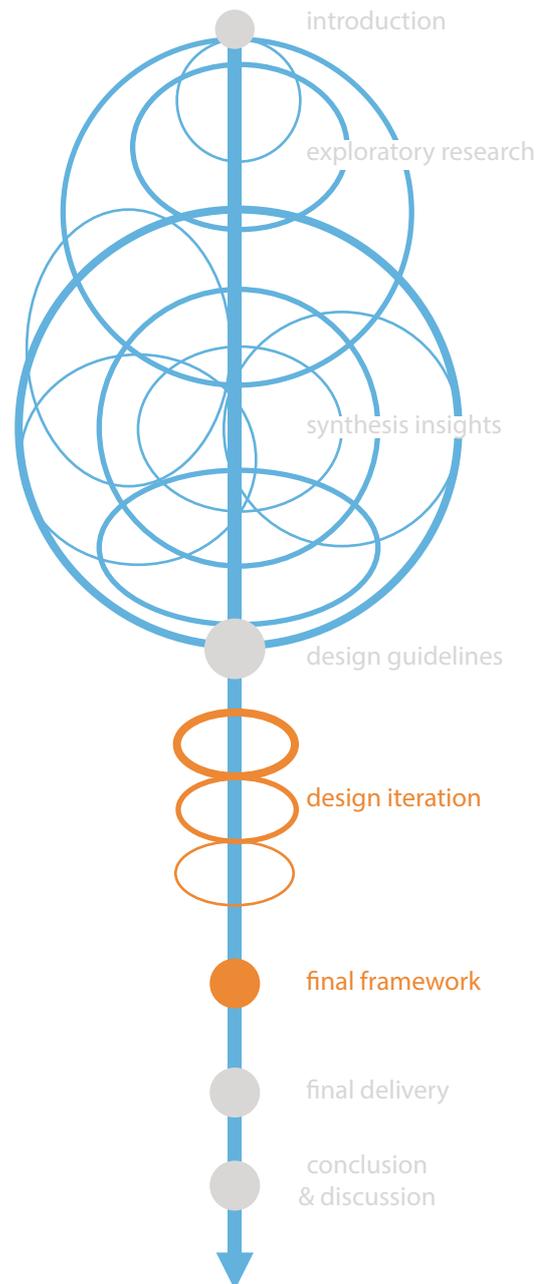
PROJECT SELECTION FRAMEWORK

4.1 From design guidelines to project selection framework

4.2 Final project selection framework

4.3 Key take-aways

This chapter introduces a new project selection framework that contains an improved project selection journey and the corresponding designed tools. The new framework is designed based on the design guidelines and feedback from interviews with relevant experts.



4.1 From design guidelines to project selection framework

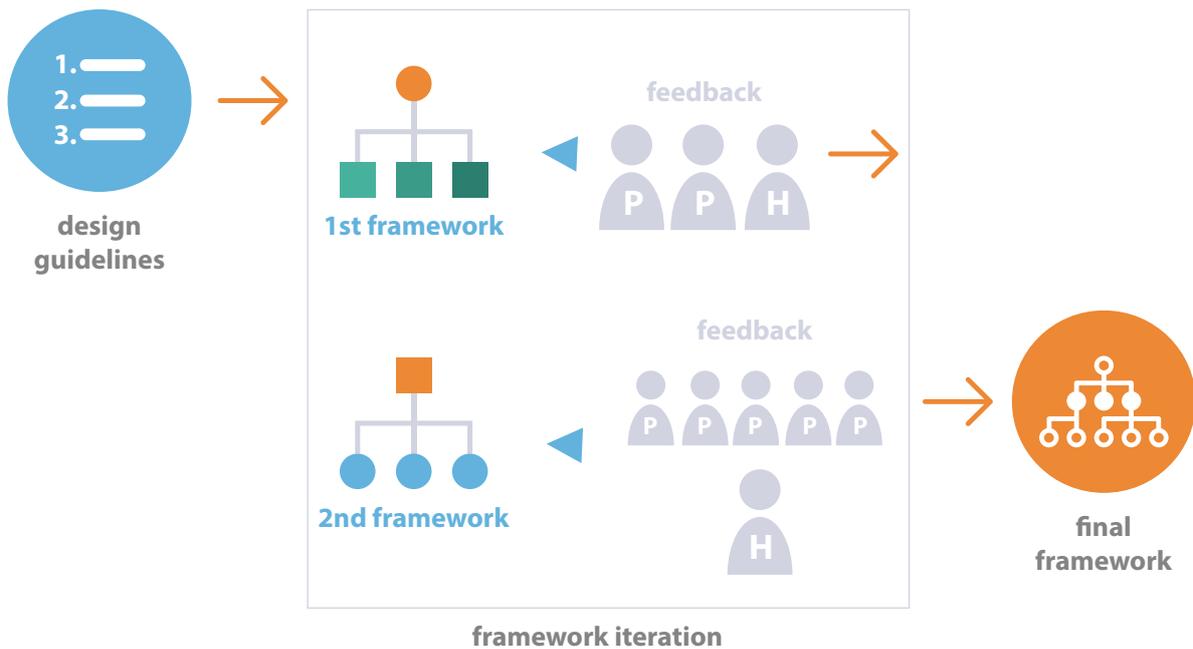


Figure 32: from design guidelines to final project selection framework

Based on the general project selection journey identified in the exploratory research and design guidelines, a new project selection framework was developed. It contains the improved project selection journey and corresponding tools to facilitate each phase of the improved project selection journey.

Before the final framework, two versions of the framework were iterated. The first version of the framework was developed based on the general project selection process and design guidelines. After it was completed, two Philips experts and a hospital expert were interviewed to collect feedback. Then, the second version of the framework was designed based on the feedback received. A workshop with five Philips experts and an interview with a hospital expert were carried out to gather feedback on the second edition of the framework. The final version of the framework is based on input from them. The first and second editions of the framework are in appendix D & E.

An Interview guide and a workshop agenda were prepared before the workshop and interviews. These can be seen in appendix A.2. A total of six respondents from Philips and two respondents from MMC Hospital participated in the feedback sessions. They were chosen because they all worked closely with value-based care studios. All interviews were recorded. The main insights were transcribed and analyzed.

The final framework provides the structure and foundation for the final toolkit design.

4.2 Final framework

Original project selection journey:

As identified in exploratory research, the original project selection journey includes three steps: project collection phase, selection meeting phase, and decision-making phase.

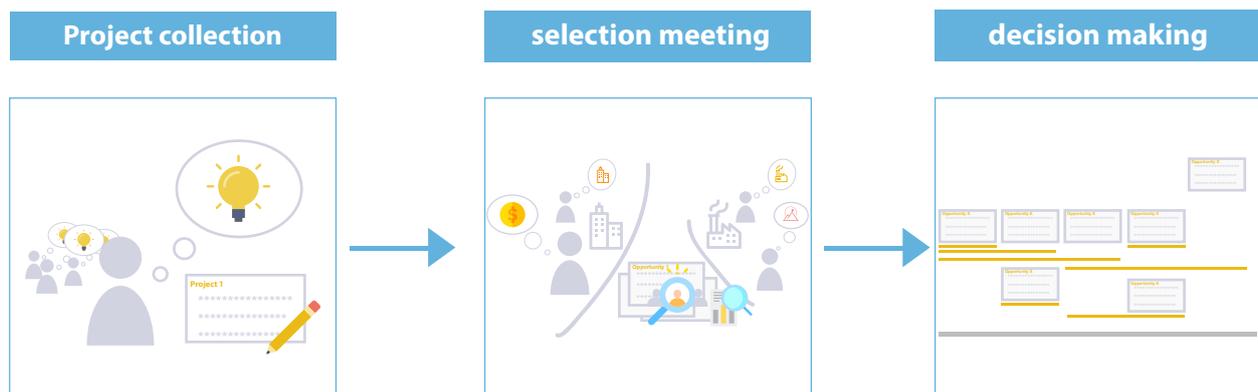


Figure 33: original project selection journey

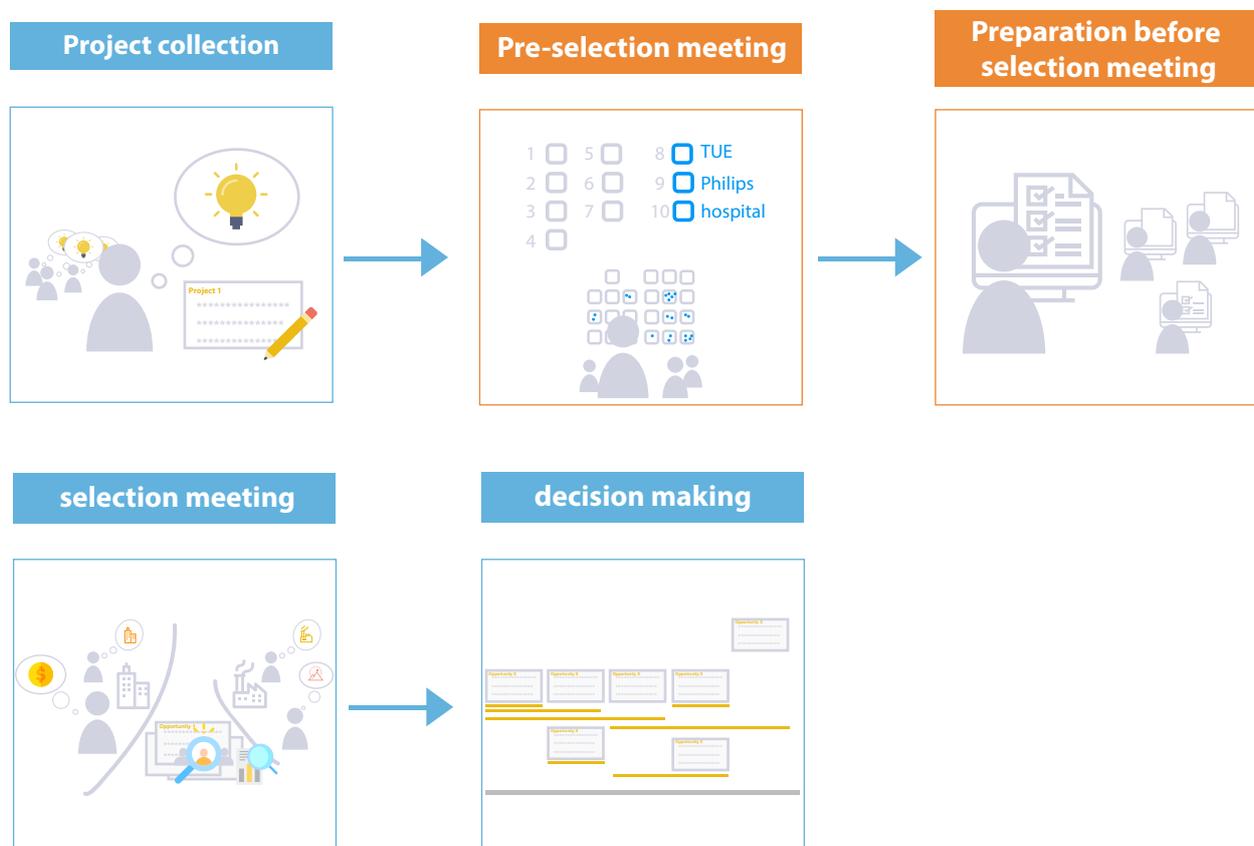


Figure 34: improved project selection journey

In the final project selection framework, an improved project selection journey was designed to facilitate the project selection process (figure 34). Except for the same phases - "project collection," "selection meeting," and "decision making," two new steps were added - pre-selection meeting and preparation before the selection meeting. The two new phases and the tools designed to support each phase are described in the following paragraphs.

Project collection



Healthcare professionals note down their ideas about possible projects.

Research team helps collect related arguments.

Supporting tool: guiding project description templates



better describing project



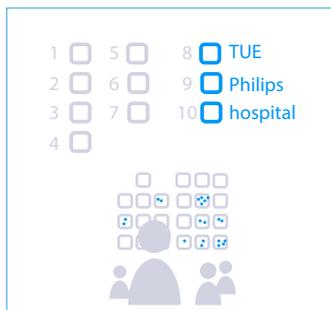
proposing arguments related to critical criteria

Healthcare professionals are very busy. Helping them quickly describe the essence of the project is critical. A project description template is designed to help them quickly note down the essence of the project. Besides, showing criteria that stakeholders pay attention to and letting healthcare professionals and research teams come up with relevant arguments is essential. It can support the team members to better evaluate the project at a later stage. So criteria are shown on templates to let healthcare professionals note down relevant arguments about why the project is important.

After healthcare professionals having filled in project description templates, the research team will later help gather more arguments related to criteria to make the proposal more solid.

"Very solid assessment of a very weak proposal is useless. Make the template more guiding and meaningful is important."

Pre-selection meeting



Steering team selects 10 projects into project selection meeting.

Supporting tools: project description templates + an instruction booklet



filtering out unattractive projects

To ensure efficient and high-quality discussions on the project selection meeting, a maximum of ten projects could enter the project selection meeting after interviews with relevant experts. When more than ten projects are collected, a pre-selection meeting is suggested to be organized. A facilitator will guide the entire meeting. The pre-selection agenda is suggested in the instruction booklet.

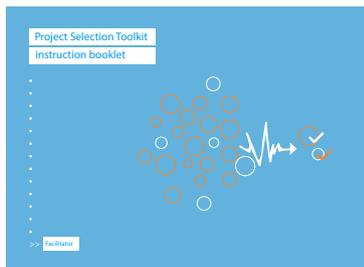
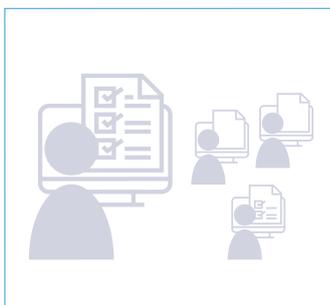


Figure 35: an instruction booklet

- An instruction booklet

An instruction booklet of the project selection toolkit is designed to explain what this toolkit is; the suggested pre-selection and project selection meeting agendas; how designed tools support the project selection process etc.

Preparation before selection meeting



Steering team members score projects on each criterion based on proposed arguments.

Supporting tool: project evaluation forms



letting members more familiar with projects & making later meeting more efficient



using criteria to help steering team members better evaluate projects

To avoid repeated phases and meetings, the “preparation before selection meeting” phase is added to collect members’ opinions and facilitate discussion in the later meeting.

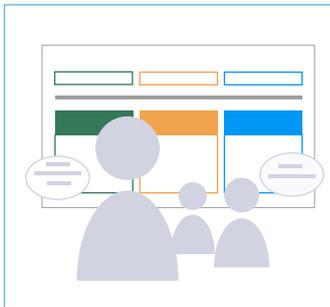
Steering team members need to fill out the project evaluation forms and score projects on each criterion. The arguments proposed by health care professionals and research

team will be shown in the project evaluation forms.

On the one hand, project evaluation forms allow members to have an overview of these projects before the meeting, which will make them more familiar with them and facilitate discussion in the meeting.

On the other hand, scores obtained from the project evaluation forms represent their opinions on those projects. It can be used to facilitate discussion and decision making in the project selection meeting.

selection meeting



A guiding canvas guides the process in the project selection meeting.

Supporting tool: a project selection guiding canvas



guiding the selection meeting



documenting key results in the process

After collecting opinions from project evaluation forms, how to use the data to facilitate discussion and decision making in the project selection meeting is essential.

A guiding canvas is designed to help guide the meeting and document the critical intermediate results in the process.



Real-time charts show scores from project evaluation forms to facilitate discussion.

Supporting tool: real-time interactive charts on the digital platform



supporting both holistic & detailed comparisons of projects.

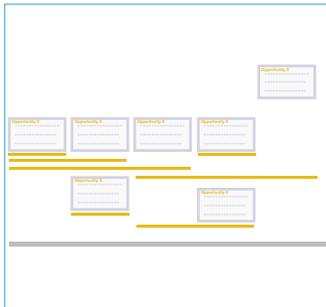


facilitating discussion

Real-time interactive charts that show the results scores of the project evaluation forms are designed. They are intended to provide the appropriate information in the proper time to facilitate discussion and decision making in the project selection meeting.

Real-time interactive charts not only support the overall comparison of projects but also support a detailed comparison of projects based on the steps suggested in the canvas.

decision making



Healthcare professionals and the research team will be informed of selected outcomes and relevant arguments.

Supporting tool: digital platform to inform healthcare professionals & research team outcomes.



keeping engaged

Informing health care professionals and providing them with a pleasant experience is critical to maintaining their participation. Otherwise, they may not want to continue to propose projects. Healthcare professionals and research team will be informed of selected outcomes and relevant reasons to promote their sense of participation.

In order to save data, project description templates, project evaluation forms can both be digital, as part of the digital platform's functions.

Because for different participants, such as healthcare professionals, steering team members, and the facilitator, their work is supported by various tools during the project selection process, the corresponding functions in the digital platform are different for them. A comparison of their digital platforms' features is as follows.

Digital platform for healthcare professionals & research team

The digital platform for healthcare professionals and research teams has three main functions - "introduction," "preparation," and "outcomes." "Introduction" describes how to use this digital platform. "Preparation" includes the "project description template" to help propose projects and add relevant arguments. The "outcomes" informs the health care professionals and the research team of the selected outcomes and reasons.

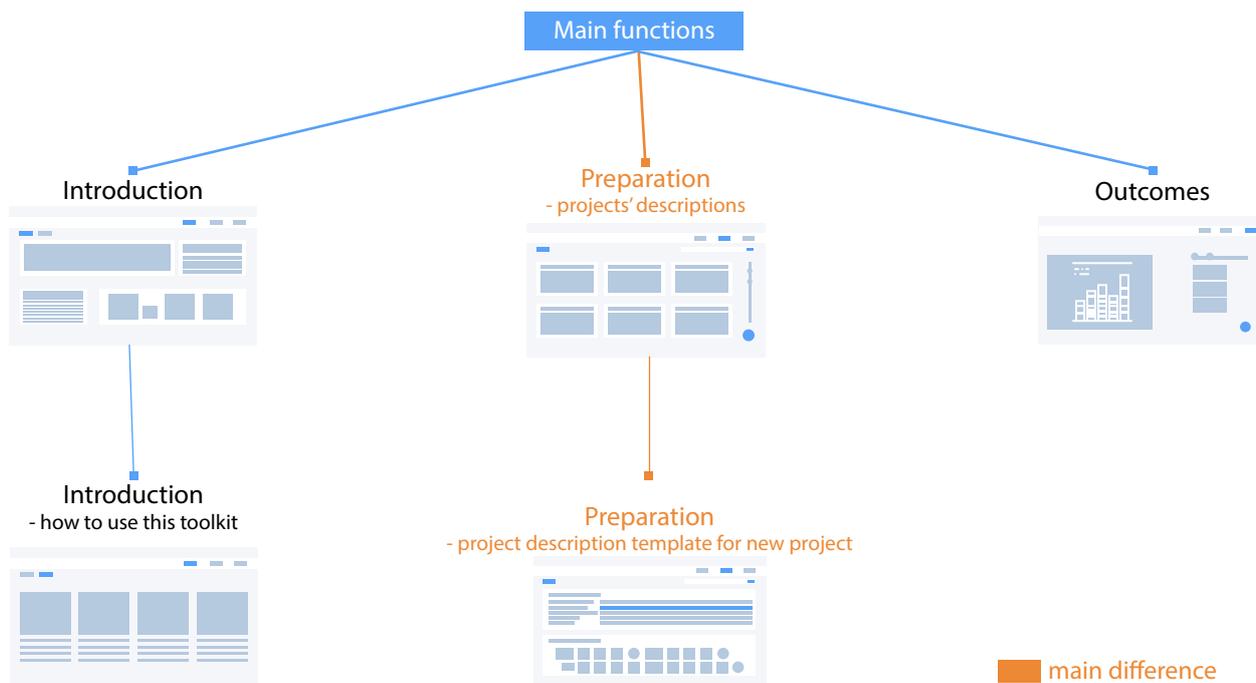


Figure 36: digital platform for healthcare professionals and research team

The digital platform for steering team members has three main functions - "introduction," "preparation," and "outcomes". "Introduction" and "outcomes" are the same – how to use this digital platform and show selected results and related arguments. "Preparation" includes the "project evaluation form" to allow them to evaluate projects before the project selection meeting.

The facilitator's digital platform has four main functions - "introduction", "preparation", "analysis" and "outcomes". "Introduction" and "outcomes" are the same. "Preparation" sends project evaluation forms to steering team members. "Analysis" displays real-time interactive charts based on outcomes of project evaluation forms to support discussion and decision making in the meeting.

In summary, the final project selection framework includes an improved project selection journey and corresponding tools. The enhanced project selection journey consists of five phases: project collection, pre-selection meeting, preparation before project selection meeting, project selection meeting, and decision-making phases. Tools are a digital platform, a guiding canvas, and an instruction booklet to help facilitate discussion and decision making.

Digital platform for the steering team members

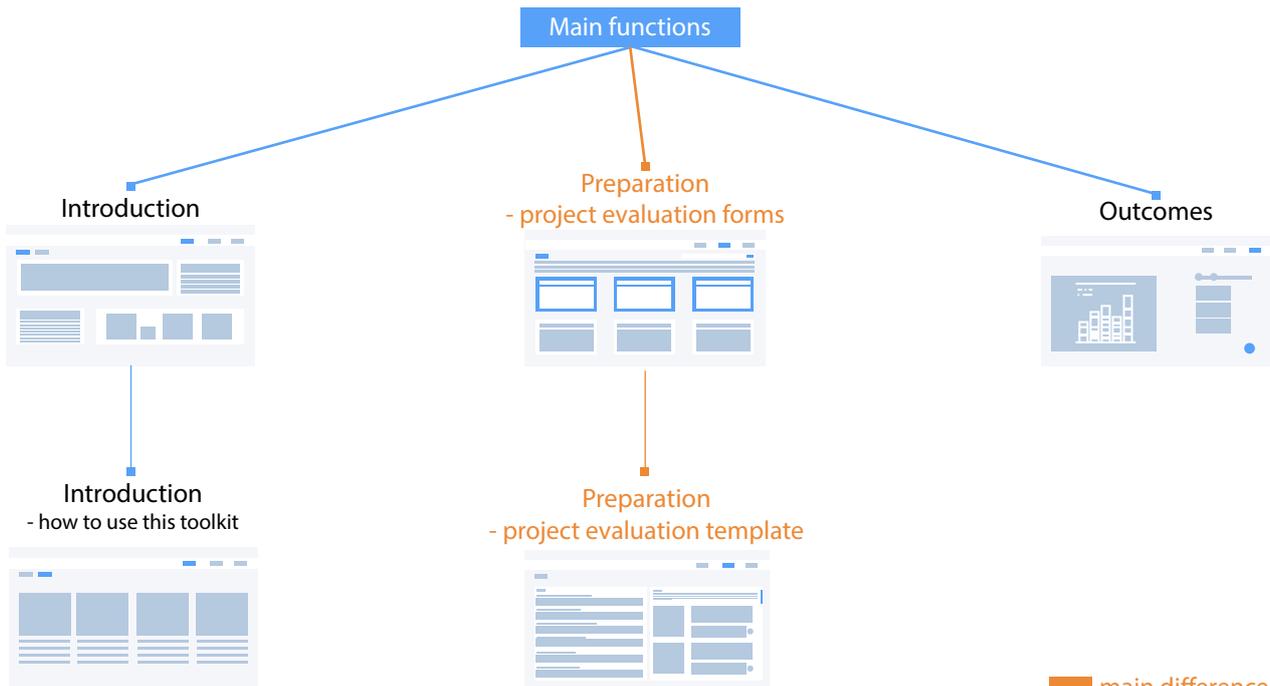


Figure 37: digital platform for steering team members

Digital platform for the facilitator

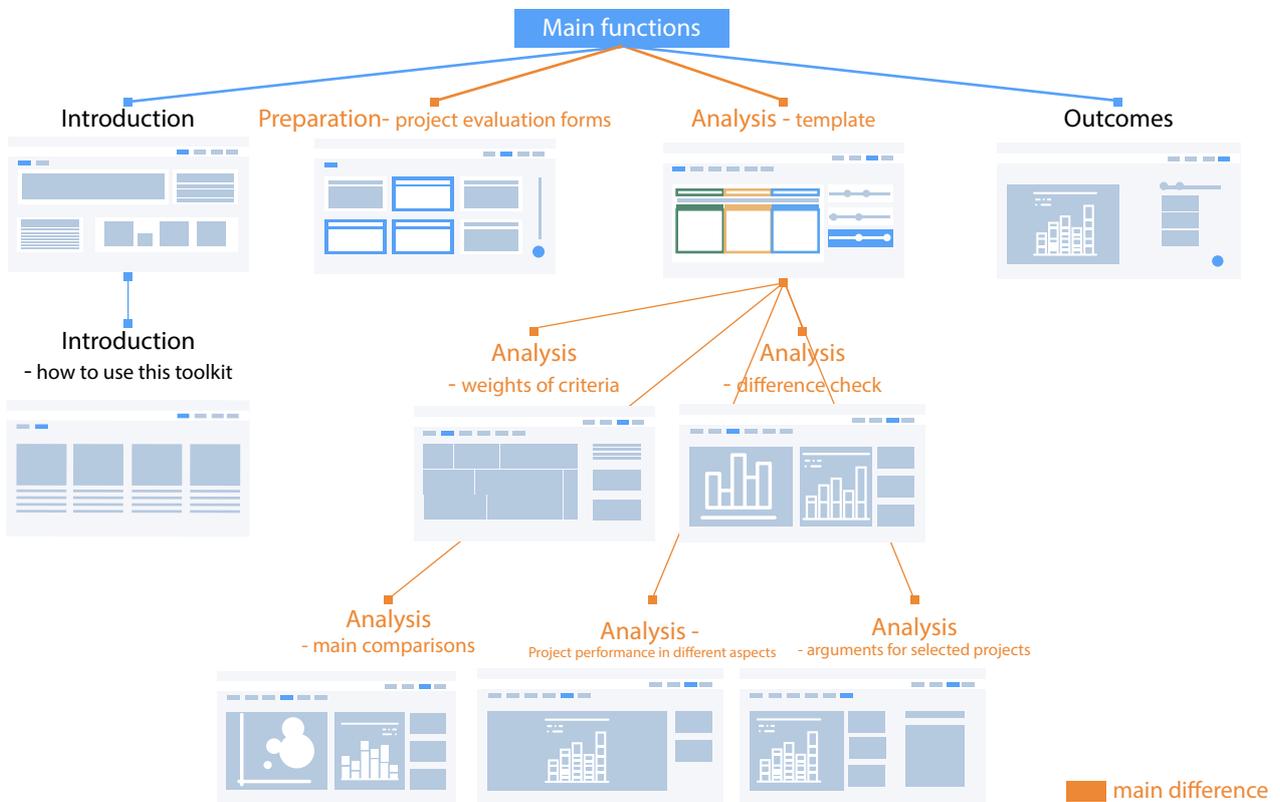


Figure 38: digital platform for the facilitator

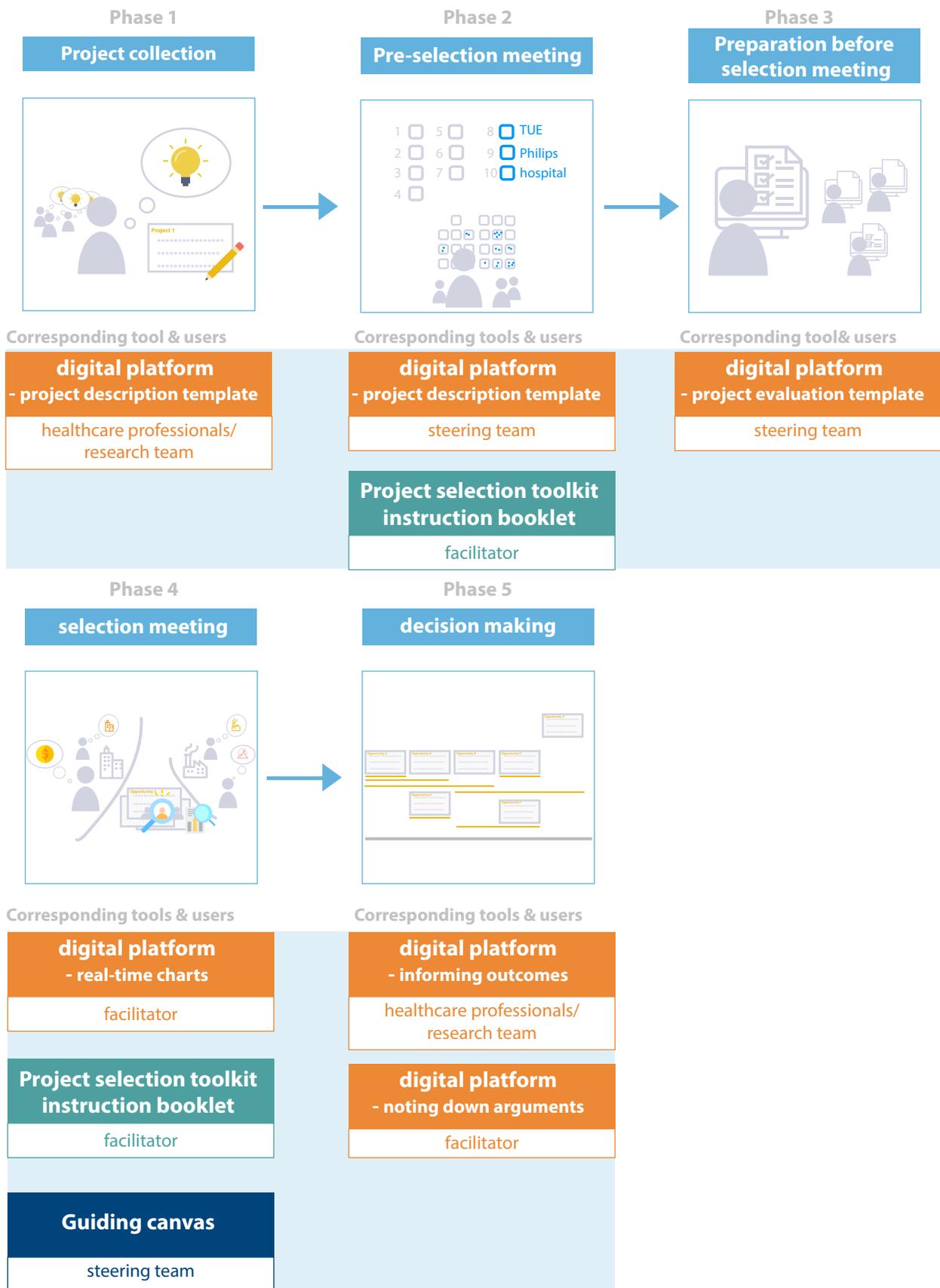


Figure 39: summary of final project selection framework

4.3 KEY TAKE-AWAYS CHAPTER 4

Based on the design guidelines and the general project selection journey, a new framework was designed. The new framework contains an improved project selection journey and corresponding tools.

The new project selection journey contains five phases: project collection; pre-selection meeting; preparation before selection meeting; selection meeting, and decision making phase. Compared with the initial project selection process identified in exploratory research, pre-selection meeting and preparation before selection meeting are added. Pre-selection meeting is designed to guarantee the high-quality discussion in the selection meeting. If more than ten projects are collected, a pre-selection meeting is suggested to filter out unattractive projects, and only ten projects are kept into the project selection meeting. Preparation before selection meeting is designed to support steering team members score projects on essential criteria. Arguments healthcare professionals and research team proposed in project description templates will shown to help the scoring process. Those scores provide content to discuss in the project selection meeting.

Totally three tools are designed to help the new project selection process: a digital platform, an instruction booklet, and a guiding canvas. The digital platform supports the work healthcare professionals, research team, facilitator, and steering team do in different phases. An instruction booklet explains the framework and meeting agendas. A guiding canvas guides the process in the project selection meeting.

In the project collection phase, the project description template for healthcare professionals/research team is designed to help them better describe projects and propose arguments related to criteria.

If projects collected are more than 10, a pre-selection meeting will be suggested to carry out. A facilitator will guide the whole session based on the instruction booklet. Finally, steering team members will only select ten projects to be progressed into the project selection meeting based on the information on project description templates.

In preparation before the selection meeting, the project evaluation template for steering team members is designed to facilitate them score projects based on essential criteria and proposed arguments.

In the selection meeting phase, a facilitator will guide the whole meeting with the help of the instruction booklet. A guiding canvas is designed to guide the process and document key findings in the meeting. A digital platform for facilitator is designed to support suitable information in suitable time in the meeting. Data is displayed through real-time charts based on outcomes of project evaluation forms.

In decision-making phase, a facilitator will write down arguments for selected projects on the digital platform. And the digital platform for healthcare professionals and research team will inform them of the selected outcomes and arguments at the same time.

<CHAPTE 5 >

FINAL TOOLKIT

5.1 Toolkit development process

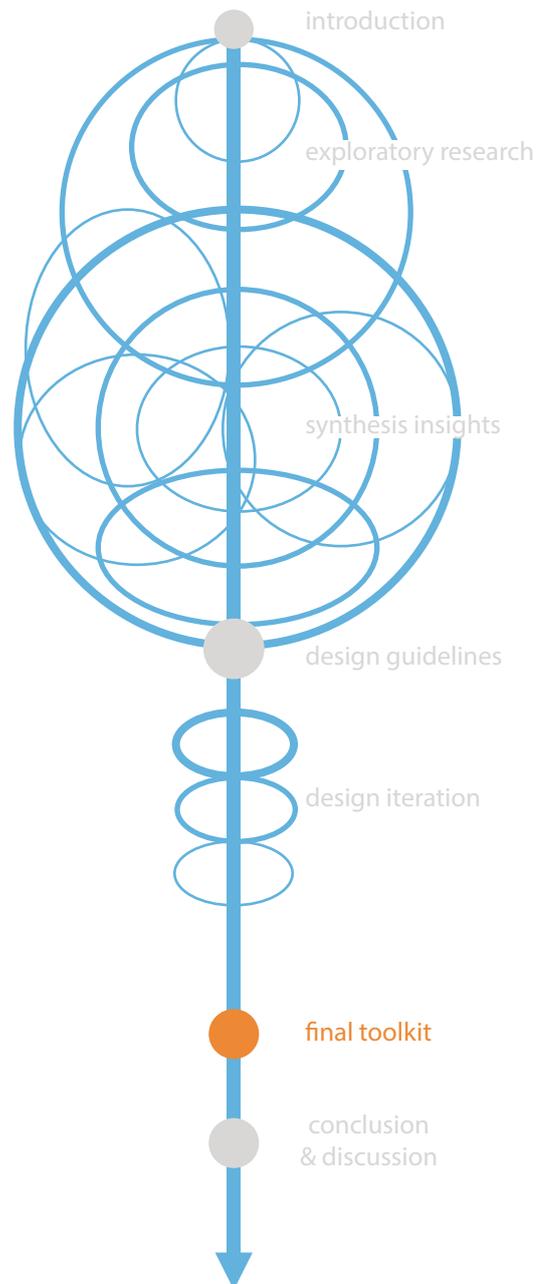
5.2 Final toolkit step by step

5.3 How the toolkit design reflects design guidelines

5.4 Reflection: how the toolkit design contributes to the corresponding academic field

5.5 Key take-aways

This chapter describes the final toolkit. The specific activities and corresponding tools for each phase of the improved project selection journey will be described in detail.



5.1 Toolkit development process

When collecting feedback on the project selection framework, experts were also provided with toolkit prototypes to gather feedback. Since the framework was iterated three times, the toolkit was iterated three times too. This chapter only covers the final toolkit. For a more detailed overview of the two earlier versions of the toolkit, see appendix D&E.

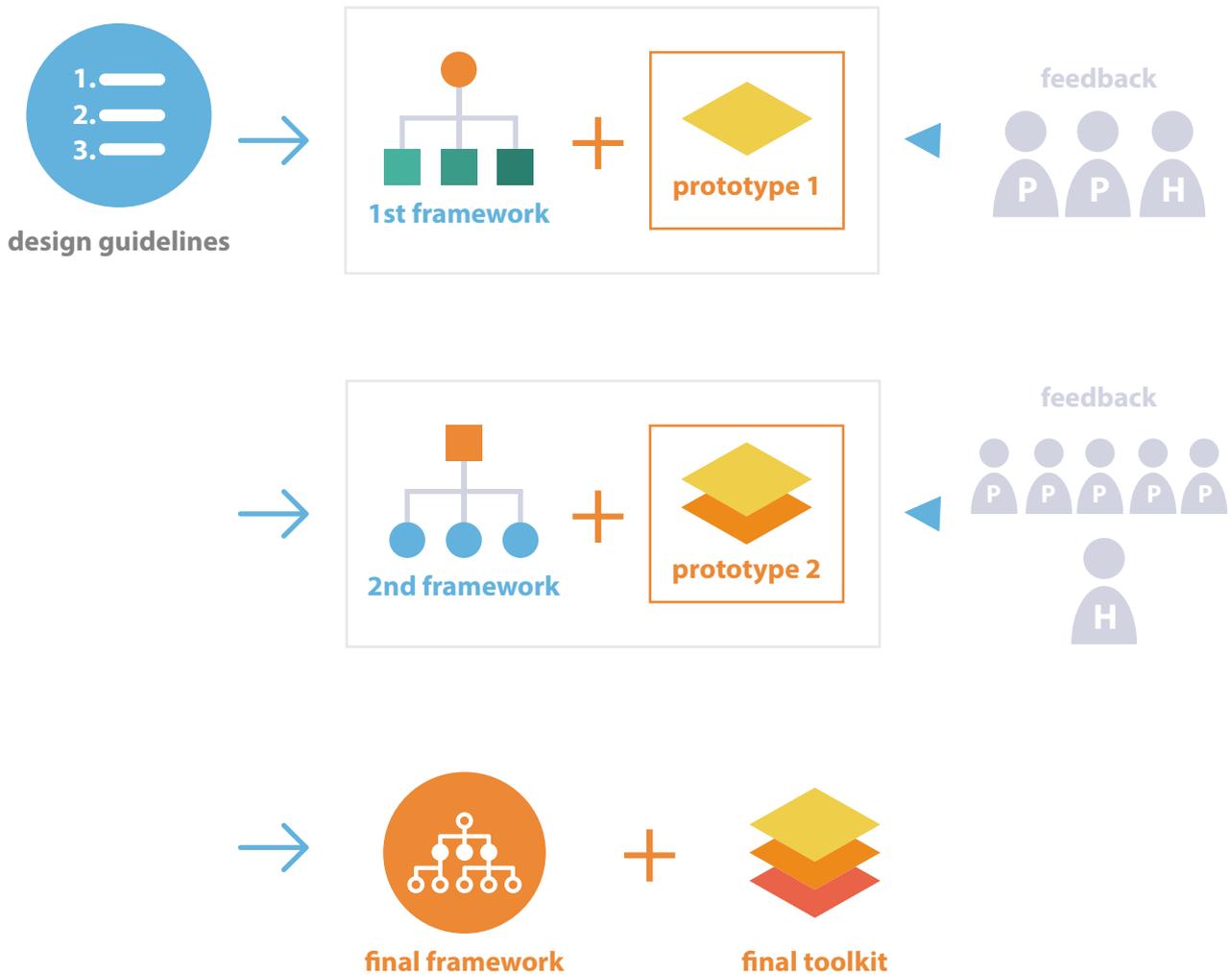


Figure 40: toolkit development process

5.2 Final toolkit step by step

In this chapter, first, an overview of the process and all the involved steps is provided (figure 41 & 42). Then the supported tools and templates for each phase of the project selection journey are described in detail.

Before the selection meeting

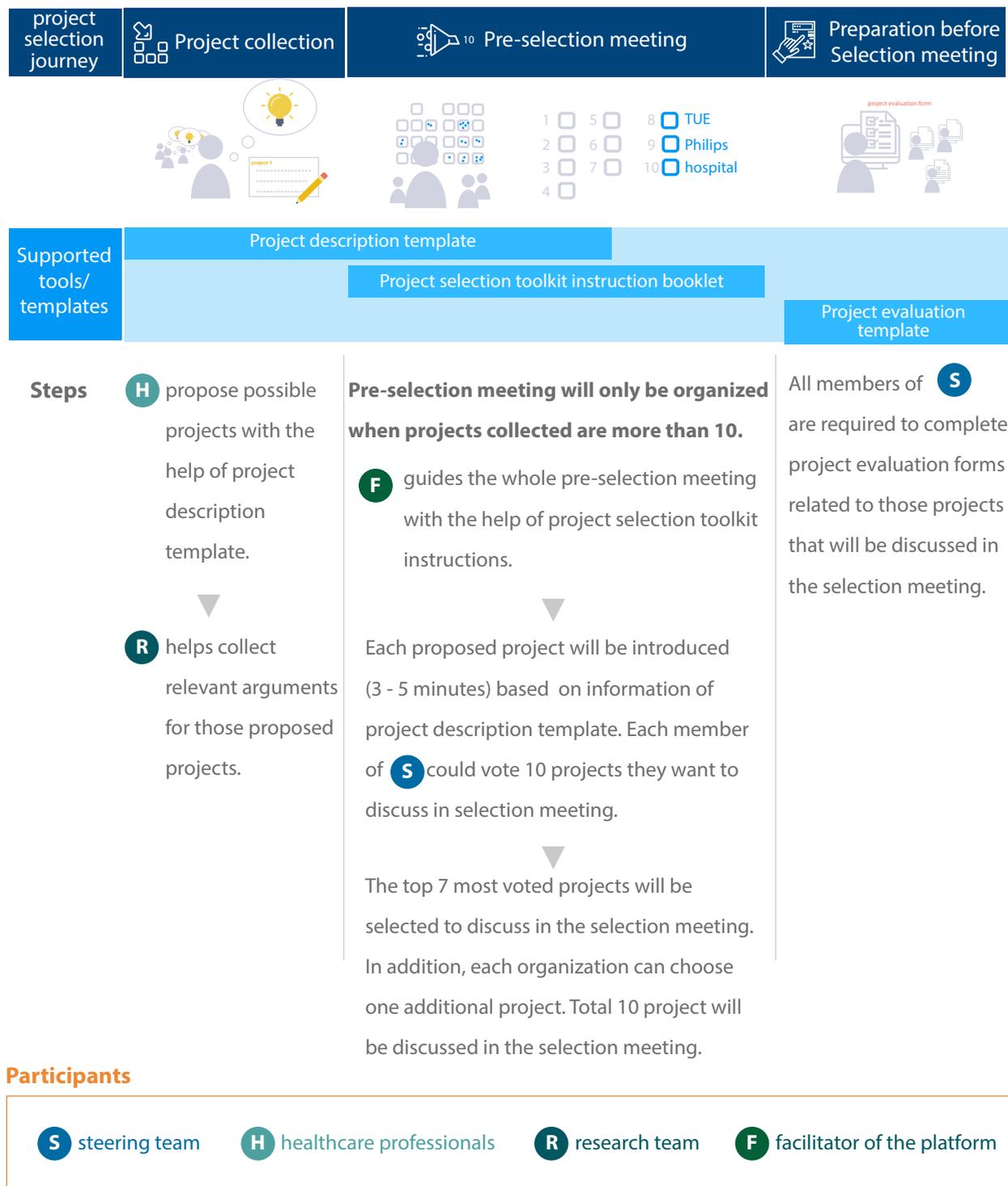
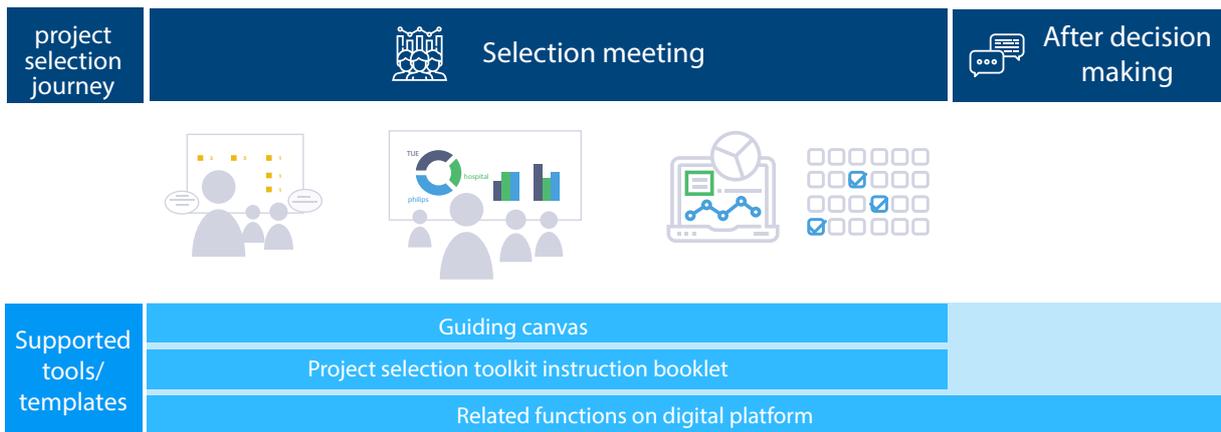


Figure 41: steps before the selection meeting

During and after the selection meeting



Steps Projects are always selected among projects with similar expected duration time.

F guides the whole pre-selection meeting with the help of project selection toolkit instruction booklet.

Members of **S** will first agree on which criteria are relevant and the weights of criteria within a given time frame.

Members of **S** will check difference - whether there are situations that different stakeholders give quite different scores for same aspect in same project. Analyze the situation.

Members of **S** will filter out not attractive projects and compare projects until achieving consensus with the help of digital platform.

After projects are selected, arguments will be documented.

H & **R** will be notified of those selected projects.

Participants

S steering team **H** healthcare professionals **R** research team **F** facilitator of the platform

Figure 42: steps during and after the selection meeting

Each phase of the project selection journey

- Project collection phase

Step 1: **H** Healthcare professionals propose possible projects with the help of the project description template. Both printed project description template and digital project template are provided. Printed project description templates are distributed in the hospital. Digital project description templates are provided in the corresponding digital platform for healthcare professionals.

Project description template contains two parts - basic information part and related arguments part.

Printed project description template

Figure 45: "basic information" part

Fill in to describe the essence of the project.

Figure 46: "related arguments" part

Healthcare professionals propose arguments related to essential criteria.



Subcriterion

improved patients' experience

Definition

This means increasing the sum of all interactions related to health care activities, that influence the patient's perception of the entire care process.

Fill in corresponding arguments.

Indicators that could be considered :

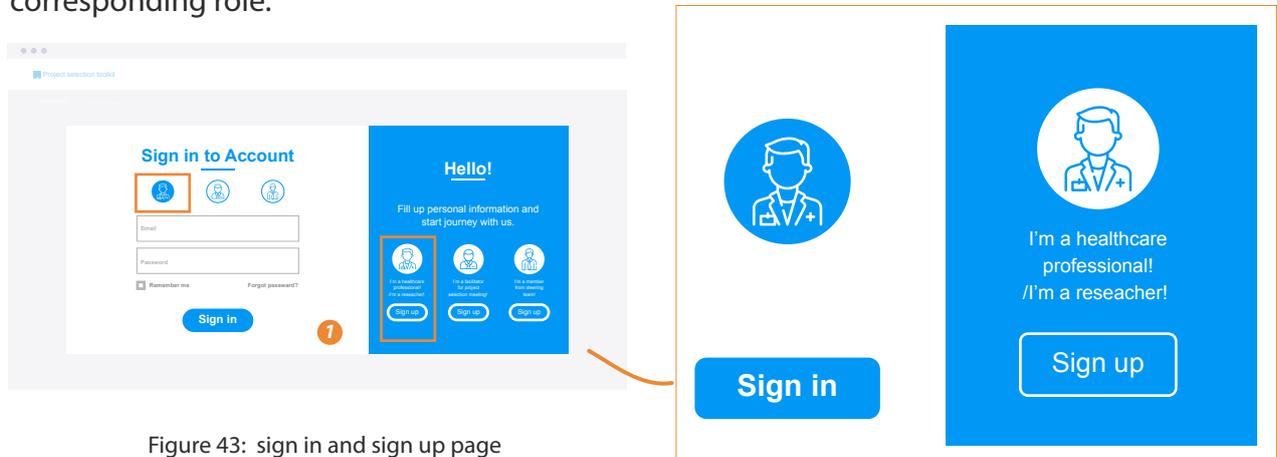
1. Pay attention to patients' physical & emotional needs.
2. Improve communication and sharing information with patients, consumers, carers and families.
3. Improve coordination, integration and transition of care between clinical, ancillary and support services across different provider settings.
4. Encourage and support participation and collaboration in decision making by patients, consumers, carers and families.

Indicators that summarized from exploratory research

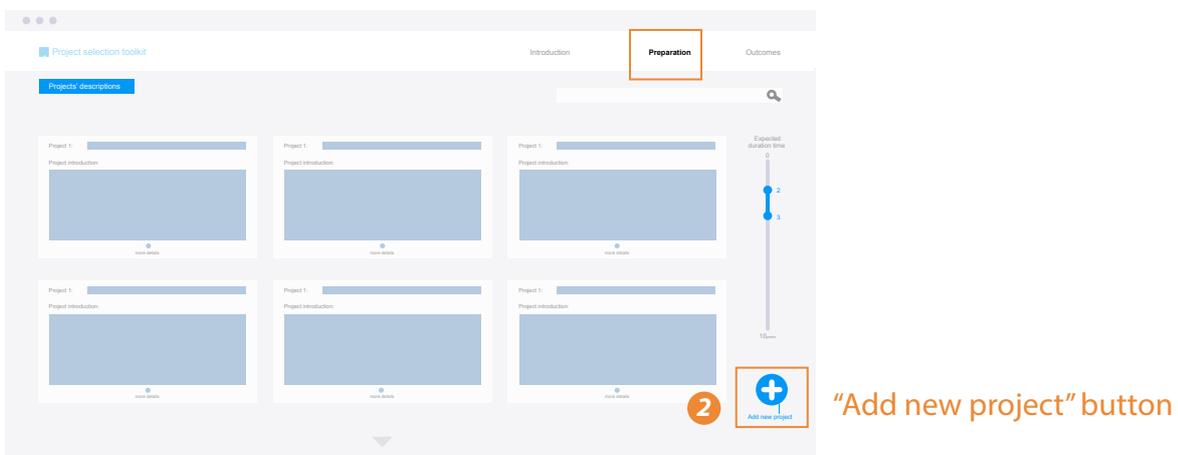
Step 2: Later research team could help collect related arguments.

Digital project description template

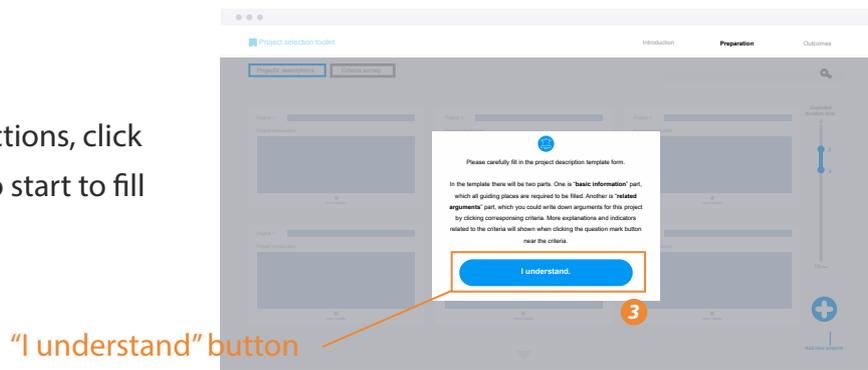
Step 1: In the digital platform, healthcare professionals need to sign in or sign up by selecting corresponding role.



Step 2: In the “preparation” function, All the proposed projects are shown. Those projects filled in printed project description templates are also shown here. To propose a new project, click the “Add new project” button.



Step 3: After reading instructions, click the “I understand” button to start to fill in the template.



Status icons indicate whether this part has been completed.

Figure 44: digital project description form

Step 4: Fill in the digital project description form (figure 44).

Step 5: The research team could also sign in/up and add arguments to make those project proposals more solid.

- Pre-selection meeting

Pre-selection meeting

Pre-selection meetings will be organized when projects collected are more than ten.

F A facilitator guides the whole pre-selection meeting with the help of project selection toolkit instructions.

Step 1: All members of **S** steering team in pre-selection meeting will have 10 votes. During the meeting, all collected projects will be introduced (3-5 minutes for each project) based on information of project description template.

Step 2: After all projects are introduced, members could vote those projects which they think are most attractive to them.

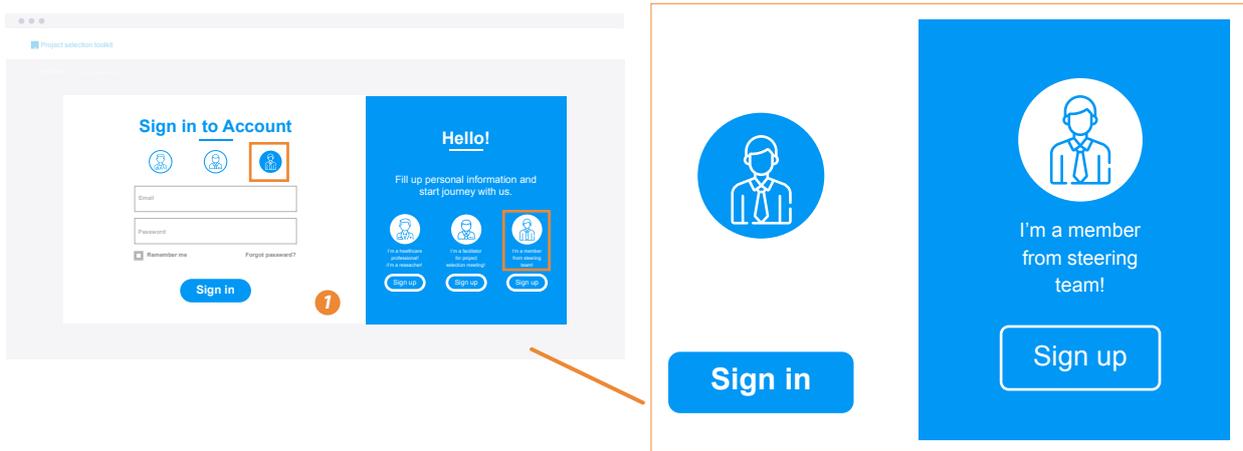
The top 7 most voted projects will be selected to discuss in the selection meeting. Besides, each organization can choose one additional plan. A total of 10 projects will be discussed in the selection meeting.

- Pre-selection meeting

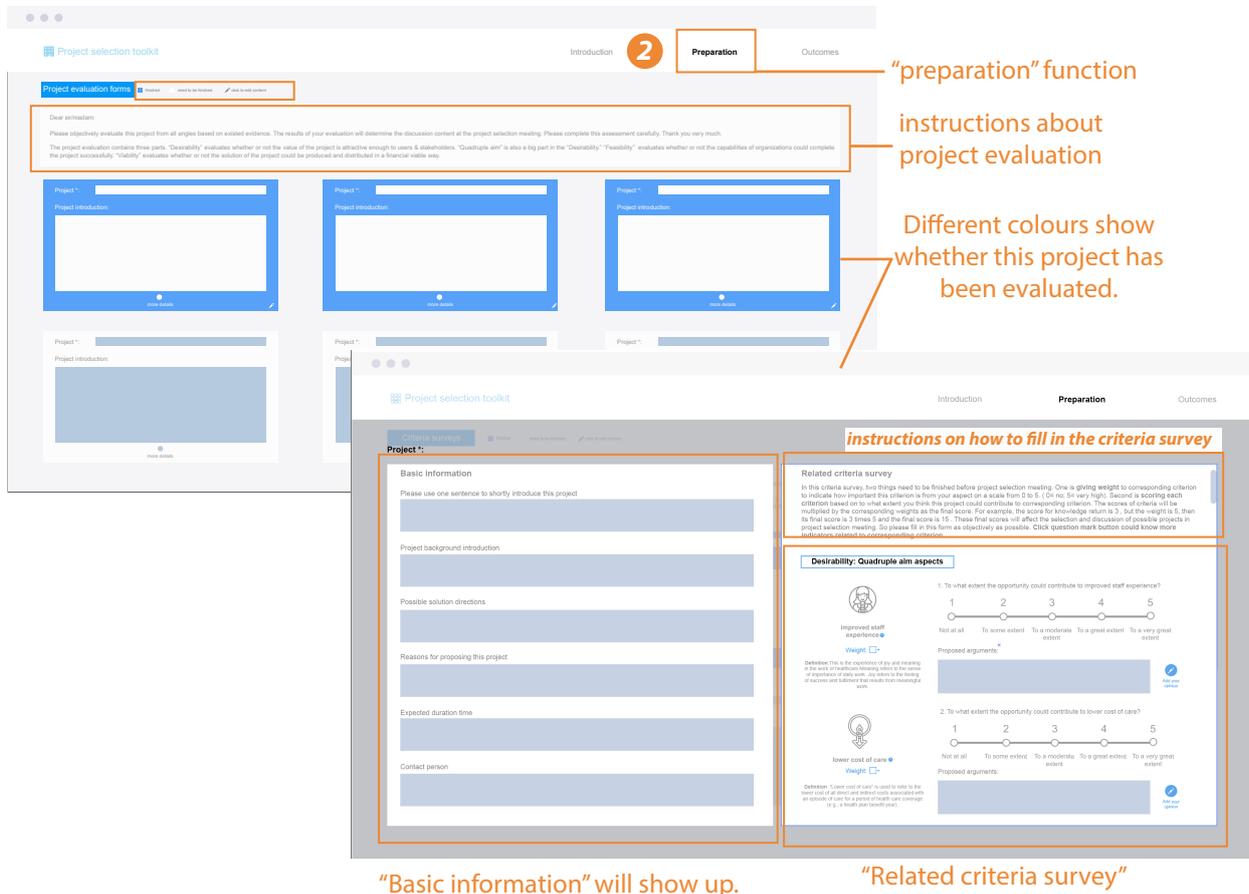
All members of **S** the steering team are required to complete project evaluation forms related to those projects that will be discussed in the selection meeting.

“Project evaluation forms” are supported by the corresponding digital platform.

Step 1: In the digital platform, steering team members need to sign in or sign up by selecting the corresponding role.

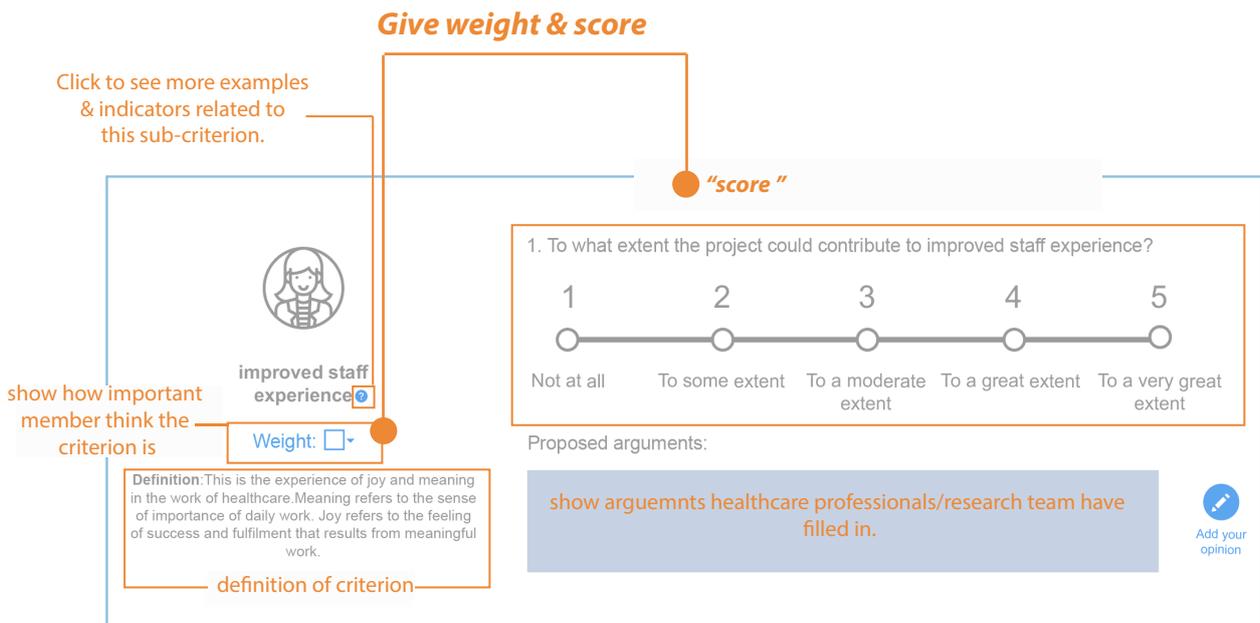


Step 2: Click the “preparation” button to start to fill in project evaluation forms.



“Basic information” will show up.

“Related criteria survey”



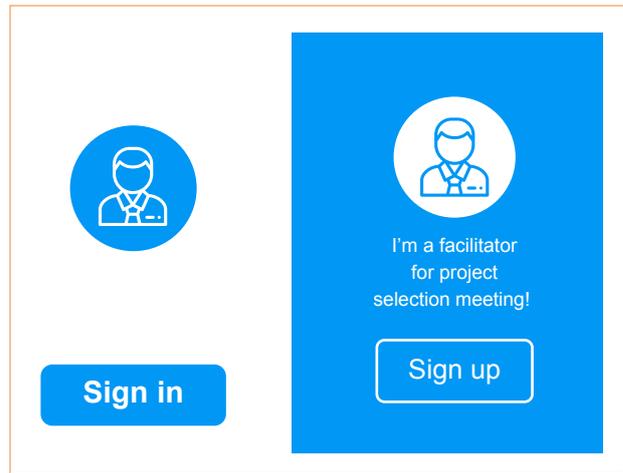
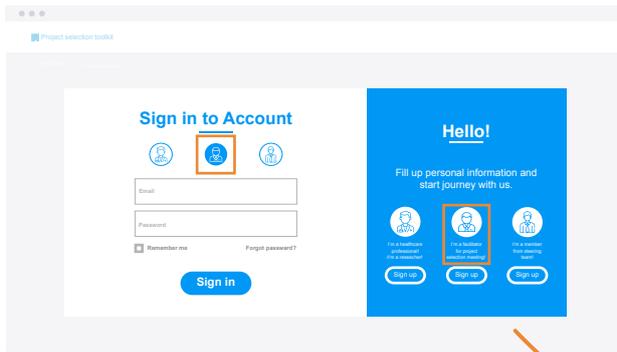
- Selection meeting

According to expert interviews, the following assumption was gradually confirmed.

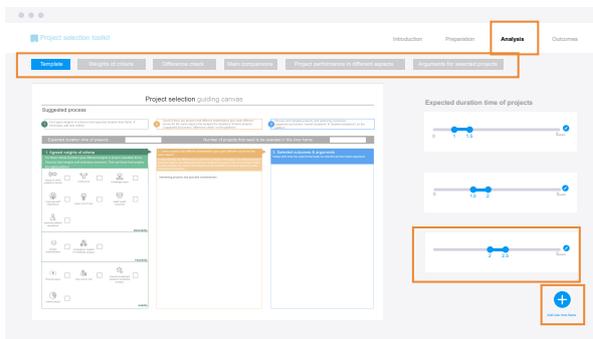
People often have different expectations for projects with different expected durations. For example, for some short-term projects, they may value the return on knowledge, and for some long-term projects, they may pay attention to economic benefits.

Based on this situation, the selection meeting is designed as the following mode (Figure 45):

1. Projects are always selected among projects with similar expected durations.
2. In each selection meeting, it is still supported to explore the comprehensive value of projects for different expected durations. For example, in the selection session 1, if the project M and N are selected. In the subsequent selection session 2, the combined result of one possible project and project M, N can be easily checked.



Sign in/up as a facilitator.



"Analysis" function and following sub functions support the suggested process in the selection session.

Click the corresponding expected duration time frame or custom the time frame.

Step 2: All steering team members first need to discuss those criteria that they gave different weights in project evaluation forms. After consensus, then put final weights into the digital platform.(25 minutes suggested)

[If it is difficult for members to agree on weights of criteria, two different weights could be recorded at the same time, and then the following steps could be carried out twice with the different weights. Projects that are both attractive under these two different weights will be selected.]



Figure 46: corresponding place in guiding canvas.

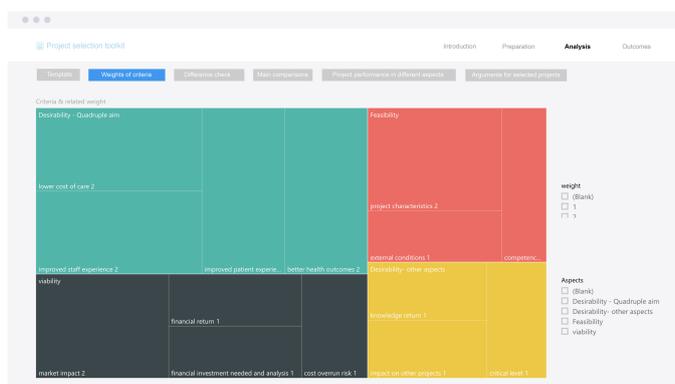


Figure 47: "weights of criteria" page on digital platform

Step 3: Members will check differences- whether there are situations that different stakeholders give quite different scores for the same aspect in the same project. Analyze the situation. If mistakes cause the situation, then adjust data in the digital platform. If that situation is caused because stakeholders have different interests in one project, write down that situation in the corresponding place in guiding canvas, and explore whether some combined projects could create common interests for stakeholders. (25 minutes suggested)

Example:

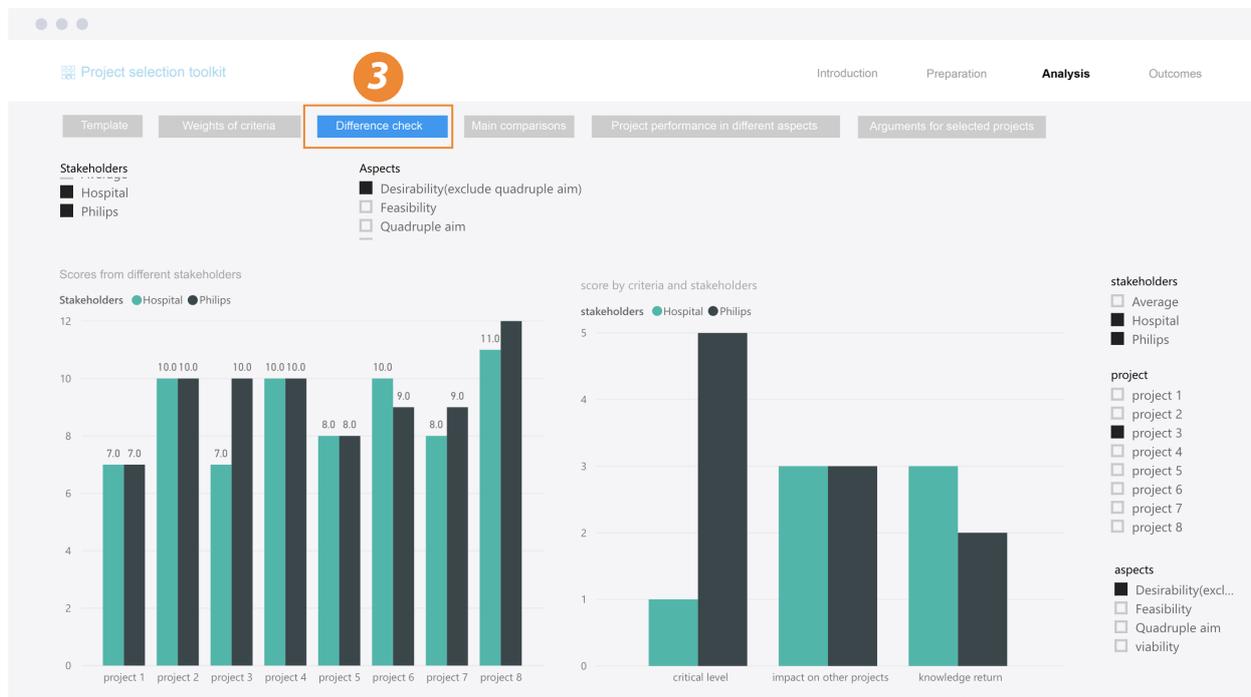


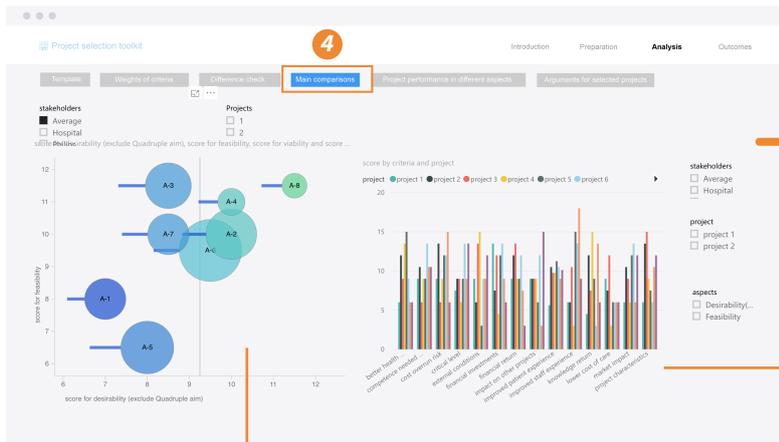
Figure 48: "difference check" page on the digital platform

This chart supports to find out situations that various stakeholders give quite different scores for the same aspect in the same project.

This chart supports to find out the reasons for those situations by checking scores members give for subcriteria in that aspect in that project.

Step 4. Filter out not attractive projects and compare projects until achieving consensus on which projects are selected with the support of real-time charts on the digital platform. (40 minutes suggested)

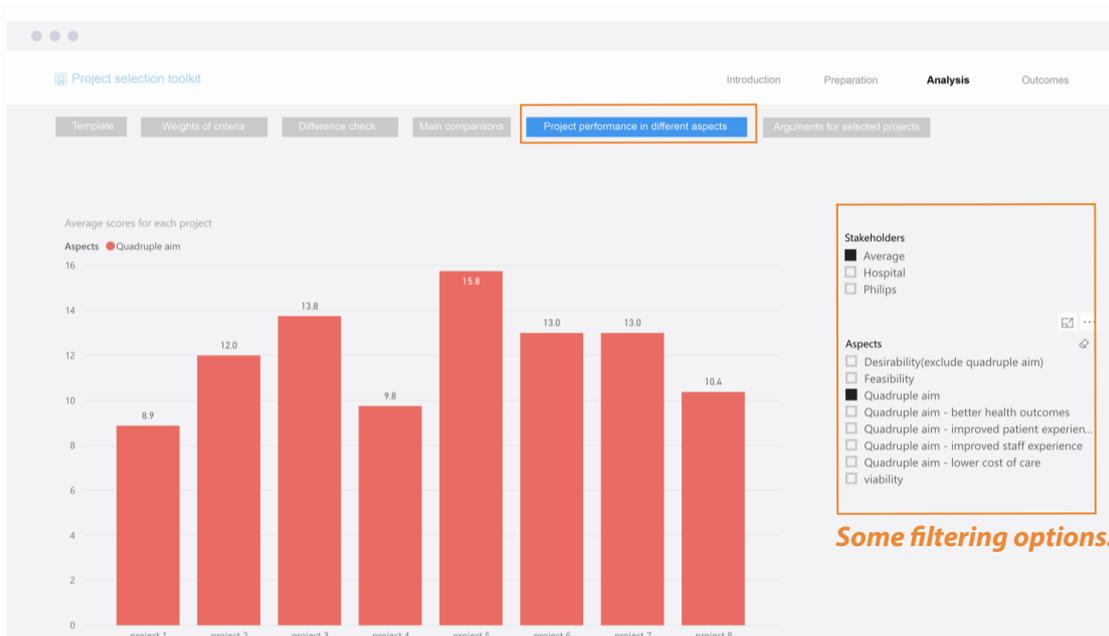
After previous stage, we can now use the average score of stakeholders' score since the situations that different stakeholders give quite different scores for the same aspect in the same project have already been checked and discussed.



“Main comparison” page

The chart supports the detailed comparison of projects by comparing their scores of subcriteria in one aspect.

The chart supports the overall comparison of projects through four aspects: desirability excluding Quadruple aim, Quadruple aim, feasibility, and viability. The X, Y axis, bubble size and length of the left bar each represent total scores for one aspect of them.



Some filtering options.

Subfunction “project performance in different aspects” could also support project comparisons when needed.

- Decision making phase

After achieving a consensus on selected projects based on information, noting down arguments for selected projects is necessary. Except noting down reasons for selected outcomes, the combined value of projects chosen for stakeholders could also be seen in the digital platform ("outcome" function).

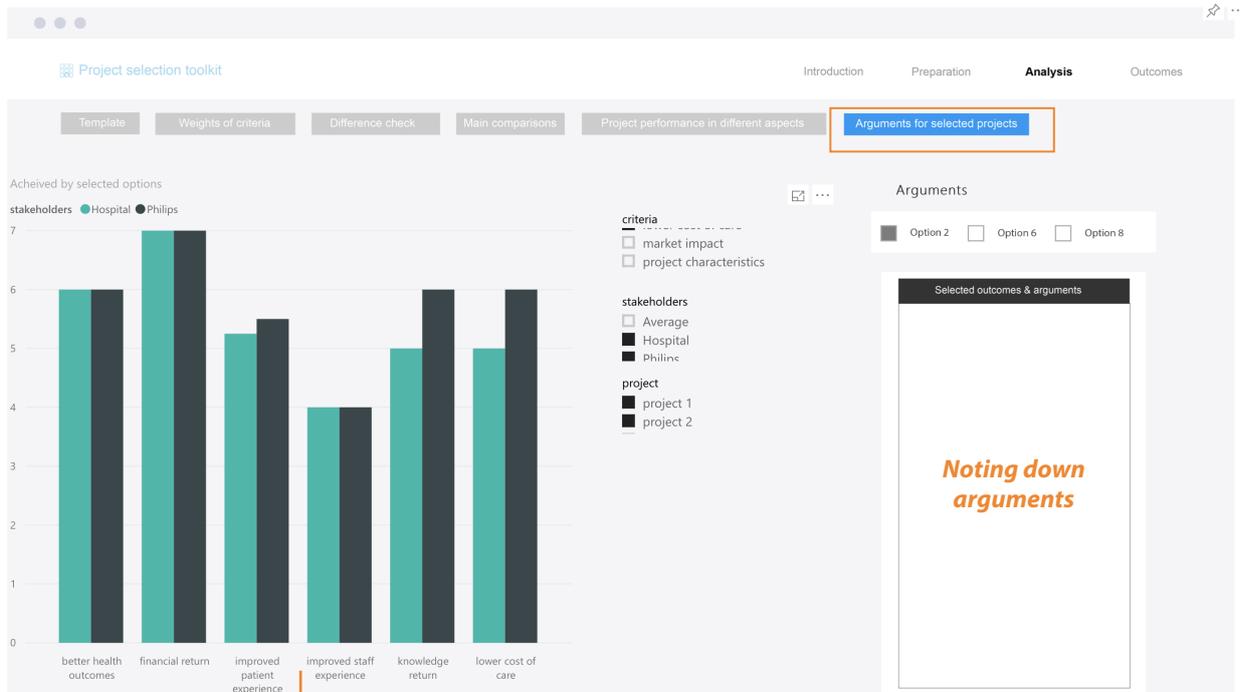
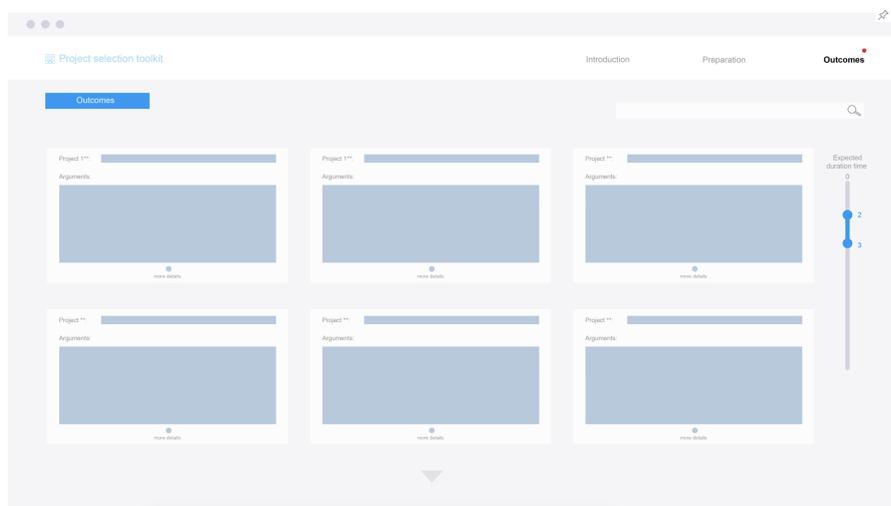


Figure 49: "arguments for selected projects" page

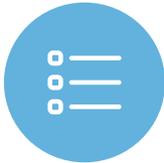
The chart shows the total value that selected projects contribute to stakeholders.



Healthcare professionals, research team, and steering team members could see the selected outcomes and reasons through the corresponding digital platforms.

5.3 Reflection: how the toolkit reflects design guidelines

After introducing the final toolkit, the following paragraphs introduce how the toolkit reflects the design guidelines.



**Provide
agreed
criteria**

Both project description templates and project evaluation templates contain critical, holistic criteria that are summarized from exploratory research. Also, the first step in the guiding canvas allows the steering team members to discuss the criteria until they reach a consensus on the needed criteria.



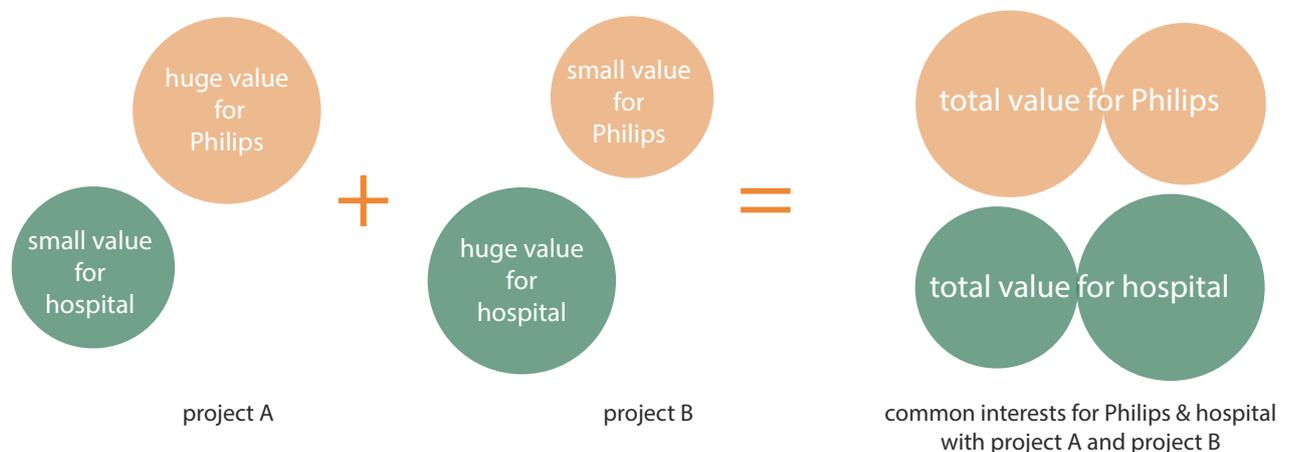
**Create
common
meanings**

Besides, definitions, examples, and indicators related to the identified critical, holistic criteria are provided to promote a common understanding.



**Facilitate
common
interests**

The suggested step 2 in the guiding canvas - "difference check" is designed to promote common interests. The different interests various stakeholders show to the same project will be paid attention to. The combined value of projects could be checked easily to promote common interests.





**be
transparent
& easy-to-use**

All arguments, scores, project selection steps, as well as selected outcomes and related arguments, are **transparent** on the digital platform, guiding canvas and instruction booklet.

Besides, improved project selection journey and tools are designed to make the process **simpler**, rather than the situation in the original process - repeating steps and unstructured guidance.



**facilitate
discussion**

The guiding canvas and corresponding real-time charts provide suitable information in suitable time to facilitate discussion and decision making in the process.



**support
both holistic
& detailed
comparisons**

The combination tools - real-time charts that show outcomes of project evaluation forms and the suggested steps on the guiding canvas, are designed to support both holistic and detailed comparisons of projects.

KEY TAKE-AWAYS CHAPTER 5

This chapter focuses on three parts of the content: the development process of the toolkit design, a detailed description of the final toolkit, and how the final toolkit reflects the design guidelines.

The toolkit was designed according to the design guidelines and the general project selection process. It was then iterated three times based on feedback from Philips and hospital experts.

For the final toolkit, detailed step-by-step instructions are provided for the corresponding tools and templates.

Project description templates, project evaluation templates, and the guiding canvas help to facilitate agreed criteria. Definitions, examples, and indicators help promote shared understanding.

The suggested step 2 in the guiding canvas - "difference check" is designed to promote common interests.

All tools and templates help make the project selection process more transparent and simple.

The guiding canvas and the real-time charts facilitate discussion in the project selection meeting and support both holistic and detailed comparisons.

<CHAPTE 6 >

CONCLUSION & DISCUSSION

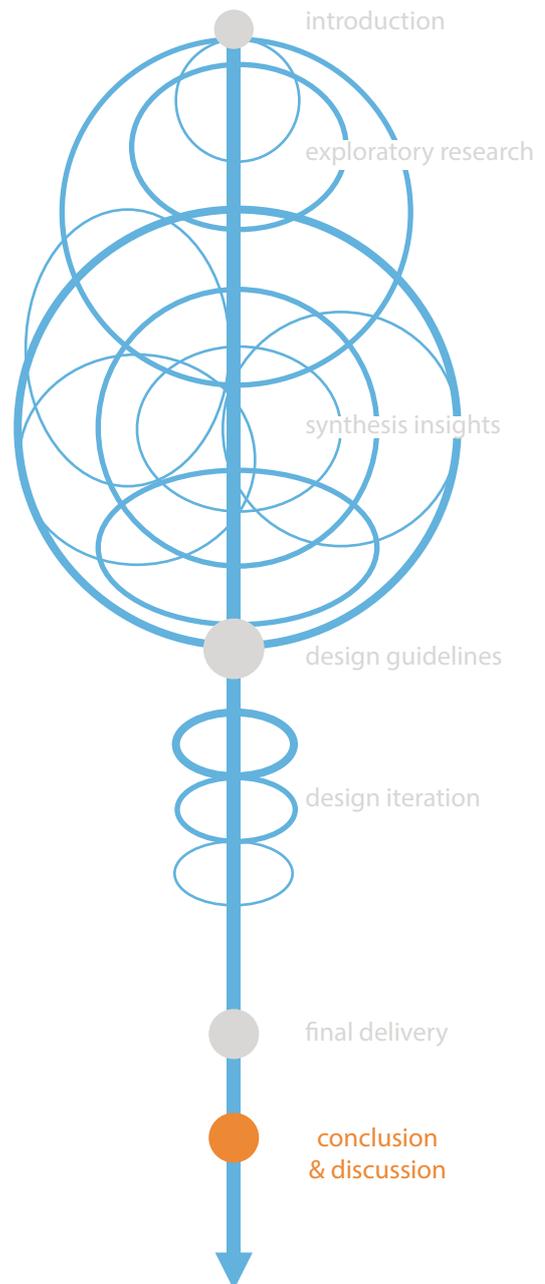
6.1 The value of the project selection toolkit

6.2 academic contributions

6.3 Limitations

6.4 Recommendations

This chapter describes the value, limitations, and recommendations for the project selection toolkit.



6.1 The value of the project selection toolkit

This chapter discusses the value of the project selection toolkit for Philips' value-based care studios.

As mentioned before, Philips believes knowing the trends of economy paradigms and transform towards the transformation economy paradigm is vital to stay forward in the market. The transformation economy requires identifying challenges and working with other stakeholders to address challenges while making profits. "Value-based care" is the ideal concept in the healthcare field. And value-based care studios aim to transform towards value-based care - identifying healthcare challenges and solving them with collaborators.

The project selection toolkit is designed in this context to help all stakeholders select the most promising project to address healthcare challenges. It provides a framework and tools that are designed specifically for current Philips' value based care studios. Of course, with the development of the studio and the changes in the external environment, the toolkit should also be developed and iterated later.

Mainly there are two significant added value the project selection toolkit brings to Philips' value-based care studios.

First is the project selection toolkit helps stakeholders understand each other better.

Leveraging collaboration is essential in tackling societal challenges. The toolkit contains written opinions, scores, weights of criteria that different stakeholders give. Those detailed elements composed the overall attitude of stakeholders, which could let stakeholders better understand each other and facilitate deep collaboration.

Second is the project selection toolkit makes the project selection process more efficient, effective, and traceable.

The toolkit not only provides an improved project selection journey that all things are transparent and clear. It also supports tools in each phase to support work that different participants do (healthcare professionals, steering team members, etc.). Those tools facilitate the project selection process and let the process more efficient and effective. Additionally, all the key results in the process are documented, like proposed arguments, scores, selected reasons. Those information makes the project selection process more traceable.

6.2 Academic contributions

The first academic contribution is that it contributes a transparent and easy-to-understand framework for project selection in the network of collaboration.

Economic globalization, emerging transformation economy paradigm, those trends all require companies to collaborate with other partners to conduct business in order to stay ahead in the market. While leveraging collaboration is more and more critical for companies, the presence of different interests, different values make the project decision process complex and challenging to achieve consensus. Many research starts to focus on researching new methods to achieve the balance of all stakeholders' interests and preferences. Mathematical programming is the most mentioned way, using multi-criteria, different weights, and algorithms. Various methods were proposed, like data envelopment analysis (DEA)(Oral, Kettani & Çınar, 2001).

However, it is hard to let all professionals in different fields understand those complex algorithms. Misunderstanding and intransparent may constrain collaboration. In this aspect, I applied Carlile's framework- three levels of knowledge boundaries and corresponding boundary objects to the project selection context, generating a transparent and easy-to-understand framework for project selection in the network of collaboration, which is one significant contribution of this work.

The second academic contribution is that it summarizes vital, holistic criteria for value-based care.

There hardly find any direct project selection criteria related to value-based care in the literature. And the determinant criteria and sub-criteria summarized from exploratory research add knowledge in this aspect.

6.3 Limitations

This chapter introduces the limitations in the process of designing this toolkit.

Limitation in the criteria summary

One thing that needs to be acknowledged is that all the critical criteria summarized from the literature focus on the current world context. When interviewing an expert from TUE, she mentioned that in her opinion, to transform towards value-based care, all criteria should be completely different from the current world context. Otherwise, it would be difficult to achieve real breakthrough progress towards value-based care.

I admit this opinion might be true. So the criteria in the toolkit might need to be iterated as the external conditions change.

A thing that needs to be emphasized is that **this toolkit is specially designed for Philips' value-based care studios**. And in Philips position paper, the quadruple aim is regarded as actionable guidelines towards value-based care. So the criteria summary is suitable for Philips' value-based care studios while not ideal for all value-based care studios since other organizations may have different opinions towards value-based care. And I position the toolkit as the first step for project selection in Philips' value-based care studios. Of course, it should develop at the same time when trends, new criteria for future economy paradigm are clear.

Limitation in the validation of the toolkit

Although the final project selection framework and toolkit had been iterated three times, the toolkit has not been applied to real situations. The toolkit should be used in a real-life case in a value-based care studio to validate the usability and effect of the toolkit.

Additionally, the research and design context is in MMC value-based care studio. MMC value-based care studio is owned by Philips, MMC hospital and Eindhoven University of Technology. In the whole assignment, although one expert from TUE is interviewed, she is not the responsible TUE person in MMC value-based care studio. And related people from TUE did not reply to my invitations of interviews, which is a pity that does not get feedback from relevant experts from TUE.

6.4 Recommendations

Four recommendations are summarized related to the further development of the toolkit.

Recommendations for toolkit itself



Testing toolkit in real-life situations and improving toolkit based on outcomes



Testing with more healthcare professionals to improve terms in definitions & indicators

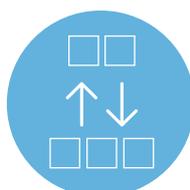
- Applying the toolkit into real situations is vital to gather more feedback about usability. Improve toolkit itself based on input from real-life tests.

- Definitions, indicators, and examples of criteria should be tested more with healthcare professionals. The latest version of definitions and indicators have already iterated based on the feedback of two hospital experts. And during the process, they mentioned that some terms were too academic. Further tests with plenty of healthcare professionals could be conducted to guarantee shared understanding.

Recommendations for further research



improving the engagement of healthcare professionals



Dealing with projects assigned by organizations & proposed by healthcare professionals

- This toolkit is designed to help select projects from possible projects that healthcare professionals propose. If there is no healthcare professional to propose projects, then the toolkit does not make any sense.

Research related to how to increase and keep the engagement of healthcare professionals should be carried out.

- Sometimes projects are assigned by the top of the organization, not by projects proposed by healthcare professionals. Further research can be done on how to handle the relationship between those two kinds of projects better and improve the toolkit that can both deal with those two kinds of projects.

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