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Design thinking for providing solutions in complex environments

I.T. Hawryszkiewycz
University of Technology, Sydney
igorh@it.uts.edu.au

ABSTRACT
The paper describes how design thinking can foster the creativity and innovation needed to provide business solutions in the trend to more complex environments. Design thinking provides the social environment to look at existing systems in detail and identify their complexities and creative ways to address them. The paper also describes processes that support communication methods for stakeholders to collaborate and recombine systems to create innovative solutions. The paper does this by combining design thinking with business building blocks to organize domain relevant skills in ways that inspires innovation and thus create value for stakeholders. Examples of implementation methods are included.

Keywords: Business building blocks, Design Thinking

INTRODUCTION

The paper proposes design thinking combined with business building blocks to address the challenges in creating business solutions now found in the emerging complex business requirements. Problems in this environment are often referred to as wicked (Head, 2013) or complex (Merali, 2006). They are found in strategic planning (Camillus, 2008) and fall into the general class of complex problems (Merali, 2006). The dominant characteristic in this environment is one of complexity and a more social approach to provide solutions. Wicked systems are often characterized by imprecise requirements. They have no definite specific formulation of the problem; there are just general goals such as increased sales in a new market, everybody well fed, or increasing tourism in some region. Often different stakeholders may have different versions of what the problem is. It is often hard to determine if a solution is better or worse, whether it will work and when to stop and where each solution is unique.

The reason for the increasing complexity is that the business environment is increasingly one where a business or firm operates in a large meta organization. In this paper the firm is seen as a legal entity
Design thinking in organizations that creates value of its shareholders; a business unit within a firm carries out some activity to create value; and an organization is a network of firm and business units. This meta-organization (Gulati, 2013) is made up of any number of firms each carrying out its business while interacting with others. Any firm must not only respond to any change in its environment in a creative way but also respond to changes in the firms with which it interacts. In such environments firms must be increasingly more adaptive and innovative to respond to such change. Innovation in this case is often not a new breakthrough product but can be a better way to do something to provide a better service to its customers or to improve the quality of its manufacturing process. Or it may be a new way to work with a partner. Or it may be finding another partner. It thus becomes increasingly important to both identify new ways to work and to work effectively. The former is a social process which is where design thinking is providing ways to do this. These challenges can be found in many environments, such as:

- Urbanisation and design of smart cities (Macomber, 2013) where a number of systems need to be integrated to provide solutions.
- Adaptive supply chains (Cozzolino, 2011).
- Restructuring business structures to remove silos and create effective business networks.

Managing in wicked environments must develop ways to encourage the creativity needed to inspire innovative solutions that address emerging situations. Solutions here are no longer analytically developed but often emerge as stakeholders collaborate to resolve complex issues and create acceptable solutions. Solutions in complex environments more often than not require changes in relationships between forms or creating new relationships to address unanticipated events. Here the theory is that organizations must themselves become complex to respond to complex environments.
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This paper describes how design thinking and building blocks address these challenges. The paper shows that design thinking when applied in a systematic manner can foster the creativity and innovation needed to address wicked problems. Design thinking focuses on the qualitative social issues and getting away from process ecosystem to innovation ecosystem through bringing stakeholders together. Design thinking can realize the conditions for creativity (Amabile, 2012) by bringing together design relevant skills and social innovation while supporting them with creativity relevant processes. It provides the necessary requisite variety to respond to emerging situations in innovative teams through focusing on interdisciplinary teams.

CURRENT PRACTICES IN ORGANIZING THE DESIGN THINKING PROCESS

In summary here, current practices focus on the conditions for creativity as defined in Conti and Amabile (2011). These are to:

- Creating a social environment through the support for collaboration within the teams,
- Creativity related processes such as brainstorming and collaboration,
- Domain relevant skills through the interdisciplinary nature of the teams.

Three approaches are found in practice, namely:

- Integrated creative agile environment,
- Innovation through innovation cycles,
- Application to specific tasks.

Each of these is fundamentally based on collecting stories and through collaboration organizing them into solutions. Typical examples of story collection here include postit notes.
Postit Notes

The implementation most commonly used is post it notes. However just having post it notes or their equivalent is not sufficient. It is also necessary to organise these to deal with complex relationships and to proceed in a way that brings stakeholders together to create solutions acceptable to stakeholders. Stories are posted in different colours with each color corresponding to a different issue.

The focus on any implementation based on postit notes is on encouraging collaboration between all stakeholders involved in a system. A common way is to use post-it notes to paste comment on a board. Different methods are used to identify issues – either by the location on the board or by different colors used for each issue. The important requirement of an implementation is a canvas, or design space, to record discussions, ideas and people’s comments on them. A board with post-it notes as shown in Figure 1 is a canvas or what is called in this paper, a design space. The emphasis here is on experimentation through bringing the tacit knowledge of stakeholders to jointly propose mutually acceptable solutions. Methods used to do this are typically postit notes on visible boards where stakeholders can post and discuss ideas as they emerge. This is consistent with the complex adaptive systems. In summary the emphasis is on holistic approaches, including stories arise from different perspectives. In this case post-it notes can represent different domains.
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Figure 1 – A board with post-it notes as a canvas

Currently the processes in most environments are ad-hoc with stories emerging based on stakeholder’s experiences and not in any formal way. The result can be that not all possibilities are examined given the lack of a framework on which questions can be based. Martin’s design thinking provides a way to introduce these in a formal way.

Innovation cycle

Postit notes assume continuous face to face interaction. There are of course other working environments. In longer term relationships between forms in an organization it is not possible to sustain a continuous board or space for the posing of stories. Alternate processes are needed. One example is shown in Figure 2. It describes an innovation cycle found appropriate for innovation within a private public relationship.

Figure 2 – Innovation Cycle (Forsgren, 2014).

The process shown in Figure 2 is not the only one supporting design thinking in organizations. A similar report (Courage, 2013) describes CITRIX a cloud company adopting a design thinking culture.
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It stresses the importance of engagement across the enterprise and extending it across distance in
global organizations.

**Focus on creativity in existing practice**

Practice focuses on satisfying creativity requirements, especially on the social environment as well as
creativity relevant processes, especially through the practice of brainstorming in collaborative settings
based on discussion on postit notes and relationships between them. Using postit notes is not as
simple as it sounds. Stories posted should not begin with a direct set of needs or solutions. They
should begin with values in a solution neutral way. Stanford dSchool, shown in Figure 3 provides
guidelines here. The process is known as the Stanford design thinking process shown in Figure 3.

Practice is concerned with gathering stories of detailed activities and points of view of stakeholders.
Step 3 in Figure 2 corresponds to making sense and creating solutions. It also emphasizes
visualizations, metaphors and experimentation in creating solutions.

![Figure 3 – The Stanford dSchool design thinking process](image-url)
The process in Figure 3 focuses on collaborative techniques such as brainstorming to propose solutions, discuss then in the context of metaphors. Learning from this the rest of the paper proposes how design thinking can be used as the foundation to create such environments.

WHAT IS DESIGN THINKING?

One hypothesis that can be made from these observations of practice is that it is based on design thinking. Design thinking is fundamentally a social process. The major idea (Beckman, 2007) is that design thinking when compared to other methods focuses on a detailed analysis of existing systems. It goes beyond system interfaces and looks into the details of system operation. It begins with what some people define as a divergence by capturing detail through observations and points of view of stakeholders as shown in bottom left quadrant in Figure 4. These are captured as stories, which form the basis of the design thinking process. These stories are combined to make better sense through combining them into more logical forms. Ultimately they converge to solutions through an ideation process where stakeholders collaborate to create solutions.

Design thinking as suggested by Martin (2009) includes guidelines and suggestions for communication by encouraging visualizations and metaphors that foster communication between interdisciplinary groups. Metaphors are used here to guide solution formation as for example (Yoo, 2013) where the emphasis is on knowledge flows, social structures or business activities. Metaphors should be general to support an interdisciplinary environment. The solutions are then put into practice and tested.
Compared to system thinking, design thinking focuses on in depth relationships to identify solutions that may not be apparent when looking at interfaces between systems. The difference of design thinking and system thinking is illustrated in Figure 5. The divergence is through stories captured in complex environments.

In design thinking there is also an emphasis on ideation through perspectives and metaphors. Describe how this can address challenges. Table 1 indicates the advantages provided through design thinking to look at the detail of operations that address the challenges.

**COMBINING DESIGN THINKING WITH BUILDING BLOCKS**
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Design thinking can be seen to focus on creating social environment and creativity related processes but be more generic in organizing domain specific knowledge. The paper proposes that business building blocks can fill this gap. Business building blocks are now increasingly used in business to support multi stakeholder decisions. In a way they provide the domain relevant skills essential in the creative process.

Here stories are captured and classified by building block. They are then put together into solutions. As shown in Figure 6 stories are put into building blocks that provide the natural concepts for stakeholders. In Figure 6 these are concepts that may be used in planning deliveries in a business. In fact business blocks can almost be seen as a conceptual model of how a particular business will work. They provide what is commonly known as a canvas on which stakeholders design business solutions. In the framework of design thinking the building blocks are a visualization of the business.

![Figure 6 – Combining with Building Blocks](image)

Collection and management of stories in a large business can become virtually impossible. Communication becomes difficult without some facilitation for organizing stories and seeing
CHOOSING BUILDING BLOCKS TO MATCH PROBLEM.

The first step in organizing a design thinking process is to create the environment for social interaction. Subsequently it becomes necessary to choose the building blocks that focus on the domain relevant skills (Sinfield, 2012) and foster creativity in a problem domain (Johansson-Skoldberg, 2013). The next step is to support visualizations where stories in building blocks can be combined with into solutions through collaborative discussion. The most widely discussed canvas is that of Osterwalder (2010), which has focused on creating business models at the strategic level. Osterwalder model includes generic building blocks such as values, key activities, key requirements or costs and revenues.

These building blocks are then presented as a canvas that is customized to a given problem. There are building blocks relevant to all the challenges and will probably appear in every canvas. There also building blocks specific to any situation - value, key activities, key requirements? These can then indicate questions relevant to the building block.

These can then be supplemented by building blocks specific to a challenge as shown in Table 1.

Table 1 – Suggested Business Blocks

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Business Blocks</th>
<th>Suggested business blocks Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolving Silos</td>
<td>Knowledge sharing</td>
<td>Link business unit knowledge needs and knowledge sources.</td>
</tr>
<tr>
<td></td>
<td>Expertise</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Channels for knowledge flow</td>
<td></td>
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<tr>
<td></td>
<td>Business units</td>
<td></td>
</tr>
<tr>
<td>Forming Partnerships</td>
<td>Partners</td>
<td>Partner knowledge and ways it</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Our business units</th>
<th>can be used in our business units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart services</td>
<td>Clients</td>
</tr>
<tr>
<td></td>
<td>Scenarios of form, function and process of using a service</td>
</tr>
<tr>
<td>Process Innovation</td>
<td>Roles</td>
</tr>
<tr>
<td></td>
<td>Role responsibilities</td>
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<tr>
<td></td>
<td>Process flows</td>
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<tr>
<td>Supply chains</td>
<td>Firms in the supply chain</td>
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<tr>
<td></td>
<td>Artifact flows</td>
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<td></td>
<td>Unit roles in flows</td>
</tr>
</tbody>
</table>

SUMMARY AND FUTURE WORK

The paper described ways in which design thinking can lead to business solutions in complex environments. It describes ways in which design thinking facilitates communication between stakeholders within a large firm or organization. The focus is away from changing existing process for short term gains; on the other hand the emphasis is to quickly create interdisciplinary groups and provide them with ways to communicate to respond to an unanticipated event. The emphasis was on communication through building blocks within the framework of design thinking. The paper also described ways in which design thinking has been implemented in organizations. The implementation depends on the relationships between the stakeholders in the design thinking process. Our future work is to combine design thinking with scenario analysis.

REFERENCES


ABSTRACT
The paper describes the trend to more complex environments and the use of design thinking to foster creativity and innovation to provide business solutions in such complex environment. Design thinking provides the social environment to look at existing systems in detail and identify their complexities and creative ways to address them. It also provides the creativity related processes that support communication methods for stakeholders to collaborate and recombine systems to create innovative solutions. The paper describes how combining design thinking with business building blocks further improves the ability to be more creative by providing a framework to organize domain relevant skills in ways that inspires innovation and thus create value for stakeholders. Examples of implementation methods are included.

DESIGN THINKING FOR PROVIDING SOLUTIONS IN COMPLEX ENVIRONMENTS

Igor Hawryszkiewycz

Faculty of Engineering and Information Technologies, University of Technology Sydney

Email: igorh@it.uts.edu.au