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**Mestrado em Gestão de Informação**

Master Program in Information Management

**Design Thinking for enabling Creativity  
in Information System Planning**

José Miguel Brito da Fonseca

Dissertation presented as partial requirement for obtaining  
the Master's degree in Information Management

NOVA Information Management School  
Instituto Superior de Estatística e Gestão de Informação  
Universidade Nova de Lisboa

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# **DESIGN THINKING FOR ENABLING CREATIVITY IN INFORMATION SYSTEM PLANNING**

by

José Miguel Brito da Fonseca

Dissertation presented as partial requirement for obtaining the Master's degree in Information Management, with a specialization in Information Systems and Technologies Management.

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## **ABSTRACT**

In a globalized business environment characterized by quickly developing technologies and intensifying competition, more creativity is demanded to foster and boost innovation. Despite Creativity being seen as one essential source of innovation, an effective and consistent way of using this core skill on the activity of Information Systems (IS) planning has yet to be achieved. Attempts have been made to establish a relationship to apply creativity principles to IS planning, but up to now, there aren't clear suggestions made on how to use the Design Thinking methodology to leverage creativity during the IS planning. Thus, this study suggests the Design Thinking's great potential to tackle more application of creativity in IS planning. In the light of this context, this study aims to investigate and define a method based on the Design Thinking methodology's approach to enable creativity during the IS planning activity. The study will follow the Design Science Research methodology to create and develop a method based on Design Thinking principles to leverage creativity in IS planning. It's expected that the method proposed shows its effectiveness and efficiency in enabling creativity for the activity IS planning and producing innovative results.

## **KEYWORDS**

Information System Planning; Innovation; Creative Thinking; Creative Capabilities; Design Thinking; Strategic Information System; Design Science

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# 1 INTRODUCTION

## 1.1 CONTEXT

Throughout the last years, many organizations are using the power of IT to make a difference and bring innovation to the market. Worldwide IT spending is projected to total \$3.9 trillion in 2020, an increase of 3.4% from 2019, according to forecast made by Gartner (2019) spending is predicted to cross into \$4 trillion territory in the near future.

The Mckinsey Global Innovation Survey, Mckinsey Analysis (Banholzer, 2019), reveals that in a dynamic business environment characterized by quickly developing technologies and intensifying competition, executives agree on the importance of innovation but are often dissatisfied with the lack of clarity on what the problem is and how to improve (see Figure 1).

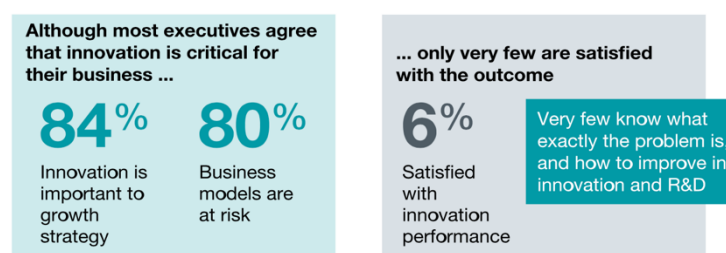


Figure 1 – 84% of Executives point that innovation is critical for their business and important to the growth strategy. Source: Banholzer, 2019

The same Mckinsey Analysis define innovation as being the result of: “creativity plus delivery, helping our clients transform their innovation performance by focusing on four requirements for innovating at scale: strategy, pipeline of ideas, execution, and organization.”

Although most organizations recognize creativity as being one of the foundations to achieve competitive advantage, their experience with it has been frustrating. Following the Future of Jobs Report 2020 (World Economic Forum), showed creativity as being part of the Top 10 Skills of 2025.

This demand has been noticed early on, the IBM Conversations based on face-to-face conversations held in 2010 with more than 1500 chief executive officers worldwide (IBM, 2010) complement and shows that this need is being identified consistently as a core skill. Also in this report, executives were asked to prioritize the three most important leadership qualities for business, “Creativity” was cited as a top leadership quality that provided new insights into leading in the new economic environment, surpassing “Integrity” and “Global Thinking” skills on the Top 3.

But one might ask, what creativity has to do with IT? Based on the findings provided by Global Digital Outlook 2019 Study (SoDA and Forrester Research, 2019), organizations are expecting that IT would be the primary lead to foster digital strategy and customer experience (see Figure 1.2).



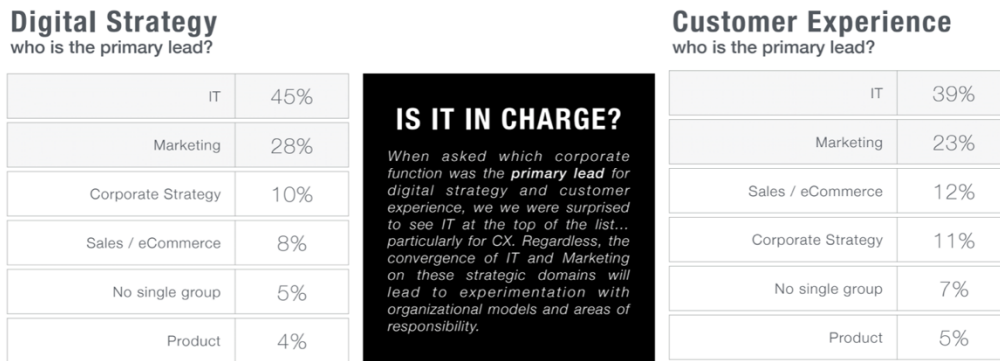


Figure 2 – IT is expected to lead digital strategy and customer experience. Source: SoDA and Forrester Research, 2019

If all IT is expected to be creative and to lead a digital strategy, Information Systems (IS) as pillars are already playing a main role in shaping overall business strategy. Laudon (2014) analysis couldn't be more appropriate: "Information systems have become integral, online, interactive tools deeply involved in the minute-to-minute operations and decision making of large organizations. Over the last decade, information systems have fundamentally altered the economics of organizations and greatly increased the possibilities for organizing work."

With organizations willing to spend a huge take of their gross income on IS and their supports. IS Planning (ISP) could probably be entitled as the most important task in the entire IS development process. Because it may lead to a massive cost for organizations if done wrong and under the penalty of being fully acknowledged only at a later stage.

Among other components, the planning process involves aligning the objectives of an organization with the objectives of the (one or more) IS. Therefore, it requires a strategic management orientation and a capacity of overviewing the needs and growth aspirations of the organization, including other top skills like creativity, as the IS will have to continue to deliver today and to become relevant to the organization in the near future. Laudon (2014) mentioned six central organizational factors to consider when planning a new system, which I highlight two of them:

- "The principal interest groups affected by the system and the attitudes of workers who will be using the system;
- The kinds of tasks, decisions, and business processes that the information system is designed to assist."

Interpreting the factors mentioned above, IS are being asked to be well designed, functional and operational in a human-centred way, i.e. made simple, easy to use and intuitive. However, these high expectations can't be achieved without the decision to upskill creativity.

In fact, creativity is mostly wanted in all phases of the ISP process but often an absent approach element. In an attempt to address creativity's lack in ISP, Ruohonen and Higgins (1998) sought to identify and establish a relationship to apply creativity principles to IS planning.

Known that ISP activity is crucial to support the future competitiveness of the organizations and Design Thinking being an approach to innovation that employs creativity, there is a promising

intersection where both areas can benefit from each other. Being a human-centred methodology based on creative techniques, Design Thinking has emerged as a potential enabler to tackle the application of creativity in IS Planning. Up to now, there aren't clear suggestions made on how to use Design Thinking methodology to leverage creativity during the IS Planning.

## **1.2 OBJECTIVES**

The main objective of this research is to create and define a method based on the Design Thinking methodology to enable creativity in the ISP activity.

To reach this main objective, the following intermediate objectives were defined as:

- Identify the IS Planning main concept and requirements;
- Define the objectives of the method;
- Build a creativity's method to use Design Thinking during the IS Planning process;
- Demonstrate and validate the use of the method during the IS Planning process;
- Evaluation of the method;
- Communication of method's utility and effectiveness.

## **1.3 STUDY RELEVANCE**

Noticing the growing relevance of IS for business, planning represents an opportunity to build a bridge to the organization's strategy, namely, to support the achievements of the strategic goals, to overcome the current business challenges as well as the challenges of the existing IS. In this globalized environment, such activity has become a complex activity that needs a constant refresh to meet the ever-changing demands.

During the planning activity, if one could introduce a new approach to be ready to help individuals and teams to apply creativity systematically, this establishment might potentially become a success factor for organizations to maximize business imperatives such as coordination, control, efficiency, innovation, operation and productivity.

Finding an answer to the necessity of a systematic approach to creativity, Design Thinking was selected with the assurance that it's used to redraw existing activities and combine them to an optimized level, is able also to address complex scenarios and has proven to help several industries (Rae, n.d.) including IT to make the difference in organizations.

Design Thinking has an approach with specific guidelines that can be useful to leverage the creative processes in ISP. The means by which organizations become more mature in their products, services, processes, and strategy can be shaped with the introduction of a design thinking approach. Once followed, it tries to merge the humanly appealing factor with what is technologically feasible and economically viable. It also provides the possibility to people who aren't trained as designers or do not initially possess those skills to use creative techniques to address a vast range of challenges.

By investigating on how to use Design Thinking methodology to enable creativity during the process of defining and planning the desired future of IS, the expectation is, when used appropriately, to identify the related benefits for boosting innovation and providing a competitive advantage. In the end, planning a new IS should leverage creativity to optimize the organization strategy, IT processes and help to speed up business's innovation.

## 2 METHODOLOGY

This study follows the Design Research Methodology in the attempt to accomplish the research goal, that is to create and develop a method, an artefact: a strategy to use Design Thinking principles to leverage creativity during the IS Planning.

### 2.1 DESIGN SCIENCE RESEARCH

Design Science Research methodology proposed by Hevner, March, Park, & Ram, (2004), offers guidance on how to carry out research in the IS area. In this methodology the result is: “by definition, a purposeful IT artifact created to address an important organizational problem. It must be described effectively, enabling its implementation and application in an appropriate domain.”

Venable and Baskerville (2012) emphasized that “by purposeful artefact, we mean any kind of artefact designed to achieve some human purpose. A purposeful artefact can be a product or a process; it can be a technology, a tool, a methodology, a technique, a procedure, a combination of any of these, or any other means for achieving some purpose.”

Considering this case, the purposeful artefact will be materialized into a method that needs to be created and evaluated to solve the identified lack of creativity.

The application of the Design Research Methodology (Figure 6) suggested by Peffers, Tuunanen, Rothenberger, & Chatterjee (2007) consists in six major activities: 1) problem identification and motivation, to have defined the specific research problem and justified the value of a solution; 2) define the objectives for a solution, to have inferred the objectives of a solution from the problem definition and knowledge of what is possible and feasible; 3) design and development, to have determined the artefact’s desired functionality and its architecture and then to proceed on creating the actual artefact; 4) demonstration, by giving evidence that the artefact can solve one or more cases of the problem; 5) evaluation, to observe and measure how well the artefact supports a solution to the problem; 6) communication, firstly to denote the problem and the related difficulties, and presenting the artefact to explain its use and the degree to which is successful in producing a desired result.

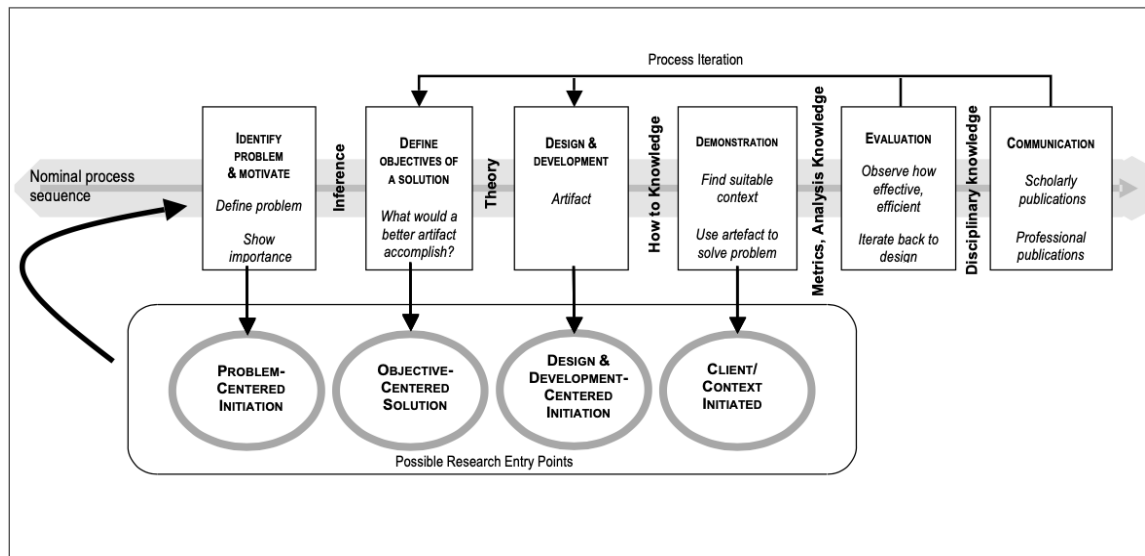


Figure 6 – Design Science Research (DSR) Methodology Process Model. Source: Peffers et al., 2007

For the proposed methodology to be eligible it doesn't need to comply or to follow the process sequential order. Peffers et al. (2007) indicates "there is no expectation that researchers would always proceed in sequential order from activity one through activity six. They may actually start at almost any step and move outward."

## 2.2 RESEARCH STRATEGY

The strategy relies on the activities considered important to guarantee that the research is performed correctly and that the solution being proposed at the end of the research is a valid solution for the problem presented, the identified activities to be executed comprise:

1. Identify the ISP main concept and requirements. To identify and analyse the main approaches to the planning activity so that the claimed creativity gap can be identified and justifiable to pursue a valid solution.
2. Define the objectives of the method as valid solution. This includes:
  - a. Identify the fit for purpose of Design Thinking for adding creativity in ISP. Which will be used to analyse where the introduction of Design Thinking to enable creativity would be highly effective for ISP.
  - b. Identify the creativity related benefits of applying the Design Thinking during the ISP process.
3. Design and Development will imply building a creativity's method (artefact) to use Design Thinking during the ISP process. It involves the study of the creativity area and in particular, the Design Thinking method. Study creative techniques and analyse the Design Thinking methodology paying attention to the actions that help design and develop an artefact to boost creativity in ISP context.

4. Demonstrate and validate the artefact to solve the problem. The aim is to have a real IS planning situation where creativity can be applied (in one company or as a comparison between many companies).
5. Evaluation of the method as solution. To set up a comparison on the initial objectives to the actual observed results from use of the artefact in the demonstration. Moreover, to identify a clear relationship between applying Design Thinking and the enablement of ISP to produce a more creative result.
6. Communication of method's utility and effectiveness. Participation in internal organization conferences and events to expose this approach to experts of the area and collect their feedback to improve the process.

### 3 LITERATURE REVIEW

This chapter has been elaborated based on the literature review that serves as background for the research development.

Initially, a description of ISP and its methodologies are presented. Together with the challenges and opportunities that this activity faces. Afterwards, a conceptualization of creativity and why it's important for ISP and how can it fit into ISP. Lastly, the review of the Design Thinking methodology and its direct connection to creativity.

#### 3.1 INFORMATION SYSTEMS PLANNING

##### 3.1.1 Concept

The value of information is directly linked to how a system helps decision makers achieve the organization's goals. Authors like Stair and Reynolds define an Information System "a set of interrelated elements or components that collect (input), manipulate (process), store, and disseminate (output) data and information, and provide a corrective reaction (feedback mechanism) to meet an objective (see Figure 3). The feedback mechanism is the component that helps organizations achieve their goals, such as increasing profits or improving customer service." (2009).

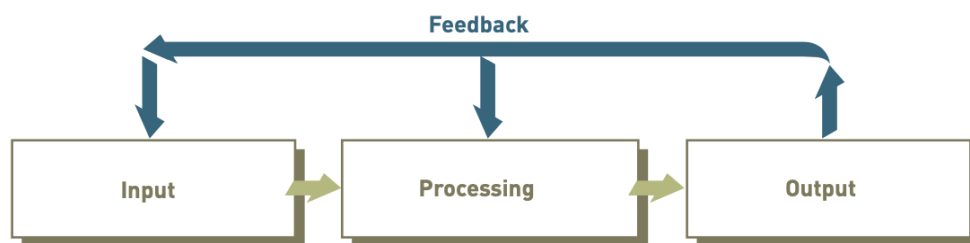


Figure 3 – The components of an Information System. Source: (Stair & Reynolds, 2009)

Back in 1984, a report was classifying an IS as a competitive weapon, demonstrating the unique opportunity for competitive advantages in the new business climate (Ives & Learmonth, 1984). The following years proved organizations understood the value of managing IS to achieve its objectives. These can include varied information topics: operational efficiency, product and/or service quality, organization security, environmental concerns and others. Now, IS are widely adopted in organizations and have penetrated to almost all areas of the organization.

Good IS management relies on effective planning. When IBM (1978) introduced Business Systems Planning (BSP) to be used for general reference on the subject of planning for IS it automatically declared the importance this activity. Henderson and Sinfonis stated that "the impact of IS technologies on the competitive capability of the firm has increased the need for effective strategic IS planning in order to positively affect the performance of the business." (1988).

Planning, according to Anthony (R. N., 1989), has been defined as "a process of deciding on the goals of an organization and the strategies for attaining these goals". Organizations increasingly plan new IS to better compete. Through such planning, they attempt to align their IS strategy and their business strategy (Newkirk, Lederer, & Johnson, 2008).

On 2017, European IT executives belonging to a total of 276 organisations were questioned in an online survey about their “concerns, spending, investments, cloud usage, security, workforce, reporting relationships, and other issues of importance. Their top-five most important IT management concerns were: Alignment, Digital Transformation, Cybersecurity, Cost, and Business Agility” (Kappelman, Johnson, Torres, Maurer, & McLean, 2019).

A vast majority authors agree that the inclusion of an ISP activity will result into a more convergent alignment. However, there is no unanimity between the experts in the right approach for the ISP activity. Published literature indicates the existence of several concepts whereas ISP is used as an umbrella term and can comprehend similar notions such as strategic data-planning (Salerno & Martin, 1983), Management Information System (MIS) planning (Bowman, Davis, & Wetherbe, 1983), information resource planning (Lederer & Mendelow, 1987), information technology planning (Boynton & Zmud, 1987), strategic information systems planning (Lederer & Sethi, 1988). Not less interesting, is the concept provided by Amaral: “is an organisational activity whose purpose is to define the desired future for the organisation's information system, how it should be supported by information technology and how that support should be implemented.” (1994). Hann & Weber (1996) also defined the ISP as the recognition of organizational opportunities and developing strategies that allow IS to be applied successfully to solve these opportunities. Pragmatically, ISP “refers to translating strategic and organizational goals into systems development initiatives”. (Stair & Reynolds, 2009).

In my perspective, the essence of an effective IS planning is to understand and integrate, strategic and organizational goals into systems development initiatives while laying up the foundation for future success (aspiration) of the organization. Based on Stair and Reynolds this activity encompasses Creative Analysis on the investigation of new approaches to existing problems and upcoming challenges envisioned by the organization. Complemented with a Critical Analysis to uncover if systems are being used in the most effective and/or efficient ways (2009). Over the years IS planning activity have been devoted to execute a Critical Analysis and consequently minimized the Creative Analysis. Even if has a huge potential more than it’s used right now (Figure 4).

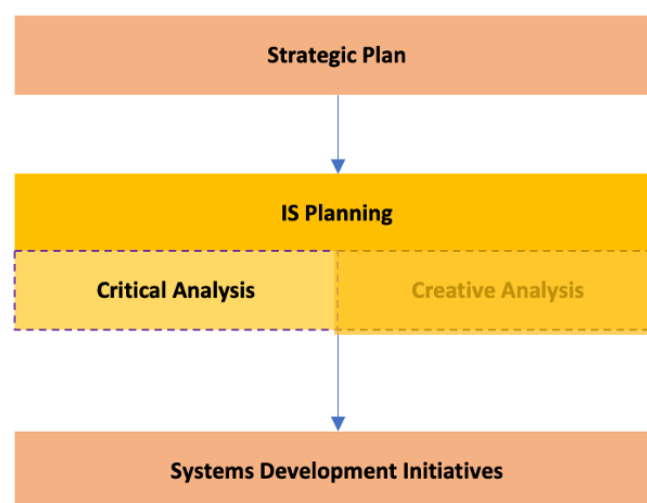


Figure 4 – The Information Systems Planning devoted to Critical Analysis.  
Adapted from Stair & Reynolds (2009)



### 3.1.2 ISP Methodologies

During the review, it was extremely difficult to find a clear distinction between what is an approach, methodology and method as these concepts are many times used interchangeably throughout the many authors.

It's a fact that there are a numerous of ISP approaches and methodologies (Amaral, 1994). Yet, this increase didn't necessarily produce an effective IS planning.

As Sinclair (1986) perceived, few organizations articulate their planning objectives before engaging in various ISP methodologies. The failure to depict what is expected for in a planning effort can result in a mismatch between what the chosen planning methodology can achieve and what the organization wants. Disregarding this aspect, often leads to wasted resources and poor-quality plans.

Historically, the ISP approaches and methodologies have been evolving to reflect new technologies and business requirements. This leads to the question: "Which ISP methodology should be used?" Many different methods for planning exist, each with their own benefits and drawbacks in different situations. For instance, Information Engineering (Salerno & Martin, 1983) is quite complete and complex to apply, requiring time from everyone involved, making it a long process for small organizations looking to be agile. No sole technique will be suitable for every situation. A number of these techniques will usually be required for an effective overall planning. Therefore, the planning process can combine good aspects of several methodologies to achieve intended results and different methodologies must be properly selected and tailored to serve the needs of different phases in IS planning process (Bowman, Davis, & Wetherbe, 1983).

Sounds easier than done, IS planning remains a complex task. Hence, this complexity can be decomposed into steps or phases when following the Three Stage model presented by Bowman et al. (1983) for IS planning:

1. Strategic planning – starting the planning process and translating organizational strategic goals into IS goals and focusing on matching the overall organizational plan with the IS plan.
2. Analysis of Organization Information Requirements – focused on identifying broad, organizational requirements in terms of information and its information architecture.
3. Resource allocation – activities for the identifying plan(s) and allocating resources needed to implement the IS strategy, development, and operation.

The alignment of IS with the business has been a main challenge over the years. For instance, lack of alignment has been identified by Ross & Weil: "senior managers need to ensure that IT spending and initiatives are aligned with and further the company's strategy and goals" (2002).

Being IS the core of many organizations for decision making and business strategy, the alignment assumes a vital role in "bringing together" business and IT, thus IS. The ISP can work as mirror of how far this alignment is intended to go.

Meaning that the planning activity can be seen solely as "applying IT in an appropriate and timely manner, in harmony with business strategies, goals and needs." (Luftman, Lewis, & Oldach, 1993) Within this traditional view, planning only driver is to build and/or buy what is being needed for the

organization. Basically, it can be described as "shopping cart" attitude, more conventional and just filling the gaps as they appear.

On the other hand, shifting from a traditional alignment with an operational orientation towards a more strategy enabler one: taking account the future requirements related with IS organization and its resources (Lankhorst, 2017) leads to business competitiveness.

Within this impact driven alignment, the planning activity is guided by a will to make the most out of IS to have a profound effect on an organization's success, by leading innovation and break down barriers to create an advantage over competitors.

Planning IS alone doesn't guarantee innovation. For the development of innovation in IS, creativity needs to be present during the planning process. Analysing managers' day-to-day behaviour, Henry Mintzberg "encourage managers to think about the future in creative ways" and stressed that a person who plans, a planner "is a creative thinker who seeks to open up the strategy-making process." (1994).

A planning activity that is not armed with creativity by default decreases its chances of impacting and bringing the so desired competitive advantage further on.

## 3.2 CREATIVITY

### 3.2.1 Concept

Creativity has been studied over the years from diverse areas like psychology, sociology, business, economics, philosophy and many more. It can be understood from many angles, some think we're born with it, and some think it is developed through hard work. There is also the possibility of maybe being a little bit of both.

In etymology, the word creativity comes from the Latin term *creō*, "to create, make".

According to an online encyclopedia: "Creativity is a process involving the generation of new ideas or concepts, or new associations between existing ideas or concepts, and their substantiation into a product that has novelty and originality. From a scientific point of view, the products of creative thought (sometimes referred to as divergent thought) are usually considered to have both *originality* and *appropriateness*. An alternative, more everyday conception of creativity is that it is simply the act of making something new." (New World Encyclopedia, n.d.)

For instance, in the Scottish education system, creativity is identified as a core skillset for learning, life and work and is defined as "a process which generates ideas that have value to the individual. It involves looking at familiar things with a fresh eye, examining problems with an open mind, making connections, learning from mistakes and using imagination to explore new possibilities." (Scotland, n.d.)

Personally, I prefer the brief way author George Keller described it: "Creativity, it has been said, consists largely of re-arranging what we know in order to find out what we do not know."

I strongly believe that the IS discipline can greatly benefit from the development of a process to enable more creativity consistently and systematically. Despite creativity being fundamentally a human process, it can profit from repetition. As stated by Csikszentmihalyi (in his book *Creativity: Flow and the psychology of discovery and invention*), "creativity is an iterative process whereby the final product emerges through a series of revisions, creative works often benefit from the direct or indirect influence of peers." (1996)

From that definition, the words: "iterative", "series of revisions" and "influence of peers" reinforce Creativity as a process that "requires hard work" (Weisberg, 1993). Studies performed by Ericsson shows that creativity emerges from a rigor practice routine (1999). Thomas Edison tried over 6,000 combinations before he perfected the incandescent light bulb. In the end, he described his work as "one percent inspiration and ninety-nine percent perspiration."

Summarizing, all of us can be creative by having a good idea. Simultaneously, creativity can also be handled as process that requires consistency to be built up logically and systematically have an output.

### 3.2.2 Creativity in Information Systems Planning

The creativity topic became more evident when Lederer & Sethi early on introduced two types of alignment goals for MIS: align and impact (1988). Amaral (1994) explained further by stating that the main difference between the goals lie on their primary intention:

- Align – to convey investment in IT/SI with the needs of the organization.
- Impact – to seek competitive advantage and avoid threats by exploring the opportunities generated by IT/IS.

The alignment of IS with the business has been a main challenge over the years. For instance, lack of alignment has been identified by Ross & Weil: “senior managers need to ensure that IT spending and initiatives are aligned with and further the company’s strategy and goals” (2002).

Being IS the core of many organizations for decision making and business strategy, the alignment assumes a vital role in “bringing together” business and IT, thus IS. The ISP itself can be seen as mirror of how far this alignment is intended to go.

Meaning that the planning activity can be seen solely as "applying IT in an appropriate and timely manner, in harmony with business strategies, goals and needs." (Luftman et al., 1993) Within this traditional view, planning only driver is to build and/or buy what is being needed for the organization. Basically, it can be described as "shopping cart" attitude, more conventional and just filling the gaps as they appear.

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Within this impact driven alignment, the planning activity is guided by a will to make the most out of IS to have a profound effect on an organization’s success, by leading innovation and break down barriers to create an advantage over competitors.

Planning IS alone doesn’t guarantee innovation. For the development of innovation in IS, creativity needs to be present during the planning process. The concern about creativity was highlighted by Couger, Higgins & McIntyre (1993) which pointed out creativity as “a neglected area in IS research and that the field needs to be developing more creative and innovative solutions to its problems.” Analysing managers’ day-to-day behaviour, Henry Mintzberg “encourage managers to think about the future in creative ways” and stressed that a person who plans, a planner “is a creative thinker who seeks to open up the strategy-making process.” (1994). Following up, Segars et al. identified six dimensions (comprehensiveness; formalization; focus; flow; participation; and consistency) to describe ISP. Being “Focus”, one of the dimensions, consisting in the ability to focus on creativity (1998). By then it appeared that the IS discipline has paid relatively little attention to the importance of creativity in this area. A planning activity that is not armed with a creative mindset by default decreases its chances of impacting and bringing the so desired competitive advantage.

Thus, where can this be creativity be inserted in the planning activity? Adopting the Three Stage model, potential subjects emerge where creativity could be an asset for the activity itself.

For instance, during the Strategic Planning phase, namely “Assess Environment” activity, when conceptualizing new IT and new opportunities evaluations. During the Analysis of Organization Information Requirements phase, namely “Assess Organization Information Requirements” activity, when anticipating information needs of the organization as can be seen in Figure 5.

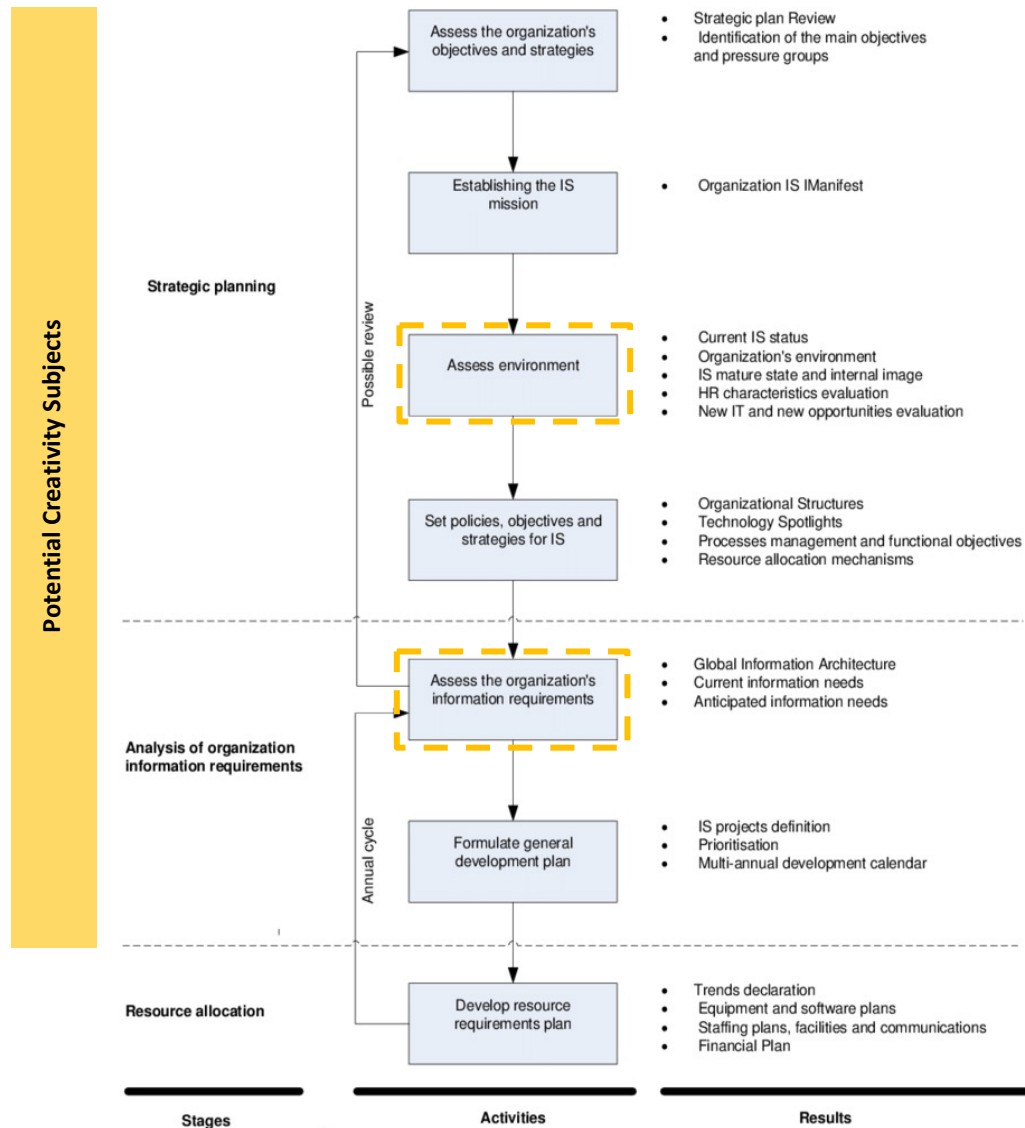


Figure 5 – The Three Stage model adapted from Santos, Amaral, & Mamede (2011)

### 3.3 DESIGN THINKING

Several creative techniques have been applied to IS but only a small extent research has explored the adaptation of Design Thinking to ISP to date. This study investigates the potential of Design Thinking for enabling creativity during the ISP activity.

The now-standard Design Thinking approach to innovation was made available by design firm IDEO in the 1990s. They developed some of the most known models like the 3 I model: inspiration, ideation and implementation and the HCD model: hearing, creating and delivering (Brown & Wyatt, 2010).

The Double Diamond model from the British Design Council (British Design Council, 2015), the Design Thinking model of the Hasso-Plattner-Institute (Hasso-Plattner-Institut, n.d.) and the Service Design Thinking model proposed by Stickdorn and Schneider (2010).

Over the years, Design Thinking has become a toolkit for process innovation, which connects the creative design approach to the traditional business thinking, with the objective of planning and solving problems (Tschimmel, 2012).

Thereby, Kimbell identified three perspectives to describe Design Thinking (2011):

- As a cognitive style with purpose of problem solving;
- As a general field for solving wicked problems;
- As an organizational resource for business seeking to create innovative solutions.

Regardless of perspectives, the main passage provided by Tim Brown, CEO of IDEO still prevails as consensus what Design Thinking entails: “is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success.” (2017)

Pondering these many concepts about DT, in my analysis it can be considered a human-centered mindset which embraces the creative thinking to solve problems and come up with innovative solutions.

Thus, to practice Design Thinking it requires accumulating real information about users, understanding their struggles and expectations, to then build a pathway to deliver solid solutions. This process normally is divided into five phases: Empathize, Define, Ideation, Prototype and Test.

- **Empathize** (also known as Immersion)

First and foremost, is about absorbing the problem defined by stakeholders and what they experience in relation, by watching and listening better insights are learned. Not relying exclusively on traditional techniques like surveys or any other statistic method helps uncover the needs, problems and desires that numbers hardly translate. This phase can be sub divided into: Preliminary and In-depth.

During the Preliminary sub-phase is to observe and assess the scope and identify whom needs to be engaged during the In-depth part. This sub-phase will interact with and interview users while

experiencing what the user experiences to determine relevant information that will guide the next phases.

- **Define** (also known as Analysis and synthesis)

Based on the findings collected in the previous step, information needs to be processed and developed in order to define an actionable problem statement with a meaningful challenge that will simultaneously help identify potential problems within a short time.

- **Ideation**

The third phase is to setup and organize sessions for teams where idea generation techniques can be applied to create innovative solutions. The inclusion of people from different backgrounds and perspectives is expected. The goal is to explore a wide repository of ideas beyond the obvious ones while discovering disruptive areas of exploration.

- **Prototype**

Building abstract or detailed physical or digital prototypes is how functionality and tangibility is tested while offering a way of failing quickly and cheaply to achieve successful solutions. Hereby, ideas are refined and implemented, with the help of the user(s) involved in the whole process providing enough confidence that they should be developed. It is not uncommon to spend short periods of rapid testing, in addition to the phases of empathy and ideation, to incorporate improvements detected in the end-user experience.

- **Test** (also known as Implementation)

This phase gives room to refine and iterate the solutions to make them better. Often, is a chance to learn more about the user and obtain unexpected insights and last but not least to confirm if the problem statement was framed correctly.

It is important to remark that the five phases do not have to be sequential neither must be executed in a logical order. They can take place concurrently and be performed several times. More than following a waterfall or step by step process it should be understood as a set of phases that play a part in finding the right solution.

## **4 METHOD PROPOSAL**

### **4.1 ASSUMPTIONS**

Based on what was learned during the literature review, it will be taken into consideration the following assumptions:

- ISP is subordinated to business strategy plan.
- ISP activity ensures that business strategy is implemented, and desired strategic and competitive impacts are achieved.
- The "traditional" style of alignment might be inadequate in some planning situations.
- Innovation is a source of competitive advantage.
- Innovation is strongly influenced by creativity.
- Design Thinking Methodology ability to enable creativity.
- ISP activity can be performed by a combination of profiles.
- Three Stage model as the most suitable approach to perform this study.
- Creative techniques in this study do not represent all the available techniques.
- Strategic requirements of users of the future IS are varied and may include business rules.
- Creativity is a skill that can be learned.

### **4.2 METHOD IMPLEMENTATION**

The method consists of setting up one or more DT workshops. The DT workshop will be targeted to explore the creative side with a clear intention of adapting and to fit a single subject: Information System Planning.

Stanford University d.school created the "Wallet" Project (found in Annex I). This exercise was projected to be an immersive activity designed to allow students to fulfill the entire DT process in the shortest possible time. Moreover, it promoted a human centered engagement combined with a frequent iteration and prototyping to turn ideas practical and useful.

To support the method, I have considered this exercise as an alternative to mitigate the usual busy agendas of the persons that will be involved in the workshop. Also, reserve time for learning Design Thinking must not become a blocker to follow this method.



In this study, we used this project as baseline and adapted the DT process to the specific activity of IS Planning. With this outline, this method proposal will be based on the ISP framework presented in chapter 2.1.1. with focus on the Creative Analysis (Figure 7).

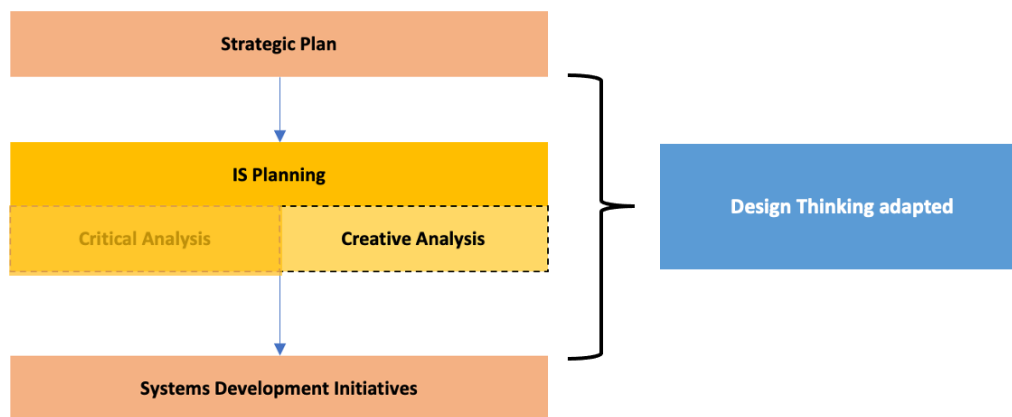


Figure 7 – Method Scope.

#### 4.2.1 How the Method works

Initially, a team should be summed up with one or more professionals with due knowledge in DT methodology to facilitate and assist during the DT workshop. These professionals may or not have a background in IS. This team will be known as the **Enable Team**.

When the sharing of the strategic plan formulated at organization's board level occurs, the Enable Team will have to define the scope of the plan and the limits of action, as well as to map and identify the key stakeholders which are mostly connected with the IS strategy to be addressed. With this identification completed, a preliminary (a Pre Empathize session) co-design session is organized and held to get insights or sub liminary expectations within the strategic plan.

With this information and before materializing the IS Plan should cause the inclusion, the Enable Team will start to invite different profiles like business managers, specialists and system users for the DT workshop. Business managers may include key (internal or external) stakeholders. Specialists may include profiles from various areas from the organization while system users can comprise current and future IS users. Once the invitations are accepted, the ones that will be participating in the DT session, will be known as the **Participants Team**.

The DT workshop gets scheduled. During the workshop the Enable Team will interact with the Participants Team with the goal of facilitating their planning journey.

The DT workshop starts with a wrong approach exercise (step 0). This will show to the Participants Team what usually happen when one must create something without any context or whatsoever.

Aligned with the start of the usual ISP activity stage, the Empathize phase gets triggered. The main purpose would be to engage the Participants Team and gather as much insights as possible. By having to put ourselves in the other's shoes, the ability to empathize is reinforced. The goal is to understand another's view and as way of assuring the relevant information is known and extracted.

This phase in my perspective will be fundamental to infer Strategy challenges ranging from simply contributing to deliver competitive advantage such as being able to develop solutions faster with possibly less costs while meeting the needs of an ever-changing market demand.

During the Define phase, the information collected previously will be analyzed. The Enable Team will try to describe the goals, critical success factors, problems and challenges that must be addressed while formulating the IS plan. The session will reflect on issues, needs, and desires. To explicitly define the problems or opportunities that needs to be addressed helps everyone to understand the insights that can be leveraged to create a successful solution.

The Enable team may use a set of questions related with IS planning activity (see Appendix 2) to help the Participants thinking towards IS specific topics.

Entering the Ideation phase, the sessions should be attended by people from different backgrounds and perspectives that stimulate creativity. The development of techniques with a great visual content allows the Enable Team to work with the most creative part of the mind while still being analytical.

Every idea generated in the previous stage of Ideation must be validated before it can be assumed to be correct. Using the Prototype phase to make the idea tangible will enhance the IS launch and increase the likelihood of success. The appropriate type of representations (e.g. from a proof of concept to a MVP) needs to be selected according to the relevance of the idea. The goal is to expose some of the functionalities in the prototype and get early feedback to improve the chances of being successful. So, before choosing the type of representation to be employed, questions like the following need to be asked:

- What needs to be verified?
- How big is the idea?
- Who is going to be target audience for this project?
- Whom do I want to convince with it?

With the output of previous phase, the Test & Transition phase begins with the goal of ensuring a closer perspective to what the prototype can deliver in the real world. By using the Business Model Canvas, the exercise of picture and structuring the key elements around the proposed solution will act as bridge to kick-start and shape the System Development Initiatives stage with valuable information.

Overall, these stages are different modes which contribute to the entire purpose of enabling more creativity, rather than sequential steps. This workshop can be applied in a repetitive way to tackle a specific point. The goal throughout is to gain the deepest understanding of the participants and support them in finding what their ideal solution of an IS would be.

This workshop requires some steps, to simplify the reading an overview is presented in Table 1, while the complete workshop guide is available in Appendix 1. That section was built aiming to help the assigned facilitator(s) to guide the DT workshop having in mind creativity and IS topic.

ISP Overview	DT Phases	What (process)	Why (purpose)	How (techniques)
Strategic Planning → IS Planning	I) Pre Empathise	Diverge	Understanding: Strategy and expectations	Interviews
IS Planning	II) Empathise	Diverge	Understanding: User- experience	A Day in the Life Awareness booklets Desk Research Exploratory Research Generative Sessions Interviews Shadowing
	III) Define	Converge (debrief)	Reflecting: Issues, needs and desires	Affinity Diagram Blueprint Conceptual Map Empathy Map Guiding Criteria Insight Cards Mind Map Personas Reframing User Journey
	IV) Ideate	Diverge	Finding solutions	Brainstorming Brainwriting Co-Creation Workshop Idea menu Position Matrix Sketching
	V) Prototype	Converge (decision making)	Selecting the best solution; Proofing the idea	Minimum Viable Product Paper prototypes Services Prototypes Staging Storyboard Volume Model
IS Planning → Systems Development Initiatives	VI) Test & Transition (T&T)	Converge (decision making)	Reflecting, selecting the development initiative	Business Model Canvas

Table 1 – The workshop scope combined with ISP stages and techniques that can be used in each DT phase.

## 4.2.2 Toolkit Summary

A summary below is provided with some of the techniques that can be used during the workshop.

### Toolkit to have Empathy

#### INTERVIEWS

This valuable activity aims to understand the interviewee's point of view and experience, as well as their thoughts, emotions and motivations. The interviewer must seek to ask why even when the answer seems to be obvious. The interviews should follow a flexible guideline so that get people motivated to tell stories, usually revealing how they think. However, some caution must be adopted, firstly business management are often not used to the time it takes to thoroughly explore the problem spaces in DT. Secondly, try to get to the bottom of a posed challenge, can be perceived as questioning their authority.

If possible, the interview should also be prepared to capture information to be analyzed later on.

#### AWARENESS BOOKLET

Stepping away from a direct and personal observation approach, this non invasive technique permits users to make their own reports of their daily life activities and how the planned implementation can influence their routine. Situations where live meeting stakeholders is not always easy, this technique is especially useful to gather information when they are remote.

Other tools like Exploratory Research, Desk Research, A Day in the Life, Generative Sessions and Shadowing are also frequently applied at this phase.

### **Toolkit to helping Define**

#### EMPATHY MAP

The Empathy Map consists on a deep understanding of the persona who is the stakeholder the design is for. The tool is appropriate when a synthesis of observations must be made to identify needs and spot unnoticed insights. The Empathy Map is divided into four quadrant areas (SAY, DO, THINK and FEEL), which must be filled based on the following questions about the stakeholders:

- What does the user see?
- What does the user hear?
- What does the user really think and feel?
- What does the user do and speak?
- What are the user's difficulties?
- What are the user's achievements?

#### REFRAMING

Technique to reinterpret assumptions and perspectives to achieve redefinition of possible solutions. This is performed by reducing the problem to its constituent parts to be captured, transformed and prepared. Capture means the data is collected from a stakeholder's regarding for instance what an IS should address. Still in this scenario, the Enable team can use mind maps and user journey to represent the assembled information and to add new perspectives, transforming it from the original state. Finally, preparation serves the purpose of providing different perspectives to the stakeholders to solve the problem.

Other tools like Insight Cards, Affinity Diagram, Conceptual Map, Guiding Criteria, Personas, User Journey, Blueprint, and Mind Map are also frequently applied to this phase.

### **Toolkit to help generating Ideas**

#### CO-CREATION WORKSHOP

The Co-creation Workshop is a collaborative meeting that sums up people from different areas to promote disruptive solutions. Workshop participants are always actors involved in one way or another in the problem to be solved.

The workshop can get a broader range of ideas for the solution because of the contributions made by persons who are not related with the problem.

#### BRAIN WRITING

Brainwriting activity is similar to Brainstorming, only that it happens before the creative discussion begins. Participants should write their ideas anonymously on pieces of paper or any other material, which are then mixed. The technique breaks the invisible barriers of the introverted professionals or employees in positions in the organization hierarchy, to have creative equity. The goal is to work together to develop a solution. There is another variation in brain writing, in which participants write their results on sheets of paper over a period and exchange sheets at the end with others who are going to read and complement the ideas of the other participants.

### **Toolkit for accelerating Prototyping**

#### STAGING

It's a simulation that pretends to put in place a determined scenario to visualize interactions between people and objects, or dialogues in which certain roles are assumed, with the purpose of testing, building or detailing the steps to improve the experience of what has been built.

#### MINIMUM VIABLE PRODUCT

The Minimum Viable Product is a concept derived from the Lean Methodology, consists of developing the simplest possible version of a product to be used and validated regarding his value proposition. It can also assess the investment on further development effort.

After a positive prototype phase assessment, teams are assembled into small projects to carry on the due tests. These must be performed to focus on other aspects, such as scalability, improved communications and information access, maturity of the organization and so on.

### **Toolkit for accelerating Test**

#### Business Model Canvas

The Business Model Canvas was originally proposed by Alexander Osterwalder, in his 2004 book, "Business Model Ontology". Since then, it has become a worldwide known instrument for representing complex business issues simply and integrated. It will also help develop new business models and understand existing ones. In a visual way, the key elements of a business model are mapped out to examine the internal and external elements that play together to create a viable product or service. Stickdorn, Hormess, Lawrence, and Schneider (2018) considered it to prototype and test the business model of new concepts.

After creating the prototyped solution, expose it the to-be or future business model to pinpoint its viability, attractiveness and feasibility.

## **4.3 EVALUATION**

To understand if this method would be feasible and effective, interviews were conducted with experts in Design Thinking to validate the method for enabling creativity. The interviews will be used comprised of a set of questions to determine the potential benefit.

I had the chance to interview a DT expert within BMW Group IT (explicitly requested anonymization according to German rules). The interview was conducted via Microsoft Teams according to the convenience and geographical constraints of the participant.

The interview was conceived to start with an introduction about the scope of the research and the related problem. In addition, room for open questions and doubts about the subject was planned. Open questions to enable the participant(s) to develop the topic, causing the exploration of some details which can be important (Charmaz, 2006). Ultimately, the interview was intended to understand the interviewee's point of view and insights.

Concerning the structure of the interview questions, it was configured aiming to know an expert point of view:

1. Do you consider the proposed method as useful for enabling creativity and why? If not, why do you believe it is not?
2. Do you have any remarks towards the proposed method? Please describe.
3. Would you consider implementing the proposed method? Please clarify why/ why not.
4. Do you have any recommendations or suggestions for further improvements of the proposed method?

During The first interview, after going through the presentation, I asked the previously mentioned questions, starting with the first one. When I asked if he considers the proposed method as useful for enabling creativity, he stated that it's useful to enable DT because of his experience in BMW Group in several projects proved that it could add more creativity, e.g. three innovations came out of the DT based workshops: an internal portal (internal tool planned from scratch), an app that uses augmented reality for a Mini car configurator and development of the interior light design. With these three evidences he stressed that a method based on DT is effective and boosts creativity in several areas.

When asked the second question, he stated that having a step to break down the possible resistance of participants not believing in their creative ability can enhance the result of the workshop itself. Moreover, he advised to reduce exposing a large volume of DT theory during the workshops, the participants should focus on learning by doing and experiencing by themselves. Most important, is for them to have a real problem/situation together with asking the right questions. To be concrete he posed the following question: "What is the car of the future?". He started by answering that this type of question can be misleading. If one thinks about it closely who can tell that in the future we will have cars and further that the cars would look alike the ones we are having today. Instead, he showed for this particular question that we need to go beyond and think about e.g. what mobility do we want, what kind of feelings shall we address. Summarizing, he states that it takes time to build up those types of questions without limiting the creative space to current standards, borders and frameworks. Moreover, he suggested using a pre-selection of the workshop participants profile based on a previous assessment to identify the ones who need some incentives to unleash their creativity from those who don't. This step would increase the probability of the workshop reaching out to all participants.

In fact, when asked the third question related to the implementation of proposed method, he considered that would be willing to implement the proposed method because so far he has had many positive experiences with DT approaches. Regarding the creativity he also asked to pay attention on two factors: groups and fits to organization's culture.

Lastly, his recommendations referred to start small, easy and fast, not investing too much budget but giving people room and space to be creative and enhance this capability. Make it as often as the organization thinks is important to ensure continuity and run away from “one time per year” event.

#### **4.4 DISCUSSION**

Based on the interview mentioned in the previous section and the literature review, the discussion about the result of this study can be shared. The method basically wanted to profit from the known benefits of DT’s usefulness to bring more creativity during the ISP.

It was considered by the interviewed expert as relevant and thus useful from a general point of view. However, being DT an iterative and explorative approach, if not well guided a DT workshop may bring disadvantages in the sense that it may not focus on the right aspects, such as precise questions, which in turn might lead to a time consuming and inefficient cycle of ideas generation.

Moreover, it was pinpointed by the interviewee, the step of selecting profiles to join the workshop as part of Enable Team and the Participants Team needs to be carefully prepared. His suggestion was to make this assessment to increase the chances of success the workshop.

From the ISP point of view, this method is a practical approach that tries to organize and systematize an activity through the lenses of DT but to fully achieve what is intended more effort should be done. During the interview it also became evident that a creative mindset will need to be established. Because, from the innovation-needs match perspective, approaching this method only by performing the workshop(s) can be short for the medium and long run goals. In parallel, the organization must evaluate if the DT principles is what fits to the organization strategy. And if this is the case, encouraging employees to take time to step out of the daily routine tasks and embrace this “room for creativity” could be considered as a major factor affecting an organization’s intention to promote culture change.

## **5 CONCLUSIONS**

### **5.1 SYNTHESIS OF THE DEVELOPED WORK**

Conducting this study included the overview of different subjects like IS, ISP, Creativity and Design Thinking concepts. Gathering knowledge on these areas made possible the design of a method that supports the planning activity with a creative approach. The proposed method defends that guaranteeing certain preconditions and exposure to creative techniques in a systematic mode can help individuals and teams become more creative during the activity of planning IS. The method was later validated by a DT expert through the interview.

### **5.2 LIMITATIONS**

This study had some limitations regarding the validation of the method. To have more access to planning environments to apply this method would help to create a more robust version of the proposal.

Even though it was approved, the number of interviewees could have been higher and, consequently, provide a more credible, and universal validation. Given the pandemics' context that was active during the conduct of this investigation, the availability of potential interviewees was reduced.

Additionally, due to the shortage of time and the fact of IS planning being a very wide range topic it implies much more research and detailing actions than what a master thesis can comprise.

### **5.3 FUTURE WORK**

In a future work, to be confirmed and evaluated is the fact of DT methodology might be strictly focusing on "bottom-up" human centered perspective leaving behind "top-down" big picture of the systems ecosystem's perspective, i.e. the systems flow, value chain, integration and others.

Another aspect to consider is if the ISP should still be handled as a static activity in opposition to this very dynamic world that demands constant change and refocus. Would Design Thinking still work or be needed to enable creativity in a "agile style" ISP? Questions like these will need an answer soon.

Finally, to share this study inside my organization will help me validate if further analysis and adaptation is needed for the proposed method. Hopefully, it will allow the rise of other related initiatives with creativity.



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## APPENDIXES

### Appendix 1: Workshop Facilitator's Guide

GOAL	GUIDE	SUGGESTION
<p>Introduction of the wrong approach to DT.</p> <p>Help participants to immediately jump right in DT and experience it for themselves.</p>	<p>Direct participants to the "Design the IDEAL Information System" worksheet.</p> <p>Don't give participants any instructions here - just tell them to draw an idea for their ideal IS in 3 minutes.</p> <p>Remind participants after each minute expires.</p> <p>Afterwards, ask: "How did that feel?"</p>	<p><b>Design the IDEAL Information System.</b></p> <p><b>Draw</b> 3min</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p>Sketch your idea here!</p> </div> <p>d. ○○○○○○</p> <p>They will likely offer some emotions that are not that positive. Highlight those, and tell them "that was a typical problem-solving approach, taking on a given problem, working using your own opinions and experience to guide you, and with a solution in mind to be designed. Let's try something else - a human-centered design thinking approach."</p>


## Empathy Phase – Research User’s Needs

GOAL	GUIDE	SUGGESTION	TECHNIQUES
<p>Research the needs and tell participants the most important part of designing for someone is to gain empathy. Participants will do this through having a conversation with their counterpart.</p>	<p>Define groups of two to design something useful for their partner.</p> <p>Participant A has 4 minutes to interview Participant B, then they switch.</p> <p>To help break the ice, Participant A walks Participant B through the contents of Partner B previous “Design the IDEAL Information System”.</p> <p>Participant A makes notes in the “Interview” column of their worksheet.</p> <p>Then they switch and perform the interview in reversed roles.</p>	<p>Your NEW mission: <b>Design something useful and meaningful for your partner. Start by gaining empathy.</b></p> <div> <div> <b>1 Interview</b>  8min (2 sessions x 4 minutes each)  Notes from your first interview </div> <div> <b>2 Dig Deeper</b>  6min (2 sessions x 3 minutes each)  Notes from your second interview </div> </div> <p>Switch roles &amp; repeat Interview</p> <p>Encourage Participants to think about: when they plan an information system, why they have particular things in there, and to make notes of things they find interesting or surprising.</p>	<p>A Day in the Life  Awareness booklets  Desk Research  Exploratory Research  Generative Sessions  Interviews  Shadowing</p>


## Empathy Phase (cont.) – Explore Deeper

GOAL	GUIDE	SUGGESTION	TECHNIQUES
Follow up on things they found interesting or surprising from their previous interviews. They should explore for stories, feelings and emotions (around pictures, objects)	<p>Participants need to understand that the Information System itself is a distraction, that what important for them to discover is what really matter to their Participants.</p> <p>Encourage participants to ask “Why?” often and to let their partner talk. Remind participants to make note of any unexpected discoveries and to capture quotes.</p>	<p><small>Your NEW mission:</small> <b>Design something useful and meaningful for your partner. Start by gaining empathy.</b></p> <div> <div> <b>1 Interview</b>  <small>8min (2 sessions x 4 minutes each)</small>  Notes from your first interview  <div></div> <small>d. @@@@</small> </div> <div> <b>2 Dig Deeper</b>  <small>6min (2 sessions x 3 minutes each)</small>  Notes from your second interview  <div></div> <small>Switch roles &amp; repeat Interview</small> </div> </div> <p>Switch roles &amp; repeat Interview</p> <p>Deceptively try to ask why helps to go further and find the real needs of the people we're designing for.</p>	A Day in the Life Awareness booklets Desk Research Exploratory Research Generative Sessions Interviews Shadowing

## Define Phase – Reframe the Problem

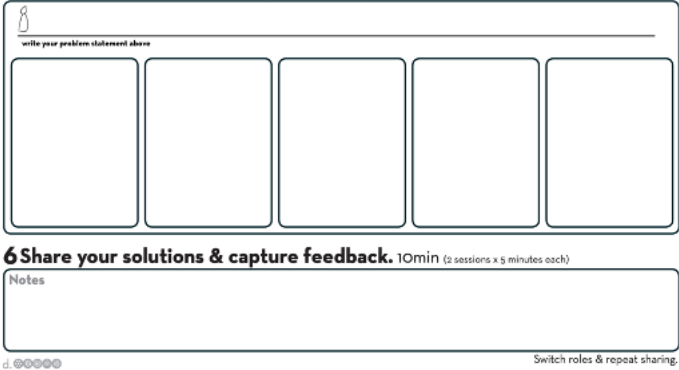
GOAL	GUIDE	SUGGESTION	TECHNIQUES
Have Participants pull out the “Reframe the Problem” worksheet if they printed it, or to create the worksheet on a blank sheet of paper if they have not.	<p>Their participant’s goals and wishes. Participants should use verbs to express these. They should think about physical and emotional needs.</p> <p>Any insights discovered can be leveraged when creating solutions.</p>	<p><b>Reframe the problem.</b></p> <div> <div> <p><b>3 Capture findings</b> 3min</p> <p><b>Goals and Wishes:</b> What is your partner trying to achieve? <small>*use verbs</small></p> <p><b>Insights:</b> New learnings about your partner’s feelings and motivations. What’s something you see about your partner’s experience that maybe s/he doesn’t see? <small>*make inferences from what you heard</small></p> </div> <div> <p><b>4 Take a stand with a point-of-view</b> 3min</p> <p> _____ <small>partner's name/description</small></p> <p><b>needs a way to</b> _____ <small>user's need</small></p> <p><b>because (or “but...” or “Surprisingly...”)</b> <small>[include one]</small></p> <p>_____</p> <p>_____ <small>insight</small></p> </div> </div> <p>d. ○○○○○</p> <p>Reframe your partner's problem into an open-ended question.</p> <p>How can you help your partner?</p> <p>Make sure your question includes a verb: "How Can I help [participant's name] [verb]-----?"</p>	<p>Affinity Diagram Blueprint Conceptual Map Empathy Map Guiding Criteria Insight Cards Mind Map Personas Reframing User Journey</p>

## Define Phase (cont.) – Take a Stand

GOAL	GUIDE	SUGGESTION	TECHNIQUES
This is where Participants articulate their point-of-view around which they will build solutions.	Select the most compelling need and most interesting insight they gained from their participant. This statement is going to be the foundation for their design work, so encourage them to make it actionable, and exciting.	<p><b>Reframe the problem.</b></p> <p><b>3 Capture findings</b> 3min</p> <div> <p><b>Goals and Wishes:</b> What is your partner trying to achieve? <small>*use verbs</small></p> <p><b>Insights:</b> New learnings about your partner's feelings and motivations. What's something you see about your partner's experience that maybe s/he doesn't see? <small>*make inferences from what you heard</small></p> </div> <p>d. @@@@</p> <p><b>4 Take a stand with a point-of-view</b> 3min</p> <div> <p> _____ <small>partner's name/Description</small></p> <p><b>needs a way to</b> _____ <small>user's need</small></p> <p><b>because (or "but..." or "Surprisingly...")</b> <small>[include one]</small></p> <p>_____</p> <p>_____</p> <p><small>Insight</small></p> </div> <p>Statements like          "Lauren needs a way to feel he has access to all his stuff and is ready to act. Surprisingly, using the system makes him feel less ready to act, not more."</p>	Affinity Diagram Blueprint Conceptual Map Empathy Map Guiding Criteria Insight Cards Mind Map Personas Reframing User Journey




## Ideate Phase – Sketch out Ideas

GOAL	GUIDE	SUGGESTION	TECHNIQUES
Write the problem statement from previous exercise and create solutions to the challenge that was identified.	<p>Remind them to be visual, to not use words but to use pictures.</p> <p>Remind Participants the goal here is idea generation, not evaluation; challenge them by saying “see if you can come up with at least 7 ideas!”</p> <p>Get ready with some ideas and just draw.</p> <p>Is not making your idea the best. This will drive more conversation forward. Quantity is better than quality here, that they should go for volume of sketches of ideas.</p>	<p><b>Ideate: generate alternatives to test.</b></p> <p><b>5 Sketch at least 5 radical ways to meet your user's needs.</b> 5min</p>  <p><b>6 Share your solutions &amp; capture feedback.</b> 10min (2 sessions x 5 minutes each)</p> <p>Notes</p> <p>Switch roles &amp; repeat sharing.</p> <p>Further advice: Don't get stuck on early ideas. Pay attention to what you notice. Opportunity will follow.</p>	<p>Brainstorming</p> <p>Brainwriting</p> <p>Co-CreationWorkshop</p> <p>Idea menu</p> <p>Position Matrix</p> <p>Sketching</p>

## Ideate Phase (cont.) – Share ideas and capture feedback

GOAL	GUIDE	SUGGESTION	TECHNIQUES
To learn more about their participant's feelings and motivations. Do not validate their ideas, and not to explain or defend their idea.	As each participant gives reactions to the sketches, the other should take note of any likes and dislikes, and also listen for any new insights. Afterwards, participants switch.	<p><b>Ideate: generate alternatives to test.</b></p> <p><b>5 Sketch at least 5 radical ways to meet your user's needs.</b> 5min</p> <p><b>6 Share your solutions &amp; capture feedback.</b> 10min (2 sessions x 5 minutes each)</p> <p>Notes</p> <p>d. @@@@@ Switch roles &amp; repeat sharing.</p> <p>Early feedback sets you up for success. Try using "I like..." and "I wish" format for feedback. Share your question. Put your ideas out quickly and listen to your partner's feedback. Take notes.</p>	Brainstorming Brainwriting Co-CreationWorkshop Idea menu Position Matrix Sketching

## Ideate Phase (cont.) – Go over again

GOAL	GUIDE	SUGGESTION	TECHNIQUES
To sketch a new idea. This idea can be a variation on an idea from before, or could be something entirely new. It is OK if they need to adjust their problem statement to incorporate new insights and needs they discovered in the last sharing.	Encourage Participants to provide as much detail and color around their idea as they can. They should think about how the solution fits into their participant's life, when and how they might handle or encounter the new solution.	<p><b>Iterate based on feedback.</b></p> <p><b>7 Reflect &amp; generate a new solution.</b> 3min</p> <div> <p>Sketch your big idea, note details if necessary!</p>  </div> <p>d. ○○○○○</p> <p>With the feedback received, it's time to create a remix of those ideas into a new and improved solution. Try to remix and share with a story, by having the following questions in mind:</p> <p>What is the thing that you initially noticed?</p> <p>What is the thing that you deeply noticed?</p> <p>What is your new idea?</p> <p>How this impact the person or this change how they feel?</p>	Brainstorming Brainwriting Co-CreationWorkshop Idea menu Position Matrix

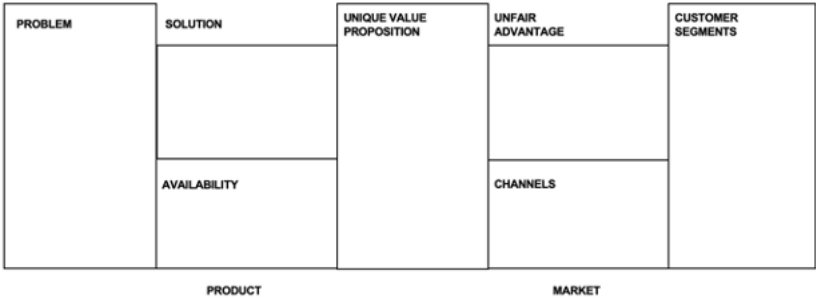
## Prototype Phase – Start building

GOAL	GUIDE	SUGGESTION	TECHNIQUES
<p>Create a physical prototype of their solution. They need to actually make something their participant can physically see and imagine engaging with.</p>	<p>Explain they should not just make a scale model of their idea. Push them to be quick.</p> <p>Who wants to create a service will ask how they can create that. Talk about creating a scenario that allows someone to experience it - they can use space, act it out and so on.</p>	<p><b>Build and test.</b></p> <p><b>8 Build your solution.</b></p> <p>Make something your partner can interact with!</p> <p>[not here]</p> <p>7min d. @@@@</p> <p><b>9 Share your solution and get feedback.</b></p> <p>What worked...</p> <p>What could be improved...</p> <p>? Questions...</p> <p>! Ideas...</p> <p>8min (2 sessions x 4 minutes each)</p> <p>Use essential office supplies to create prototype.</p>	<p>Minimum Viable Product</p> <p>Paper prototypes</p> <p>Services Prototypes</p> <p>Staging</p> <p>Storyboard</p> <p>Volume Model</p>

## Prototype Phase (cont.) – Share your solution and get feedback from your peer

GOAL	GUIDE	SUGGESTION	TECHNIQUES
One participant shares their prototype with the other and collects feedback, then switch roles.	Make sure Participants are only interested in a targeted conversation around the experience, specifically focused on their feelings and emotions.	<p><b>Build and test.</b></p> <p><b>8 Build your solution.</b></p> <div><p>Make something your partner can interact with!</p><p>[not here]</p><p>7min</p><p>d. @@@@</p></div> <p><b>9 Share your solution and get feedback.</b></p> <div><div><p>+ What worked...</p></div><div><p>- What could be improved...</p></div><div><p>? Questions...</p></div><div><p>! Ideas...</p></div></div> <p>8min (2 sessions x 4 minutes each)</p> <p>Take note of what their peer liked and didn't like, what questions and ideas emerged.</p>	Minimum Viable Product Paper prototypes Services Prototypes Staging Storyboard Volume Model

## Test and Transition (T&T) Phase – Make it ready for DEV initiative

GOAL	GUIDE	SUGGESTION
Structure the solution according to Business Model Canvas.	Participants can create a Business Model Canvas around the solution found.	<p><b>Business Model Canvas</b></p>  <p>The diagram illustrates the Business Model Canvas, a tool for developing business models. It is structured as follows:</p> <ul style="list-style-type: none"> <li><b>PROBLEM</b>: A large box on the left side.</li> <li><b>SOLUTION</b>: A box in the top right of the Problem section.</li> <li><b>AVAILABILITY</b>: A box in the bottom right of the Problem section.</li> <li><b>UNIQUE VALUE PROPOSITION</b>: A large box in the center.</li> <li><b>UNFAIR ADVANTAGE</b>: A box in the top right of the Unique Value Proposition section.</li> <li><b>CHANNELS</b>: A box in the bottom right of the Unique Value Proposition section.</li> <li><b>CUSTOMER SEGMENTS</b>: A large box on the right side.</li> </ul> <p>Below the diagram, the labels <b>PRODUCT</b> and <b>MARKET</b> are positioned under the Problem and Unique Value Proposition/Channels sections, respectively.</p> <p>Explore the specific parameters to have a draft of a possible development initiative.</p>

## Appendix 2: Set of questions targeted at ISP

1. How will a better IS benefits you?
2. How will you define the scope?
3. How will you measure IS success?
4. What do I need my information system to do?
5. How does an information system help us implement our strategy?
6. How can I make a business case for investment in information systems?
7. Where is the system going to be implemented?
8. What is the real cost saving?
9. Would it consider data privacy?
10. Would it consider environmental sustainability?
11. What resources and skills do I need for each of the three phases (develop, scale, and sustain)?
12. How can you assess what skills are already available partners?
13. Do you know what the system must or should do?
14. Should I build, buy, request as a service or adopt a system?
15. How do I compare various options objectively?
16. How will I select the right vendors?
17. How do I ensure that an information system clearly specifies how the system should perform?
18. How will I ensure that my team has the knowledge and skills I need to sustain my information system?

## ANNEXES

Annex 1: Adaptation of Stanford University d.school “Wallet” Project

### Design the IDEAL Information System.

**Draw** 3min

Sketch your idea here!

d. ⓄⓄⓄⓄⓄ

Your **NEW** mission: **Design something useful and meaningful for your partner.**  
**Start by gaining empathy.**

#### 1 Interview

8min (2 sessions x 4 minutes each)

Notes from your first interview

d. ⓄⓄⓄⓄⓄ

Switch roles & repeat Interview

#### 2 Dig Deeper

6min (2 sessions x 3 minutes each)

Notes from your second interview

Switch roles & repeat Interview



## Reframe the problem.

### 3 Capture findings 3min

#### Goals and Wishes:

What is your partner trying to achieve?

\*use verbs

**Insights:** New learnings about your partner's feelings and motivations. What's something you see about your partner's experience that maybe s/he doesn't see?\*

\*make inferences from what you heard

### 4 Take a stand with a point-of-view 3min



\_\_\_\_\_  
partner's name/description

needs a way to

\_\_\_\_\_  
user's need

because (or "but ..." or "Surprisingly ...")

[circle one]

\_\_\_\_\_  
insight

d. 🗳️🗳️🗳️🗳️🗳️

## Ideate: generate alternatives to test.

### 5 Sketch at least 5 *radical* ways to meet your user's needs. 5min



\_\_\_\_\_  
write your problem statement above

### 6 Share your solutions & capture feedback. 10min (2 sessions x 5 minutes each)

Notes

d. 🗳️🗳️🗳️🗳️🗳️

Switch roles & repeat sharing.

## Iterate based on feedback.

### **7 Reflect & generate a new solution.** 3min

Sketch your big idea, note details if necessary!

d. 

## Build and test.

### **8 Build your solution.**

Make something your partner can interact with!

[not here]

7min

d. 

### **9 Share your solution and get feedback.**

+ What worked...

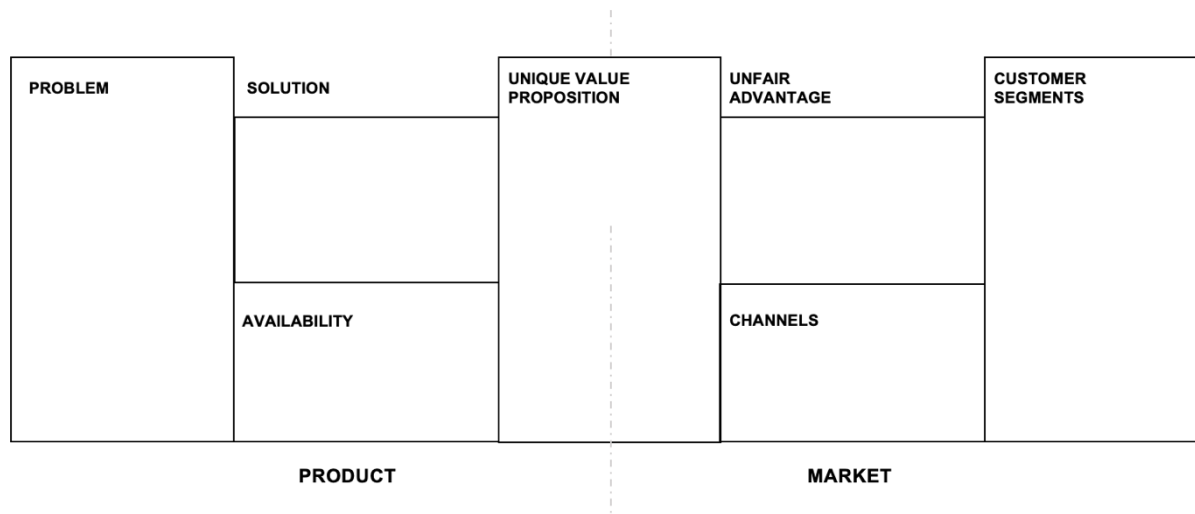
- What could be improved...

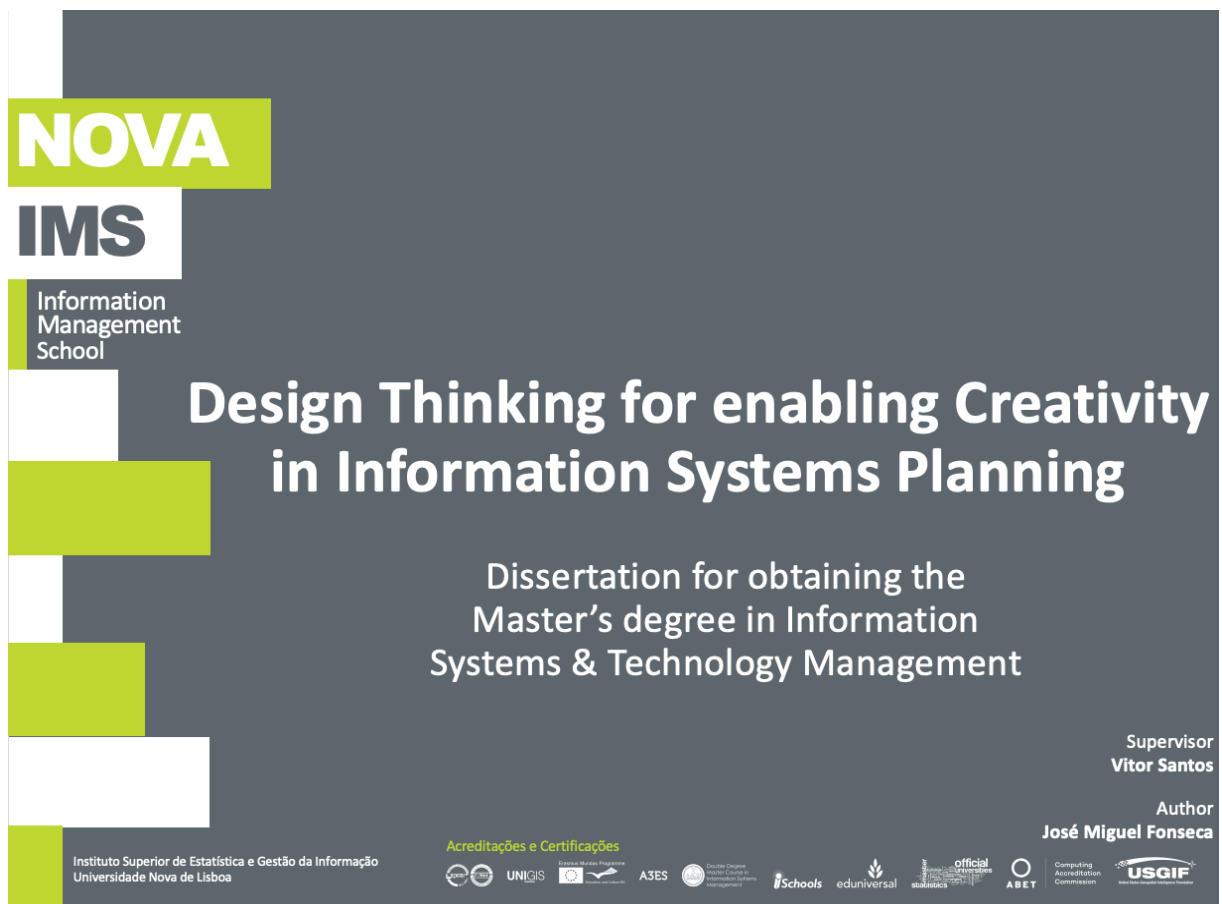
? Questions...

! Ideas...

8min (2 sessions x 4 minutes each)

## Annex 2: Adapted version of Business Model Canvas





**NOVA**

**IMS**

Information  
Management  
School

# Design Thinking for enabling Creativity in Information Systems Planning

Dissertation for obtaining the  
Master's degree in Information  
Systems & Technology Management

Supervisor  
**Vitor Santos**

Author  
**José Miguel Fonseca**

Instituto Superior de Estatística e Gestão da Informação  
Universidade Nova de Lisboa

**Acreditações e Certificações**

EFMD EQUIS ACCREDITED UNIGIS EFMD EQUIS ACCREDITED A3ES QUALITY DEGREE MASTER COURSE IN INFORMATION SYSTEMS MANAGEMENT iSchools eduniversal official statistics ABET Computing Accreditation Commission USGIF

# Problem Statement

**1** IS Planning made with a “shopping cart” attitude

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**2** IS Planning not having an impactful action in the Business Strategy

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**3** Lack of alignment between IS Planning and Business Strategy Plan

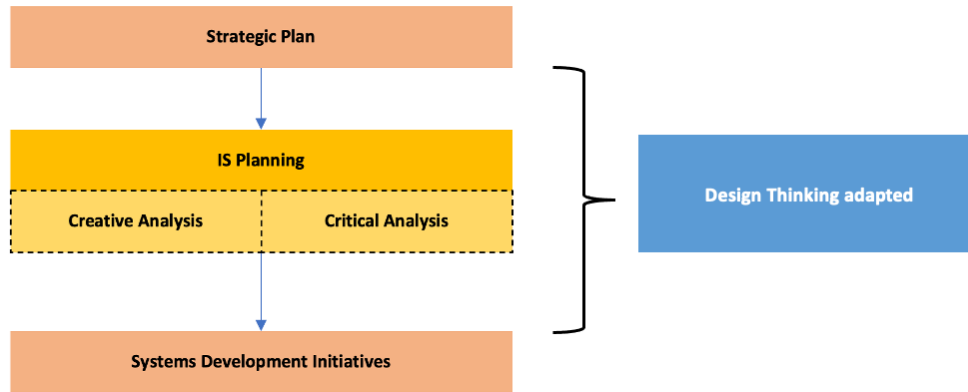
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**4** Creative approaches are skipped during IS Planning activity

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**5** IS is not supporting Business Strategy

## Method Proposed Scope



Source: The Information Systems Planning. Adapted from Stair & Reynolds (2009)

# Method Overview

ISP Overview	DT Phases	What (process)	Why (purpose)	How (techniques)
Strategic Planning → IS Planning	I) Pre Empathise	Diverge	Understanding: Strategy and expectations	Interviews
IS Planning	II) Empathise	Diverge	Understanding: User- experience	A Day in the Life Awareness booklets Desk Research Exploratory Research Generative Sessions Interviews Shadowing
	III) Define	Converge (debrief)	Reflecting: Issues, needs and desires	Affinity Diagram Blueprint Conceptual Map Empathy Map Guiding Criteria Insight Cards Mind Map Personas Reframing User Journey
	IV) Ideate	Diverge	Finding solutions	Brainstorming Brainwriting Co-Creation Workshop Idea menu Position Matrix Sketching
	V) Prototype	Converge (decision making)	Selecting the best solution; Proofing the idea	Minimum Viable Product Paper prototypes Services Prototypes Staging Storyboard Volume Model
IS Planning → Systems Development Initiatives	VI) Test & Transition (T&T)	Converge (decision making)	Reflecting, selecting the development initiative	Business Model Canvas

# Method Overview (cont.)

The following table summarizes the content of the 11 cards shown in the image:

Card Number	Title	Description
1	Wrong Approach	Shows a linear flowchart that is not iterative, contrasting it with the design thinking process.
2	Empathy Phase - Research User's Needs	Focuses on understanding the user's needs through research.
3	Empathy Phase - Explore Deeper	Focuses on deeper exploration of user needs and experiences.
4	Define Phase - Reframe the Problem	Focuses on reframing the problem to see it from a new perspective.
5	Define Phase - Take a Stand	Focuses on taking a stand on what the problem is and who it affects.
6	Ideate Phase - Sketch out Ideas	Focuses on sketching out ideas to explore potential solutions.
7	Ideate Phase - Share Ideas and capture feedback	Focuses on sharing ideas and capturing feedback from others.
8	Ideate Phase - Go over again	Focuses on iterating on ideas based on feedback.
9	Prototype Phase - Start Building	Focuses on starting to build a prototype of the solution.
10	Prototype Phase - Share Your Solution And Get Feedback from peer	Focuses on sharing the solution and getting feedback from peers.
11	Test and Transition (T&T) - Make it ready for DEV initiative	Focuses on testing the solution and making it ready for development.

## Interview Questions

1. Do you consider the proposed method as useful for enabling creativity and why? If not, why do you believe it is not?
2. Do you have any remarks towards the proposed method? Please describe.
3. Would you consider implementing the proposed method? Please clarify why/ why not.
4. Do you have any recommendation or suggestions for further improvements of the proposed method?

**Thank you for your time  
and contribution!**

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**Acreditações e Certificações**



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Universidade Nova de Lisboa



