The Service Transformation Game: Snakes and Ladders to Advanced Services

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Abstract
This paper presents a game that engages players with the transformation processes involved in servitization. We have developed a workshop activity using this game for senior executives from large enterprises and SMEs, which encourages participants to explore transformation processes. The activity employs a board game reminiscent of Snakes and Ladders. Transformation steps are assigned to the squares on the board, and enablers and inhibitors are associated with ladders and snakes respectively. The game encourages reflective learning by asking players to assign their own perceived barriers and enablers to the snakes and ladders, based upon their own experiences.

Keywords: Gamification, Organizational Change, Servitization

Introduction

Baines et al. (2017) define servitization as the process of manufacturers building revenue streams through services rather than the sale of products. Since Vandermerwe and Rada (1988) exposed this trend, research has grown steadily in this area. Categories of services manufacturers can offer include base (e.g. providing goods and spare parts), intermediate (e.g. helpdesks, training, maintenance, repairs and overhauls) and advanced (e.g. customer support agreements and outcome contracts) (Baines and Lightfoot, 2013). However, one of the outstanding issues associated with this research is that transformation processes towards servitization are poorly understood (Baines et al., 2017; Ziaee Bigdeli et al., 2017).

Broadly, servitization is a process of organizational change and transformation. There are many topics involved in change processes, which are also relevant in servitization contexts. Obtaining insight into these topics from cases that are specific to servitization presents a significant research challenge. While it is possible to identify case examples that have servitized in the past, manufacturers currently undertaking servitization can provide rich data related to challenges that emerge in their specific contexts. SMEs, for example, may experience very different issues when compared with the likes of Xerox or Rolls-Royce.

There are two potential approaches to undertaking such research. One is that organizations undergoing service transformation can be identified and accessed by researchers. Another approach is that organizations considering service transformation can be approached by researchers to undertake transdisciplinary research and co-create knowledge about servitization (Baines et al., 2017). We argue that the latter can provide more varied data related to the range of issues organizations experience at the outset of exploring service transformation. Research related to servitization can be used to engage manufacturers with this co-creation. However, this presents a paradox: how can the transformation processes of servitization be researched if this research is needed to engage manufacturers with service transformation in the first place?

A possible method of engagement is the use of games. To date, games and gamification have been used as tools to attract manufacturers with servitization during the co-creation of research (Andrews et al., 2017a, 2017b; Shi et al., 2017). These approaches draw manufacturers into the lexicon of servitization and begin to engage them with the adoption of more advanced services. As there may be insufficient data to inform simulations of transformation, it has been argued that games can provide manufacturers with the motivation needed to undertake the transformation journey, which can in turn be used to inform accurate models of service transformation in the future (Andrews et al., 2017a, 2017b).

The current paper continues this prior work and discusses the application of a game that focusses on the transformation process towards advanced services. The use of games to overcome the combined challenges of i) obtaining insight into the transformation process manufacturers undergo and ii) engaging them with the process of doing so, can be phrased as potential research questions:

- Can games or gamification be used to engage manufacturers with service transformation?
- Can games or gamification be used to teach manufacturers about service transformation?
- Can games or gamification be used to obtain data related to service transformation?

Our approach to these questions has been to co-create a game with select industrial partners, which has in turn been used to engage manufacturers with service transformation. The Service Transformation Game: Snakes and Ladders to Advanced Services is the outcome of this process. The game functions by assigning transformation steps to a Snakes

and Ladders board, and assigning potential barriers and enablers to ladders and snakes respectively. The game teaches players about transformation processes by encouraging reflection upon each step of the process as they progress and any perceived barriers and enablers they might encounter in their specific contexts.

We argue that the game helps overcome the conundrum outlined above by simultaneously engaging manufacturers with, and teaching them about, service transformation through reflective learning. The remainder of this paper discusses the co-creation of the game based on prior work in gamification systems development, and its application with manufacturers.

The Service Transformation Game

We have created a hypothetical service transformation roadmap based upon prior research into servitization and organizational change. This has been informed by a research agenda from a recent review (Baines et al., 2017). The roadmap is divided into four sections representing each phase of the servitization journey: Exploration, Engagement, Expansion and Exploitation. Through continuing research and validation with senior executives from manufacturing companies, the roadmap is subject to ongoing refinement. One comment that has emerged during consultation with executives is that a roadmap infers a linear process, which is not normally the case. Indeed, one executive stated that servitization is "a bit like playing a game of Snakes and Ladders". Following our previous work in gamification, we saw this as an opportunity to reflect the service transformation process in a game.

Game Development

Previous work (Andrews et al., 2017a) identified the similarities in approaches to conceptual modeling for simulation-based serious games (Robinson, 2008a, 2008b; van der Zee et al., 2012) and 'gameful' design processes associated with gamification (Deterding, 2015; Morschheuser et al., 2017). A process based on the alignment of these approaches was proposed for the development of games and gamified applications. An expanded version on this process can be seen in Figure 1 and Table 1. An explanation of these processes follows through a description of the creation of the Service Transformation Game.

Scoping

The different stakeholders in the game project were academics in the Advanced Services Group at Aston Business School and industrial partners from large, small and medium-sized manufacturing enterprises. The purposes of the project were:

- Teach manufacturers about the transformation steps towards advanced services (of benefit to industrial and academic stakeholders)
- Prepare manufacturers for potential barriers and enablers on the journey to advanced services in their specific contexts (of benefit to industrial stakeholders short-term and academic stakeholders long-term)
- Obtain data related to the barriers and enablers manufacturers face (of benefit to academic stakeholders short-term and industrial stakeholders long-term)

A gamified approach was deemed suitable following comments from industry that the transformation process is not linear, and the mechanics of Snakes and Ladders were immediately associated with service transformation. The budget was very limited, and a prototype board game was deemed suitable in the short-term. The skillsets were also limited to those of the academic and industrial stakeholders, who were not game developers, but had experience co-creating gamified applications in the past. The recognized association with Snakes and Ladders provided an accessible template for everyone involved.

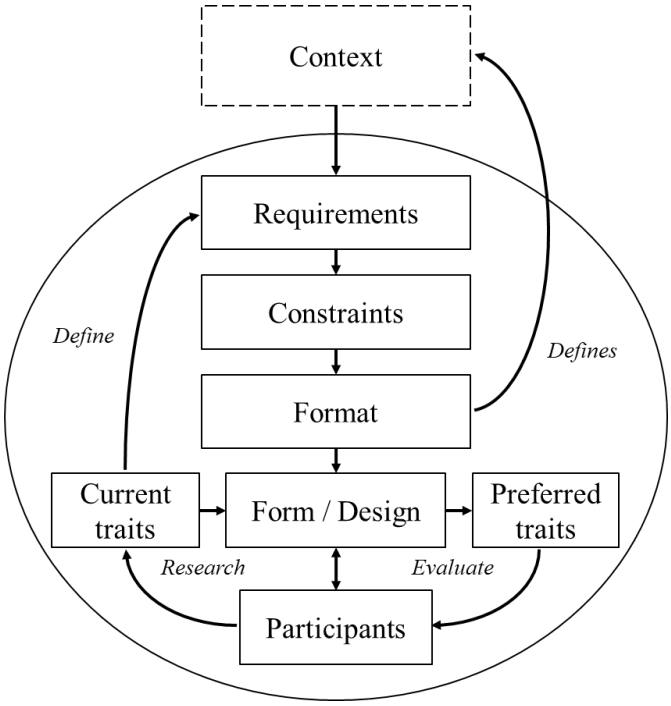

Figure 1 – Framework for conceptualizing gamification systems

Table 1 – Process for creating gamification systems

Activity	Details
1. Scoping	Identify stakeholder roles of Owner(s), Specialist(s), Participant(s), Builder(s) and Evaluator(s). Create agreed upon purpose for gamification system, and ensure gamification is suitable. Define constraints of budget, deadline, and skillset(s) available / required in the project, and availability of stakeholders.
2. Research	Define context through consulting with relevant stakeholders. Define the participants existing and preferred *traits.* Create criteria for format of gamification system, identify and select builder(s).
3. Co-design	Create sequence of events that correspond with what the participants currently do, related to the participants current traits. Envisage future scenarios based upon structure of current scenarios, and how events lead to preferred traits. Use tools to identify links between future scenarios and game design elements that encourage informed decision making.
4. Co-creation	Build low-fidelity prototypes and test interactions with participants. Build prototypes in the format of the gamification system and test interactions. Complete system based upon previous outputs in this activity.
5. Dissemination	Create implementation strategy and schedule for pilot and use results from pilot to inform final strategy and schedule. Create promotion strategy and schedule for gamification system and commit implementation. Research the engagement and performance of participants, monitor usage, and modify system if possible and necessary.

Research

The context defined at a broad level was manufacturers seeking to adopt advanced services, while at a specific level the game would be used in workshop activities by a range of companies. One of the problems being explored was that different companies experience transformation differently, and so the approach had to be relevant to different contexts.

When identifying traits, we use the categories of knowledge, opinion, emotion, action and behavior. Though they were of the opinion that advanced services have significant potential, a lack of knowledge was of concern to manufacturers considering service transformation. This resulted in traits that were of concern to the academics; the prioritization of actions that are not relevant to transformation, and behaviors which indicated reluctance and emotional indifference towards servitization. The game's criteria and preferred traits from using it would therefore be increased knowledge and confidence in pursuing advanced services.

Co-Design

Snakes and Ladders is a traditional board game. The board is divided into square units on a grid. Each player is assigned a token and their goal is to advance their token from the bottom left to the top right corners of the grid. To do this, each player takes a turn to move their token along the path of the grid by rolling a dice and moving their token the number of squares rolled. The winner of the game is the first player whose token reaches the end of the grid. Along the way, players may encounter snakes or ladders. If a player rolls a number that lands their token on a square that touches the bottom of a ladder, then they automatically progress up the grid to the square where the top of the ladder is touching. If an equivalent move lands a player's token on the tip of a snake's tongue, then they are taken back to where the end of the snake's tail sits further down the grid.

Using the snakes and ladders template, the current and preferred traits of players could be easily mapped to a game. Each square on the grid was associated with a step in the transformation journey towards advanced services. To accommodate the squares on a grid space, the phases of the roadmap (made through academic and industrial collaboration) were divided into a roughly equal number of steps. These steps are shown on the basic board in Figure 2. When playing the game, the player would consider each step they progressed through. Deeper reflection would occur in the positioning of the ladders and the snakes.

It occurred to the research team and the industrial collaborators that in some ways the current and preferred traits could be mapped onto the board as snakes and ladders respectively. The positioning of the ladders would correspond with barriers and inhibitors that were either perceived or experienced by manufacturers. Similarly, the ladders could be placed in relation to potential enablers. By competing with different companies while playing the game, each player would not only reflect on their own perceived inhibitors and enablers, but would also learn from other companies' experiences as well. This in turn would improve players' knowledge of, and confidence in, service transformation.

To facilitate this development and exchange of knowledge, the rules were adjusted slightly from a traditional game of snakes and ladders. In our version, when a player lands on a ladder or a snake, they must reflect upon and record a potential scenario related to this. To encourage this reflection, we ask players to note the following depending upon whether they encounter a snake or a ladder:

- Snake : "What could go wrong here, and how would you deal with it?"
- Ladder : "What might help you here, and how would you enable this?"

Figure 2 – The steps in the service transformation roadmap, mapped to a board

Participants should record their responses based on where the ladders and snakes are, and the steps they have jumped from and to. The initial positioning of the ladders and snakes was done during the design phase. This was based on hypothetical positions of barriers and enablers on the transformation journey as identified by the research team and select industrial collaborators. Some of these positions corresponded with milestones between phases, as depicted in Figure 2. However, through continued collaboration, the positioning was refined through co-creation.

Co-creation

The low-fidelity paper-based prototypes of the Service Transformation Game were quite similar to its final form as a board game. When testing the prototypes, the emerging traits demonstrated that participants were engaging with the game and generating knowledge through discussion of the inhibitors and enablers. Through this process, it emerged that the positioning of the snakes and ladders required refinement, as representatives from industry engaged in discussions about where they experienced, or would experience, enablers and inhibitors in their respective contexts. The outcome of this process was the positioning of snakes and ladders in the game as depicted in Figure 3.

Figure 3 – The Service Transformation Game board

Additional refinements made during this stage related to the mechanisms of feeding back reflections from playing the game. Gamification is the introduction of game elements in non-game contexts (Deterding et al., 2011), which inevitably has some impact upon these contexts, as depicted in Figure 1. The use of a board game had an impact upon the workshop environments in which it was being used and facilitated discussions around the inhibitors and enablers that corresponded with the snakes and the ladders. To exploit this, a further design revision was made in which several teams played the game in parallel, and after the games were finished the common issues were mapping against the ladders and the snakes. Example templates for these mapping activities can be seen in Figure 4. In this mapping activity, common inhibitors and enablers could be categorized and quantified by the research team, and industrial participants could continue to reflect upon and exchange information related to service transformation. In this way, the mapping activity served to complete the process started by playing the game.

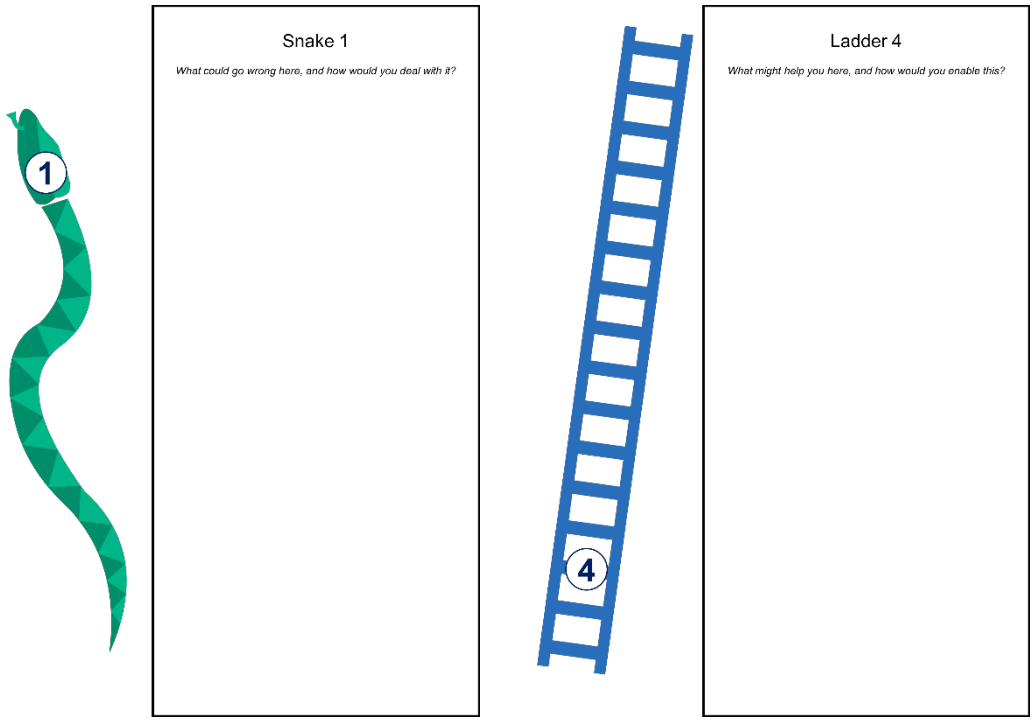

Figure 4 – Example templates for mapping enablers & inhibitors

Ultimately, Snakes and Ladders is a game of chance, and the mechanics of the game mean that players could hit the same snakes and ladders repeatedly, or not at all. This was a concern during the design phase, though it emerged during the co-creation phase that players valued the opportunity to come up with different answers each time they hit the same snake or ladder, as this resulted in a deeper reflective learning experience. Additionally, if some players didn't land on certain ladders or snakes, the mapping activity which followed compensated for this by encouraging group discussion. Nevertheless, we recognize that using Snakes and Ladders as a template did impose limitations, which will be discussed further.

Dissemination

The game was successfully piloted with senior executives from large enterprises at an industrial roundtable, who described the game as enjoyable and insightful. In this context, participants were already familiar with the subject matter. In subsequent applications, the game was promoted at industrial conferences as part of a wider remit of engaging industry with the work in servitization conducted by the research group. In the sessions at these events where the game was used, many participants had only recently become aware of the term servitization. Informal feedback and observed enthusiasm suggested that the tool provided an engaging method of introducing the subject of servitization, as well as the transformation process towards advanced services specifically.

Since then, the game has been used with participants with different degrees of familiarity with servitization. When using the tool with executives from large organizations and SMEs who are already familiar with servitization, the game provides data related to the various enablers and inhibitors that that organizations have faced or anticipate that they could face. These data had been difficult to extract previously, and thus the game served as means of representing boundary objects (Boland and Tenkasi, 1995; Scarbrough et al., 2015) for participants to engage with potentially innovative processes.

Discussion

As research into the transformation processes towards advanced services develops, both academics and practitioners will become increasingly confident in producing and applying roadmaps for service transformation. The paradox here is that a hypothetical roadmap may be needed to generate the data that informs this research. By creating and disseminating a game, we have explored a potential approach to this conundrum.

We have developed an activity that both teaches participants about the transformation roadmap and generates data that informs its continuing development. This was done by aligning the theory of transformation processes in servitization with co-creation processes of games and gamification. The Service Transformation Game takes players through the hypothetical transformation process in a way they have reported they find engaging and enjoyable. By mapping potential inhibitors and enablers to snakes and ladders, the process of generating knowledge of transformation is aligned with the mechanics of a classic game.

The strengths of our approach are accompanied by some limitations. The unique circumstances of each organization's context of transformation makes the application of a roadmap challenging, and the roadmap we have used to inform the game requires validation. The use of steps in our game and milestones between phases have been employed at a level of abstraction that we believe suits the context of use, however, we acknowledge that these will require further development. The snakes and the ladders function as instigators of boundary objects that encourage reflection upon enablers and barriers within specific contexts of transformation, which in turn will be used to refine the roadmap. Nevertheless, while every effort has been made to accommodate the input of different stakeholders in the positioning of these snakes and ladders, it is impossible to accommodate all the different inhibitors and enablers that each company will face, or where and when they will face them, in this game. The mechanics of the game itself also mean that players encounter inhibitors and enablers by chance, and some snakes or ladders could be encountered several times and others not at all. In some instances, this encourages players to generate multiple responses to questions and envisage various possible scenarios related to their specific contexts. However, this also means that the data generated will not be consistent for each use of the game. Finally, it is acknowledged that, in its current state, the game prioritizes engagement over knowledge generation, and initial evaluations have been done accordingly. This means that as a tool for teaching manufacturers about service transformation, engaging manufacturers with advanced services, and generating data, it is a compromise of all three. As research develops in service transformation, which could be informed by the game itself, it is anticipated that the balance between learning, engagement and data generation will become increasingly effective in The Service Transformation Game.

Conclusion and Future Work

The Service Transformation Game: Snakes and Ladders to Advanced Services demonstrates the potential for aligning research into servitization with established game mechanics for the purposes of generating data, teaching participants about servitization, and engaging stakeholders. The game has been successfully used at various conferences, roundtables and events with large, small and medium-sized enterprises. The game will be refined in future work related to the transformation roadmap and positioning of enablers and inhibitors, and further dissemination may occur through digitization of the game. There is also potential to generate further qualitative and quantitative data related to the forms of inhibitors and enablers participants report, and the game's effectiveness as a teaching exercise. As the game continues to be used, it will inform its own design through the generation of these data, which will in turn be used to validate theoretical transformation processes for the benefit of academics and practitioners exploring advanced services.

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