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# Wicked Strategies: Comparing Evolved Double Diamond and PPG's Framework for Strategy Creation for Wicked Problems in Service Design

Sari Kotaniemi<sup>1</sup>, Mari Suoheimo<sup>2</sup>, Satu Miettinen<sup>1</sup>

[skotanie@ulapland.fi](mailto:skotanie@ulapland.fi), [mari.suoheimo@aho.no](mailto:mari.suoheimo@aho.no), [satu.miettinen@ulapland.fi](mailto:satu.miettinen@ulapland.fi)

<sup>1</sup> University of Lapland, Finland

<sup>2</sup> Oslo School of Architecture & Design, Norway

## Abstract

Wicked problems are present in many of the services that service designers design as in healthcare, social work or sustainable transportation. Camillus (2008) argued that wicked problems often increase as an organisation faces constant change or unprecedented challenges. These challenges need models on how to tackle them and in this article we will compare the Evolved Double Diamond model with PPG Industries' framework for responding to wicked problems, as presented by Camillus (2008). Both models are used to create a strategy for the context of wicked problems: a new Evolved Double Diamond model that addresses especially complex problems. It is good to look at models critically and understand their similarities and differences for possible future development of strategies.

Keywords: wicked problem, strategic service design, evolved double diamond, PPG's framework for responding to wicked problems

## Introduction

It is important to review our design models and critically consider how we can enhance the way we do our work in the context of wicked problems (WPs). Wicked problems are unsolvable problems such as global warming, unemployment, social- and health care services. They are ill-defined and extremely complex in their nature. As Rittel and Webber (1973) have put it, the selection of the wicked problems will determine the resolution of the problem. The problem begins with defining the problem and who is defining or selecting its definition will be crucial.

The wicked problem, as a theme, has been a growing trend over the past 10 years in the field of service design for example in the number of publications (e.g., Suoheimo et al. 2021; Akama, 2015). Service design itself is not much older than the growing trend of wicked problems as both grow in number of publications after around the year 2000 based on a search made in Web of Knowledge (Suoheimo et al., 2021). We need strategies to handle WPs.

The strategic challenges of businesses include the growing uncertainty of the business environment and the goal that many organisations face in today's world – to achieve both profit and growth, although other values have been raised in design as well. According to Camillus (2011), organisations need to develop their identity and change their business environment while maintaining a symbiotic relationship between the identity and the environment. A new strategy can mean change for the organisation as in ways of working or the internal culture. Strategies will lead us to expected futures and outcomes. They are very difficult to create in a WP context, as WPs cannot be solved but only tamed (Rittel & Webber, 1973). Developing a strategy often implies changes, and this set of changes can be viewed as a WP (Deserti, 2015; Suoheimo 2016) independently of its field.

Currently there are several kinds of process models or methodologies in the design field applied for complexities and wicked problems and how to create strategies on how to handle them. One positive development in design has been the introduction of the new Evolved Double Diamond (EDD) model from the Design Council, which now better handles complexities in design (Design Council, 2021c). Although the model has been adapted in many circumstances as many have brought additional diamonds to it, we still wish to look at this model from the United Kingdom's Design Council since it has the iterative arrows showing that one may overgo some of the processes several times.

The focus of this article is to examine Evolved Double Diamond and PPG's framework for developing strategy in design for WPs. Thus, the research question that the article wishes to answer is as follows:

What are the similarities and differences of the EDD and the PPG's framework in creating strategy in the context of WPs?

Designers always work with people from different fields and often some of the stakeholders can be from the management field. We see that knowing the ways or tools from other fields as the PPG's framework from management for creating strategy may be helpful for designers to communicate their own ways of strategy creation in the field of wicked problems. Studies have shown that knowing the vocabulary from the field that you are collaborating with is already one way to make



collaborative work easier (Suoheimo et al. 2022). Also, Suoheimo et al. (2022) highlights how sharing the process models in the beginning of a project can aid the collaboration between different fields of professionals in a cross-collaborative work.

The Evolved Double Diamond is commonly known and used in service design literature, but the PPG's framework is less known or applied. Wicked problems are social and often the service design literature handles more socially oriented problems in wicked problems as healthcare (Khambetea et al., 2015), education (Suoheimo et al. 2022) or unemployment services (Sarantou & Suoheimo, 2018), still there are wicked problems in the industrial fields such as supply chain management, energy consumption or issues of fabrication, and it would be beneficial for service designers to start acting more in such fields as well. On the other hand, knowing how the field of management uses PPG's framework can also teach service designers new issues on creating strategies for tackling wicked problems in industrial fields or beyond them.

We do not present any strategy, but we merely wish to understand more deeply the differences and similarities of these two models, whose aims are to create strategies. Having common strategies across sectors is important when working with service design and it is even more essential when we handle problems that are wicked as the problems are deeper and they require more holistic and collaborative approaches (Roberts 2000; Suoheimo 2016). We agree with Carlopio (2009) that there are not ready strategies, but one needs to always create one for an existing problem and these two Evolved Double Diamond and PPG's framework can be helpful methodologies in creating a strategy.

In the next section, we discuss WPs in service design. Service design handles many WPs (Suoheimo, 2020; Buchanan, 1992) and, often, one might not perceive them until some of the 10 points defined by Rittel and Webber (1973) begin to appear. One of the points is how to define the problem or how to solve it, which becomes an impossible mission. Service designers are given tasks such as designing rehabilitation services for former prisoners or issues related to large organisational changes or sustainability, which can be defined as WPs.

We then compare the selected models, EDD and PPG's framework for responding to WPs (2008). Each can be used to create strategy. Then, we discuss what the findings mean and how they can contribute to the design and service design fields. This type of study is important, as service design is increasingly encountering complexities and WPs, which has been identified as an area requiring research (Suoheimo, 2020; Sangiorgi, 2009).



## Theoretical Framework

### Wicked Problems

Often problems are categorized into three by several authors as simple, complex and wicked, where the wicked is the most difficult of them (Roberts 2000). Simple design problems are to design a button, complex problems are to make library service, but a wicked problem is design for example a sustainable supply chain management across countries. According to Rittel and Webber (1973), WPs are different because traditional processes cannot resolve them. Previously, Churchman (1967) had brought the term into science by explaining how most complex social systems are ill-formulated, although it was the landmark article by Rittel and Webber in Policy Sciences that coined the term and identified 10 points that make a problem a wicked one. Since then, the phenomenon has been treated in many fields outside design. We summarise the 10 points in the list below (Rittel & Webber, 1973; Suoheimo 2016):

1. There is no precise formulation of a WP.
2. WPs do not have a stopping rule, neither they reach a “final solution” because the resolution can always be improved.
3. Solutions to WPs are not “true” or “false” but “good” or “bad.”
4. There is neither a final test nor an immediate solution to a WP.
5. Every attempt at a solution to a WP is a “one-time operation,” and each attempt counts significantly.
6. WPs do not have enumerable sets of potential (or exhaustively descriptive) solutions.
7. Each WP is unique.
8. Any WP can be considered a symptom of another problem.
9. The existence of discrepancies in the representation of a WP can be explained in several ways. Choosing an explanation determines the nature of the problem’s resolution.
10. The planner must not be wrong because WPs have consequences.

Since a wicked problem is a symptom of another wicked problem (Rittel and Webber 1973), there is a system behind. We will not elaborate on the points but recommend reading research that has applied them to design problems (e.g., Jones & Bowes, 2017; Suoheimo 2020).



## Wicked Problems in Service Design

Service design is used to concretise the customer experience and increase the commitment of service personnel through experimental prototypes, storytelling, and different types of media (Miettinen et al., 2016; Miettinen, 2016). Service design aims to support business development by considering both the customer experience and the employee experience (Reason, 2015). Service design can improve participation processes through the use of appropriate tools and methods in an organisation's policies and processes and thus also increase engagement and value creation (Sangiorgi, 2011).

Stickdorn et al. (2018, p. 19) point out how service design is an holistic, multi-disciplinary, integrative field and “choreographs processes, technologies and interactions within complex systems in order to co-create value for relevant stakeholders.” Woodham et al. (2017, p. 237) on the other hand write how “[s]ervice design strategies are seen to be successfully shaping new approaches and providing possible solutions to often intractable or ‘wicked’ problems.” Often when service designers work with more complex or wicked problems, they tend to lend the service dominant logics framework on how value is co-created by multiple actors, and the process should always also include the beneficiary (Vargo et al., 2016).

In the design field, there has been some confusion with the term “WP” and, as Termeer et al. (2019, p. 10) point out, it has become a “buzzword to attract attention.” Not all design problems are wicked (Suoheimo, 2020), and one should understand the level of the problem, or, as Buchanan (1992) expressed it, through the example of four orders of design.

Suoheimo (2020) argues that service designers handle all four orders of design, although they might work more predominantly in the third order that Buchanan (1992, pp. 9–10) defines as the “design of activities and organized services.” Still, service design also involves the first, “design of symbolic and visual communications,” more visual design, as these can be touchpoints of a service. An example of this can be a logomark on a store that signals what the place “is about”. The second order entails the “design of material objects” (Buchanan, 1992, pp. 9–10), and here service design is often used in the context of a product service system. The fourth order is even more complex and wicked: the “design of complex systems or environments for living, working, playing, and learning” (Buchanan, 1992, pp. 9–10). Service designers also work in this order by designing complex systems, as in health care (e.g., Alhonsuo, 2016). In the Iceberg Model of Design Problems, the last two orders are situated more on the side of WPs (Suoheimo et al. 2021).



Service ecosystems connect not only multiple actors but also their relationships, as well as interactions at micro, meso, and macro levels (Beirão et al., 2017). Service design operates throughout these levels. At the micro level, individual users participate and are investigated; at the meso level is the organisation; at the macro level, the overall system is described. In micro level services could be a service such as providing a sandwich in a bar, in the meso level library services think how different users can benefit from the service and in the macro level service design there are issues such as refugee integration services to society.

The new EDD and the PPG framework for responding to wicked problems can help in addressing ecosystem development from both process and complexity viewpoints. When addressing WPs, it is important to understand the complexities in service ecosystems and determine from which level or viewpoint design tools could help.

## Introducing the Models

This section briefly introduces the PPG's framework for responding to WPs, presented by Camillus (2008), and the EDD model. In the section after we will compare and evaluate both of the models critically.

### PPG's Framework for Responding to Wicked Problems

PPG's framework for responding to wicked problems (later "PPG's framework") is a model that Camillus (2008) brought as an alternative in handling WPs (Figure 1). In it, an enterprise, when confronting frustrating problems, should be aware and capable of recognising that they may be wicked. Moving from denial to acceptance is important; otherwise, companies will continue to use conventional processes and never effectively address their strategy issues (Camillus, 2008).



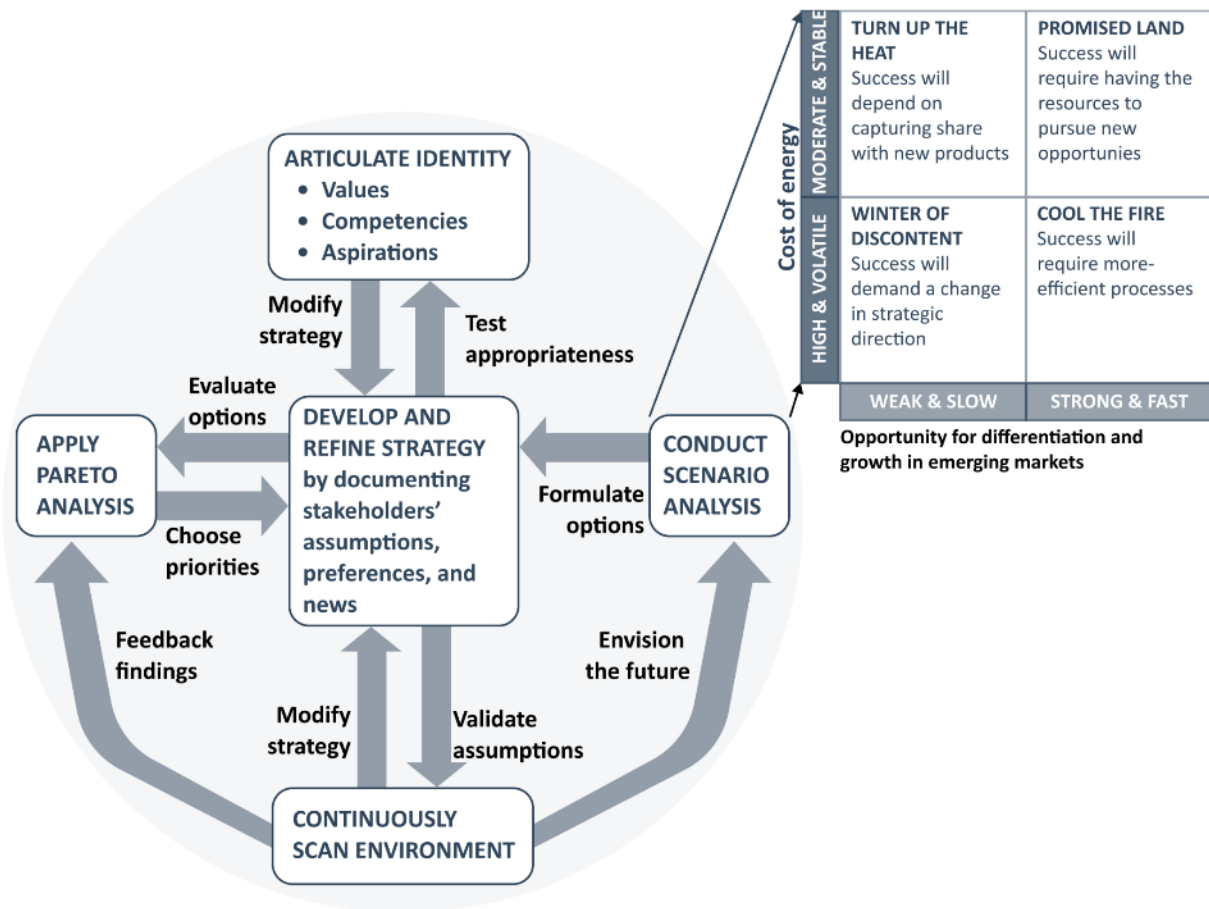


Figure 1. PPG's framework for responding to wicked problems and alternate futures. Source: adapted from Camillus (2008).

There are no solutions to wicked strategy problems, but companies can learn to cope with them. To do so, they should

- involve stakeholders, document opinions, and communicate;
- define the corporate identity;
  - Values: What is fundamentally important to the company?
  - Competencies: What does the company do better than others do?
  - Aspirations: How does the company envision and measure success?
- focus on action; and
- adopt a “feed-forward” orientation (Camillus, 2008).

Camillus (2008) wrote that PPG first noticed the wickedness of strategy in the late 1980s. PPG expressed its identity on Blueprint. The company stated that it values steady growth and strives to remain a profitable global player in all of its industries.





Although PPG's business portfolio has changed, its identity has been preserved. PPG Industries developed strategies after searching for and documenting stakeholder assumptions, preferences, and alternative views. It assesses the appropriateness of the strategies it develops based on its identity, scrutinizes the environment, and tests assumptions to see if it needs to change course. The assessment of possible scenarios helped PPG formulate new options, and its managers used Pareto analysis to identify a small number of actions that are likely to have a large impact. To solve the wicked strategy problems, PPG Industries tried to envisage the different futures it could face. In 2004, it developed four possible scenarios combining the biggest opportunity - access to emerging markets - and the biggest challenge, the cost of energy, over the next 10 years (Figure 1). This allowed PPG to identify three strategies that would yield results in any of the four situations: strive for operational excellence with an emphasis on cost-effectiveness and quality; enhance differentiation through technology and service innovation; and generate money. (Camillus, 2008)

In addition, it is salient to identify three types of actions that would deliver results in all four cases or scenarios (Camillus, 2008):

- emphasise operational excellence through cost-effectiveness and quality;
- improve differentiation through technology-based innovations and new services that meet customer needs; and
- earn money to support strategic initiatives, manage the corporate portfolio, and pay dividends.

Pareto analysis can then be employed to identify the 20% of strategy options that would have 80% of the impact that could be derived from pursuing all of them (Camillus, 2008). Pareto analysis helps in decision-making. It is a statistical technique aimed at a significant overall effect. The Pareto principle is also known as the 80/20 rule: by doing 20% of the work, you can obtain 80% of the benefits of doing all the work. For example, in quality improvement, most problems (80%) are due to a few main reasons (20%) (Haughey, 2020).

The 80/20 rule can be applied to almost anything:

- 80% of customer complaints arise from 20% of your products and services;
- 80% of delays in the schedule result from 20% of the possible causes of the delays;
- 20% of your products and services account for 80% of your profit;
- 20% of your sales force produces 80% of your company revenues; and



- 20% of a system's defects cause 80% of its problems (Haughey, 2020).

There are eight steps in creating a Pareto diagram, and we recommend Haughey (2020) as one example in learning more about it. We will not go through it more deeply, as it is not the focus of our research.

## Evolved Double Diamond (EDD) Design Processes

The Design Council's framework, known also as EDD (Figure 2) for innovation, helps designers and non-designers across the globe tackle some of the most complex social, economic, and environmental problems. These issues resonate with WPs (Rittel & Webber, 1973), and the model has been applied to address them (e.g., Nielsen, 2019) as well as in strategy creation (e.g., Clune et al., 2014).

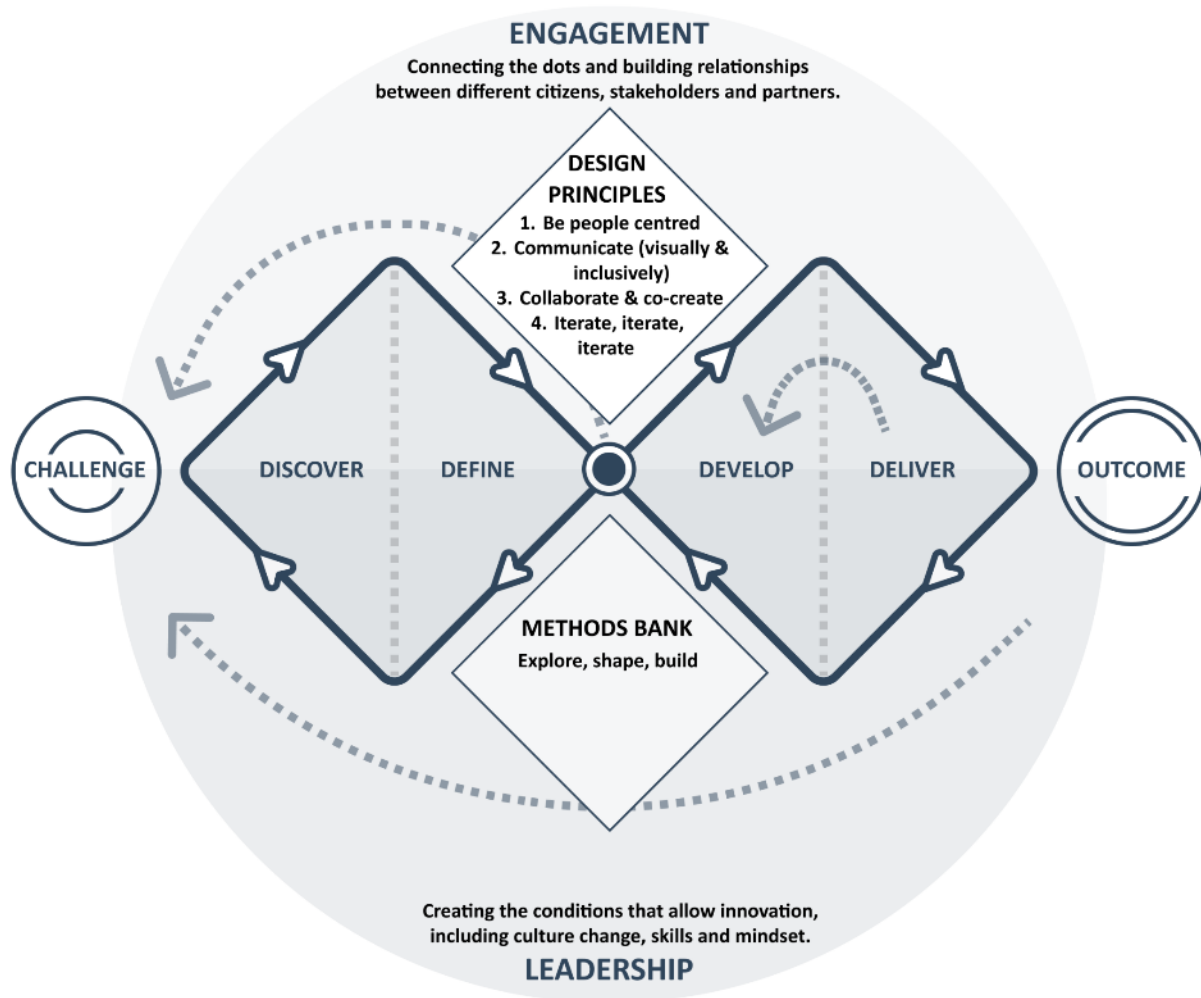


Figure 2. The EDD model. Source: adapted from Design Council (2021c).



The Design Council's DD clearly conveys a design process to designers and non-designers alike. The two diamonds represent a process of exploring an issue more widely or deeply (divergent thinking) and then taking focused action (convergent thinking).

- Discover. The first diamond helps people understand, rather than simply assume, what a problem is. It involves speaking to and spending time with people who are affected by the issues.
- Define. The insight gathered from the discovery phase can help you to define the challenge in a different way.
- Develop. The second diamond encourages people to give different answers to the clearly defined problem, seeking inspiration from elsewhere and co-designing with a range of different people.
- Deliver. Delivery involves testing different solutions at a small scale, rejecting those that will not work and improving the ones that will (Design Council, 2021c).

EDD (Figure 2) includes the key principles and design methods that designers and non-designers need, and the ideal working culture they require, to achieve significant, long-lasting, positive change.

## Analysis of the Models

We investigated the models in greater detail. Table 1 presents their main characteristics. Some of these characteristics relate to divergent and convergent thinking, iterative process, testing, and decision-making. Understanding what they are used for and by whom was also considered. Furthermore, how they support future thinking is an interesting aspect to analyse. These are issues that we think are at their core and consider important when thinking of the context of WPs. We initially thought of analyzing in depth leadership styles involved in both models, but we saw that it would be too large a topic for this article, thus we will not handle it here and suggest further studies of the topic.



Characteristics	Evolved Double Diamond (EDD)	PPG's Framework (Camillus, 2008)
<b>Divergent and convergent thinking</b>	Divergent – Convergent (Design Council, 2021bc).	<p>“PPG Industries evaluates the appropriateness of the strategies it draws up against its statement of identity” (Camillus, 2008, p.6).</p> <ul style="list-style-type: none"> <li>- Develop strategies after searching for and documenting stakeholder assumptions, preferences and alternative views.</li> <li>- Assess the appropriateness of the strategies developed based on identity and continuously scan the environment and test assumptions to see if it needs to change course.</li> <li>- Assessing possible scenarios will help shape new options.</li> <li>- Managers use Pareto analysis to identify a small number of actions that are likely to have a large impact. (Camillus 2008).</li> </ul>
<b>Iterative process</b>	<p>Constantly obtaining feedback and iteratively improving.</p> <p>Engagement and leadership (Design Council, 2021bc).</p> <p>EDD includes the key principles and design methods that designers and non-designers need, and the ideal working culture required, to achieve significant, long-lasting, and positive change (Design Council, 2021c).</p>	Continually scans the environment and tests assumptions. (Camillus, 2008).



<b>Testing</b>	Delivery involves testing different solutions at a small scale, rejecting those that will not work, and improving ones that will (Design Council, 2021c).	Evaluates the appropriateness of the strategies it draws up against its statement of identity and continually scans the environment and tests assumptions to see if it needs to change course” (Camillus, 2008, p.6).
<b>Where it is used</b>	<p>“Problem-solving tool, make the process visible and in particular the importance of spending time (and money!) on understanding the problem that the eventual design was trying to solve” (Design Council, 2021b).</p> <p>Identify and tackle challenge (Design Council, 2021b).</p> <p>Reflection and iteration are at the heart of the framework for innovation (Design Council, 2021c).</p>	Wicked problems – Develop and refine strategy (Camillus, 2008).
<b>Who uses it?</b>	Designers and non-designers, enabled to support public, private, and third sectors (Design Council, 2021c).	Senior executives / executives (Camillus, 2008).
<b>When?</b>	Tackle some of the most complex social, economic and environmental problems (Design Council, 2021c).	Continuously (Camillus, 2008).
<b>How many phases?</b> <b>Core activities</b>	<p>4 phases:</p> <p>Discover, define, develop, test (Design Council, 2021c).</p>	<p>5 phases:</p> <p>Develop and refine the strategy, articulate identity, apply Pareto analysis, conduct scenario analysis, continuously scan the environment (Camillus, 2008).</p>
<b>Future thinking?</b>	Possible to use foresight methods (Design Council, 2021c).	Envision the future, scenario analysis (Camillus, 2008).



<b>Decision-making style</b>	<p>Decisions are made – if not otherwise, then by voting.</p> <p>Go/no go decisions or sensible choices (Design Council, 2021a).</p>	<p>The assessment of possible scenarios helps to formulate new options and apply Pareto analysis to identify a small number of actions that are likely to have a large impact (Camillus, 2008; Haughey, 2020).</p>
<b>Creation of strategy</b>	<p>The model is flexible and may use different kinds of tools to create strategy. The model itself uses the first diamond to make insights and then on the second diamond responds to the problems encountered.</p>	<p>Develop strategies after searching for and documenting stakeholder assumptions, preferences and alternative views. Managers use Pareto analysis to identify a small number of actions that are likely to have a large impact. (Camillus, 2008)</p>
<b>Tackling wicked problems</b>	<p>DD model has been created for several kinds of problems micro, meso and macro. The EDD has more concentration on the complex problems.</p>	<p>A model created especially for wicked problems.</p>

Table 1. Analysis of the EDD and PPG’s Framework.

## Divergent and Convergent Thinking

It seems that both models have ways to increase and decrease ideas or options. The two diamonds represent a process of exploring an issue in a broader or deeper way (divergent thinking) and then targeted action (convergent thinking) (Design Council, 2021bc). Where EDD uses divergent and convergent thinking, the Camillus model evaluates the appropriateness of strategies it draws up against its statement of identity.

Develop strategies after searching for and documenting stakeholder assumptions, preferences and alternative views. Assess the appropriateness of the strategies developed based on identity and continuously scan the environment and test assumptions to see if it needs to change course. Assessing possible scenarios will help shape new options. Managers use Pareto analysis to identify a small number of actions that are likely to have a large impact. (Camillus, 2008)



## Iterative Process

In the EDD model feedback is given continuously and iteratively improved. In addition, the EDD model brings engagement and leadership into this process. As mentioned, EDD includes the key principles and design methods that designers and non-designers need, and the ideal working culture, to achieve significant and long-lasting positive change (Design Council, 2021c). Camillus' model constantly scans the environment for weak signals rather than conducting periodic analyses of the business landscape. PPG executives say the design process is continuous and the company is constantly identifying problems and developing solutions to them (Camillus, 2008). Iteration is also characteristic of both models.

## Testing

Testing is also common to both models. In the EDD model, delivery includes small-scale testing of various solutions (Design Council, 2021c). Non-functioning solutions are discarded, and functional solutions are improved. The PPG framework, in turn, evaluates the appropriateness of the strategies it develops in relation to the identity clause and continuously scans the environment and tests assumptions to determine whether it should change course (Camillus, 2008).

## Where, Who, and When

EDD is a problem-solving and innovating tool which makes the process visible; in particular, it emphasises the importance of spending time and resources on understanding the problem in the first diamond and then on the second trying to find best outcomes to the challenge or a strategy (Design Council, 2021c). As mentioned, EDD was made for designers and non-designers (Design Council, 2021c). PPG's framework is used for WPs when developing and refining strategy (Camillus, 2008). The model is designed for (senior) executives, and it should be used continuously. Continuous scanning of the environment happens naturally with the EDD model although it is not mentioned separately.

## Phases, Future Thinking, and Decision-Making Style

EDD has four phases: discover, define, develop, and test. Camillus's model has five: develop and refine the strategy, articulate identity, apply Pareto analysis, conduct scenario analysis, and continuously scan the environment.

EDD provides the possibility of using foresight methods. In PPG's framework, foresight is written inside the process: envision the future and analyse scenarios. The assessment of possible scenarios helps in formulating new options and applying



Pareto analysis to identify a small number of actions that are likely to have a large impact.

### **Creation of Strategy and Tackling Wicked Problems**

The EDD model has been created especially to handle complex problems (Design Council (2021c) and it has been also used or proposed for wicked problems as Pyykkö et al. (2021) have suggested. PPG's framework has been created solely to handle wicked problems in the corporate world (Camillus, 2008).

None of the models EDD nor PPG's framework give a ready strategy, but one needs to go through the different stages of making a strategy. Both models make an analysis of the current situation and then make an action plan on how to model that situation, in this case the WP. In the PPG's framework the Pareto analysis or the scanning of the environment is a way of creating knowledge of the current situation when in the EDD model the word empathy is more used and often ethnographic tools such as interviews, service journeys or observation can be applied. Also, prototyping is important in the EDD model to see how the strategy might work. It is as Carlopio (2009) defines a process of creating strategy by design.

### **Discussion**

The main objective of this research was to describe the similarities and differences of EDD and PPG's framework. The models were analysed from the perspective of how they can be used especially for strategy creation for WPs.

In design, it is very important to focus on creating empathy towards WPs. However, there are still organisational and business issues, such as costs and energy, as Camillus (2008) mentions. These issues are perhaps not a strength of design, but they are important in the process of creating strategies to tackle WPs. Designers should perhaps learn more of these business-oriented skills/perspectives or work in close collaboration with people that handle them, and Pareto analysis could be one way to address them. Transdisciplinary research and approaches cannot be overly stressed and here, business and service designers can learn from each other.

PPG's framework for responding to wicked problems is a tool made for executives. Its focus is more on costs and efficiency. By contrast, the epistemology of service design most often draws from interpretive or social constructivism (Sun, 2020). This is perhaps the main difference in the perspectives of the models. Service design





addresses the needs of the customer, but it also needs to think of the organisation's targets and value creation.

PPG's framework is more prescriptive because it has built-in methods, but DD models have numerous methods that are applied as needed. Continuous scanning of the environment is stressed in the PPG's framework, as the world changes. In DD models, scanning might be implemented only once at the start, during the discovery phase. However, the world is changing constantly – this is why iterativeness is important: scanning the changing environment is also important for designers.

The strength of PPG's framework is that it is made specifically for WPs. It is more recently in design history that design models have been used or adapted for this context, and the EDD model is one example. Design Thinking and EDD are recognised as a special type of creative problem-solving. The way designers solve problems is equally important to communities, public organisations and governments, commercial life, and business (Blyth et al., 2011). Neither one of the models provides a ready strategy but one needs to go through the model in order to create one.

PPG's framework was made for a context of creating probably more sustainable businesses and there hasn't been currently literature of how the model has or could be used in the public sector. On the other hand, the EDD is a model used both in the private and public sector and can seek or not monetary outcomes. This makes the EDD model a bit more versatile in comparison to PPG's framework.

The method bank that is provided in the EDD model is relevant and a good update in comparison to the previous model of the Double Diamond. At the PPG's framework the tools are quite fixed on how the model proceeds on, but EDD gives more flexibility in this manner. There are a couple not many tools made solely to handle wicked problems, i.e. excluding their use to complex or simple problems (Suoheimo 2016; 2016). They are useful in strategy creation as first to create insights in the wicked problem level and then later how to tackle them. For example, the Mess Mapping™ tool (Horn and Webber, 2007) is a tool advised to use in the first stages of the DD (Suoheimo & Miettinen, 2018). Resolution Map™ (Horn and Webber, 2007) is a tool that the second stage of the diamond would benefit by creating resolutions for the future. New iterations of the Double Diamond would be then required to handle the problems at hand, which are several and interconnected.

The EDD model is flexible; it can be still used for problems that are more simplistic, but also for wicked problems. The use of the tools will determine the level that the problem can be tackled. In the simple micro level or meso and macro the tools are different and also the approaches (Suoheimo et al., 2021; Suoheimo 2020). We wish



to encourage more future research on how the EDD model could be better adapted to handle wicked problems.

The contribution of this paper is to see the possible problems of using the models in the wicked problem context. We still see a need to update the EDD model in the sense that it would better service wicked problems. For example, in the social sciences it is quite usual to provide reports or write case studies that handle wicked problems have had several years life span as Castillo-Burguete et al. (1982) report 15 years. This is not the dominant literature yet in the service design field and thus we recommend future studies on it. The current dominant literature is based and much focused on the systems-based design that could or not address wicked problems. Thus, we wish to see more of the macro, which is the wicked problem level of handling problems and how to approach them. Often the systems-based strategies are limited to complexity level problems. Wicked problems are political and will need a political level of planning which will involve stakeholders in a participatory manner throughout the process (Suoheimo, 2020).

We see that the other contribution of the paper is that knowing what the models are in the design and non-design fields will help design and other professionals to work more fluently together since the knowledge of the vocabulary of each other's field and the process models will help in cross-collaborations.

## Conclusions

Change requires envisioning or thinking about the present through the future and change itself can be a WP. This article provides insight into how change can be led through the EDD and PPG's framework. The originality of the article lies in the comparison of different perspectives on handling WPs.

There are no straightforward strategies or WP-oriented methods embedded in EDD as in the PPG's framework. Iterativeness can be seen in all models. PPG's framework emphasises continuity: the world is scanned continuously. This prompted us to reconsider the EDD model and to add EDDs within it, thus introducing a way to handle a WP in a timeframe more suitable for it.

We suggest further research on how scanning of the environment, Pareto analysis, and the energy and economic values of the PPG's framework can be implemented in design models. We call for case studies using the EDD model introduced here for complex and wicked problems. We believe it will be beneficial for service designers and those tackling societal challenges, as sustainability, education, poverty, and



gender equality – to name a few problems – require long-term, lifespan development. Running case studies can be also one form in evaluating how the current EDD model can be better adjusted to handle wicked problems.

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