UNIVERSITY OF
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"Exploring Gamification as a Complementary Capability"

Thesis submitted in accordance with the requirements of the University of Liverpool for the degree of Doctor in Philosophy by:

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To my beloved family...

To my exceptional father and his support and devotion...

To my loving mother and her endless love and encouragement...

To my delightful sister and her kindness and compassion...

To Rose the heavenly creature...

I love you...

-O.K.

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Abbreviations

SN: Social Networking

OM: Organisational Management

ICT: Information and Communication Technologies

RBV: Resource-Based View

HR: Human Resources

HRM: Human Resource Management

MDE: Mechanics, Dynamics and Emotions

MDA: Mechanics, Dynamics and Aesthetics

SDT: Self-Determination Theory

VRIN: Valuable, Rare, Inimitable and Non-Substitutable

DWP: Department for Work and Pensions

PBL: Points, Badges and Leaderboards

CEO: Chief Executive Officer

KPI: Key Performance Indicators

IS: Information System

IT: Information Technology

CAGR: Compound Annual Growth Rate

NIST: National Institute of Standards and Technology

DDA: Dynamic Difficulty Adjustment

SMS: Short Message Service

CSC: Customer Service Centre

iOS: iPhone Operating System

MCQ: Multiple Choice Question

SME: Small to Medium Enterprise

IJOPM: International Journal of Operations and Production Management

ISR: Information Systems Research

AI: Artificial Intelligence

Contents

Abstract

Gamification emerged as a promising concept for its perceived benefits such as motivation, engagement and learning improvements, which attracted the attention of practitioners and researchers in areas such as health, education, employee engagement and customer satisfaction areas. Despite the early hype and the proliferation of literature on this topic, the growth of gamification started to quickly decline, going through the trough of disillusionment (according to Gartner's hype cycle) due to the confinement of its implementation to merely engagement tools, neglecting the anticipated potential and capabilities such gamified technologies could achieve. This research (presented across four papers/studies) is an attempt to address this gap for which the theoretical lens of organisational capabilities is adopted to explore gamification's complementarity potential. The established complementary capability angle is applied as the primary theoretical lens, which has been used for the examination of similar subjects in strategic management, organisational studies and operations management disciplines.

The study consisted of a number of key steps from theoretical reviews and examination of the subject to field studies and experimental exploration of ideas. Four distinct academic articles have been achieved as the result, each addressing a key aspect of the intended research. The first study develops a theoretical framework introducing gamification as a complementary addition to the organisation that has the potential to bring new (and contribute to) capabilities in the organisation. Built on a thorough theoretical examination of the concept, the framework depicts the different facets of gamification as a complementary asset, including a) the required game elements, b) the utilisation of engagement antecedents, c) the development of psycho-behavioural outcomes, and d) the alignment of these outcomes to build relevant individual and organisational capabilities. The second study builds upon this theoretical foundation and develops, through qualitative interviews with experts/practitioners, a gamification design method that can support achieving the strategic complementarity benefit for organisations through a) a user-centric design approach that develops intrinsic and extrinsic employee motivation, b) a goal-oriented design approach that factors in short-term and long-term individual constructs and targets organisational capabilities and c) an agile development process that incorporates robust/strategic evaluation metrics to successfully develop a complementary capability that fulfils organisational objectives. The third study presents a showcase that utilises the outcomes from the first two papers and applies them to a critical area for most organisations, namely cybersecurity, as one of the major risks that currently face businesses and societies. The study attempts this by offering design methods to target the development of human capabilities for cybersecurity using two levels of gamification, namely content and structural, as an effort to develop an effective cybersecurity awareness platform

for organisations. The fourth study is a different empirical experimentation of the concepts developed through direct application of the proposed frameworks and design methods to build relevant organisational capabilities in a targeted case. A longitudinal action research was undertaken with a UK-based company, where the researcher a) identified major internal challenges from the employees' and customers' perspectives, b) designed a gamified system to overcome the identified issues using the complementarity design approach developed in the previous studies, c) studied the effects, impacts and benefits on the firm's capabilities through quantitative online surveys and qualitative focus groups, and d) offered not only strong validation and support for the proposed theoretical contributions, but added a range of new insights for the application of gamification complementarity and generally supportive technologies in organisations. The successful case study allowed the research to achieve and introduce a roadmap for organisations to adopt and properly foster (and harness) gamification's strategic benefits.

The overall research outcomes propose new insights on strategic complementary benefits of gamification, supporting it as a valuable investment in organisations. The studies offer nuances in design methodologies for the development of ICT-based technologies, which has the potential to be extended to other areas of interest. The research also provides several contributions towards theory and practice and manages to push gamification from the trough of disillusionment up the slope of enlightenment and place it, as an important technological solution, on the plateau of productivity for practitioners and also for academics to be able to examine its full potential.

Introduction

Due to the dynamic and rapidly changing nature of today's environment, many organisations have been eagerly seeking sustainable competitive advantage through technology advancements (Chesbrough, 2003) that pledge to assist in building essential organisational capabilities such as learning, collaboration, innovation and strategic flexibility, which have been heavily researched lately due the complex nature/process of their development (Allred et al., 2011; Dosi, 2000). Recently, gamification has been identified as a powerful mechanism that can be used to stimulate some important organisational aspects as well, such as employee engagement and motivation (Robson et al., 2015; Zichermann & Cunningham, 2011). The significant potential and perceived benefits of such utilisation within organisational context attracted lots of practitioners and researchers, but despite the proliferation of literature on this topic, much of the focus on organisational gamification has centred solely around its motivational benefits as it relates to employees' performance (Hamari et al., 2014). The focus of these applications was merely to implement a gamified platform that acts as a short-term solution for emerging engagement issues while neglecting the huge strategic potential and capability-building capacity such gamified technologies can offer. From a theoretical perspective, these gamified solutions were mainly studied from an individual, short-term system interactions point of view, lacking any in-depth examination of purposeful design methods of game element utilisation to develop long-term/strategic organisational impacts. This led to a major gap in exploring the potential benefits of introducing gamification as a technology-enabled complementary asset that can develop (and assist in building) important organisational capabilities to support practitioners and academics adoption.

Therefore, this research is an attempt to address this gap by exploring gamification's complementarity potential, for which the established complementary capability theory (Teece, 2007) is identified and adopted as the primary theoretical lens. Drawing upon gamification theories (e.g. Hamari et al. (2014)) and technology in practice theories (e.g. Orlikowski (2000)) as well, the research demonstrates the key constructs inherent in gamification (mainly focusing on the technology-enabled side of gamification) which work interactively to lead to added value in the form of building organisational capabilities (Teece, 2007; Winter, 2003; Ambrosini & Bowman, 2009). Following a PhD structured as papers approach, the research consists of four interrelated papers that collectively aim to explore the potential of gamification's complementarity within organisations by employing a new lens that studies the design process, strategic benefits and impacts of gamification as a capability-building technology facilitator.

The first paper aims to develop a theoretical framework for gamification as a complementary capability. The paper explores the potential value of gamification and its mechanisms to impact staff behaviour, their way of working, their abilities and capabilities, and consequently organisational capabilities (e.g. innovation, collaboration and learning), on which there is very limited research. A conceptual framework is proposed to illustrate the complementarity potential of gamification through the incorporation and integration of three main perspectives: gamification as a game, gamification as a structure-enacting technology-enabled solution and finally gamification as a motivational affordance. The main outcome of this paper is a purposeful gamification framework capable of complementing and influencing other organisational capabilities through a) purposeful choice of game elements that act as intrinsic motivational affordances, b) targeting relevant psycho-behavioural outcomes by devising relevant self-determination factors and states of flow and c) aligning individual behavioural changes towards high-level (and long-term) organisational objectives manifested in the respective capability building constructs. Hence, the paper provides new insight into the existing literature, advancing the understanding of gamification's complementarity, going beyond the current superficial perception of gamification as an engagement tool. The models developed propose new strategic complementarity benefits fostered through gamification adoption, with a clear contribution to both theory and practice.

The second paper utilises these findings and explores how to design gamified systems (or conversely not to) that can achieve their strategic, capability building, potential. A qualitative study was employed based on the first paper's theoretical framework to examine gamification design methodologies that can achieve complementarity from a designer (gamification service-provider) point of view. Gamification experts provided valuable insights about their practical experiences within the gamification industry and their recommended design processes for achieving strategic complementarity. The results provide a practical gamification design framework that can potentially lead to effective changes in human resource behaviour within the organisation and as a consequence, positive changes in the learning environment and social interactions, leading to improved processes, routines and ultimately organisational capabilities. The main outcome of this paper is a gamification design framework for complementarity that details a) the user-centric design approach needed to develop intrinsic and extrinsic employee motivation, b) the goal-oriented design approach that needs to factor in short-term and long-term individual constructs to target respective organisational capabilities and c) the agile development process that targets the right core drives through the corresponding motivational affordances and incorporate robust/strategic evaluation metrics to successfully develop a complementary capability that fulfils organisational objectives.

The third paper applies the theoretical framework of complementarity of the first paper and the resultant gamification design method of the second paper to propose a conceptual model that aims to build one specific, and crucial, organisational capability: cybersecurity capability. Using organisational learning and knowledge absorption theories, the paper examines and identifies key factors that contribute to the effectiveness of cybersecurity training programmes, and which should be attended to in developing and introducing staff education programmes. The main outcome of the paper is the proposed conceptual model that offers a practical approach to the development of human capabilities for cybersecurity using two levels of gamification, namely content and structural, which can guide the approach to effective awareness programmes in organisations. The paper also provides an expandable model that can be adapted to build training and learning capabilities beyond cybersecurity within comparable contexts.

The fourth and final paper is an action research study that, again, applies the theoretical framework of complementarity from the first paper and the resultant gamification design method from the second paper to solve an organisational capability issue for a massive company in the UK referred to as Beta (pseudonym). The research follows a longitudinal field study approach that utilises gamification to help address major strategic shortcomings during an initiative to digitalise and transform several core services/capabilities (namely, employee engagement, organisational learning, breaking silos and strategic communication). Going through an action research cycle of identifying the problem, planning, acting and evaluating the results, the researcher a) identified major internal challenges from the employees' and customers' perspectives, b) designed a gamified system to overcome the identified issues using the complementarity design approach developed in the previous papers and then c) studied the effects, impacts and benefits on the firm's capabilities through quantitative online surveys and qualitative focus groups. The research outcomes detail a successful case study (and roadmap) for organisations on how to take advantage of the strategic complementarity benefits of gamification (in a practical way that is supported by strong theoretical foundations) that was previously overlooked and narrowed down to limited short-term engagement tools.

Abstractly, the research focuses on answering the question of how gamification can help organisations build relevant capabilities from an operational perspective. This makes the research an interdisciplinary project, drawing upon organisational management perspectives, gamification technologies as well as behavioural aspects of entities within organisations from a psychological point of view. This chapter sets the scene for the context of the research, the established body of knowledge, rationale and approaches of the papers, and how they are related to one another and to the wider literature. First, the research topic is briefly introduced and the research questions are illustrated. Drawing from that, research within the main

identified areas is explored with respect to the variants of research paradigms and methods that are currently in use. Based on this, the chapter illustrates the choice of research methods for the proposed research topic with respect to the social science and organisational management literature by illustrating the reasons, implications and opportunities of making such choices.

1. Proposed Research

From a business practice standpoint, gamification has been explored through two main perspectives in the literature so far: understanding the principles of gamification; and explaining how to create gamified experiences that would help managers think about new and innovative business practices (Hamari et al., 2014; Werbach, 2014). However, the aim of the proposed research is to examine the impacts of introducing gamification as a complementary asset to organisational processes and the required tools and techniques to achieve this. This would shift the current focus of most researchers from just focusing on gamification as a tool, as the main units of analysis, to a higher-level view of gamification, and how it can be used as a behaviour changing (and engagement) technology-enabled solution to affect/enhance processes and build relevant capabilities within organisational contexts. As a result, the strategic long-term benefits of gamification, which have not been properly explored in the literature, will be examined in detail in this research so that relevant theoretical and practical contributions can be drawn out and be made available to create real organisational value from such a promising concept.

This would directly link to Flyvbjerg's (2001) arguments regarding the choice of the problems that should be addressed by the research by focusing on the end values. In this case, it is clear that the end value of the proposed research would be introducing ideas, models and methods which could lead to organisational improvement and subsequently sustained competitive advantage through using gamified tactics. This would create a richer and more practical view on the subject at hand and not just explaining how and why gamification works. This being said, it should be noted that the existing body of research in this area concerned with explaining and understanding the principles of gamification is of great value, but what is currently missing is highlighting the advantages of these findings when applied in real contexts to advance and contribute to "world building" as Flyvbjerg (2001) argues. For example, how to utilise the engagement value of gamification towards building wider capabilities for organisations instead of aiming for engagement as an end goal. As the proposed research seeks to fill in this gap, questions such as where are we going, is it desirable, what should be done, who gains and who loses, which were raised by Flyvbjerg (2001) would have clear and

expectedly articulated answers. This is important, as Schatzki (2002) argues, since the research would emphasise the practical aspect of gamification and the impact on society from a business standpoint.

Therefore, a review of gamification research in the social science literature is necessary to understand the current philosophies, approaches and paradigms, highlighting the main gaps that will be addressed throughout this research and the relevant methods (and rationales) that need to be employed.

2. Gamification and Social Science

The vast majority of the gamification literature, especially within organisational context, focuses on one research question of whether or not gamification works as a motivational tool (Hamari et al., 2014). The units of analysis have been mostly limited to engagement/psychological outcomes and changes in behaviour. Although more quantitative research has been conducted within the field of gamification compared to qualitative ones, the results have been mostly descriptive efforts that do not focus on empirical reporting of the inferential effects and impacts of such gamified systems (Hamari et al., 2014). This also goes back to the fact that the intended research outcomes usually aim to demonstrate how gamification works as a motivational tool and how it can affect an individual's behaviour. Some studies, however, have shown that gamification does not usually yield positive effects regarding user behaviour or psychological engagement (Hamari, 2013; Jung et al., 2010). This led to researchers drifting away from the hyped fallacy that gamified elements are able to engage people irrespective of the context, which can be related to Flyvbjerg's (2001) philosophical arguments about the importance of context within social science research. Although gamification has been adopted through different contexts such as education and healthcare, from an organisational perspective research is limited to (and only focuses on) the analysis of individual users. Given that users can be employees or even customers, the effects of gamification have been widely studied to understand the effects of its application on individuals with little research that studies its impact from a wider organisational perspective (e.g. organisational performance metrics and/or capabilities) (Kifetew et al., 2017; Huotari & Hamari, 2017; Warmelink et al., 2020).

From the social science research point of view, gamification is still in its early stages of development. Since the term was properly introduced in 2011, very few empirical research efforts have been conducted in that area, which in return creates a considerable opportunity for this reach. Most of the published research on the subject has focused on the explanatory aspect of gamification from a descriptive and conceptual view (Robson et al., 2015). An

example of these descriptive efforts is Huotari and Hamari's (2015) descriptive work of relating gamification to economics. Although these efforts lacked the empirical dimension of trying to test or build any theories, the work was influenced by the positivist approach to research, as is the case with most economics studies, by trying to propose quantifiable reasons of modelling human behaviour who are subjected to those gamified experiences (Majuri et al., 2018; Osatuyi et al., 2018). As they draw heavily upon behavioural economics and how they relate to the decision-making process of a participant within a gamified system, they lack a deep understanding of the motives and feelings that would engage those individuals during such experiences and to be able to utilise them in a strategic capacity. This is a typical state of work in the field, which can be associated with a lack of interpretivist in-depth investigations expected in a qualitative approach.

On the other hand, Robson et al. (2015) and McCallum (2012), among others, followed a more interpretivist approach in trying to understand the principles of gamification and how and why it works. These approaches are supported by the use of case studies which again show the adoption of a more constructivist approach. This was the case since answering questions such as how and why, as argued by Saunders et al. (2012), would usually involve adopting such research strategies, especially case studies. Others, like Remi-Omosowon et al. (2016) even took this one step further by conducting action research to observe the effects of deploying a gamified system on employees. As is the case with action research, several steps were conducted in an interpretive cyclical progressive manner (Whyte, 1991; Eden & Ackermann, 2018), where the diagnosing phase required some investigation (Eden & Huxham, 1996), which was conducted in an interpretivist qualitative approach by conducting in-depth interviews. This shows how the current research within this area is starting to take a more field-oriented practical approach to understanding and interpreting the effects of gamification.

One important aspect deduced from the literature about gamification is the focus on educational and health aspects of it. Considerable research has been conducted within these areas such as the work done by Maturo & Setiffi (2016) regarding how and why gamification can be used to address different health aspects. Although their research followed a mixed-method approach, they justified this by the importance of understating the emotions of the participants. This is completely aligned with the main purpose of using interpretivist methods, especially since human behaviour, motivation and feelings act as the main unit of analysis (Flyverg, 2001; Bryman & Bell, 2011). This focus on the health and educational applications of gamification directed the focus to the social benefits of the topic, which may be visible in the lack of postmodernist driven research addressing the ethical implication of gamification, given that it was briefly mentioned throughout different research works (Huotari & Hamari, 2015).

However, this focus potentially evidences how researchers are deviating away from the actual implementation of gamification within organisations to engage employees or attract customers to achieve strategic objectives (Robson et al., 2015) (Meloni & Gruener, 2011).

Within the discussed research areas, there are a number of paradigms that have been identified. From an internal business standpoint, employee engagement had been widely researched. Many models have been formulated and utilised as a way of incentivising employees. Although this area has been explored from different perspectives (also different realities as Flyvbjerg (2001) would argue), the literature became rich with what is called inscription devices (Law, 2004). There have been lots of crafted models like the 3D work engagement model by May et al. (2004) that highlights the main physical, emotional and cognitive engagement components or frameworks such as the job burnout model (Maslach et al., 2001) that illustrates the hygiene elements for engagement and satisfaction of employees based on Herzberg 's (1964) work hygiene factors. Significant amounts of research have also been published regarding explaining how these engagement models affect employees and how employee satisfaction in general can affect productivity, using qualitative and quantitative approaches to understand and explain these causalities respectively (Truss et al., 2006; Gallup, 2004). Other researchers focused on measurements and crafted several tools to measure employee engagement such as Bakker (2007) and Harter and Schmidt (2008).

Although all of these efforts have been widely useful and extensively adopted by practitioners, the efficacy and sustainability of these employee engagement methods were challenged when gamification was introduced in 2011 (Kaplan, 2011). Gamification methods challenged the acceptance of what is known as the "hinterland" in this area (Law, 2007), relating to all the routine efforts of crafting specific engagement models and incentive systems that more or less rely on theories of economics without taking the importance of context and demographics changes into considerations. Gamification on the other hand focused more on context-specific factors such as the exposure of current technologies, lifestyle and demographics (Kaplan, 2011). This goes back again to the importance of context and why Flyvbjerg (2001) emphasised on shifting to a more phronetic research by examining phenomena that are variable in time and space and are mainly context-specific. When researchers started investigating these aspects, more explanations were identified within this area. Bershidsky (2013), for example, highlighted the lack of loyalty within Generation Y (one of the issues addressed in the fourth paper) as an arguably common feature, based on his research, and tried to explain the dissatisfaction levels within the majority of the new workforce (being mostly from Generation Y) by explaining the causal relationship between loyalty, job satisfaction and retention rate (CIPD, 2013). This opened up a new area from a psychological and behavioural point of view

as gamification efforts were observed to be successful when it came to hiding uninteresting tasks behind game enjoyment to make them more appealing (Kim et al. 2009).

However, despite the anticipations, the value of gamification does not seem to have been well appreciated, evident in the fact that the market growth for gamification has started to lose ground to other emerging technologies before reaching its full potential. According to Gartner's hype cycle report (Scheibenreif & Hagemeyer, 2014), gamification went through its hype cycle very quickly from its peak in 2013 to a major drop in 2014, interpreted as the effect of disillusionment. Several contributing factors caused such decline such as the limited scope of implementation, which confined gamification applications within a rigid moulding that was manifested solely as an engagement tool, sacrificing all the anticipated potential and capabilities such gamified technologies could achieve (Kifetew et al., 2017; Warmelink et al., 2020). This led to the pursuit of such technologies as an end-goal (against strategic facilitators), with no real long-term outcomes expected as a result, which had an adverse impact on the perception of gamification and the benefits sought, leading to a rapid decline in the usage and utilisation of such promising technologies. Therefore, this research is an attempt to offer a fix to this misperception by employing a new lens that presents gamification as a technology-enabled capability that has complementarity features that can help organisations build complex capabilities.

3. Research Opportunity

As indicated earlier, the main research focus would be answering the question of how gamification would impact organisational capabilities if employed as a complementary asset within organisational context. Organisational capabilities are defined as a collection of abilities, skills and expertise owned by an organisation in terms of its individuals' collective abilities and competencies (Ulrich & Smallwood, 2004) needed to create certain outcomes (Makadok, 2001). The importance of this capability angle is evident due to the potential strategic benefits and organisational values that can be created by employing a complementarity lens. By aligning targeted behaviours towards organisational goals, gamification can help build the right capabilities for achieving long-term strategic goals, which is expected to be of huge value to academics and practitioners, given the lack of such implementations from the literature (detailed discussion is available in the first paper).

The rationale behind choosing this complementary angle regarding gamification and its impacts on organisational capabilities is threefold. First, the complementary angle elevates the utilisation of gamification from a short-term engagement tool into a strategic asset with long-term organisational impacts, which is an angle that has not been properly addressed in

the literature and as a result gamification usage has been trivialised (discussed in details in the first paper). Second, the adopted capability view is necessary to help build a robust and clear set of design guidelines for academics and practitioners (e.g. gamification developers) on how to properly devise effective gamified platforms that can target several human-based processes and routines needed to build a diverse set of strategic and competitive capabilities for an organisation instead of individual interventions that are not theoretically grounded nor strategically impactful similar to the ones available in the current literature (detailed in the second paper). Finally, this view provides a fertile ground for organisational adoption of the proposed design methods regardless of any firm-specific goals, capabilities or strategies. Hence, a wide application spectrum is provided, which, again, addresses a major gap in the literature and responds to a massive hype surrounding organisational gamification (from a strategic perspective) that is much needed by firms within the current dynamic and rapidly changing environment. Therefore, the third paper provides a theoretical application of those design methods to an urgent organisational capability (namely, cybersecurity awareness) that has not been properly addressed in the literature till this point and compares the benefits and efficacy of the propositions with alternative interventions available in the literature. Similarly, the fourth paper provides a practical application of the proposed methods to a diverse set of capabilities through an empirical study to demonstrate the gamification process, the usefulness of the capability view and the complementary utilisation and the strategic benefits of the developed design methods in comparison to other interventions.

Although the research in hand can be perceived as an effort in developing a substantive theory compared to middle range and Grand theories[1], future contributions and advances within the field have the potential of reaching (and possibly exceeding) those of the middle-range ones[2]. This is due to the fact that this research, as any substantive work might be, is bounded and restricted by time and place (even specific organisations) (Saunders et al., 2012). However, as an initial effort of changing the ways managers deal with the theories of human motivation, this research and future ones can potentially utilise theories and empirical approaches to formulate behavioural changing tools based on significant advances in information technologies. It is also worth noting that one of the main aims of this research is to take what has been widely observed as a successful phenomenon (gamifying experiences) and try to find useful ways of applying this (as a complementary asset) in organisations to build relevant capabilities. As it is obvious, this would also align with the pragmatism philosophy regarding

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[1] Grand theories are perceived as large contributions to science that usually change the way people understand the world (Saunders et al., 2012)

[2] Middle range theories are the significant contributions that would lack the capacity of changing how people understand the world as it is the case with Grand theories (Saunders et al., 2012)

the importance of relevancy of the conducted research to practice (Watson, 2011). Therefore, the aim and objectives of this reach are as follows:

Aim: Explore and study the complementarity potentials of gamification within organisational context.

Objectives:

- Develop a theoretical framework for gamification as a complementary capability – first paper
- Develop a gamification design framework for complementarity purposes– second paper
- Theoretically and analytically examine the ideas proposed in the first two papers. For this, a conceptual model is proposed for the development of human capabilities for cybersecurity as a case study for gamification complementarity – third paper
- Apply and test the complementarity frameworks in a real case (longitudinal action research) to develop organisation capabilities using gamification – fourth paper

4. Research Methods

From a philosophical side, the research in hand would be largely leaning towards the interpretivist approach, through understanding and highlighting differences in social actors, within the business and management research. From an ontological perspective[3], gamification relies on behavioural changes and social settings that are heavily context dependent. That is why the interpretivist is in favour due to the complexity of the social context within targeted business situations that would lead to behavioural changes (if any) at specific times. Similarly, from an epistemological perspective[4], different social actors and their behaviours will need to be understood beside the motivating actions behind such behaviour changes. This again reinforces the fact that the knowledge that needs to be generated, captured and accepted within these social contexts would need deep understanding and digging beneath the surface of what is an observable phenomenon in order to understand the reality of such details. This is also supported by von Wright's (1997) view on the differences between understanding (more interpretivist) and explanations that typically lack the intentionalist or semantic dimension of understanding. Again, an interpretivist approach would be more suitable in this case since facts and causal laws would not adequately explain and illustrate the motives and meaning

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[3] Ontology is the study of the nature of reality and being from a philosophical side (Saunders et al., 2012)
[4] Epistemology is concerned with the theory of knowledge and what is perceived as acceptable knowledge (Bryman & Bell, 2011)

behind the actions that are deeply rooted within psychological and behavioural constructs (Gummesson, 2003; Saunders et al., 2016).

As part of discovering and gaining more insights about the usage of gamification and the corresponding effects on organisational performance aspects, in-depth interviews would potentially fulfil the required objective as a research method for the intended qualitative analysis (second paper). This also aligns with Bryman's (1988) view on the differences between qualitative and quantitative approaches being merely technical, but the choice between them relies heavily on the research question and how to answer it. This also goes toe to toe with Jupp and Clive's (1997) argument about interpretivism being more suitable within these social contexts since it inherently assumes different construction of behaviours than natural ones. Although several interviews (in the second paper) with practitioners and experts would be pursued from different organisations, the detailed and extensive analysis would also face the same issue of qualitative approaches which is the generalisability. As opposed to quantitative approaches where the selected samples would typically be chosen big enough to be representative, this is not the case with qualitative approaches. However, the cases/participants would be adequately selected to comprise some typical and/or representative cases where abstractions can be drawn from (Gummesson, 2014; Saunders & Townsend, 2016).

An additional longitudinal case study research (fourth paper) was conducted to deal with context-bound knowledge from a practical side in relation to how and why gamification is used (Saunders et al., 2012), since gamification and the nature of the required behavioural changes is highly context-dependent. This longitudinal nature would help in tracking and observing changes in behaviour over time and facilitate building the theory within the selected areas by triangulation from different methods such as the conducted interviews and case study observations and the gathered primary and secondary data (Bryman & Bell, 2011; Gummesson, 2014).

This aligns with Flyvbjerg's (2001) views, arguing that unlike natural sciences, social science should rely more on practical knowledge, intuition and context-based judgements instead of context independent rules and abstract theories alone. He justified this by using Dreyfus and Dreyfus (1980) skill acquisition stage model. In their work, they illustrate how human learning takes place while gaining new skills from a novice up to an expert (Dreyfus & Dreyfus, 2005). Their work has been supported by Eraut (1994) as well, showing five different stages for human learning: Novice, advanced beginner, competent behaviour, proficient performer and expert. Eraut (1994) and Dreyfus and Dreyfus (2005) explain how on one end the novice acts based on context independent rules and on the other end the expert would rely on intuition and effortless performance within the state of flow. Flyvbjerg (2001) uses this model to

illustrate how, similar to human learning, social science should become context dependent relying on practical knowledge and intuition rather than limited by rule-based approaches. There has however been lots of criticism of this learning model such as Gobet and Chassy's (2009) argument that analytical thinking is still important even for experts. The two views still agree on the importance of the practical and intuitive side of the model and only differ on whether it is enough or should be supported by more analytical thinking.

The proposed research method, therefore, takes into consideration what Raey et al. (2009) mentioned as evidence-based management, where evidence is used to improve management practices drawing upon knowledge from practitioners, local context, research evidence and affected parties (Briner et al, 2009). That is why a case study approach (as implemented in the fourth paper) would integrate different views from those who are involved into the practice and development of gamified systems within an organisation relating to employees, managers and/or customers who would be impacted by these gamified applications. Although case studies are always criticised for the limited number of selected cases (which sometimes can only be one) and issues with generalisations, rigorous research can be achieved by careful selection of these cases studies and using techniques such as triangulation from different sources including qualitative focus groups/interviews to ascertain the validity of the findings (Lewis, 1998). Another important aspect is that even though limited statistical analysis (if any) could be applied in these cases, still the real benefit in selecting the case study approach relies on the fact that these studies can potentially lead to richer, new and more creative insights that would help in developing new theories compared to the more limited and constrained quantitative survey approaches.

This discussion leads to the topic of validation as a typical business research evaluation criterion (Bryman & Bell, 2011; Riege, 2003). Although some of these validations are mostly quantitative-based like measurement validity[5], there are some validation techniques that can be utilised within a qualitative interpretivist approach as well. Scholars such as Guba (1985) have even gone further in addressing these differences and argued that these evaluation criteria can be perceived differently with qualitative approaches. Guba (1985) argued that, for example, credibility, transferability, dependability would fit better with interpretive research than validity and reliability. However, internal validity[6] can be achieved within qualitative research, specifically within case study approaches, by deploying some tactics such as pattern matching technique that is adopted in the second and fourth papers. For example, Leonard-Barton (1990) discussed how measurement validity can be achieved within qualitative research as multiple data sources and evidence are used (Gummesson, 2014), which would be

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[5] The extent of establishing correct measures (Voss et al., 2002)
[6] The extent of establishing causal relations (Voss et al., 2002)

the main data collection approach in the research in hand (employed in the fourth longitudinal case study paper).

5. Summary

Gamification has emerged as a mainstream buzzword amongst organisations over the last decade. However, current design methodologies and perspectives have been limiting the expansion of such a promising concept, especially within organisational contexts. Therefore, this research aims to explore the strategic potential of gamification as a complementary capability, not just as a short-term engagement tool, and the sheer benefits and impacts of such implementation on different organisational capabilities. By drawing upon several philosophical debates, the lack of vigorous empirical research within the gamification literature is evident. Some paradigms were also explored beside showing the research gap from a social science perspective that would be fulfilled by conducting this research in relation to the current limited focus of the literature and the selected methods. Based on this analysis, a more interpretivist approach was identified, utilised and justified in the four papers developed, drawing upon the nature of the research question and the desired outcomes, beside the exploration and understanding that need to be in place.

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Gamification Systems as Complementary Capabilities; A Theoretical Framework

The utilisation and adoption of several gamification systems in areas such as health, education, employee engagement and customer satisfaction have been on the rise lately. Within organisational context, the emergence of gamification as a technology-enabled solution has been received with anticipation and perceived benefits such as motivation, engagement and learning improvements. Despite the proliferation of literature on this topic, much of the focus on gamification has solely centred around its motivational benefits. This theoretical study explores gamification from the novel perspective of strategic complementarity within organisations, utilising complementary assets/capabilities and technology-in-practice theories as its foundation, purporting the utilisation of gamification to explore/exploit different resources and assets for capturing and creating new values within organisations. A conceptual framework is proposed to illustrate the complementarity potential of gamification through the incorporation and integration of three main perspectives: gamification as a game, gamification as a structure-enacting solution and finally gamification as a motivational affordance. The proposed approach identifies a purposeful gamification framework capable of complementing and influencing other organisational capabilities through a) purposeful choice of game elements that act as intrinsic motivational affordances, b) targeting relevant psycho-behavioural outcomes by devising relevant self-determination factors and states of flow and c) aligning individual behavioural changes towards high-level (and long-term) organisational objectives manifested in the respective capability building constructs. Hence, the paper provides novel insight into the existing literature of managing technologies within organisations, advancing the understanding of gamification's complementarity, going beyond the current superficial perception of gamification as an engagement tool. The models developed propose new strategic complementary benefits fostered through gamification adoption, with clear contribution to both theory and practice.

Keywords: Gamification, Organisational Capabilities, Complementary Assets, Competitive Advantage

1. Introduction

Emergence of social networking (SN) technologies has brought about extensive new promises, particularly related to enabling effective people engagement within organisations (Korzynski, 2015; Fogg, 2003), which in turn is expected to contribute to enhanced organisational capabilities such as strategic sensitivity, decision making prowess, learning aptitude and resource fluidity and flexibility (Lu & Ramamurthy, 2011; Dosi, 2000). Among such social networking technologies is gamification, which emerged and was embraced by various industries over the last decade. The concept's profile, presented as an innovative way of utilising technology-assisted application of game elements in non-game contexts (Hamari, 2013), has been consistently increasing, with some extensive applications in health, education, employee engagement and customer satisfaction areas (Banfield & Wilkerson, 2014; Dominguez, 2013; Osak, 2013). Despite the anticipations, the value of gamification does not seem to have been well appreciated, evident in the fact that the market growth for gamification has started to lose ground to other emerging technologies before reaching its full potential. According to Gartner's hype cycle report (Scheibenreif & Hagemeyer, 2014), gamification went through its hype cycle very quickly from its peak in 2013 to a major drop in 2014, interpreted as the effect of disillusionment.

Expectedly, gamification should present significant contributions to some of the mainstream philosophies and methodologies that are typically heavily reliant on the role of human resources in terms of workforce mindset and behaviour (Harper & Utley, 2001; Dyer & Ericksen, 2006) and their engagement in social and network-based activities. We however know little about the strategic advantages we may expect from introducing gamification to organisations and what values may be generated by implementing it. The literature of Organisational Management (OM), including operations management, is yet to engage properly with this topic and has been relatively silent on theorising the role such technologies can have for those adopting them. A lack of theoretical vision for the concept exists in the extant research which to our view has contributed to its undervaluation and hence the slowdown in its growth and realisation of potential.

As a technological solution, gamification may be seen from the tradition of information and communication technologies (ICT) theories and literature, while also treated from a resource-based view (RBV) and utilisation of resources point of view. Theoretically, ICTs have been considered as capabilities core to organisations or as complementary for supporting its strategic objectives and ambitions (Bresnahan et al., 2002). However, gamification, being introduced from the gaming domain, with play/fun as its primary purpose, can be associated with certain characteristics which make it distinct as a technology-enabled solution in

organisations, hence not easily explained using existing theories for ICT or organisational theories such as RBV or human resource management (HRM) in organisations.

While a technology-enabled solution for connectivity, networking and communication, gamification is primarily centred around the concept of play and game (Ford et al., 2009), which also carries psychological and emotional elements in its core, leading to behavioural outcomes/changes (Hamari, 2013; Kapp, 2012). From a technology in practice and performative point of view (Orlikowski, 2000), gamification, due to its social dynamic nature and the game elements involved in its design process, should be able to produce enactments for overcoming social inertia leading to social changes. Also, being built on organisational resources (i.e. technology and HR), gamification can be considered an asset or a capability that may directly influence or otherwise complement other assets (i.e. increase their marginal return/value) or capabilities for capturing profits associated with organisations' strategies, which is the definition for complementary assets/capabilities (Teece, 1986).

This paper is an attempt to provide a new reading of gamification for its strategic importance. Using selected appropriate theoretical lenses, we introduce a frame of thinking to explain its potential place and position in organisations and also to demonstrate the key constructs inherent in gamification which work interactively and lead to added value in the form of complementary capabilities (Teece, 2007; Winter, 2003; Ambrosini & Bowman, 2009). We address questions such as how gamification affects staff behaviour, their way of working, their abilities and capabilities, and consequently organisational capabilities in utilising resources, on which there is very limited research. We take and explain gamification as an organisational asset that can complement and influence other capabilities including innovation, organisational learning and relationships between employees, markets and customers.

This conceptual work will have important contributions to practice too: 1) Understanding of potential values of gamification and its mechanisms will help in making decisions for adopting it (hence investment by organisations). As projected by Stieglitz and Heine (2007), investing in complementarities is rational only if it is targeted at value creation and/or avoiding possible losses (e.g. revenue and/or opportunities); 2) How gamification elements can be utilised as motivational affordances in order to achieve their strategic potentials. Depiction of game dynamics, mechanics and components are discussed in light of the framework, which assist organisations in unlocking the complementarity potentials of gamification to serve its purposes.

2. Research Background

The general literature depicts gamification as a synthesis of play/game elements, enhanced by the application of technological tools that provide the required platform for the design and execution of the games. Two commonly held definitions on gamification in academic literature are: the use of game design elements in non-game context (Deterding et al., 2011); and Huotari & Hamari's (2015) that express it as a process of enhancing a service with affordance for gameful experiences in order to support users' overall value creation, specifically the experiences derived from its use/adoption. Gamified applications therefore were in principle designed intentionally to include elements of games to engage users in fun and engaging experiences (Marczewski, 2013).

However, gamification's role has evolved to be about more than just fun. New approaches see it more as game-based thinking, which through utilisation of game-like approaches can be used for solving problems and creating better experiences. Gamification is now considered to constitute value creation capability through cognitively demanding tasks that help broadening the overall horizon of activities within the organisation (Huotari & Hamari, 2012) and motivate people or assist in performance improvement (Wang et al., 2017). Kapp (2012) suggests that gamification is not just turning work into a game, but facilitating engagement, motivation and learning through a serious process that can result in new insights, understandings and skills through an enjoyable activity. Efforts have therefore been made in both research and professional communities of gamification to relate with its macro-play design principles such as the objective-challenge-reward loop (Philippette, 2014) to realise its ability not only to motivate users, but also to support and enhance strategic activities in organisations such as innovation and co-development of new products and services (Hamari et al., 2014).

Despite such background, the dominant approach towards gamification has been a reductionist one, typically confining it to points, badges and leaderboards (PBL) akin to games played for entertainment purpose (Kifetew et al., 2017). Existing definitions and approaches have been challenged for either their generalisation or lack of a connected theoretical framework (Huotari & Hamari, 2017) to reflect its multidisciplinary nature and to properly explain gamification's role and position within organisation. Warmelink et al.'s (2020) extensive review of the gamification literature highlights a) the narrow scope of game element utilisation, b) the limited availability (and use) of comprehensive constructs/concepts and c) the lack of behavioural/outcome assessment with validated measurement instruments. Therefore, we argue that to understand gamification and utilise it properly, a shift in perspectives is necessary.

Researchers have referred to gamification as the means of utilising virtual worlds for social change (Oceja, 2008; Kim, 2015; Oceja & González-Fernández, 2016), which relate to the more advanced theoretical views on the nature and role of technology in society and organisations, such as the structural and performative perspective (Orlikowski, 2000; Schultze & Orlikowski, 2010). From this point of view, organisations and people enact new and different structures by interacting with technologies and consequently appropriating structures during their use of the technology. Such embodied structures are therefore emergent in nature and come to existence through recursive interaction between technology users and the technology itself within a social dimension (Schultze & Orlikowski, 2010; Fogg, 2003). Technology in this way, according to Schultze and Orlikowski (2010), is interpreted with an in-practice lens, demonstrating three dimensions for enacted structures: facilities available to the users (e.g. technology tools); norms that inform the ongoing technology practice (e.g. work practices and protocols); and interpretive schemes (e.g. tacit and explicit knowledge). These fit well with the nature and principles of gamification frameworks, which usually consist of ongoing monitoring and updates from user activities leading to adaptation to user behaviours, usability and usage patterns (e.g. impact on norms and interpretive schemes). This lens helps identify and understand how gamification, as a technology-enabled solution and not just a tool, can produce different types of enactments associated with users interacting with technology.

Using Orlikowski's (2000) view, we can associate gamification with social change, which happens when the interaction with technologies results in new practices, norms, relations or even complete transformations. An important point to highlight here is the fact that unlike most off-the-shelf technologies that are implemented within organisations, gamification is not the end product/technology in itself. In other words, gamification is not the typical technology that would face social inertia, rather the technology-enabled facilitator that can potentially overcome social inertia faced by other/new technologies (or activities) within the organisation. In this way, gamification would help in increasing adoption and usage of new technologies within firms, and therefore not as a one-time end-user application by itself. This role can be interpreted as a capability building practice or facilitator.

The above arguments highlight the capability perspective as a highly potent outlook for understanding gamification, which is missing in the existing literature. The arguments indicate gamification as complementary capabilities or assets (as opposed to core capability or asset), which conceptually was introduced as a key dimension of organisational capabilities to support it achieving strategic objectives as well as understanding the performance of new technologies (Teece, 1986; Dosi, 2000). A complementary asset according to Teece (1986) is a resource or capability that supports capturing the desired outcomes from introducing and implementing a strategy, technology or innovation. Complementary assets can be crucial to

firms when developing products or entering new markets, acting as a set of supporting assets in the process (Helfat & Lieberman, 2002; Schoenecker & Cooper, 1998). Barney (1991) explains how resources and capabilities needed for building complementary assets can vary from being human, organisational or physical resources. Examples of complementary assets in the literature include process innovation and implementation (Christmann, 2000), R&D, production and sales force assets (Rothaermel & Hill, 2005) and also workforce organisation and training (Bresnahan et al., 2002).

From an RBV perspective, investing in complementary assets can have positive impacts on a company's competitive advantage and financial performance (Helfat, 1997; Teece, 1986; Ulrick & Lake, 1991). Activities are considered complementary if performing more of any one of these activities increases the marginal profitability/performance of other activities (Milgrom & Roberts, 1995). For example, complementarities between human capital (such as training and learning) and other organisational resources have been shown to have a positive impact on an organisation's performance (Crocker & Eckardt, 2014; Mackey et al., 2014; Wright et al., 2014). Amit and Schoemaker (1993) argued that these strategic assets are intangible resources/capabilities that are tacit and firm-specific. Based on this definition and Teece's view, we propose gamification as a complementary asset (that complements activities such as human capital, training, technology adoption) through a re-designed process that would have a positive impact on the marginal performance and the strategic outcomes of the firm (See Table 1).

Table 1: Differences between traditional and proposed views of gamification

Differentiating factors	Traditional view of gamification	Proposed view of gamification
Perspective	A reductionist view of game elements with generic points, badges and leaderboard motivators	Complex game elements that enact specific structures and result in social change
Objectives	The development of entertaining gamified system	Utilisation of gamified technologies as a facilitator to build capabilities
Design approach	Short term engagement tool	Gamification as a complementary capability to build other capabilities with strategic long-term impacts/objectives

3. Conceptualising Gamification as Complementary Assets

Building on the above review, we propose that gamification can play as an important complementary asset within organisations for building and supporting core organisational capabilities and achieving strategic objectives. Figure 1 depicts gamification, by utilising the technology perspective, designed and devised as what is primarily known as motivational affordance (Huotari & Hamari, 2012) through the right combination of game elements (Werbach, 2014). Our contention here is that such framing would act as complementary assets that contribute to organisational strategic objectives hence competitiveness. Theoretically and as depicted in Fig. 1, this causal effect emanates from the behavioural changes in people that result from the psychological outcomes of motivational affordance and engagement designed in gamification. We explore and explicate this view in the following, leading to insights about how gamification processes and mechanisms act to support some of the valued activities and strategies in organisations, such as innovation and collaboration capabilities, leading to our conceptual framework for conceptualising gamification.

Figure 1. High level architecture of gamification as a complementary asset

3.1 Gamification as Motivational Affordance

In principle, gamification can be explained as the means to utilise motivational affordance, or the actionable properties between an object and an actor such as game elements, to influence and attract the players to the system and to extend the duration of their interaction (Zhang, 2008). In gamification, technology enhanced games (i.e. a game-like approach to aesthetics and usability in computer based systems/products) are purposefully designed to create a

gamified environment for players/users with two purposes: first, engage them towards a level of flow (as a state of mind of utter concentration on and absorption in the task at hand (Csikszentmihalyi, 1990)); second, to motivate them intrinsically in the process (Groh, 2012) to facilitate self-determination (Roy & Zaman, 2017). These can induce and enhance players' learning and lead to behavioural change (Cristea & Lei, 2016). Motivational effects of gamification result from the experience of enjoyment in playing games, making it a preferred medium for learning and to continue using it. Gamification is a fertile ground to enable self-determination through incorporating key factors of the self-determination theory (SDT), namely autonomy, competence and relatedness (Ryan et al., 2006; Ryan & Deci, 2000). These elements, as the cornerstone for engagement (Bakker, 2011), motivate people intrinsically (unlike extrinsically rewarding motivations) to take certain actions and bring longer term behavioural changes (Lilienfeld et al., 2010) (see Figure 2).

Gamification
Utilises game elements as a facilitating technology

Stimulates self-determination factors	Achieves a state of flow

Motivational affordances develop engagement loops and positive emotions

Psychological outcomes: Motivation and Engagement
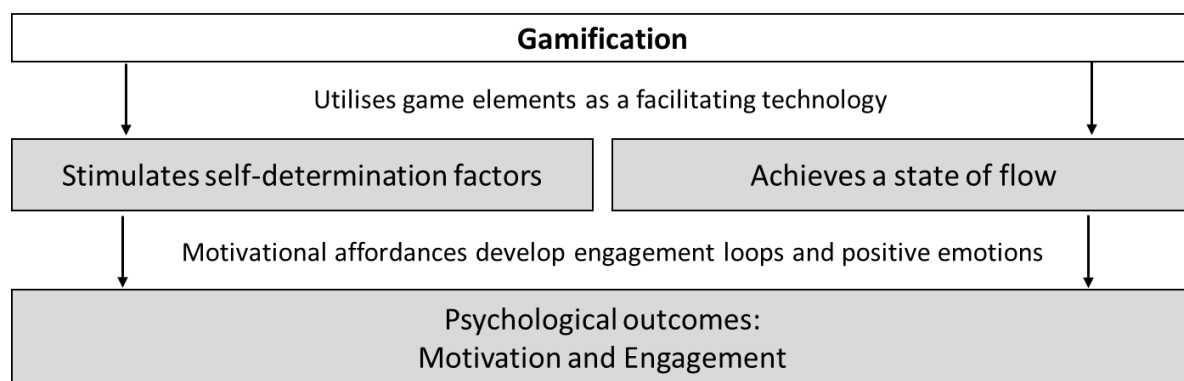
Figure 2: Gamification can act as a motivational affordance by addressing self-determination factors and maintaining a state of flow

Gamification frameworks (e.g. Werbach's (2014) and Dignan's (2011)) are therefore typically made up of multiple building blocks, referred to usually as elements, integrated to achieve the targeted engagement and motivation purposes (Zichermann & Cunningham, 2011; Kapp, 2012). Gamification elements include three main parts: game dynamics, game mechanics and game components (Werbach, 2014), that form a system with hierarchical relationships designed based on users' needs into ICT-based applications supported by aesthetics. This highlights game elements choice as an important aspect of gamification, suggesting that the constituting elements should be adequately selected and crafted to align with specific needs of the business and its business environment, and that there is no "fit for all" structure for engagement and motivation (Hamari, 2013). To understand Gamification's motivational

affordance feature, we briefly review how gamification elements work, leading to a conceptual model and a proposition.

3.1.1 Game Dynamics

Game dynamics are the general set of rules, aims and objectives that serve as an overall framework for the gamification model (Werbach, 2014). Dynamics of the game are provided via three key factors: First, certain constraints are defined that should be followed in order to progress throughout the game (e.g. by gaining points) (Bess, 2013). These constraints shape how people (or employees in our case) should behave or act within a defined framework. This can be set as physical rules (operational rules that define activities), business rules (industry related rules) or social rules (constraints that regulate the social behaviour). This is followed by the progression factor which satisfies the natural tendency and desire of people for learning and development (Ryan et al., 2006). For this, instantaneous visual feedback about performance improvement is offered which can be considered as a reward on its own (Kapp, 2012). This would help players/employees recognise progress patterns and better understand the impacts of their actions and/or activities within an environment. As a result, players are incentivised, satisfied and potentially becoming more motivated and engaged individuals (Zichermann & Cunningham, 2011). Third, is the story or narrative as the path that guides the player towards goals (Kapp, 2012). This is important to provide the required context and also increase the players' understanding by guiding their attention and actions.

From a psycho-behavioural point of view, game dynamics tap into basic intrinsic motivations (based on SDT) such as autonomy, competence and relatedness through creating engagement loops that utilise emotional and social aspects to increase engagement and motivation (Zichermann & Cunningham, 2011). These loops pull players in and incentivise specific actions (e.g. certain rules and constraints), and reward users (for competence) by providing additional incentives for additional actions (e.g. progression loop). The immersion into these engagement loops elicit positive emotions that create a fun and engaging environment that could result in complete user immersion that leads to different behavioural outcomes such as increase in usage of the gamified platform (e.g. adoption rate for customers and employees), increased productivity of the gamified task (e.g. customer service level or sales numbers) or enjoyment of the activity (e.g. engaging training).

Perhaps the most important side of the game dynamics is the emotional part related to the fun experienced during playing, resulting from the created engagement loops through constraints and progression. A major advantage of games is the element of fun which can have varied

meanings for individuals depending on their perceptions (see Lazzaro (2004)) and can impact them in different ways, depending on their preferences and typology (Dixon, 2011).

3.1.2 Game Mechanics

Game mechanics are the elements that drive a game forward (Werbach, 2014). In other words, they are the "verbs" of gamification, which encompass the processes, actions and control mechanisms required in order to gamify a certain behaviour. These mechanics are either "agency" actions that players perform or "urgency" rules that apply pressure on those actions. Example mechanics include goals, feedback, win-states, rewards and challenges.

The routes of achieving goals are usually motivational factors that are satisfied by producing a quantified outcome as a result of competition (Kapp, 2012). Although winning is a desire for most individuals, gamification is not only about winning but mastering a skill or activity to broaden experience and gain knowledge, which can be perceived as a reward for winning (Zichermann & Cunningham, 2011). Properly balanced goals and objectives in the design of games, not to be too easy or too hard to achieve, plays a role in inducing appropriate engagement from the players. This refers to the matter of player's competence level, a reality in organisations, which through design should reflect the state of the function in the organisational setting to provide motivational challenges for employees without causing frustration or boredom (Zichermann & Cunningham, 2011). From a psycho-behavioural perspective, this can lead to the 'flow zone' (Kapp, 2012), which according to Csikszentmihalyi (1990) is that "magical zone" between anxiety and boredom that can result in total involvement that people may not need external rewards to motivate them.

Also, reward mechanics in the form of immediate feedback are one of the main strengths of gamified designs as they give a sense of progression to motivate players (Kapp, 2012). These mechanics draw upon the behavioural approach to psychology, especially by utilising feedback loops and operant conditioning by associating the desired behaviour or activity to different rewards (Gazzaniga, 2010). By tapping into these psychological needs, adequately designed game mechanics have the potential of developing associating capability-based behaviours (e.g. organisational learning, training or stimulating innovation) through purposeful and desired rewards (e.g. career progression or company-wide recognition) that would keep employees hooked into the magical flow zone of progressing towards building individual and organisational capabilities.

3.1.3 Game Components

Game components are defined as the individual instantiations of gamification elements that typically build up an implemented system such as points, badges and leaderboards (Werbach, 2014). Rewarding points and badges provide immediate feedback, which gives a sense of progression to motivate players (Kapp, 2012). Different gamification components have different effects on people's motivation (Hamari, 2013). From a psycho-behavioural point of view, this again taps into the intrinsic motivational factors of relatedness and competence by providing a competitive environment for players to pursue and lead. Badges, for example, can act as an extrinsic motivational factor as well as an intrinsic one by providing social promotion of self-image within an environment (Zichermann & Cunningham, 2011). This can also be accomplished using leaderboards which can provide a positive competent environment that incentivise hard workers. An important aspect of gamification is the importance of carefully designing the gamified environment to avoid creating a mistrusted system within a poisonous competitive environment that lacks fairness and honesty. In addition, the role of artistic and visually appealing design is critical to create appropriate aesthetics that help enhance the game's meaningfulness (Kapp, 2012).

In summary, different game elements (including dynamics, mechanics and components) can motivate and engage individuals by tapping into basic human needs. These elements go beyond PBL and can act as both intrinsic or extrinsic motivational affordance; hence, provide more personalised (and customised) affordance choice to overcome the limited/generic utilisation of game elements as pinpointed by Warmelink et al.'s (2020) review of the current literature. Motivational resources, as such, can develop engagement by increasing autonomy, providing instant feedback and rewards, as in gamification, which would satisfy basic psychological needs and increase performance (Ryan et al., 2006). Based on the above discussion we can propose the following model to explain how game elements (including dynamics, mechanics and components) can act as motivational affordances through stimulating engagement antecedents, which have individual psychological and behavioural outcomes (Figure 3).
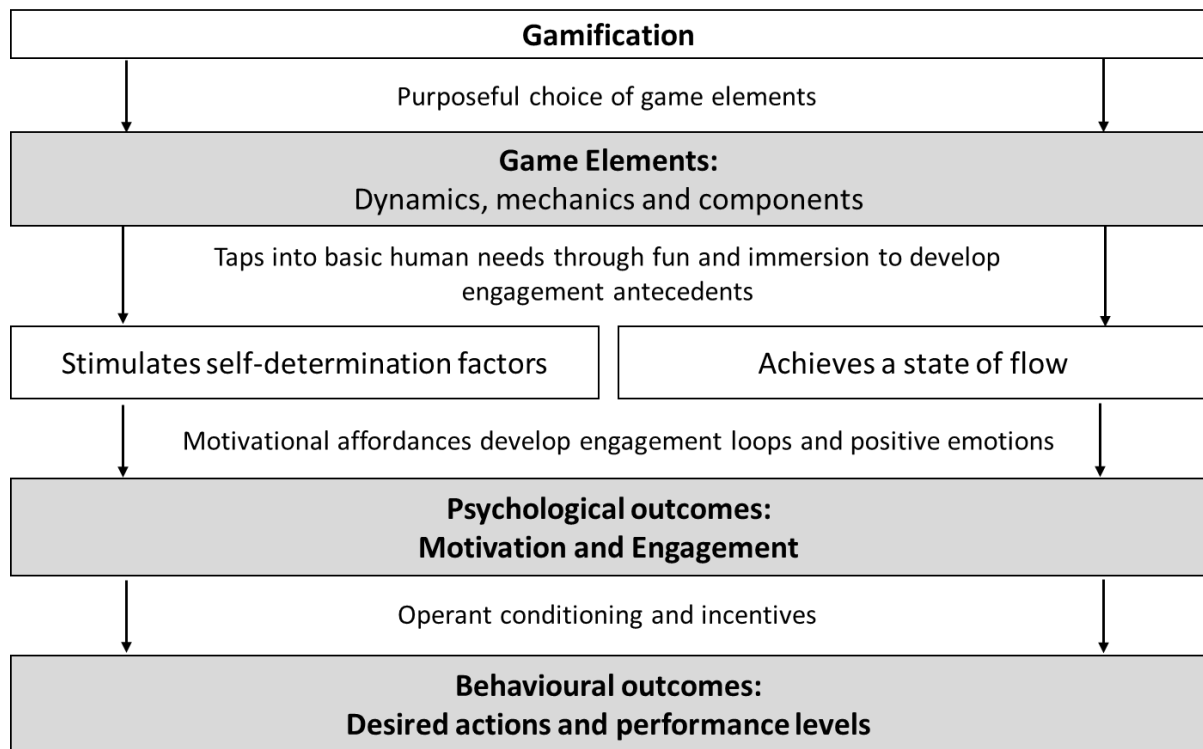
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┌─────────────────────────────────────────────────────────────────────┐
│                          Gamification                                 │
└─────────────────────────────────────────────────────────────────────┘
                     Purposeful choice of game elements
┌─────────────────────────────────────────────────────────────────────┐
│                          Game Elements:                               │
│                  Dynamics, mechanics and components                   │
└─────────────────────────────────────────────────────────────────────┘
           Taps into basic human needs through fun and immersion to develop
                          engagement antecedents
┌───────────────────────────────────┐ ┌─────────────────────────────────┐
│  Stimulates self-determination    │ │     Achieves a state of flow    │
│            factors                │ │                                 │
└───────────────────────────────────┘ └─────────────────────────────────┘
          Motivational affordances develop engagement loops and positive emotions
┌─────────────────────────────────────────────────────────────────────┐
│                       Psychological outcomes:                         │
│                      Motivation and Engagement                        │
└─────────────────────────────────────────────────────────────────────┘
                   Operant conditioning and incentives
┌─────────────────────────────────────────────────────────────────────┐
│                       Behavioural outcomes:                           │
│                Desired actions and performance levels                 │
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Figure 3: Gamification purposeful design of game elements can provide an engaging environment with psycho-behavioural outcomes

Proposition 1: Through contextualised and purposeful craft and use of dynamics/mechanics/components, gamification provides an environment for people in organisations to deeply and continually engage with activities with positive effects on their self-determination, developing a state of flow that leads to engagement/motivation and consequently positive behavioural changes.

3.2 Gamification's Complementarity

The main contention of our argument is that gamification can be considered as a complementarity (as opposed to a short-term application or an end-product of itself). Therefore, motivation and engagement factors will be the means to achieving key changes in human/employee behaviour in an effort to increase the marginal value of other capabilities by facilitating and increasing the efficacy of the capability building and maintenance process. This will build on Robson et al.'s (2015) MDE (mechanics, dynamics and emotions) framework which has similar terminologies to the discussed game elements (dynamics, mechanics and components), but with a slightly different meaning. Within the MDE context, mechanics relate to game setup rules and progression (which is equivalent to game elements in general),

dynamics relate to the interactions between players and the game (in our case, this represents enactments such as psychological and behavioural outcomes) and emotions which refer to the elicited emotions due to playing. This notion will be utilised in this study to understand how those psychological and behavioural outcomes (expressed by employees) through a purposefully devised set of emotions (crafted as a result of certain motivational affordances) can help in building certain organisational capabilities.

Exploring the extent to which such behavioural changes can be aligned with strategic objectives of the organisation to help building the required organisational capabilities is an interesting starting point for a potentially substantial research. For example, complementary behavioural activities such as knowledge acquisition (hence organisational learning), interaction (hence collaboration), increasing performance levels (hence task quality), or stimulating innovation, can be the type of factors gamification can help develop and build to contribute to strategic organisational impacts.

Previous studies have supported such a notion, of which the review undertaken by Hamari et al. (2014) presented a range of examples of motivational affordances (game elements) and their psychological and behavioural outcomes. The findings and examples from Hamari et al.'s study (2014) provide evidence that utilising the psychological and behavioural outcomes can help in identifying potential organisational capabilities that can be stimulated and/or built using gamification if it was to be implemented as a complementary asset. From a practical perspective, Bunchball (2010), one of the biggest gamification companies, published several white papers, indicating how their gamified systems helped companies such as Adobe, SAP, Cisco, T-Mobile and Salesforce achieve certain strategic goals such as increasing productivity levels, better knowledge acquisition/sharing, stimulating collaboration, increasing technology adoption rate and facilitating training. Again, this shows the potential of utilising gamification as a complementary asset as opposed to using it solely as a short-term engagement tool.

For example, based on the analysis done so far, recognition in the form of rewards and achievements (game mechanics) through badges and points (game components) can stimulate both intrinsic and extrinsic motivation leading to enjoyment and immersion (psychological outcomes). These outcomes can then be utilised to modify certain behaviour such as increasing adoption rate of certain products (behavioural outcome) or increase task performance, productivity or quality which can be interpreted as potential capability building exercise. We will explore those findings from a user/team level to understand how gamification can be utilised as a strategic asset to build individual capabilities (such as learning, increasing performance and adoption) and organisational capabilities (such as knowledge, innovation and strategy communication).

Subsequent to the above discussion, the conceptual model is further extended as shown in Fig. 4. The extended part of the model leverages the integration of psycho-behavioural outcomes to drive individual and organisational capabilities, which can potentially allow achieving complementarity.

Gamification

Purposeful choice of game elements

Game Elements: Dynamics, mechanics and components

Taps into basic human needs through fun and immersion to develop engagement antecedents

Stimulates self-determination factors	Achieves a state of flow

Motivational affordances develops engagement loops and positive emotions

Psychological outcomes: Motivation and Engagement

Operant conditioning and incentives

Behavioural outcomes: Desired actions and performance levels

Aligns psycho-behaviour outcomes with individual capabilities

Individual Capabilities: Maintain engagement, participation and adoption and learning

Aligns individual capabilities with strategic long-term goals

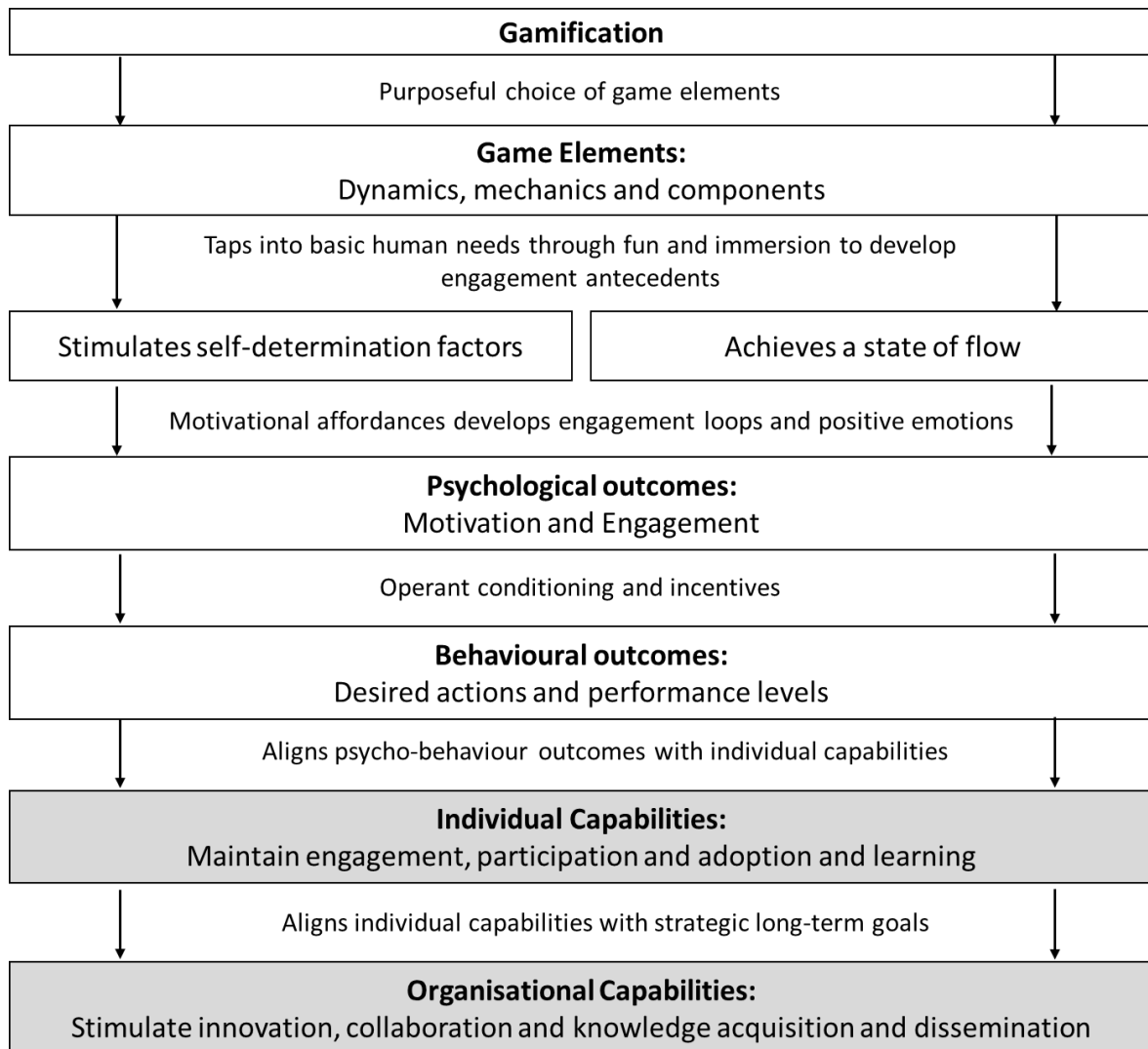| **Organisational Capabilities:** Stimulate innovation, collaboration and knowledge acquisition and dissemination |
|---|

Figure 4: Gamification purposeful design of game elements can provide an engaging environment with psycho-behavioural outcomes

Achieving this understanding of gamification is predicated on exploring it as a technology-enabled solution, utilising Orlikowski's (2000) lens, in relation to different organisational capabilities. Seeing a gamified system as a technology-in-practice formulation could allow the enacted rules and resources to lead to capabilities building rather than short-term engagements. A perfect example would be Microsoft's initiative to internally gamify their

Windows 7 testing process (Werbach, 2014). To motivate employees across different departments to participate in the tedious job of reviewing and testing Windows 7's language/translation accuracy, Microsoft utilised a simple gamified platform that kept a register of each participating team, the country they represent (and hence the language they are testing), the number of bugs they report and their relevant score (calculated based on the number and accuracy of bugs detected). Each participating team represented the region/country they were testing its language and a companywide leaderboard was updated weekly based on team scores to recognise high performing teams. The system was a massive success with around 4,500 volunteers/participants who reviewed over 500,000 dialog boxes and managed to report 6,700 bugs (Werbach, 2014). From a psycho-behavioural analysis (and using SDT components), participants felt the autonomy (due to voluntary participation), competence (due to region-specific relevant language assignment) and relatedness (due to the feeling of responsibility to promote their team/region/country and climb up the leaderboards accordingly).

This implementation reframed the whole process by motivating employees to participate in what they used to believe to be a tedious task (typical norms of testing procedures). Using the right motivational affordance and game elements (in this case country specific teams, participation score and across teams/countries leaderboards), gamification managed to immerse employees in the same facilities (testing procedures), change the norms (believing that testing is mundane) and develop new interpretive schemes (feeling of responsibility to promote self/country image by topping the leaderboards). From a technology-in-practice perspective, Microsoft managed to overcome the social inertia attributed with testing procedures and devise social change through compelling gamified tactics that managed to intrinsically motivate and attract employees towards certain behaviours (e.g. collaborative/rigorous testing) that is aligned with Microsoft's strategic goals of building a robust/high quality operating system by targeting the relevant capabilities (such as stimulating team collaboration and increasing individual performance/participation levels) needed to achieve such goals.

In this way, organisational capabilities can be potentially built by employing gamification as a complementarity, utilising engagement as the means of capability building instead being the sole end-goal. Through proper design, gamification can be introduced as a capability building asset structured by experiences, knowledge, habits, social relations, norms, and game elements.

Proposition 2: Elements of motivational affordance of gamification instigate emotional and psychological outcomes in players/users leading to measurable social/behavioural changes,

effective to organisational strategies and objectives (learning, improved performance, innovation...etc.) that targets building relevant capabilities.

In the following we identify and discuss a few key areas in organisations and the potentials of gamification, as a complementary asset, to build and help in building relevant capabilities.

4. Building Organisational Capabilities using Gamification

Organisational capabilities have been widely discussed in the literature. These capabilities can be represented as a collection of abilities, skills and expertise owned by an organisation in terms of its individuals' collective abilities and competences (Ulrich & Smallwood, 2004). They are defined as the identity and personality of the firm to bring people and resources together to create certain outcomes (Makadok, 2001). Ulrich and Smallwood's (2004) research highlighted several capabilities that tend to be present in well-managed companies. The main capabilities highlighted by Ulrich and Smallwood (2004) were: talent, speed, shared mind-set, accountability, collaboration, learning, leadership, customer connectivity, strategic unity, innovation and efficiency.

It was argued before that by employing a complementarity lens and through proper design, gamification can be introduced to drive behaviours through engagement loops and then measure them. By aligning these targeted behaviours towards organisational goals, gamification can help build the right capabilities for achieving those goals. As an example, to increase sales or drive an increase in sales, the targeted behaviours could be more calls, better qualified leads and better customer service. Gamification may be set to target such activities that prompt sales and do so in an engaging and motivating way. The desired behaviour(s) can be promoted by tapping into the relatedness component of SDT. The road to mastering those activities (e.g. attracting more accounts) can be designed to be a progressively challenging and rewarding journey for the players, which works by tapping into their competence element of SDT and developing a balanced and immersive state of flow. As a technology-enabled solution, gamification connects between employees and their objectives, aligned with organisational values, through leveraging motivational feedback loops, rewards and achievements, while enacting inspiring interactions between employees that drive them towards higher performance on a daily basis. The following are some detailed examples of how gamification can help build different capabilities such as collaboration, innovation and learning/compliance capabilities.

4.1 Collaboration Capabilities

One of the main functionalities of gamification is enhancing collaboration within an organisation. Ibarra and Hansen (2011) show that to develop a collaborative environment within an organisation, rewards should be tied with collaboration instead of individual agendas. They stress the importance of developing joint responsibilities between team members beyond individual goals to increase performance within an organisation based on case studies from GE and Akamai. Research has also shown that companies can be both innovative and efficient by building a collaborative/learning culture (see Adler et al., 2011; Gulati, 2007), to which rewarding and valuing cooperation to achieve them are crucial. Gamification can encourage collaboration by providing data about employee and team achievements and behaviours (such as in Microsoft's example).

Gamifications can also support building responsible social networking which rewards collaborative activities. This facility can enhance features such as tightening the communication between internal departments and management (Kanter, 2006) and formation of informal communities of practice for sharing knowledge (Mcdermott & Archibald, 2010). With clear accountability and oversight of such communities, communication can be more effective leading to better knowledge management. Kotter (2007) also demonstrates how communicating a clear vision, empowering employees to change and planning for short term wins are important aspects regarding transformational changes, specially by innovative companies.

Different behavioural elements used by gamified systems have been witnessed to stimulate collaboration because of the ability and mechanisms of rewarding individuals not only based on their individual efforts, but also based on their team/collaborative performance through shared goals such as team or departmental performance indicators, which can be compared to other departments or previous efforts of the same department. This can also be maintained by providing adequate rewarding and recognition structures that would favour team-based performance and productivity by using the right metrics that would create a positive competitive atmosphere across teams.

For example, SAP was able to utilise gamification to encourage employees to use the company's intranet for consultancy and advice (Herger, 2013) and gaining points for doing so, which stimulated collaboration and knowledge sharing by gamifying and incentivising internal communication, and helped identify who to reach to solve specific problems (based on their relevant score which reflects proficiency) within an organisation. Similarly, Adobe utilised some gamified tactics to motivate users to adopt Adobe ELO (an online social collaboration tool that help update forecast indicators) by linking desired behaviours, such as knowledge sharing and opportunity management, to a virtual currency system and a shared

leaderboard as an effort to enhance organisational forecast capabilities. The gamified system yielded a 325% increase in active users per week and a 727% increase in forecast indicator updates per week (Bunchball, 2010), essential for enhancing organisational performance.

4.2 Innovation Capabilities

Interestingly, innovation and stimulating innovation within organisations has already been tackled in the literature, where gamification elements were utilised as levers to encourage creativity (Robson et al., 2016). Gamification applications, such as creating virtual platforms with virtual currencies for voting for best ideas, which provide intrinsic and extrinsic motivations in the form of the joy of achieving and sharing innovative products, have shown significant success in institutes such as the department of works and pensions (DWP) (Bunchball, 2010; Brousell, 2015).

Shpakova et al. (2020) discuss the extent to which gamification can be utilised to aid the process of innovation. By dissecting game elements to dynamics, mechanics and components as previously discussed in this work, they explore how different gamification elements can be deployed in different innovation phases (based on Tidd et al. (2005) framework) such as ideation, selection, implementation and capture phases. They identify several approaches such as a) facilitating physical and cognitive ideation processes through engagement and craft of playful experiences and b) deploying gamification tools to act as performance evaluators for innovation. The work opens up new ways of gamifying the innovation process, specifically process innovation and its extension to open innovation.

On a strategic level, a firm's innovation process can be aided by gamification. In particular, practice-based innovations, arising from the ideas and collaborations of people involved in daily operations, can benefit from the inherent play and creativity associated with gaming (Hyypiä & Parjanen, 2015). Gamified practice-based innovation processes essentially facilitate a safe, creative and inspiring environment for ideas to flourish in ways not possible in the normal workplace, where fear of ridicule or embarrassment usually prevails (Hyypiä & Parjanen, 2015). Such gamified environments also empower employees by giving them the required autonomy and control over the process of innovating and coming up with a new product and/or service that has the potential of being implemented in house, hence giving them more recognition and better incentives to celebrate their success company wide. This also would give the required space by autonomous team structures which facilitates these innovative initiatives (such as in the cases of DirecTV and DWP (Brousell, 2015)), where gamification was successfully utilised to stimulate innovation through social collaboration. These gamified structures would also make it easier for resource allocation activities since

individual and team efforts can easily be tracked and maintained, providing a transparent and visually illustrative metrics for allocating rewards for idea generation or any other measurable innovation efforts. Such systems would potentially create a more trusting and transparent culture that would encourage, recognise and reward staff participation in innovative activities.

4.3 Learning Capabilities

Learning and knowledge are amongst the critical capabilities needed for building a sustainable competitive advantage (Ulrick & Lake, 1991). Becker's (1993) human capital theory propounds that human capital investments in employees' training and education can have positive economic impacts as they develop and nurture the knowledge and skills of these employees, consequently improving their productivity. This includes aspects such as formal education, work experience, workplace orientation, and organisational training (Miller et al., 2014; Shaw et al., 2013; Kim, 2009). Gamified application for learning has become popular across different industries, as educators seek new ways of motivating trainees/users in an engaging way. As examined by Stott and Neustaedter (2013), gamification present key elements for this purpose such as progression (Sheldon, 2012), Freedom to fail (Lee & Hammer, 2011), storytelling (Kapp, 2012), and rapid feedback (Kapp, 2012; Gee, 2008).

While facilitated training and awareness programmes for employees can be critical in building and expanding a company's knowledge base, it is about how effective such programmes are, and more importantly how they can be designed and delivered to serve the purposes sought. Many companies face the hurdle of providing engaging training methods that motivate employees and positively influence a behavioural change or result in compliance using proper gamification design techniques (Baxter et al., 2016; Hamari et al., 2014) beyond superficial structural approaches. Such programmes should engage learners in the process of learning (structural gamification) without providing engaging content (content gamification) (Hallifax et al., 2018). However, such a task is usually difficult and burdensome. Gamification as a complex and iterative process can be aligned with the learning objectives of the firm (through goals and rules) to achieve/enhance the knowledge acquisition process.

Gamification, if tailored to purpose and context, brings about motivation and engagement and consequently creates behavioural changes that would positively impact learning, awareness and adoption levels. By using game dynamics such as storytelling and progression, a complete learning cycle (Kolb, 1984) can be developed through a bespoke engaging experience for heterogeneous users with different knowledge, skills and motivations, that would facilitate the learning to go beyond the knowledge acquisition phase in Kolb's theory (1984). This can be achieved by re-designing the learning process through game elements that maintain

learners/employees within a flow state of learning, applying the knowledge in a risk-free simulated environment, while encouraging compliance and adoption through application of knowledge in day-to-day activities (Csikszentmihalyi, 1990).

For example, instead of just motivating employees by attaching points/scores/badges over lesson completion (which is known as structural gamification), gamification can convert the learning materials into a more engaging series of experiences (known as content gamification) through compelling narrative (storytelling dynamics), challenges (mechanics) and progression (dynamics). This approach can also prove more effective towards organisational absorptive capacity of the firm (Zahra & George, 2002). Awareness programs, if are not engaging and lack the active learning element, would adversely affect the potential knowledge absorption capacity since employees will not properly acquire the right knowledge and skills to be able to apply the intended best-practices due to unengaging materials and broken learning cycles (e.g. Tschakert and Ngamsuriyaroj (2019) and Aldawood and Skinner (2019)). Gamification instead can use engagement as means to target learning efficacy and absorptive capacity, which are the main elements towards building organisational learning capabilities, beyond just the engagement factor.

Spanellis et al. (2020) are amongst one of the very few studies that explore the role of gamification with respect to organisational learning capabilities, specifically focusing on knowledge workers. They demonstrate how the right utilisation of gamification can discover new methods to the empowerment of knowledge workers through the case study of Zappos, the online retailer. The work presents potential avenues for gamification to help support different levels of knowledge workers based on Davenport (2005), McIver et al. (2013) and Davenport and Prusak (1998) frameworks. These avenues include: a) the collaborative dynamics crafted using certain game elements (such as peer to peer rewards with points and badges) to overcome the loneliness and boredom of knowledge workers' transactional models, b) the stimulation of creativity and relatedness through gamified social circles and competitive contests to overcome the routine based/mundane work that has low level of tacitness and c) the visibility and characterisation of knowledge workers competence levels using motivating mechanics such as badges, honorary avatars and progression ladders. The overall study helps in visualising the role of gamification in an important organisational learning capability.

5. Discussion and Concluding Remarks

Gamification has gone through a strenuous cycle over the past decade. Following its formal introduction in 2011, gamification was met with a lot of anticipation, which reached its peak around 2013 (Scheibenreif & Hagemeyer, 2014). However, this hype started to quickly decline,

going through the painful trough of disillusionment. Several contributing factors caused such decline such as the limited scope of implementation, which confined gamification applications within a rigid moulding that was manifested solely as an engagement tool, sacrificing all the anticipated potential and capabilities such gamified technologies could achieve. This led to the pursuit of such technologies as an end-goal (against strategic facilitators), with no real long-term outcomes expected as a result, which had an adverse impact on the perception of gamification and the benefits sought, leading to a rapid decline in the usage and utilisation of such promising technologies.

This research is an attempt to offer a fix to this misperception by employing a new lens that presents gamification as a technology-enabled capability that has complementarity features which can help organisations build complex capabilities. Such efforts aim to push gamification from the trough of disillusionment up the slope of enlightenment and place it, as an important technological solution, on the plateau of productivity for practitioners and also for academics to be able to examine its full potential. The technology-in-practice perspective (Orlikowski, 2000) helped explore the extent to which gamification can act as a complementary asset and its capacity in utilising/exploiting resources in the procession of building complex organisational capabilities. Fostering gamification as a complementarity, achieved with the right choice of game elements and approach as a motivational affordance, would help tackle organisational inertia towards becoming more productive and innovative, and contribute to the firm's competitive edge.

While there has been some important precedence regarding the use of gamification for strategic objectives, there were no appropriate theoretical explanations for what had been examined and reported prior to this research. From the complementarity perspective, this has been an evidence of the potentials of gamification as a technology adoption facilitator, hence its complementarity role. Therefore, the work presented is an initial step to help researchers, academics and practitioners view the extensive opportunities for gamification as a complementarity.

The delineation of different game elements and their respective psychological, emotional and behavioural impacts offers an abstract roadmap for organisations to start thinking of their context-bound strategic problems and how to solve them using gamification. The proposed conceptual model offers new thinking on finding new ways for addressing old and persistent organisational problems. Our analyses highlighted some important differentiating characteristics and features for gamification in comparison to known approaches and practices for stimulating collaboration, innovation and even increasing performance levels. Primarily, gamification employs the power of technology-enabled play to create engaging and immersive experiences that positively influence employees and motivate behavioural changes

that can be aligned with long-term organisational objectives. In other words, gamification taps into basic intrinsic motivation through providing autonomy, competence and relatedness through various tools and elements to devise fun experiences. For this, different gamification elements (through variable dynamics, mechanics and components) act as motivational affordances to induce positive psychological outcomes such as engagement and motivation, which are crucial elements if aligned properly with organisational needs (and the needed capabilities) to address complex issues such as learning deficiencies, lack of collaboration, limited/closed innovation, absence of compliance or even scarce technology adoption.

The arguments in this study largely focused on what is known as "internal gamification", which is the application of gamification within organisational context (i.e. when the users are staff members and employees) as opposed to "external gamification", which is concerned with external users such as clients and customers (Bess, 2013). The presented conceptual model explains how using different game elements such as providing immediate feedback, rewarding badges and sharing competent leaderboards, gamification can act as a situational interest that facilitates interest creation towards certain activities through mechanisms such as job flow creation. Although Schaufeli and Bakker (2004) argue that flow is different from engagement, in that it is much shorter and focused and not a long-lasting state of mind as engagement, we argue that it can serve as an intrinsic motivator towards an activity (Guo & Ro, 2008).

From the RBV theory, the value of gamification, as a complementary asset, lies in its ability to leverage specialised resources and capabilities within the firm to achieve the required competitive edge. From this angle, the proposed perspective departs from the existing generic approach of gamification implementation and contends a purposeful choice of game elements that elicit specific psychological and behavioural outcomes through custom-built motivational affordances. The approach in this way will be directed towards aligning employees' performance with the intended strategic objectives, and as such engagement shall be utilised as a tool instead of an end product. Considering the RBV's VRIN's attributes (Ambrosini & Bowman, 2009), it can be said that gamification systems will develop *valuable* strategic objectives for the firm by building relevant (and firm-specific) capabilities instead of short-term generic engagement outcomes. These gamified systems would also be unique and specific to a) the firm's objectives (through goal alignment), b) context and c) employees (through alignment of users' intrinsic motivation), providing long-term impacts which can in turn be *rare* and *hardly imitable* by other firms.

The discussed work and examples that illustrated gamification's positive impacts on salient capabilities such as innovation, learning and collaboration also align with Dyer and Singh's (1998) definition of complementary assets, which propounds that such assets usually create synergies that exceed the sum of their individual endowment/rent. This was evident in the

discussed attributes of gamification as a complementarity. Short-term engagement that serves no other purpose by itself, is hardly sustainable within organisations. However, tapping into intrinsic motivators through motivational affordances such as flow and SDT elements and utilising engagement as a tool for facilitating and/or building relevant capabilities (such as innovation and learning) creates a positive synergy between engagement capabilities and core capability building processes. This can be traced in examples such as DWP and Zappos, where gamified systems managed to yield higher efficacy, engagement and performance levels (concurrently) when aligned to strategic objectives such as enhancing organisational learning or innovation.

Upon reflection, the perspective employed in this paper draws parallels to the well-known "expected theory of motivation", from the organisational behaviour literature, that explains why individuals (in this case employees) choose certain behaviours over others within organisational context (Vroom & Deci, 1995). The theory demonstrates how employees can be motivated towards certain goals if: a) there is a positive correlation between employees' efforts and their attainment of the desired performance level, b) there is a desirable outcome/goal than can be achieved if the required performance level was met and c) there is a favourable reward that can be claimed by achieving the desired outcomes/goals (Vroom & Deci, 1995). Gamification, as discussed in this paper, addresses similar elements by acting as a complementary capability that can motivate users/employees to achieve certain (strategic) goals (i.e. organisational capabilities) through purposeful crafting of game elements that a) develops a state of flow that correlates the difficulty level of each task with the incremental competence level of each employee, b) develops engagement loops that incentivise desirable behaviours through the right reward and feedback mechanisms and c) aligns these desired behaviours to long-term strategic objectives such as capability building efforts. Therefore, gamification can be perceived as a goal-attainment catalyst through aligning employees' motivation with certain organisational goals through the craft of user-specific and context-specific game elements. These elements should a) take employees' skill/competence level into considerations, b) build the required competence level through bespoke/user-specific progression loop, c) provide instant, clear and informative user feedback that articulates current and required performance levels, d) communicate individual and/or organisational goals and the impacts of task completion and/or behavioural changes on them and e) adequately reward/recognise desired behaviours in a fair and transparent way.

A contribution of this work is presenting new insights to the technology-in-practice field (Orlikowski, 2000). Application of the idea to gamification provided a new angle on different enactments expected from human interaction with technology within organisations. It was shown how the process of onboarding employees from the social inertia stage to social change

and full adoption of new technologies may be facilitated within a gamification environment. A summarised version of the proposed model is shown in Figure 5.
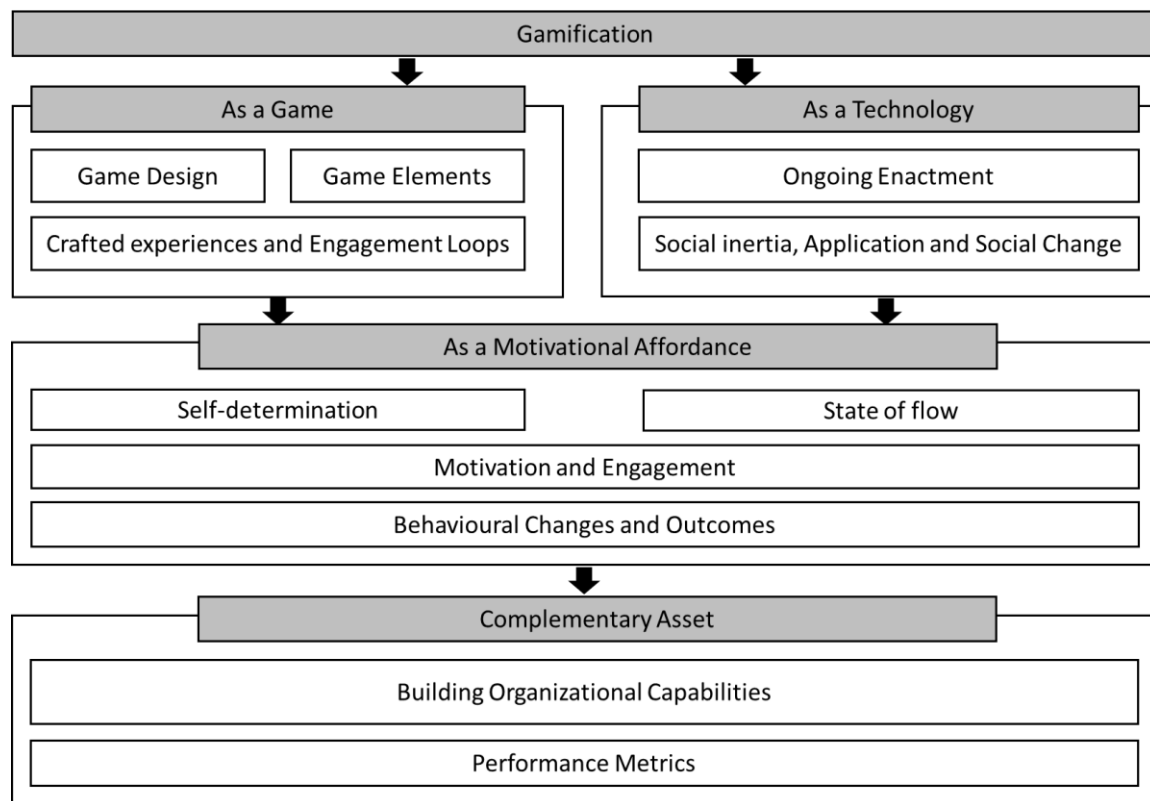

Figure 5: Gamification for complementarity summary

Although the focus of this research was conceptualising a gamification model that complements the organisational capability building process, yet there is a room for expanding the model to dynamic capabilities (being the ability to integrate, build and reconfigure, internal and external competencies to address rapidly changing environments (Teece, 1997) through potential future contributions. Teece's (2007) dynamic capabilities foundations rely on three important aspects: sensing opportunities, seizing opportunities and reconfiguring resources for transformations to cope up with the dynamism of the current rapidly changing market. Utilising the proposed model, it is possible to potentially influence these aspects.

An important implication of this study is the role of approach to gamification in terms of how it shall be designed and implemented. As an artifact, gamification is design dependent, and therefore the approach to designing and implementing gamification shall be given special attention in order to consider contextual factors and the specific targeted needs of the organisation to complement other assets and resources of the organisation. A purposefully designed gamified system can help organisations adapt to a ceaseless stream of ever changing

and evolving technologies due to the rapidly changing market. A concrete design framework with rigorous design principles will be a needed addition to the perspective proposed here. Therefore, a potential research opportunity would be expanding on this conceptual model and devising an appropriate design framework that can be utilised by practitioners while developing their context-specific gamified processes. This can be achieved by more extensive empirical studies that collect and analyse data from gamification experts to formulate design approaches and best practice guidelines that have roots in both academic and practical worlds.

As another future research opportunity worth of investigation, it will be paramount to test this conceptual model empirically in a real organisational context, typically as a case study. In that, the complementarity perspective can then be further extended by introducing and presenting tangible measures for examining the effects of deploying gamification as a technology-in-practice, and how varieties of organisational capabilities may be developed with the support of gamified systems. The research opportunities, given this new lens, are extensive. A new range of problems may be considered for future studies including gamification's capability building potential towards key topics such as technology adoption, cybersecurity and compliance (which is a prominent organisational threat that has not been properly addressed in the literature yet) and also further refinement of the units of analysis such as emotional, psychological and behavioural impacts of different motivational affordances. The new lens can contribute to new thinking for expanding on the RBV theory, in terms of whether (and how) gamification can help in shaping up and reconfiguring organisational resources (specifically human resources) for creating competitive edge for organisations.

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Gamification Design for Complementarity;
A Qualitative Study

Within organisational context, gamification has recently attracted many practitioners and researchers due to its application as an engagement tool for employees as well as customers. However, most of those implementations failed to achieve tangible long-term impacts on a strategic level for reasons such as the lack of purposeful design methods that posit gamification as a complementary asset. Designed as such, gamification can help in building different organisational capabilities, which in turn can develop a competitive edge for an organisation. The current literature shows a major gap in the extant gamification design models in providing a clear, concrete and purposeful design process with complementarity features. Therefore, this study explores the idea of developing a purposeful design framework for gamification that can realise its complementarities through targeting more long-term strategic outcomes and building organisational capabilities. A qualitative study is conducted to develop this framework through interviewing gamification experts and understanding the potential impacts of such design from their own practical experiences. The data shows a major potential contribution of gamification design towards several strategic capabilities (such as innovation, collaboration and organisational learning) through user-centric and goal-oriented design considerations that delineate the game elements, psycho-behavioural constructs and technological design considerations needed to achieve complementarity. The results provide a nuanced design framework that can potentially affect the way practitioners and academics utilise gamification.

Keywords: Gamification, Design Elements, Organisational Capabilities, Complementary Assets, Qualitative Study

1. Introduction

The concept of gamification has been booming during the last decade, promoted as an innovative way of utilising and applying technologies across different fields including education, health and organisational development (Zichermann & Cunningham, 2011). The literature shows key potential effects of applying gamification within organisations including engagement, motivation, collaboration, knowledge sharing, learning and even stimulating innovation (Lucasse & Jansen, 2014; Ryan & Deci, 2000; Kapp, 2012). This is predicated on the fact that gamification develops what is known as social engagement loops that utilise psychological and emotional constructs to increase engagement and motivation (Zichermann & Cunningham, 2011). Therefore, gamification has been received with a sense of anticipation to promise a new generation of assets that might be employed to enhance organisational capabilities (Hamari, 2014; Elsayed et al., 2018).

However, the existing studies have largely approached gamification within organisations as an interactive tool for employees that can stimulate short-term engagement and motivation (Rapp, 2015). The short-term view approach has confined the implementation of gamification to a rather narrow and limited area (Rapp, 2015; Bockle et al., 2018). This is in contrary with the recent hype around the usage of gamification in academia and industry, which suggests a shortage of studies that investigate gamification concepts and design methodologies with a strategic lens and in particular as a complementary capability, beyond superficial points, badges and leaderboards (Rapp, 2015; Bockle et al., 2018). Shortcomings in the gamification literature may be summarised in the three following aspects: 1) superficial utilisation of limited/generic game design elements that only invoke (if any) short-term extrinsic motivators, 2) lack of explanation of game elements/motivational affordance choices through comprehensive constructs/concepts and 3) use of narrow and almost trivial design frameworks that target engagement as an end goal, missing on key aspects such as using engagement as a catalyst for achieving more strategic and complementary goals such as building organisational capabilities (Warmelink, 2020; Rapp, 2015; Elsayed et al., 2018; Robson et al., 2015; Werbach, 2014; Kapp, 2012). These highlight the need for new studies to examine gamification for its strategic and potential complementary roles and also to explore gamification design aspects and the methods that can facilitate achieving such outcomes. This research is motivated by this research gap and undertakes a qualitative study of the field experts' views and experiences to shed some lights on the darker side of the subject.

While attention to more strategic impacts of gamification has been commented on by several researchers (see Robson et al. (2016) and Hamari (2014)), no clear theoretical work had been reported until the study of Elsayed et al. (2018). The conceptual model by Elsayed et al. (2018) contends that to understand gamification and realise its full complementarity potentials, we

should consider and explore how gamification relates to long-term strategic benefits impacting organisational capabilities from a technology-in-practice perspective. On the other hand, the authors contend that achieving this objective requires an accordingly appropriate approach to the design and implementation of the game elements, which should be purposefully designed to modify the user behaviour and induce the required complementarities as the result (Elsayed et al., 208). This research adopts the view of Elsayed et al. (2018) with the aim of examining it empirically. We therefore explore gamification from a design perspective addressing the questions: 1) how gamification design, hence the required gamification design elements, should be approached to achieve complementarity and strategic impacts beyond short-term engagement? and 2) what are the expected strategic impacts of an appropriate gamification design approach on organisational capabilities? A rich source of information related to these questions would be the community of relevant experts and professionals, and as such a qualitative approach was identified as a suitable method to explore the research questions. Using in-depth interviews with a selected group of practitioners in the gamification industry, the research provides a range of new insights related to: 1) the required design methods of gamification to achieve strategic objectives, 2) how different game elements can impact psychological, behavioural and emotional antecedents, and 3) the game design requirements and best-practices needed to (and their implications on) building organisational capabilities.

2. Research Background

Existing literature has largely studied and presented gamification as a motivational affordance stimulating psychological and behavioural outcomes. Elsayed et al.'s (2018) conceptual model however contends that for understanding gamification, it should be explored in relationship to different organisational capabilities as a complementary asset. In that view, gamification (as a game, technology-enabled capability and motivational affordance) can potentially have strategic organisational impacts by creating a motivational, fun and engaging environment, and as the result modifying user behaviour to align with the relevant capability building processes (See Figure 1). We first provide a critical review of the current state of literature, highlighting the gaps that will be addressed through the conducted qualitative research.
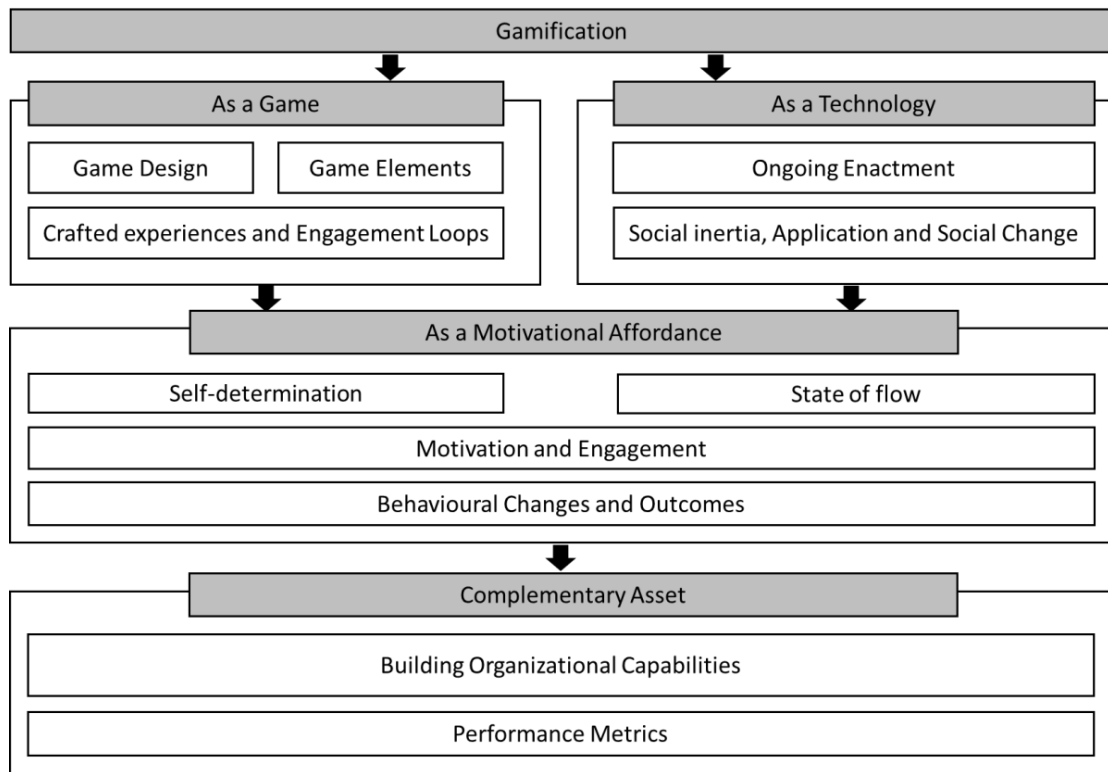
Figure 1. Conceptual model for building organisational capabilities using gamification as a complementary asset based on Elsayed et al. (2018)

2.1 Gamification and Design Frameworks

Gamification is defined as the utilisation of different game design elements within non-game contexts (Zichermann & Cunningham, 2011) for deriving certain behaviours. These design elements should be adequately crafted to align with a specific business environment, and not only added as a "fit for all" structure for engagement and motivation (Hamari, 2013). Therefore, it is important to carefully understand the players (users), their competence level and the context of design to be able to design an adequate and relevant gamification model that should provide a motivational challenge without causing frustration or alienation (Zichermann & Cunningham, 2011). This adequate design can lead to a state, referred to as the 'flow zone' (Kapp, 2012), where players can find a balance between challenge, control and progression when highly engaged and immersed in the activity.

In general, gamification frameworks are made up of multiple building blocks that share the purpose of creating an engaging gamified environment (Dignan, 2011). Given these building blocks, the aim is not to implement them separately, and instead an integrated and engaging experience should be pursued by a proper utilisation of different gaming elements (Zichermann & Cunningham, 2011). Early gamification frameworks, such as Dignan's (2011), had been criticised for missing to integrate crucial motivational items such as autonomy,

competence and relatedness (Ryan & Deci, 2000). Such key elements according to the self-determination theory (SDT) are a cornerstone of basic needs for engagement (Bakker, 2011). These elements are also necessary to attract users more towards intrinsic motivators and avoid the "overjustification" effect of extrinsic rewards that can demotivate the players if the intrinsic ones are already in place (Werbach, 2014). Addressing this, Werbach (2014) extended Dignan's (2011) model by incorporating intrinsic motivators.

Werbach's (2014) framework, which is the most referenced gamification framework (Mora et al., 2017), utilised some of the tools used in persuasive technology and design thinking to create an engaging gamification roadmap. His approach provides an abstract and a general framework that can be adapted within different organisational contexts in order to create a more engaging experience for employees. The framework is user centric, where the experience is the centre of attention not just the gamified elements, which was the main extension Werbach added to the widely accepted gamification framework introduced by Dignan (2011).

However, based on works such as Bockle et al. (2018), none of these frameworks have been able to define a structured way or purposeful utilisation of game elements that can inform the design of a gamification system with long-term effects and outcomes and strategic implications. This is supported by several reports that demonstrate the failure of many gamification-based solutions developed through mixing and matching different ad-hoc experiences and game elements, without a clear and formal design process (Mora et al., 2017).

Warmelink et al.'s (2020) extensive review of the current gamification literature also highlights gaps such as the lack of comprehensive design constructs that provide explanations for game elements/motivational affordance choices. Although there have been recognisable efforts to conceptualise a concrete design framework since 2012, yet the extant models still lack clarity, and the limited utilisation of game elements falls short when it comes to long-term strategic impacts (Azouz & Lefdaoui, 2018).

2.2 Game Elements and Motivational Design

As discussed, gamification design usually aims to change individual behaviour and attitude using engaging game elements (Fogg, 2003). These elements are categorized into: game dynamics (such as rules and constraints), game mechanics (such as competition, rewards and challenges) and components (such as points, badges and leaderboards) (Werbach, 2014). To be able to utilise these elements to develop a highly engaging activity, intrinsic and extrinsic motivators are usually deployed. Intrinsic motivators (such as enjoyment) engage users into the activity itself, making it more interesting and fun without external rewards. On the other hand, extrinsic motivators (such as rewards) are the structural incentives that attract and keep

users hooked into the activity, regardless of how engaging it is (Ryan, 2006; Werbach, 2014). Intrinsic motivators, which are harder to implement while supposedly have long-term effects, are usually considered to encompass three main elements: autonomy, competence and relatedness (known as key elements of SDT) (Ryan, 2006; Ryan & Deci, 2000). These elements, unlike extrinsically rewarding motivators that have short-term productivity effects (Lilienfeld et al., 2010), are considered the cornerstone of engagement (Bakker, 2011). However, proper intrinsic motivational game design is seldom utilised in the literature for different reasons as follows.

Most research efforts aim to increase short-term engagement (Zichermann & Cunningham, 2011; Attridge, 2009; Elsayed et al., 2018), considering it the end goal by itself rather than means to achieve more long-term strategic outcomes (e.g. learning or innovation capabilities). This approach can be traced back to the design considerations and game elements chosen, which have usually been limited to attaching scores, badges and leaderboards on "any activity" to make it seem more fun (Kifetew et al., 2017). This narrow abstraction only manages to engage users using extrinsic motivators (such as monetary rewards) as Rapp (2015) demonstrates in his in-depth user experience study. This however tends to be a rather superficial level of engagement of collecting virtual points/currencies, which does not motivate any behavioural changes, does not engage users in targeted activities and does not lead to meaningful impacts in the absence of real intrinsic motivators (Huotari & Hamari, 2015; Robson et al., 2016; Werbach, 2014; Hamari & Eranti, 2011; Baxter et al., 2016; Silic & Lowry, 2020). This typical approach has locked gamification design into what is known as the PBL parade (points, badges, leaderboards) as a convenient and ad-hoc means of gamifying activities that pursue engagement as a goal and not as a technology adoption facilitator.

Most of the published empirical research have, as the result, been focusing on studies around measuring engagement and motivational impacts of gamification within organisations (Rapp, 2015) for their psychological and emotional impacts (Mora et al., 2017; Elsayed et al., 2018). The need for a new design approach is a real one, which should target facilitation benefits of gamification to harness its full complementarity benefits beyond PBL utilisation and engagement. The new design should support the complementarity view of gamification in which the focus is utilisation of gamification as a technology-enabled capability that can be directed towards more strategic objectives (such as organisational capability building) through engagement (as means and not an end goal) to achieve organisational wide strategic benefits.

2.3 Gamification Complementarity for Building Organisational Capabilities

Complementary assets are defined as the capabilities and/or resources that help firms capitalise on the profits and outcomes associated with a technology, strategy or even an innovation (Teece, 1986; Helfat & Lieberman, 2002; Swink & Nair, 2007). These capabilities can be represented as a collection of abilities, skills and expertise owned by an organisation in terms of its individuals' collective abilities and competences (Ulrich & Smallwood, 2004; Ulrich & Lake, 1991; Maritan2001). Therefore, the essence of gamification's complementarity rests in the ability of an organisation to leverage elements of play in an effort towards building one or more of these abilities, skills and expertise, required by an organisation to build a sustainable capability. Elsayed el al. (2018) argued that by developing an engaging experience through compiling the right game elements and design approach, gamification has the potential for complementing organisational capabilities (i.e. learning and innovation capabilities) by supporting individuals as well as organisational constructs (i.e. knowledge acquisition and application). Achieving this objective requires an investigation of gamification design methods and techniques.

3. Aim and Objectives

The aim of this study is therefore to explore and develop the idea of a concrete and purposeful design framework for gamification's complementarity, targeting more long-term strategic outcomes and building organisational capabilities. To this effect we consider the following as the core research question: what gamification design methods are required for complementarity purposes, and what are their expected strategic implications?

Elsayed et al.'s (2018) model suggested utilising the gamification design cycle through the right choice of game elements, aligning strategic business objectives through capability building metrics and devising the appropriate engagement loops by eliciting the appropriate psychological and emotional antecedents of human resources. This study explores this through the following objectives:

1. Understanding and exploring the game design process that can support the deployment of gamification technologies to act as complementarities with potential strategic impacts.
2. Understanding how the game design process may trigger different psychological, behavioural and emotional factors that can be utilised to build

organisational/complementary capabilities (and their respective capability constructs).

3. Exploring the potential strategic implications of such purposeful design on organisational capabilities.

4. Methods

As indicated earlier, gamification literature has been focusing on inferring user-behaviour and evaluating short-term interaction using quantitative methods (Hamari et al., 2014). Qualitative studies have been rare in this field, especially the ones aiming to understand the long-term strategic impact of gamification (Dong et al., 2012; Montola et al., 2009). An exploratory approach was adopted in this study in order to discover more ideas and get insights from practitioners and gamification experts about their views and experiences of strategic and long-term aspects of gamification and consequently the design process that can support such an approach (Miller & Salkind, 2002). From a philosophical point of view, the research largely leans towards an interpretivist approach within the business and management research built on understanding and highlighting differences in social actors (gamification users) and processes (engagement loops and behavioural changes). From an ontological perspective, gamification relies on psychological antecedents, behavioural changes and social settings that are heavily context and user dependent. This also calls for an interpretivist or constructivist approach, which is favoured when dealing with a complex social context within targeted business situations that would lead to behavioural changes (if any) at specific times (Saunders et al., 2012). This reinforces the fact that the knowledge that needs to be generated, captured and accepted within these social contexts requires deep understanding and digging beneath the surface of what is an observable phenomenon in order to properly understand the reality of such details. Therefore, an interpretivist interviews approach is more suitable in this case since facts and plain causal laws would not adequately explain and illustrate the motives and meanings behind the actions that are deeply rooted within psychological and behavioural constructs (Gummesson, 2003; Saunders et al., 2016). The following subsections detail the sampling criteria, the rationale and specifics behind the interviewing method and the analytical steps conducted.

4.1 Sampling

To answer the research question in hand, expert interviews were conducted as part of the exploratory research (Saunders et al., 2016) to understand gamification complementarity. Three complementary sampling techniques were utilised to contact experts. The first selection

criteria employed was based on experience and interest in the subject matter (Miller & Salkind, 2002). This was identified through investigating: 1) available participants' publications, conference contributions and track record with respect to gamification, and 2) their practical experience of designing and developing gamified platforms, especially practitioners who have worked on gamified projects targeting users who are internal to an organisation (e.g. employees) and possibly with capability-building goals. Participants were also asked to nominate other relevant subjects/experts in the second snowball sampling effort. The third and final sampling method was convenience sampling, which was defined by constraints such as limited time and availability of the contacted participants/experts. In total, 72 experts from different countries were identified, of whom only 15 responded to an invitation for participation. This did not come up as a surprise, given the busy and preoccupied nature of the contacted field experts. Finally, 10 of the experts agreed to attend the interviews. Although a sample of 10 participants may be considered to be relatively small, however careful sampling and the use of thorough and in-depth interviews can result in insights capable of answering and addressing the research question (Holloway, 1997; Saunders & Townsend, 2016; Dörfler & Stierand, 2019). This number of participants also aligns with the theoretical saturation threshold identified by Eisenhardt (1989) for valid sampling, which is at least 10 cases.

The selected sample had 6 males and 4 females (see Table 1). The diversity of the participants in terms of their domain of expertise as well as their length of experience in the field (hence the depth of their knowledge) allowed for gaining in-depth insights from the sample, encompassing different perspectives about the gamification process. The participants' roles and work experience included CEOs, sales managers, consultants and designers of gamified systems with experience in projects including organisational training, learning, employee development, employee engagement and stimulating innovation and collaboration. The average age was 40 and the average years of experience within the gamification industry were 8 years, which is quite acceptable for an emerging branch of the industry.

Table 1. Participants characteristics

Characteristic	Count
Gender	
Male	6
Female	4
Age	
30-40	3
40+	7
Educational achievement	
Bachelors	3
Master's	2
PhD	5
Experience	
Less than 10 years	4
More than 10 years	6
Gamification Area	
Consulting	5
Learning and development	3
App development	2

4.2 Data Collection - Interviews

The data was collected through online one-on-one interviews, which allows in-depth study of the subject (Bradley, 2013), which in practice were perceived to be informed by perspectives gained while designing and implementing the gamified platforms. A semi-structured interview format (Miles & Huberman, 1994) was designed in order to gain insights from the interviewed gamification experts/practitioners about their perception of gamification's complementarity and the reasons behind it. The semi-structured format was also used to increase the replicability of the data and knowledge gained and enhance their quality (Myers & Newman, 2007).

Priori themes were chosen based on Elsayed et al.'s (2018) conceptual model to reflect the main objectives of the study as shown in Table 2 (a full list of the interview questions is shown in Appendix A). The semi-structured questions covered three main areas: 1) game elements beyond superficial gamification, and design considerations for complementarity; 2) motivational affordance and the psychological and behavioural impacts of each game design element; 3) organisational capabilities and their constructs that can be targeted using the right game elements and through the right psychological and behavioural antecedents; and 4)

strategic and performance impacts of such designs. The interview questions were piloted with the research supervisory team (two academics as expert advisors) and one representative from a gamification service-providing company. This piloting phase assisted in evaluating the representativeness and suitability of the questions (Saunders at al., 2016), which helped establish content validity.

The practitioners were interviewed each for one to 1.5 hours, which was recorded and then transcribed after the events. Despite the relatively small sample size, saturation of results was reached for all themes after the 7th interview, where the main design methods and their strategic implications were satisfactorily understood and questions were answered. This can be attributed to the focused style of study, interviewing only practitioners with considerable experience in developing internal gamified platforms within organisations, where long-term capability building was considered partly too. While conducting the interviews, clarifying questions and probing meanings were maintained to explore responses from different angles in order to achieve a satisfactory level of validity and credibility (Saunders et al., 2016). This was also maintained by encouraging participants to provide extensive answers through open ended questions to build a holistic picture around the design for complementarity method.

Table 2. Mapping interview questions to priori themes based on Elsayed et al. (2018) model and research objectives

Priori themes	Interview Questions	Research Objective
I. Design for Complementarity		Research objective 1
Game design	Questions 1 & 2	
Game elements	Question 3	
Playful experiences & engagement loops	Questions 3 & 4	
II. Motivational Affordances		Research objective 2
Psychological outcomes	Questions 5	
Behavioural outcomes	Questions 6	
III. Organisational Capabilities		
Capability building	Questions 7 & 8	
Design consideration for capability constructs	Questions 9 &10	
Performance metrics	Question 11	
IV. Strategic Impacts		Research objective 3
Complementarity	Questions 12	
Strategic value & impacts	Questions 1 & 13	

4.3 Analysis

Using nVivo, thematic analysis based on pattern coding was used in order to identify the main themes and reasons behind using gamification as a strategic complementarity (Miles & Huberman, 1994). A three-stage inductive coding technique was used as part of the qualitative thematic analysis (see Figure 2) to generate inductive themes that were verified using triangulation among the informants' input and feedback. Open coding was first generated based on participants' responses, then axial and selective codes were applied based on the identified patterns from which recurring themes were generated (Braun & Clark, 2006). Different codes were then grouped into potential themes by triangulating across and within the participants' data. Finally, themes were reviewed and refined to determine if any of the identified ones had to be discarded or combined based on factors such as coherency and meaningfulness so the theme, and distinguishable differences between themes. As part of ensuring the research's validity, low-inference descriptors were maintained by using direct quotations from participants. Participants' feedback was also requested to check the consistency and validity of the interviewer's interpretations of all the responses. This was conducted by sending the transcribed responses to participants to provide any feedback and/or amendments to their answers.

1. Data reduction
- Transcribing interview data
- Priori themes
- Inductive coding

2. Data display
- Hierarchal categories
- Thematic analysis

3. Conclusions and verification
- Low inference descriptors
- Triangulation
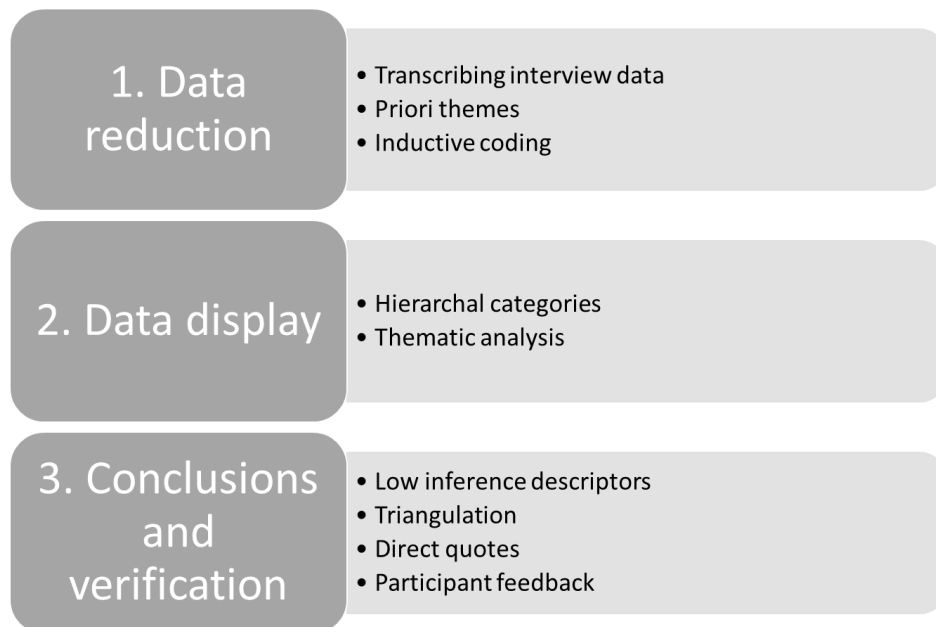- Direct quotes
- Participant feedback

Figure 2: Qualitative data analysis procedure based on Miles and Huberman's (1994) framework

5. Results

The themes derived from practitioners' responses provided valuable insights of the detailed design processes and considerations required towards achieving the complementarity aspect of gamification for building organisational capabilities and/or capability constructs with long-term strategic value. To validate the theoretical lens adopted, queries were made about the views participants held regarding the strategic role of gamification and how such effects may be explained and expected to present themselves. The following sections discuss the identified themes, derive design considerations and explain gamification's strategic potentials.

5.1 Gamification from Experts' Point of View

Participants were asked to define gamification and its value from their perspective as an introductory discussion item. Some of their views aligned with the published literature and others expanded on the current position by providing practical perspectives, especially regarding the long-term capability value of gamification beyond the typical engagement outcomes as follows:

1. Major agreement on defining gamification as: "Game mechanics/elements that are utilised within non-game contexts" and differentiating between implicit and explicit gamification.

2. The real value of gamification lies within its motivational affordance ability (emotional appeal) and its long-term strategic impact.

5.1.1 Definition and Gamification Visibility

Most participants defined gamification as the "*game mechanics that are utilised within non-game contexts*". This consensus was expected since it aligns with the widely agreed upon definition and understanding of gamification by academics and practitioners. This was also the same definition introduced by Zichermann and Cunningham (2011) that has been used by more researchers and practitioners since then (see: Kapp, 2012; Zichermann & Linder, 2013; Hamari et al., 2014; Werbach, 2014; Robson et al., 2016). An interesting addition to the literature regarding the basic definition was classifying gamification into implicit and explicit gamification based on the level of visibility of integrating game-like components.

> Participant 2: *"Explicit is something that is about making the game elements very visible and so therefore explicit gamification may even have games like real game designs as a part of it. Then the other form is that users only gain elements of game design and so you can see very easily what I call implicit gamification. I think today*

a lot of implicit gamification and psychological techniques like nudging let's say have certain overlaps, so if you nudge people in certain directions during when they are doing such actions then one could call that implicit gamification as well."

This classification is important as it highlights the importance of customising and designing gamified systems based on context, content and user demographics. The idea here is how to attract and engage users without distracting them, and how to maintain this state of immersion without being too gimmicky or too formal/mundane, especially considering a diverse organisational setting. This complements Hamari et al.'s (2014) proposal regarding the importance of considering players demographics and their work environment while designing gamified platforms to ensure that the right fit and "*flow*" are achieved. A good example is LinkedIn and how the platform incorporates implicit gamification elements without being too "gimmiky" so that they do not repel or alienate their target users (Ferro & Walz, 2013). Although the platform borrows heavily from games, yet the aesthetics used to illustrate progress bars (e.g. profile strength), badges (e.g. upon completing all profile details) and social connection (e.g. endorsements) are all designed professionally and "implicitly" to build engagement with the right audience and avoid losing formality that adheres to the professional tone and context.

5.1.2 Gamification Value

The emotional element of gamification was clearly observed and predominant as the main value of the experiences enacted by gamification. Key terms were identified such as "*engaging people*", "*get motivation*" and "*gain interest*" to describe typical gamification experiences (see Table 3). This emotional aspect sets gamification apart from traditional IT/ICT platforms by highlighting the human-centric emotional aspect of gamification. This again complements the literature and the predominant usage of gamification as a tool for motivation and/or engagement (Zichermann & Cunningham, 2011; Kifetew et al., 2017). The data supports gamification's capacity to "*engage people beyond their educational or social level*". This is because game rules can potentially overpower social and/or cultural rules, creating an engaging environment and experience for different users, going beyond their demographic characteristics. This also aligns with the literature as Zichermann & Cunningham (2011) argued how engagement loops can be constructed regardless of cultural differences by creating immersive experiences that tap into basic human needs such as autonomy, competence and relatedness, and this can, on itself, positively reinforce social engagement loops and bring people together in a collaborative form of interaction.

Table 3. The coding process of the perceived value of gamification

First order codes	Second order themes	Third order aggregate dimensions
Create a playfield for different stakeholders	The strategic and capability building potential of gamification	Short-term and long-term values of gamification within organisational context
Increase performance and achieve goals		
Track performance		
To complete tasks		
Intervention		
For teaching & learning		
Envisioning new skills in short time		
Manage people behaviour	Emotional and psychological benefits of gamification such as engagement and motivation	
Gain interest		
Get motivation		
Pay to play games		
For engagement		
Interactive stories to engage people		
Inspiration		
Acquire buy-in		
Powerful for users with different educational and economic background	Social value of gamification and the power of brining diversified set of users together	
Game rules overpower cultural and social rules		

As a departing point from the literature, participants did not consider engagement and gamification's motivational benefits/outcomes to be the expected sole values. Strategic impacts were predominant in the data as well, where different strategic, long-term and organisational wide capability-building benefits of gamification were evident and highlighted. For example, human resource (HR) constructs such as "*increasing performance*", "*completing tasks*" and "*learning new skills*" were targeted by participants' gamified systems as an effort to build relevant HR capabilities for their client organisations. Not only this, but company-wide processes were also observed such as "*tracking performance*" and "*engaging stakeholders*", highlighting the complementarity potential of gamification to tackle strategic objectives as proposed by Elsayed et al. (2018), which will be analysed in more details in the upcoming subsections.

5.2 Gamification Design

The themes emerging from the participants answers outlined several design principles, some of which bridge certain gaps in the literature regarding how gamification can be designed and utilised within organisations to achieve organisational-wide strategic goals instead of being an end goal in itself. Two main points in regards to designing for complementarity arose:

1. Human-centric design approach and the importance of factoring in human emotions of individuals/users through deploying the right game elements.
2. Goal-oriented design approach that takes organisational-wide objectives and success metrics into consideration to targets a wider set of strategic goals.

5.2.1 Human-centric Design

A major theme identified was how gamification design should be more "*human-centric*" than "*functional-centric*" from an individual user perspective, since human motivation is one of the main considerations of designing those systems in the first place.

> Participant 4: "*This is a distinction I would like to make here and this is the difference actually between a human focused design and a function focused design. What I mean is that usually a function focused design is a function focused system so it just says, like you have buttons and you have staff and you just click and everything works fine. Right so everything works fine, and everything is functional and it is ok however when we think about gamification we always think about human motivation.*"

The emotional element was emphasised and its role in differentiating gamification design from traditional software (or systems) design models was highlighted. Crafting "*artistic game experiences*" that would consider the "*motivation behind each element*" and consider "*human feelings*" are examples of gamification's human-centric design approaches that consider the user's emotional journey, which complements (and extends) the traditional functional-centric design elements of typical software applications. Typically, function focused design approaches are only concerned with systematic/technological features (e.g. buttons, work flow or even simple aesthetics) while disregarding the enacted structures (Orlikowski, 2000) and the developed user behavioural journey, which are usually at the core of successful gamification designs.

> Participant 7: "*But always coming from the understanding of the design of the user and understanding what they thinking and feeling and how that relates to what they are trying to achieve in the experience and that could be an event or a game*

something physical, it doesn't really matter because all of that is just how you help people to interact with your narrative, basically".

To capitalise on this emotional element, gamified systems need to provide "*autonomy*", "*engagement loops*" and "*meaningful reward mechanics*" based on different user preferences, which contends that the "*human focused design*" aspect dictates the choice of elements after studying the intended user base and their respective motivational affordances and relevant engagement antecedents. This directly aligns with the self-determination theory (Ryan & Deci, 2000) and the user typology theory (Dixon, 2011) reflected in the context of the business environment and player preferences (Hamari, 2013). This also expands on Dixon's (2011) user typology framework that is based on Bartle's (1996) player types that explains how different users/players are motivated differently, and how gamification design processes should address these differences. This typology divides users into four groups: achievers, killers, explorers and socialisers based on how they act/interact with others and their environment. Achievers are motivated by goals and seek gathering points and levelling up. Killers are competitive and are motivated by climbing leaderboards. On the other hand, explorers seek progression, and socializers are concerned with building relationships and collaboration, since cooperation is more important to them than competitions. Therefore, it is crucial to understand different users (typically through typology surveys (Dixon, 2011)) and accommodate for different typologies throughout a bespoke gamification design process.

Two new terms were extracted from the data to explain this further, namely: "*white hat gamification*" and "*black hat gamification*". White hat gamification is the process of choosing positive/fulfilling game elements to tap into intrinsic motivators. This can be achieved by targeting "*core drives*", which are the intrinsic antecedents that motivate individuals towards certain activities/actions, such as "*epic meaning*", "*accomplishment*" and "*empowerment*". Therefore, one needs to select and utilise the right tools (game elements) to achieve/target relevant core drives.

> Participant 4: "*Core drive two is called development and accomplishment, it is usually what we would consider is the internal drive of people of making progress, you are studying as you hope to get more knowledge, you are working harder because you know maybe tomorrow you will get an advance, you will improve and get something better. An example here is the linked in progress bar*".

On the other hand, black hat gamification was described as the negative reinforcement loops that can engage users by tapping into their fear of loss and avoidance, using core drives such as "*scarcity*" and "*unpredictability*". This can be implemented using different game elements such as collecting points and losing virtual tokens. From a theoretical perspective, this aligns with the reinforcement/punishment behavioural theories in psychology that explain how

feedback loops and operant conditioning are useful methods that can associate a desired behaviour or activity to a reward to promote a change in behaviour (Gazzaniga, 2010). However, it is crucial to balance white hat game elements with black hat ones depending on the gamified task (and organisational needs) to avoid losing the sense of urgency (by utilising only white hat elements) or apply excessive pressure and stimuli (by utilising only black hat elements).

The proposition of these new concepts contributes to expanding the limited elements of self-determination theory (namely autonomy, competence and relatedness) to incorporate a wider set of drives coined as "core drives" as shown in Table 4, which in turn provides a wider range of design options and game elements to utilise beyond PBL, to target relevant core drives and move towards a more intrinsically engaging experience with long-term lasting effects.

Table 4. Core drives and the expanded view of intrinsic motivators

Self-determination theory: basic drives for engagement	Corresponding Core drives: expanded list of intrinsic drives	Type
Autonomy	Ownership	White/black hat
Competence	Accomplishment	White hat
Relatedness	Social influence	White/black hat
	Meaning	White hat
	Empowerment	White hat
	Scarcity	Black hat
	Avoidance	Black hat
	Unpredictability	Black hat

5.2.2 Iterative Goal-oriented Design Approach

When participants were asked about the typical design journey of crafting complex gamified platforms, an interesting process emerged, detailing three main distinctive stages: "*ideation*", "*implementation*" and "*testing*". These stages are similar to the software engineering design process (based on Attman et al. (2007)) and need to be implemented with a customer-oriented approach in mind (i.e. developed in close collaboration with customers/clients and potential users, to maintain incremental updates, adjustments and feedback (Andrei et al., 2019)). However, in the case of gamification design, the emotional aspects are heavily interrelated and integrated within these three stages of design. Triangulating this theme with the results from the characteristics of the game design process and the important theme emerging from the "*human-centric design*" aspect also made this more evident. Although the three stages had

functional purposes, yet the demographic and typology of targeted users have to be maintained and accounted for, even with high-level organisational goals in mind as shown in Figure 3.
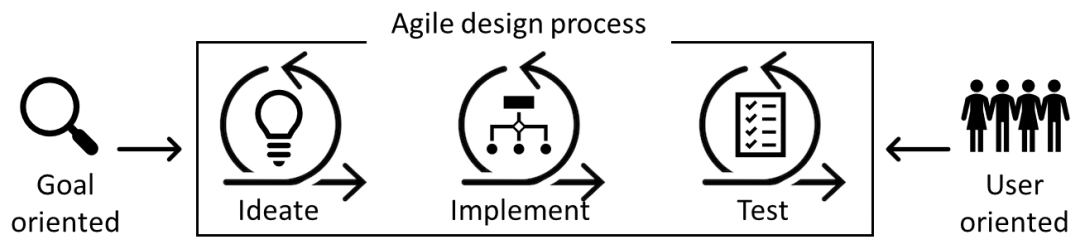

Figure 3: Goal oriented design process

The design process is not strictly an engineering waterfall design method, but more of an agile approach with "*rapid prototyping*" and "*incremental*" design focus (hence the customer-oriented approach), based on iterative testing (Andrei et al., 2019). However, the process was not game-based or human-centric solely, but also goal-oriented. Although human emotions were considered throughout the whole design process (and while selecting each game element), the whole objective of the system should be tied to a relevant organisational goal that needs fulfilment and hence achieve the value of gamification complementarity. This highlights how "*long-term objectives*" of the gamified platform should shape and dictate the design process, which again reinforces the context-dependent and bespoke nature of gamification as opposed to the typical "one size fits all" approach present in the literature.

> Participant 3: *"Basically I start out by getting people to really focus on the problem they want to solve and agree on how they would know if they solve a problem and then figure out game design approaches that they can use to solve it. So, I don't typically pick out a game design until I figure out what the problem is first, because if you pick a game team or a game design first it might not be the right fit for the problem you want to solve."*

The data highlighted the importance of clearly identifying the "*purpose and goal of the system*" to harness the complementarity aspects of gamification, detailing how designing for long-term objectives starts from the problem definition stage (early in the ideation stage) and goes on to shape up the whole system (through design, implementation and even testing stages, and evaluating success against the fulfilment of those primary goals and objectives), deciding if gamification can actually help in fulfilling those objectives. The customer-oriented approach beside the incremental/agile considerations proposed also helps maintain the alignment between the system being developed and the targeted strategic goals (which should dictate the success metrics) in case any deviations arise.

Participant 1: "*We sit with clients and we put a list of business metrics. Those are the important business outcomes that the company wants to have in the end as you can imagine.*"

5.3 Motivational Affordances and Psycho-behavioural Outcomes

From discussions around design approaches, steps and processes, we now explore more design specificities about game elements, their motivational affordances and their psycho-behavioural crafting patterns. The concepts of creating engagement loops through intrinsic motivation developed by Zichermann and Cunningham (2011) was a recurring theme, complemented by the importance of choosing the right elements to devise the right "*flow zones*" (Kapp, 2012) to create sustainable long-term engagement instead of focusing on short term extrinsic rewarding schemes. For example, game elements such as customised/targeted feedback, intelligence difficulty adjustment (Zohaib, 2018) and user-specific progress indicators can act as roadmaps for gamifying educational content. This would maintain adequate balance between user's knowledge acquisition speed and his/her progress speed through the learning content, which can avoid pitfalls such as frustrating the users (due to ramping learning difficulty) or making them lose interest (through slow-paced progression).

Participant 6: "*So if you engage someone in something and they really find it valuable and they get that internal buzz of learning or achieving something then they are more likely to engage with the content going forward.*"

The data explained how the proposed human-centric design, accompanied with goal-oriented game design can "*artistically*" craft a gamified experience that would take users into a journey of psychological, emotional and behavioural changes. Several behavioural outcomes were identified by participants such as "*learning*", "*increased productivity*" and "*personal development*", where "content" gamification was specifically targeted (to develop intrinsic engagement) as opposed to "structural" gamification. From a theoretical perspective, content gamification is defined as the process of gamifying an activity to make it more fun (e.g. making the learning content more game-like), which is a much more powerful intrinsic motivator than superficially adding game elements (such as scores or leaderboards) around a pre-existing activity (i.e. structural gamification that is widely spread in the literature (Hallifax et al., 2018)). This largely serves as a short-term engaging method that does not make an activity any more interesting or fun, but incentivises investing in it through an independent (and usually irrelevant) rewarding structure.

Participant 7: "*Sometimes you want them to understand something more about it, so learning is also very much a behavioural outcome that can come from it. You want people to understand more about pensions so that you help design a way of explaining that to them in a way that they will feel more connected to you know.*"

The process identified from the emerging themes advocated content gamification utilisation to tap into intrinsic psychological antecedents (e.g. core drives such as empowerment or accomplishment) that drive certain intended behaviours (such as learning capacity and efficacy), which if aligned properly with organisational objectives, can act as constructs that help in building relevant capabilities (e.g. knowledge acquisition and organisational learning). This was an important finding and an addition to the literature and the current gamification frameworks as discussed in Section 2. Even though some of the participants used slightly different terminologies (e.g. core drives/emotional antecedents), they all agreed on the following high-level process flow:

1. The choice of game elements is dictated by the core drives required (such as accomplishment).
2. Core drives integration in game design evoke different psychological outcomes (such as flow).
3. Those outcomes elicit different emotions (such as immersion, excitement and engagement).
4. These emotions can act as a facilitator for change if properly aligned with respective behavioural outcomes and wider objectives.

Their arguments expanded on the current literature to clarify: 1) the relationship between the human centric design and choice of game element and 2) the relationship between psychological/emotional drives and choice of game element. First, explanations were provided about how the human-centric approach contributes to the choice of game elements while designing a gamified system. Participants mentioned several game elements that they utilise while designing their gamified platforms, which align with Werbach's (2014) dynamics, mechanics and components model (See Table 5 for a detailed list of the elements utilised by participants).

Table 5. Summary of game elements used by participants

Name	Element Type	Visibility	Frequency
Points/Score	Component	explicit	6
Leaderboard	Component	explicit	5
Immediate and meaningful feedback	Mechanic	implicit	5
Badge	Component	explicit	4
Progress	Dynamic	implicit	3
Social rating and feedback	Mechanic	implicit	3
Rules and constraints	Dynamic	implicit	2
Competitions and quests	Mechanic	implicit	2
Goals and missions	Mechanic	implicit	2
Levels	Component	implicit	2

Interestingly, the same implicit/explicit categorisation, mentioned before, was present here as well. Experts explained how implicit and explicit gamification can be achieved using the right set of elements that should serve the design purpose as well as the "*demographic and user preference*". Although Table 3 shows the points (an explicit gamified element) to be the most used one among practitioners/experts (similar to the PBL parade issue identified in the literature), yet its utilisation was not a generic one. Instead, careful and meaningful implementation is usually considered before attaching points/scores to respective activities. For example, user score should be calculated as a performance evaluation metric to provide meaningful feedback and motivate users towards a specific desired behaviour. Also, most of the elements used by practitioners were surprisingly implicit ones, reflecting the emerging theme that recommends avoiding the overly "*gimmicky*" feeling and advocates shifting towards richer and more user specific design approaches that go beyond limited PBL elements. In other words, focusing more on meaningful, immersive and creative experiences with social engagement loops instead of typical flashy and/or cartoony dashboards (Kapp, 2012).

Second, with the previous explanations of "core drives" and "human centric design", the extracted themes were able to demonstrate how different game elements can successfully trigger the respective core drive (see Table 6). This is crucial since the literature failed to provide a robust mechanism that clearly identifies the right game elements needed to elicit specific psychological/emotional outcomes, which has partially contributed to the dominance of the PBL parade, making it an easy and straightforward design choice.

Table 6: Mapping game elements to triggered core drives

Core drive	Game element
Ownership	Points, virtual currency, avatar
Accomplishment	Badge, status, progress bar, leaderboard
Social influence	Sharing, voting, collaboration, commenting
Meaning	Narrative, story, feedback
Empowerment	Unlockable, instant feedback, combos
Scarcity	Prize, timer
Avoidance	Progress lost
Unpredictability	Random rewards, Easter eggs

5.4 Complementarity for Building Organisational Capabilities

When participants were asked about their design experiences and the capability building potentials/impacts of gamification, their views came as follows:

1. With the right design approach, gamification can build certain organisational capabilities (and/or their constructs) or assist in building them.
2. It is usually difficult to provide performance metrics that measure company-wide impacts of such gamified systems, but proxy measures and meta-data can be used instead.

5.4.1 Capability Building Potential

A prominent theme was identified from the data that affirms that gamified platforms have the ability of building different organisational capabilities, given the right design approach and procedures were implemented and maintained. This is attributed again to the design considerations mentioned in the previous sections as key points to consider in order to design for complementarity, and hence building capabilities.

> Participant 7: *"but I would say, can you design experiences that have impacts on these organisational capabilities – absolutely, it just comes down to understanding what it is you are trying to achieve, why you are trying to achieve it and not getting stuck in either over gamifying something or over featurising, so really understanding how your employees are working."*

Organisational capabilities that were successfully developed through gamification (as per the interviewed experts) can be categorised into two main threads: individual development capabilities and organisation-wide capabilities. First, individual/employee capabilities were

mentioned as observed/targeted outcomes of gamification, which ranged from "*developing personal skills*", "*learning*", "*participation*", "*quality of work*" to "*team work*". Aggregating these aspects was observed to impact higher-level organisational capabilities such as "*collaboration*" and "*knowledge*". Other organisational wide capabilities such as "*breaking silos*", "*innovation*" and "*nurturing human capital*" were all successfully developed by experts through targeting and incentivising the right behaviours (e.g. scoring and rewarding collaboration to break silos) that can act as capability constructs, which are needed to help build relevant capabilities. Experts attributed their successes to designing for complementarity back to the design methods, design considerations and craft of motivational affordances discussed in the previous subsections. Table 7 shows a frequency count of experts who were able to target a capability construct (based on Ulrich and Smallwood (2004) and Ulrich and Lake (1991)) using gamified systems.

Table 7: Frequency distribution of organisational constructs that were directly impacted by gamified systems designed by participants

Capability Type	Capability Constructs	Frequency
Individual development constructs	Quality	7
	Teamwork	7
	Learning	5
	Skills development	4
	Participation	3
	Adoption	3
Organisation-wide capability constructs	Knowledge	8
	Collaboration	7
	Innovation	7
	Retention	4
	Breaking silos	3

Gamification's complementarity role aligned with Teece's (1986) definition of complementary assets as "capabilities that may influence/complement other assets or capabilities for capturing profits associated with organisations' strategies". The constructs provided by participants also matched the definition of organisational capabilities by Ulrich and Smallwood (2004) as "the collection of abilities, skills and expertise owned by an organisation in terms of its individuals' collective abilities and competences". Participants argued that by utilising these design processes (e.g. user-centric and goal-oriented approaches), choice of game elements (by tackling bespoke motivational affordances) and crafting proper

psychological/emotional/behavioural responses (through the right core drives), long-term engagement outcomes can be expected rather beyond the short-term ones, for which they provided some supporting evidence from their experience.

> Participant 1: *"we have got some basics, so an in all apps there is a bit of drop off initially and retain the core users which is about 60% and (average goes up and down) we are happy with that, because it is usually 20% people stay on and use in on a weekly basis."*

However, an important theme was identified, describing the importance of strategically embedding the philosophy of purposeful adoption of gamification within the organisation to achieve its full potential. Gamification is not an app to build or a workshop to conduct, hence it should not be perceived as the end goal in itself, rather as a means to more strategic goals that fully capitalise on its complementarity benefits and serve long-term organisational objectives.

> Participant 4: *"Gamification cannot just be an icing on a cake, and we have quite a lot of clients that come and say we already have a solution but can we add gamification? We need it to be part of everyday strategically and it is not something that they do differently in each organisation. Not like a new initiative and then throw it and do something else. It needs to be HR and businesses get on board and say we should integrate more individual development plans rather than tell them what we want every time."*

The themes emerging from the data explained how the delivery and usage of such gamified systems themselves may be short-term (e.g. for learning certain skills), but long-term impacts can still be in place. This again supports the proposition of gamification complementarity, as it can be used as a catalyst to derive long term impacts, even if the usage or delivery was done in a relatively short time span.

> Participant 5: *"They are both actually because you have different instances where it may be a very short-term initiative but the gamification will promote high performance. In the longer term where the user buys into a longer-term strategy they are looking at their own performance grow over time so as they unlock the badges and achieve the points, as they can see their own performance grow, that gives them confidence in their own ability. In some instances, we may have it that we are continually providing the training, in other organisations we may have one module that moves around the business. So, in some respects that is the short-term delivery but if they are a stakeholder they are still able to manage the performance and cross reference the performance of the various groups."*

Nevertheless, participants explained the requirements and constraints for adopting gamification as a complementarity. Factors such as the "*size of the company*", the availability of "*resources*", the capacity of "*outsourcing*" and the "*actual need for gamification*" all came as important elements to help measure the readiness of a company for introducing gamification as a complementary asset. This "internal development vs outsourcing" argument has been a major discussion point in the literature regarding complementary assets in general. Teece (1988) distinguishes between integration-based (internal development) and contractual-based (outsourcing) modes of engagement with assets like that and contends that a decision may boil down to the given appropriability regime (Teece, 1986). A tight regime exists when innovations are hard to imitate and their value must be captured by the firm through patents for example (Teece, 1986). On the other hand, weak regimes exist when the market is uncertain and imitators face low entry barriers (Teece, 1986). Therefore, it will boil down to organisational appetite/approach towards innovation, the circumstances of the industry, the level of competition and a cost benefit analysis valuation of the best approach.

> Participant 3: *"I think that again depends on all the context right. So, is gamification going to solve the issues that they face? Has it been successful in the past for them? Is it easy for them to implement within their organisation? – so these are just a number of things they need to look at. There are some companies that could really, really, really use gamification and some that have certain profitism in place where it is not as necessary as others so I think, as we keep saying, it depends on the context. Right!"*

5.4.2 Measuring Impacts and Performance Metrics

Experts found it difficult to adequately measure certain company-wide performance metrics resulting from building the desired capabilities, and accurately linking certain outcomes directly to gamified interventions. However, there were certain reassuring experiences, related to how experts had witnessed and targeted some basic proxy measures such as "engagement levels", "retention levels", "reach" and "cost savings", compared to ineffective alternatives.

> Participant 5: *"Cost reduction, greater reach and also geographically we deal with a lot of companies that have a dispersed workforce and it is very costly to transport workers to a central position or send trainers out to multiple positions and so we are able to delivery training and we are very efficient and do it in a cost-effective way. If you then couple that with increased retention versus formal training where you can lose up to 90% of the knowledge that you learn in a classroom setting, that in itself offers a single instance of a return on investment, coupled with the savings as well."*

One of the proxy metrics that participants mentioned was "usage and adoption rates" that can be measured against the objective being gamified in general (e.g. engagement with a training package), and hence project the benefits of the tool (e.g. learning outcomes from training). Consequently, cost savings can be measured using a comparative analysis against other intervention methods, implicit value of gaining the required skills and savings from streamlining and/or digitising the process. This expands to the world of analytics and how those measures, if properly utilised, can provide a valuable dashboard of live performance indicators that keep track of individual and company-wide metrics in real-time.

> Participant 7: *"How many people have improved a certain skill? Well if there is no set way to measure that certain skill being put into place it is hard to see exactly what the impact was or wasn't. But there is usually some sort of performance metrics, so in customer service you can see if after this, you start using a tool that helps employees in a certain way so if the time it takes to answer a certain issue goes down that is clear. You may not know exactly what changes have happened inside the employee but you see it did and it caused something in a constructive manner to help lead you towards the results that you wanted".*

An interesting addition to the literature was the valuable meta-data such gamified systems can provide as by-products. Deeper insights such as "employees' strengths/weaknesses", "learning curve", "knowledge capacity", "performance" and "skill level", can all be extracted, aggregated and tracked from these gamified systems. These can then help in making more strategic and better-informed decisions at an organisational level (e.g. more transparent and fair appraisals). Such data would have been hard to capture in any other format, but the technology-facilitated nature of gamification provides a fertile ground for collecting metrics such as peer comparisons (e.g. how each employee is performing in comparison to his/her peers), the individual/collective rate of change (e.g. increase/decrease rates in performance levels on a daily/weekly/monthly/annual basis) and the magnitude of the change.

> Participant 5: *"Particularly collaboration as we can highlight strengths and weaknesses, so we can lead our stakeholders to make informed decisions in the future. Whether that is around further development that may be required or that there is an area that is particularly strong in, for example a sales business they can focus on those products as they know that there is a strong appetite and knowledge retention or knowledge base or materials."*

Participants also explained that the data gathered through gamification processes can reflect the "human capital performance" and "engagement levels" within an organisation, which can be aggregated to give a high-level view of how the company is performing, making it a valuable input to any organisational analytics or KPIs (key performance indicators). Hence,

appropriate interventions can be devised in a timely manner based on observed patterns and identified strengths and weaknesses.

> Participant 5: *"And there are others that absolutely pin the future success of their organisation on gamification as it identifies the success of each individual group, team, region etc."*

As a summary of the findings, this strategic view can be achieved by devising the proposed design techniques from an end-to-end perspective through:

1. Using human-centric design that acknowledges emotions and targets social change.
2. Utilising gamification as a complementarity through a goal-oriented design approach to build measurable capabilities rather than targeting gamification as the end goal.
3. Choosing the appropriate game elements and level of visibility (implicit vs explicit) based on the organisational context, goals, user/player typology and desired emotional antecedents by targeting relevant core drives.
4. Crafting the gamified experience around the desired company-wide and/or individual targeted capabilities, with direct or proxy measurements of success.
5. Assessing the readiness (and the need) to utilise gamification as a complementarity prior to embedding it within the company's strategy and/or philosophy.

6. Discussion and Conclusion

In a nutshell, managers are currently missing a lot by ignoring the full spectrum of gamification's perks and fringe benefits if properly utilised. Technology, for a very long time, has been the differentiating factor (in most industries) between the ability to develop a sustainable competitive advantage and the lack of it. Now gamification presents itself as a capability building solution that can even act as a technology facilitator, being the tool organisations can rely on to encourage collaboration, stimulate innovation, accelerate knowledge acquisition and develop organisational learning and even facilitate the adoption of other technologies such as online communication platforms, knowledge sharing tools, remote working packages (needed now more than ever) and training suites. A proper approach to the design and development of gamification systems is able to empower companies with a digital catalyst that works on individual and organisational levels to cultivate valuable impacts. A digital catalyst that does not face the adoption challenges or social inertia most IT solutions encounter. A digital catalyst that mangers are yet to embrace to fully understand the unlimited potential it can provide.

The outcome of this research is a design framework that expands the current literature to liberate gamification from the restrictive implementation methods and provide a clear and

robust roadmap of design features that translate long-term strategic goals to specific (and organised) choice of game elements that can be utilised by academics as well as practitioners. The summarised design framework is illustrated in Figure 4. This view offers a wider scope for gamification and promotes it as a strategic complementarity that can build and help in building complex capabilities for organisations by utilising intelligent engagement loops and purposeful design elements.
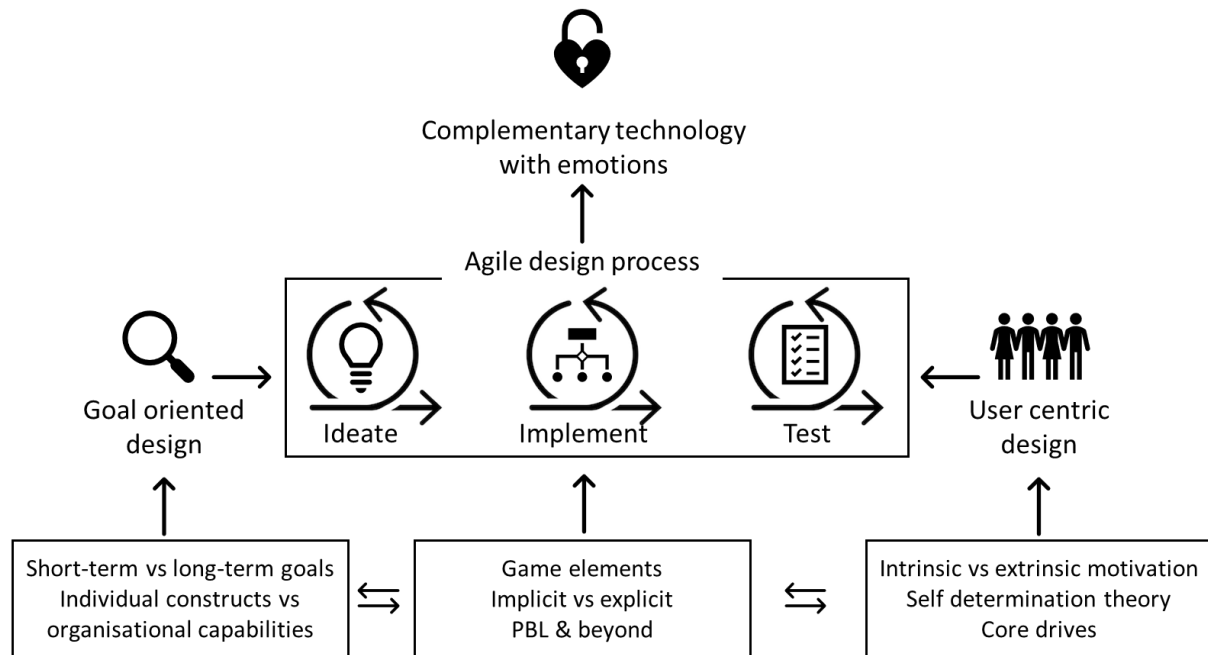

Figure 4: gamification design framework for complementarity

The proposed human-centric design approach explains, for game designers, how to utilise different game elements beyond PBL (such as story/narrative and custom feedback) to target more sustainable long-term intrinsic engagement. Core drives, a major contribution of this research, expands on the elements of engagement of SDT to encompass a much wider (and purposefully crafted) set of game elements. From a theoretical perspective, the study extends existing knowledge that did not provide a clear direction on how game elements can translate into intrinsic motivators that accommodate for different user preferences. Core drives were identified in the study as important constructs that reside between game elements and the targeted emotional and behavioural outcomes. Instead of using arbitrary elements (mainly points, badges and leaderboards) as prevalent in the literature (Rapp, 2015), more sophisticated understanding of relevant core drives of potential users can help devise the right game elements that connect with respective user typologies. Consequently, this provides a

clear explanation for game elements (affordance) choices, addressing the research gap identified by Warmelink et al. (2020) in the process.

Furthermore, the goal-oriented design approach complements the human-centric one by defining and aligning the targeted individual behaviours and organisational constructs to achieve the required strategic impacts. This shift takes away the end goal of gamification from being solely engaging users into more complex and organisational wide constructs that can help building different capabilities. By delineating metrics such as efficiency, effectiveness, quality and flexibility (which are the typical operational performance metrics (Slack et al., 2004)) as gamified objectives, employees/players can be motivated through iteratively/progressively designed engagement loops and game elements that can positively impact their performance levels, quality levels and productivity. By embedding these tools in gamification systems, an incentivised and engaging experience can be created that would positively change routine jobs through psychological influences, to support building respective capabilities.

From a theoretical perspective, this goal-oriented design supports the prevalence of content gamification over structural gamification in terms of effective and long-term engagement facilitator. For example, gamification has been used excessively for training purposes in the literature (Liu et al., 2017; Hamari & Koivisto, 2015; Scott & Neustaedter 2014; Kim, 2009), yet its application has mostly been to just motivate user participation and adoption of these training platforms (i.e. structural gamification). The core of the findings here is therefore the human centric and goal-oriented design approaches that tap into intrinsic motivation (through core drives) and provide more sustainable and effective training platforms in this case for developing engaging and immersive training content (i.e. content gamification). Therefore, intended behaviours should be the determinant of the game element design procedure and not just engagement or adoption. Hence, in the case of training, knowledge acquisition and application (Kolb, 1984) should be the targeted behaviours, and not just user participation. This can be implemented by choosing the right game elements to engage users in both the knowledge acquisition and its application processes. To accommodate for this, instead of just attaching points and/or scores to extrinsically motivate the usage/adoption of the training platform (structural gamification), a storytelling element (game dynamic) that incorporates the learning materials can be used to develop a more immersive and engaging content. Immediate feedback (such as exploring different story paths/outcomes based on knowledge level) can be provided in the process as users progress through different story levels (learning modules). This way, users will be engaged in the learning cycle itself, which will be reflected on learning efficacy and knowledge application (which is the targeted capability), both of which can be used as performance/success metrics.

The proposed design considerations (summarised in Table 8) are in accord with the technology-in-practice perspective (Orlikowski, 2000; Schultze & Orlikowski, 2010), since it helps in understanding how organisations can use gamification as a facilitator to convert the induced enactments of social inertia (the technology resistance phase that usually face function-focused software platforms) to social change (the acceptance and adoption phase which can be achieved through gamified, user-specific design methods) through acknowledging and maintaining user experiences and emotions while interacting with the system. This is inherently incorporated in the proposed design method, borrowing the incremental and agile development processes from software engineering processes (i.e. feature/goal-oriented design method) and the motivational affordances engagement loops from games (i.e. user-centric design method). From this perspective, instead of using gamification as an end goal or as an abstract software tool with a set of concrete/emotionless features, gamification can potentially be used as a catalyst that helps in increasing adoption and usability of newly implemented technologies and/or drive behavioural changes (as an engaging solution) towards capability building efforts by harnessing the power of play that can create the right set of psychological and behavioural antecedents.

Table 8: Gamification Design Considerations

Items	Tools	Outcomes
1. Goal-oriented design	Objectives identification and requirements gathering (strategic, individual or company-wide)	Target capabilities and/or capability constructs Target behaviours
2. Human-centric design	Research context, environment and users (player typology surveys)	Player typology distribution, intrinsic motivators/cored drives to target and design approach
3. Motivational affordance design	Devise engagement loops and flow states based on the identified intrinsic motivators, required behaviours and mediating core drives	Engagement loops Immersive feedback loop (maintain flow state)
4. Game elements design	Mapping of core drives and targeted behaviours to game elements	Game dynamics, mechanics and components
5. Performance testing	Identify metrics to evaluate goals, targeted behaviours and psychological/emotional impacts	Individual and company-wide evaluation metrics and/or proxy measures
6. Iterative design	Agile design process of implementing and testing small increments	Individual and company-wide feedback to modify the design

Finally, the research identified the crucial role of measures and metrics for proper evaluation and monitoring of gamified systems. These metrics should be developed prior to implementation and should be derived from the capability impacts or constructs that are to be expected/desired from individuals or across the company. The model is a useful guide for gamification design processes in order to target more intrinsic motivators through core drives and evaluate the outcomes against strategic metrics. Several implementation opportunities present themselves to explore and test the proposed design guidelines such as addressing the shortcomings of vital organisational capabilities such as organisational learning, overcoming silos and building effective communication strategies. These areas can be considered in future research as an application showcase of the proposed arguments. Cybersecurity awareness is one relevant topic that falls under the organisational learning umbrella and is worth studying due to the prominent human element within cybersecurity capabilities and the potential of remedies these shortcomings using gamification given the current lack of robust awareness interventions.

Naturally, the study has some limitations. The small sample size of 10 participants is one such limitation, although theoretically it was large enough to support the process of theory development and proposition of the new framework due to the achieved saturation. Nevertheless, future studies may examine the ideas presented here in a larger and more diverse population (e.g. interviewing more experts and practitioners) and even exploring it from a different perspective such as an employees' (users) perspective. The propositions and their implications can be critically explored using different methods including case studies, involving both practitioners and user communities. A longitudinal case study may help in testing the framework and observing its application to different contexts (e.g. SMEs vs large firms), different industries (e.g. retail vs IT) and different workplace regimes (e.g. different demographics and work processes), then comparing the effect of these variables on the observed outcomes. The social and financial impacts of such design approaches can also be an interesting angle for further development, which can act as a starting point for utilising and expanding these design considerations in wider areas such as health and education, beyond organisational contexts, opening up more challenges relating to ethical considerations (e.g. employees compliance vs autonomy), financial considerations (e.g. cost benefit analysis of internal development vs outsourcing based on Teece's (1986) different appropriability regimes), user typology (e.g. generation X vs generation Y vs generation Z), behaviours and motivational requirements.

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Addressing the Human Capabilities of Cybersecurity Using Gamification; A Conceptual Model

Cybersecurity, as a major risk to businesses and the society, is highly dependent on the human factor which manifests itself in the behaviours, awareness levels and compliance levels of employees in organisations. Increasing attention has been paid in the industry to address this risk with training awareness programmes, which absorb considerable resources from organisations. The evidence however shows limited impacts of such investments on the rate of cyberthreats. The literature associates this problem with the approach to training/awareness programmes and how they may lead to proper knowledge absorption, inducing motivation in people and encouraging them to use it effectively in practice. On the other hand, advances in information-technology-based solutions such as gamification have brought new promises for addressing such impending issues in training. This paper explores the potentials of introducing gamification into cybersecurity awareness programmes. We conducted an extensive literature review to examine and identify key factors that contribute to the effectiveness of training programmes, and which should be attended to in developing and introducing staff education programmes. We also critically analysed current training offerings/methods, highlighting their shortcomings towards effective knowledge acquisition and application. Using organisational learning, knowledge absorption theories and purposeful gamification design methods we proposed a conceptual model that offers a practical approach to the development of human capabilities for cybersecurity using two levels of gamification, namely content and structural, which can guide the approach to effective awareness programmes in organisations.

1. Introduction

Cybersecurity represents a major risk to societies, from individuals to organisations, both public and private (Accenture, 2019; Johnson & Willey, 2011; Tu & Spoa-Harty, 2015). Cyberattacks, including major security breaches and sensitive data records being compromised, have been on sharp rise (Financial Times, 2020), leading to impactful financial and reputational losses to organisations as well as impacts on the level of trust that customers, stakeholders and business partners have in a company (Trautman, 2015). Businesses have in response been investing vastly on cybersecurity by building cyber resilience capabilities (Markets & Markets, 2020).

It has been well-recognised that making such investments is highly dependent on addressing cybersecurity's weakest link, the human factor (Mitnick & Simon, 2002; Hogg, 2017; Hadlington, 2017). This factor is now a key contributor to cybersecurity issues (IBM, 2018; PwC, 2018). As a measure in response, many organisations have introduced interventions through training and awareness programmes, which is theoretically supported also as a best practice (Puhakainen & Siponen, 2010). Some extensive investments have been made in security awareness training for employees, evident in the security awareness market which reached $1 billion in 2014 and is expected to grow to a $10 billion market by 2027 (Gartner, 2016). Despite these measures, human errors are still a top cybersecurity risk, accounting for almost 50% of all identified data breaches (Berinato & Perry, 2018). Such shortfalls are largely attributed to the ways awareness and training programmes are developed and implemented. Recent reports demonstrate that the inadequate tick-box cybersecurity training format neither delivers on its intended learning outcomes nor yields the expected behavioural results (IBM, 2018; PwC, 2018).

While the importance of effective training and education for information systems/technology (IS/IT) has been a concern of several researchers (Bostrom et al., 1990; Spears & Barki, 2010), there is limited literature on training and awareness programmes for information security and cybersecurity. Theoretical reflections on the subject are rare according to Puhakainen and Siponen (2010) who asserted that IS security approaches have remained "atheoretical and anecdotal" (p. 3). Most of the existing frameworks are aimed at building abstract models based on existing best practices that lack the required impact/outcome (Bochman, 2018; PwC, 2018; Lebek et al., 2014).

Few studies reported on IS/IT training including IS security, have set forward ideas such as: importance of learning style for effective end-user (IS/IT) training (Bostrom et al., 1990); criticality of user participation in achieving security policy objectives, hence the need for training to be based on active user engagement (Spears & Barki, 2010); employee behaviour

change and modification to be at the core of IS/IT security awareness (Whitman, 2008); and the importance of intrinsic motivation in making IS/IT training programmes effective (Venkatesh, 1990). Examination of the current deficiencies within cybersecurity awareness programs and their underpinning theories highlighted three main factors that contribute to the current cybersecurity awareness issues faced by organisations: 1) heavy reliance on concrete learning while neglecting the active experimentation element (Tschakert & Ngamsuriyaroj, 2019; IBM, 2018); 2) ineffective and unengaging training methods (Aldawood & Skinner, 2019); 3) lack of motivation for meaningful knowledge application and compliance by employees (PwC, 2018).

In addressing such factors, researchers have paid attention to solutions which can induce active participation and engagement. Game-based training has in particular been advocated for such purposes, which in theory uses a state of playfulness for inducing engagement and motivation (Venkatesh, 1990; Elsayed et al., 2018). Advances in game-like training built on technology platforms, known as gamification, have also become prominent in providing more effective educational programmes. While gamification has found advocates among research and practice communities (Liu et al., 2017; Hamari & Koivisto, 2015; Scott & Neustaedter, 2014), its application in cybersecurity is very limited within organisational context, particularly from a theoretical perspective. A review of the literature reports only a limited amount of research addressing gamification for cybersecurity (Silic & Lowry, 2020; Baxter et al., 2016; Banfield & Wilkerson, 2014). Being at a nascent stage, the reported works cover some aspects of the current prominent deficiencies within cybersecurity awareness programmes, leaving many other questions not addressed (see Boopathi (2015) and Adams and Makramalla (2015)). This study contributes to addressing these research gaps by employing the concept and offerings of gamification as a complementary capability. We examine gamification for its potentials for making employees' training more effective as opposed to the current unengaging didactic forms, and through this, we address the theoretical gaps in understanding the requirements of an effective approach to developing the human element of cybersecurity through training and awareness programmes.

The paper builds on and extends Elsayed et al.'s (2018) work who advocate gamification as a catalyst in building different organisational capabilities by modifying user behaviour and creating motivational, fun and engaging learning experiences. A conceptual model is proposed which offers an innovative and effective way of addressing the key elements required for building cyber resilience. Two main theoretical threads from the gamification literature, namely content gamification and structural gamification, are utilised in the model to offer solutions for the cybersecurity capability issue/gap. The former is about developing motivational affordances to engage users, and the latter works as a behavioural antecedent to

complement the learning element and target real behavioural changes. The theoretical insights from this study further contribute to other aspects of employee education/training in organisations as well as introducing an improved set of measurements regarding training effectiveness, contributing to practice in organisations.

2. Research Background

In this section we first review the importance of the human element in building cyber resilience and the existing cybersecurity awareness programs, followed by an exploration of gamification constructs that can potentially help in the development of an effective awareness framework.

2.1 Cyberthreats and the Human Factor

Cybercrime is on the rise and so are the costs attached to it. In less than four years, the cost of cybercrime has increased by almost 62% (Accenture, 2019), exceeding $11.7 million annualised average cost for major global businesses (Blau, 2017). For example, a major data breach cost Target, the retail giant, nearly $200 million (Hackett, 2015) and a similar breach cost Yahoo about $350 million (Disparte & Furlow, 2017). These attacks do not only affect the company financially, but also drastically impact its reputation. Consequently, businesses have started investing in cybersecurity measures to build cyber resilience, which is now becoming an essential organisational capability (Bauer et al., 2018). Such capability is defined as the collection of abilities, skills and expertise owned by an organisation in terms of its individuals' collective abilities and competencies (Ulrich & Smallwood, 2004; Ulrick & Lake, 1991). Market reports estimate the current cybersecurity market size to be around $152.71 billion and expect it to grow to $248.6 billion by 2023 at a compound annual growth rate (CAGR) of 10.2% (Markets & Markets, 2020).

In practice, cybersecurity is a complex problem that is rooted deeply in employees' knowledge and behaviours rather than in technological solutions or purchases (Solms & Niekerk, 2013). Some industry reports demonstrate that 95% of all investigated cybersecurity incidents identify "human error" as a major contributing factor (IBM, 2014). Cyberattacks such as the "WannaCry", "Mirai", and "Petya" incidents were all found to be largely due to poor user response and individual actions (Blau, 2017), that can be as simple as clicking a bad link or falling for a phishing attack (Blau, 2017). The fourth annual Cyberthreat Defence Report (2017) also demonstrated that the greatest obstacle in establishing effective defences was "low

security awareness among employees". Human behaviour related to cybersecurity threat has however not been properly tackled to date (Blau, 2017).

2.1.1 The Human Element and its Impact on Cybersecurity

From a theoretical perspective, the literature has identified two main categories of human factors that contribute to cybersecurity capabilities. First, direct human factors that depend on individual characteristics and behaviours such as human errors, lack of awareness, skills, expertise, apathy and stress levels (Hadlington, 2017). Second, indirect human factors that rely on organisational intervention such as security policies, culture, communication, security policy enforcement and incentives (Iivari & Hirschheim, 1996). Glaspie and Karwowski (2018) expanded on those factors and explained how different human factors can collectively foster a positive security culture within an organisation and help decrease the cyberthreat level through empowering the human element.

The literature illustrates how direct human factors, such as lack of motivation and awareness and attitude towards cybersecurity, are significant predictors of risky cybersecurity behaviour that leads to organisational wide vulnerabilities (Hadlington, 2017). Findings demonstrate that more than half of the staff (56%) lacked the skills and awareness levels needed to combat cyberthreats, something which when combined with individual characteristics (such as impulsivity) can result in risky cybersecurity attitudes (Hadlington, 2017). Glaspie and Karwowski (2018) findings also elucidate how indirect human factors (such as incentives and policy enforcement) have a positive influence on the company's overall information security.

Companies need therefore to address these direct and indirect human factors concurrently as a step towards building comprehensive cybersecurity capabilities. Part of the solution may be sought in more effective training and awareness mechanisms through informative, engaging and immersive exercises. On the other hand, indirect human factors also need to be addressed to induce adequate information security behaviours and effective enforcement of security policies.

2.1.2 Awareness and Training

In response to the severity of the threat and realisation of the human side of this problem, businesses have widely turned their attention to cybersecurity awareness programs (Dhingra et al., 2018). This has led to a considerable security awareness market estimated by Gartner's (2016) to grow to a $10 billion market by 2027. Effectiveness of these programmes beside some emerging best-practices (e.g. National institute of standards and technology

cybersecurity framework) to protect against cyberthreats have been debated (see Bochman, 2018). According to Cheng and Groysberg (2017), most cybersecurity processes still fall short of expectations. A more detailed analysis of the current cybersecurity awareness programs helps in understanding the roots of such failures.

2.2 Shortcomings within Cybersecurity Awareness Programs

Cybersecurity awareness programs usually aim to lower an organisation's attack surface, empower employees as the first line of defence and enforce policies and procedures (Disparte & Furlow, 2017; Gardner & Thomas, 2014). However, companies who do invest in cybersecurity awareness programs do not seem to reap these benefits due to incompetent awareness programs that fail to achieve their desired outcomes (PwC, 2018; IBM, 2018). A review of the literature to identify the main reasons behind these failures, summarised in Table 1, indicates three key issues with further details on the contributing factors, theoretical threads employed, and potential treatments. These are explained in the following subsections.

Table 1: A summary of the identified shortcomings within the current cybersecurity awareness programs, the theoretical underpinnings and potential solutions

Identified Issues	Contributing Factors/Constructs	Theoretical Underpinnings	Potential Treatments
Broken learning cycle (direct human factor)	-Passive Learning -Traditional/Didactic methods -Lack of experimentation/simulation -Neglecting different learning styles -Lack of self-pacing	-Learning cycle (Kolb, 1984) -Learning Styles (Lu et al., 2007) -State of Flow (Guo & Ro, 2008; Csikszentmihalyi, 1990)	-Active learning -Learning medium that integrates different learning styles -Self-paced teaching methods that balances skills and challenges -Risk free experimentation
Lack of engagement (direct and indirect human factors)	-Broken learning cycle -Demographics -Short attention span -Unengaging content and teaching methods -Lack of autonomy, competence and relatedness	-Immersion and absorption (Saks, 2006) -State of Flow (Csikszentmihalyi, 1990) -Self-determination Theory (Kahn, 1990)	-Self-paced and web-based teaching methods that balances skills and challenges -Add autonomy, competence and relatedness elements -Tap into user's intrinsic motivation
Lack of behavioural change (direct and indirect human factors)	-Absorbed knowledge is not reflected on realised behaviour -Gap between awareness and adoption -Lack of behavioural change incentives	-Knowledge absorption (Cohen & Levinthal, 1990; Grant 1996a, 1996b; Park, 2011) -Potential vs Realised absorptive capacity (Zahra & George, 2002)	-Integrate behavioural tasks and incentives -Tap into user's intrinsic motivation for behavioural change

2.2.1 The Broken Learning Cycle

Deficiencies in the current cybersecurity teaching methods, according to studies by Azmi et al. (2018) and Gardner and Thomas (2014), result in inadequate and incomplete learning cycles that do not surpass the concrete learning stage (if any). As a result, these methods fail to address direct cybersecurity human factors such as raising awareness levels. Theoretically, this falls short of satisfying Kolb's (1984) experiential learning cycle which should, beyond the concrete learning (knowledge acquisition), include reflective observation (on past experiences), abstract conceptualisation (new ideas formation) and eventually active experimentation (application of knowledge) (Kolb, 1984). As evident in the literature, most of the current cybersecurity awareness programs follow a passive learning format crammed into

a one/two-day workshop structure, relying on traditional lecturing methods, hence usually lacking the essential active learning hands-on ingredient (Gardner & Thomas, 2014; PwC, 2018; IBM, 2018). Employees as a result fail to apply what they learn whenever they encounter a real cyberthreat (Lambert, 2012). No risk-free environment is provided for learners to practice and apply the theoretical knowledge, making it challenging for them to bridge the gap between theory and practice, which results in shorter-term recall of information (if any) that does not develop the required practical skills and abilities (Arain et al., 2019; Tschakert & Ngamsuriyaroj, 2019).

Another contributing factor is the "one-size fits all" structure of these programs. These workshops do not accommodate for different learning styles nor different skill/knowledge levels. There are various learning styles such as visual (images), aural (auditory), verbal (linguistic), physical (kinesthetics), logical (reasoning), social (interpersonal) or solitary (intrapersonal) (Clark & Mayer, 2011; Gardner & Thomas, 2014). However, these are usually neglected in favour of a few, which alienates employees with different individual preferences and learning styles (Bostrom et al., 1990). Going back to Kolb's learning cycle, this means that most trainees usually struggle to find materials that cater for the learning style that suits them, whether it is diverging (learning by watching), assimilating (learning from concepts), converging (learning by solving problems) or accommodating (learning by doing/applying) (Lu et al., 2007). On the other hand, conducting large workshops to include all employees from varying backgrounds and skills quickly leads to disengagement. Tech-savvy employees lose interest in what they think is axiomatic, and less tech-savvy employees fail to cope as they feel overwhelmed by the amount of new information that is being fed to them (Butavicius et al., 2016).

Web-based training has a slight advantage over traditional in-person training in that regard, by providing self-paced courses that help employees learn at their own speed (Gardner & Thomas, 2014). Studies show that simulated phishing attacks, for example, were able to drop employees' susceptibility to phishing rate by 40% (Mello, 2017). However, such simulations a) have very limited applicability (e.g. focusing only on dealing with spam emails), b) may elevate employees' anxiety levels, which can decrease phishing detection efficacy (Wang et al., 2019) and c) are hard to replicate in other cybersecurity areas/concepts (e.g. remote access or password updates) (Kumaraguru et al., 2008). Similar interactive techniques are needed not only to raise employees' awareness, but to change their behaviour as well (Blau, 2017). Such interactive techniques can demonstrate cyberthreats instead of just informing users about them, can accommodate for different learning styles and can adapt to user pace, knowledge level and speed of learning. In section 2.3 such a technique is introduced.

2.2.2 Lack of Engagement

Lack of engagement was highlighted as one of the main deficiencies within the current cybersecurity training programs (Aldawood & Skinner, 2019; PwC, 2018). Several contributing factors for this disengagement were identified, including the characteristics of the targeted demographics and the mundane training content. According to Gartner (2019), generation X (born 1965-1978) and generation Y (born 1980-2000) comprise the majority of the current and future workforce. These generations have grown up during the digital era and are characterised by being easily bored and having low tenure rates (CIPD, 2013). The tick-box training methods that are currently being implemented fail to provide an engaging platform for these demographics or even motivate them to participate in these training programs (Aldawood & Skinner, 2019; Tschakert & Ngamsuriyaroj, 2019).

From a theoretical perspective, engagement is not just an attitude, but the degree to which an individual is absorbed in his/her role (in this case, towards the training program) (Saks, 2006). Engagement is also closely associated with formal job involvement and flow (May et al., 2004). An example is the "magical zone" between anxiety and boredom proposed in the work of Csikszentmihalyi (1990). Current "one-size fits all" programs, lacking provision of active learning element, fail to maintain this state of flow (balance between skills and challenges) and result in employees falling into one of two areas: feeling anxious, if they lack the technical skills, or feeling bored, if they come from a highly technical background (Santhanam, 2016; PwC, 2018; Gardner & Thomas, 2014).

Although some companies try to overcome this by introducing rewards to incentivise employees to participate in these training programs (IBM, 2018), yet participation by itself does not imply knowledge acquisition, hence cannot be considered an effective measure of awareness nor does it demonstrate any actual change in behaviour (Dimov, 2019). It is instead suggested that companies should focus their attention on integrating autonomy, competence and relatedness (elements of the self-determination theory) into their awareness programs (Ryan et al., 2006; Ryan & Deci, 2000). These elements, according to Bakker (2011), are considered the cornerstone of engagement as opposed to the extrinsically rewarding motivations (such as monetary incentives), which only have short-term productivity effects (Lilienfeld et al., 2010). Therefore, immersive content and teaching methods are required to engage employees by maintaining a flow zone that would elevate engagement levels (Guo & Ro, 2008). Higher engagement levels can potentially motivate employees to express themselves physically, emotionally and even cognitively in their respective tasks (Kahn, 1990), and go beyond just knowledge acquisition and into knowledge application through positive behavioural changes.

2.2.3 Knowledge Absorption; From Knowledge to Behaviour Change

User awareness training is one of the main building blocks of a mature security program (Gardner & Thomas, 2014), which ideally empower employees with the knowledge and skills required to act as the first line of defence for a company and eventually lowering their attack surface (Mitnick & Simon, 2002). Current training programs, however, seem to lack the required tools to transform the learning outcomes into behavioural outcomes in terms of physical practices and/or procedures. According to the literature, 62% of organisations measure the effectiveness of their cybersecurity awareness programs by completion (just mere attendance) and 55% use test scores at the end of the session, with no means to collect metrics around employee behaviour or observed number of attacks on an organisational level (Dimov, 2019). From a theoretical standpoint, this highlights the knowledge absorption aspects of these programs. Knowledge absorption is the ability of the firm to transfer, integrate, and utilise new knowledge obtained from external sources (Park, 2011). The knowledge transfer phase and issues, resulting from the lack of engagement and the broken learning cycle, were previously highlighted.

On the other hand, the application of this knowledge, manifested in the employees' behavioural changes through adhering to proper security procedures, is also as critical. This can be demonstrated by dissecting an organisation absorptive capacity into potential absorptive capacity (the ability of a firm to acquire and assimilate knowledge) and realised absorptive capacity (the ability of a firm to integrate and exploit knowledge) (Zahra & George, 2002). Awareness programs, if not engaging and lack the active learning element, would adversely affect the potential knowledge absorption element and naturally does not help in building an organisation's absorptive capacity. In this case, it means employees will not properly acquire the right knowledge and skills to be able to adhere to cybersecurity best-practices due to unengaging materials and broken learning cycles.

The second issue with the current awareness programs is that they are completely disjoint from policy development and enforcement (Blau, 2017; Hogg, 2017), with mostly following an ad hoc design, lacking any grounding in the known cybersecurity frameworks (Azmi et al., 2018). Gardner and Thomas (2014) argue that current programs do not provide any means of educating users about policies, nor incorporate tools to monitor, track and/or enforce these policies. This is of particular importance since most of the widely accepted cybersecurity frameworks, such as the National Institute of Standards and Technology (NIST) cybersecurity framework, centralise around the concurrent and continuous nature of cybersecurity functions within organisations that include raising awareness (protection) as well as monitoring, detecting and responding activities (NIST, 2020). In addition, the generic awareness programs are not usually customised to businesses nor sectors' needs and

specifications, extending the gap between theory (what users learn) and practice (what users do) (Disparte & Furlow, 2017). As a result, this study suggests that the 'realised absorptive capacity' constructs are missing from the current awareness programs. The above highlights that for cybersecurity awareness programs, to be able to develop knowledge absorption constructs, they should adopt a process approach as proposed in the following sections.

2.3 Gamification as a Technology Assisted Solution

We have so far established that for cybersecurity awareness programs to be effective, they need to be designed with engaging content and adequate/adaptive learning cycle to lead to positive measurable behavioural changes. The literature suggests the concept of gamification with great potential for solving issues of this nature. Gamification is defined as the use of different game design elements within non-game contexts (Zichermann & Cunningham, 2011). Gamified solutions aim to derive certain user behaviours, utilising the concept of play that is known to positively affect individuals through creating more imaginative, creative and fun experiences (Kolb & Kolb, 2010; Fogg, 2003).

Several organisations have already used gamification to leverage employee engagement (Gartner, 2011), while others have sought results such as enjoyment, which helped facilitate employees training that used to be boring and less absorbing (Brandon, 2015). As an engagement antecedent, gamification makes a highly relevant cybersecurity awareness idea due to the demographic distribution of the workforce, generations X and Y, who have grown up during the videogame era. Gartner (2011) advocated the use of gamification techniques as they would resonate with the demographic personality of the dominant generation and relate to their lifestyle and even create a sense of belonging for them.

We argue that gamification can offer the solution to the problems discussed before and contribute to maintaining and enforcing security policies. We examine the use and suitability of gamification in the next sections from both theoretical and practical perspectives to derive a conceptual framework that can address the cybersecurity awareness issues in hand.

2.3.1 Gamification and the Power of Play

Basically, a game is a play that is defined by boundaries and rules to create a quantified outcome (Kapp, 2012). Kark (2011) demonstrates how playing can be used to modify and stimulate certain behaviours using cognitive, affective and motivational factors. There are three main aspects considered within gamification: human behaviour, game design and individual psychology (Zichermann & Linder, 2013). Gamification is successfully applied as a

fun tool for engaging and immersing individuals in what can be perceived as mundane tasks regardless of the scope on implementation (Zichermann & Linder, 2013), making fun a central motivational factor in gamification that can drive certain behaviours and activities (Werbach, 2014). Hence, gamification has been widely adopted to facilitate learning, customer engagement and employee engagement (Lucasse & Jansen, 2014). However, gamification is not just turning work into a game, but a lever that facilitates engagement, motivation and learning through a serious process that can result in new insights, understandings and skills (Kapp, 2012). We should therefore expect gamification to potentially turn cybersecurity awareness programs into an engaging educational experience for the users/employees.

2.3.2 Gamification, Motivational Design and Game Elements

Gamification is made up of multiple building blocks that share the purpose of creating an engaging environment. Different gaming elements are therefore integrated through a design approach to serve a specific purpose (e.g. cybersecurity awareness). These elements are usually categorised into: game dynamics, game mechanics and game components (Werbach, 2014). Gamification frameworks, such as Werbach's (2014) and Dignan's (2011), incorporate intrinsic motivators that comprise three main elements: autonomy, competence and relatedness (elements of the self-determination theory mentioned earlier) (Ryan et al., 2006; Ryan & Deci, 2000). These elements are considered a cornerstone for engagement (Bakker, 2011), which, unlike extrinsically rewarding motivations, tap into users' intrinsic motivation to address issues such as lack of engagement. These game elements are discussed in detail in Table 2.

Game element	Definition	Examples	Cybersecurity context
Game dynamics	Rules, aims and objectives of the gamification model (Werbach, 2014).	Constraints: rules that shape up activities and behaviours (Bess, 2013). Progression: communication of learning and development progress (Ryan et al., 2006).	Learning about cybersecurity and applying this knowledge in a progressive manner that balances challenge, skill level and progression to develop the required 'flow zone' (Kapp 2012; Santhanam, 2016).
Game mechanics	Elements that drive a game forward (Werbach, 2014).	Feedback: performance and progress evaluation and/or assessment (Kapp, 2012). Rewards: intrinsic and extrinsic incentives that utilises operant conditioning through associating the desired behaviour or activity to different rewards (Gazzaniga, 2010).	Cybersecurity awareness programmes can incentivise learning and progression by rewarding behavioural changes that reflect security policy awareness and adoption.
Game components	Instantiations of mechanics and dynamics that can appear in the form of achievements, badges, points or leaderboards (Werbach, 2014).	Points/Badges: can act as an extrinsic motivational factor by providing social promotion of self-image (Zichermann & Cunningham, 2011). Leaderboards: provide a positive competent environment that incentivises hard workers. Aesthetics: dictate and shape up the system in an artistic and visually appealing way that is context specific to create meaningfulness to the game (Kapp, 2012).	A context-specific cybersecurity system that acknowledges individuals' differences in motivational preferences and awareness levels (Hamari & Koivisto, 2015).

2.3.3 Gamification and Cybersecurity

Although gamification and game-based learning have shown potential in solving similar issues from cognitive (learning), psychological (motivation/engagement) and behavioural (compliance) standpoints, very few studies managed to utilise their full potential in addressing the three main issues that face cybersecurity awareness training. For instance, Silic and Lowry

(2020) focus on the "enjoyment" aspect of cybersecurity training and propose a training system that utilises gamification to enhance intrinsic motivation, supported by the hedonic-motivation system adoption theories. Their six-month field study of 420 participants is grounded in an innovative design-science research approach and proves the efficacy of gamification in fulfilling users' motivational needs. While the study opens a novel view to the problem using gamification, the question of how to address experiential learning gaps is not answered, which as a result may not prove as an effective approach for dealing with more complex cybersecurity issues and maintaining the required compliance level. From a gamification point of view, the shortcoming is largely due to the degree of emphasis and reliance on structural gamification concepts over content gamification. Structural gamification is the use of game components (such as points, badges and leaderboards) over a pre-existing system (learning modules) to immerse users into an engagement loop of collecting points and climbing the leaderboards, without changing anything within the activity (in this case the learned content) (Hallifax et al., 2018). Therefore, such gamification design techniques may not fully address the knowledge acquisition and adoption phases of the learning process. Content gamification can be used instead (or in conjunction) where the focus will be more on gamifying the activity itself to make it more game-like and consequently intrinsically engaging (e.g. gamifying the learned content itself) (Hallifax et al., 2018).

Similarly, Baxter et al. (2016) focused their work on measuring how their gamified security training was fun and enjoyable, and in the end, they do not offer significant evidence about the impacts on users' knowledge. Other efforts such as Banfield and Wilkerson (2014) and Boopathi (2015) show the potential of gamification in this area, but with attention to the context of use, such as students in universities as opposed to organisational security practices. Other studies such as the work by Adams and Makramalla (2015) contribute to designing an attacker-centred awareness program that covers a wide variety of detailed attacks. However, the work can benefit from a stronger theoretical foundation from a gamification design perspective. Therefore, this research tries to provide a holistic gamification model for cybersecurity training that addresses the three main identified factors from cognitive (experiential learning cycle through content gamification), psychological (engagement loops through content game-like mechanics) and behavioural perspectives (compliance through structural gamification) as follows.

3. A Conceptual Model

Building upon the theoretical threads analysed so far, a conceptual model will be developed in this section. The model utilises gamification's psycho-behavioural constructs to develop a

cybersecurity awareness program that can offer remedy to the key issues identified: the broken learning cycle; the engagement problem; and the behavioural/adoption shortcomings. Accordingly, the proposed model aims to address the main cybersecurity functions as identified from the literature to be: identify, protect, detect, respond and recover security phases (NIST, 2020; Ros et al., 2020). The "identify" function is mainly concerned with cybersecurity policy establishment and communication. The "protect" function revolves around cybersecurity awareness and training. The "detect" function focuses on cyberthreat monitoring and detection processes. The "respond" function delineates cyber risk reporting and response strategies. Finally, the "recover" function describes incident recovery steps and utilisation of lessons learned to update organisational policies.

The key tenet of the model is utilising gamification to build cybersecurity capabilities by levering the human element through game elements. This will be achieved by integrating two main components: a learning component and a behavioural component. First, the learning component will be examined and developed using theories from the gamification for education literature and the learning/cognitive theories literature (Sweller, 2011). The outcome will be immersive and engaging learning experiences that tap into users' intrinsic (and extrinsic) motivations (Ryan et al., 2006; Ryan & Deci, 2000; Venkatesh, 1999). These constructs are integrated in an effort to address cybersecurity awareness/cognitive issues resulting from disengagement and lack of motivation (Bandura, 1993; Deci & Ryan, 1985). Content gamification will be the foundation of this approach, that utilises story-based and narrative transportation theories (Hull et al., 2019; Green & Brock, 2000) to address the experiential learning cycle issues and to close the gap between theoretical/cognitive learning and subsequent behaviour and practical implications by enabling learners' systematic cognitive processing of information (Puhakainen & Siponen, 2010).

Second, for the behavioural component, structural gamification approach will be used. The approach integrates organisational learning theories to accompany and complement the proposed learning component in order to sustain positive behavioural changes of players on a daily basis. This will be achieved by studying and developing gamified engagement loops that track, motivate and reward day-to-day cyber hygienic behaviour and incentivise problem-solving knowledge transfer and application (Zichermann & Cunningham, 2011; Kapp, 2012).

These two components (learning and behavioural components) that make up the proposed model are grounded in the widely accepted and globally utilised (see Azmi et al., 2018) NIST (2020) cybersecurity framework to overcome the cybersecurity training issues presented in the previous sections. The learning component targets the employee awareness issue through engaging game-supported content, hence addressing the protect function in the NIST framework through immersive and interactive cybersecurity scenarios and case studies. The

learning component will also tackle the detect and respond functions through developing an active learning experience where users can actively participate in identifying and responding to cyberthreats in a risk-free simulated environment that encourages exploration and motivates learning through trial and error. The second component, the behavioural element, targets knowledge application, policy adoption and compliance to motivate users to adequately detect and respond to cyberthreats in line with the company's cybersecurity policies. The performance outcomes from both components will be fed back to update and improve recovery planning (aligning with the recovery function) and cybersecurity policies and procedures (relating to the identify function) which we find to lead to a dynamic cybersecurity infrastructure that develops with its user's competence and knowledge.

The integration of these components, summarised in Table 3 and detailed in the next subsections, is expected to help in building a theoretical framework that can act as a starting point for practitioners and academics for building cybersecurity capabilities within organisations.

Table 3: A summary of the components of the proposed conceptual model

Model Components	Constructs	Game Elements	Objectives
Learning element (content gamification)	Knowledge acquisition and potential absorption	Story/narrative, progression, feedback and aesthetics	Create an active learning experience that is self-paced and provide a risk-free interactive case-based learning platform that engages and immerses users
Behavioural element (structural gamification)	Knowledge application and realised absorption	Goals, progression, feedback points, badges, leaderboards	Motivate compliance by scoring users based on their daily cybersecurity behaviour and comparing their performance company-wide

3.1 Content Gamification for Learning

The first component proposed by the model is the learning component that utilises content gamification, which is gamifying the learning phase to make it more game-like (Kapp 2012) by focusing on content creation, formulation and presentation. The research conducted by Scott and Neustaedter (2014) highlights three main gamification elements, argued to be more popular and successful than others, used for learning and/or training. These elements are storytelling, progression and rapid feedback. These will be incorporated in this phase

following Liu et al. (2017) task congruence design principles and based on the elements' theoretical underpinnings derived from the literature as summarised in Table 4.

Table 4: A summary of the game elements used in the proposed learning component

Game Elements	Selected Elements	Benefits	Theoretical underpinnings
Game dynamics	Storytelling	-Problem solving -Active learning -Case-based learning -Immersive narrative -Risk-free experimentation -Simulation of real scenarios	-Story-based memory schemas (Hull et al., 2019) -Cognitive theory (Bartlett, 1932) -Narrative transportation theory (Green & Brock, 2000)
	Progression (levels)	-Self-paced (autonomy) -Flow zone (balance skills and challenges)	-State of Flow (Csikszentmihalyi 1990) -Self-determination Theory (Kahn, 1990) -Segmenting Principle (Clark & Mayer, 2011)
Game mechanics	Feedback (branching scenarios and quantifiable score based on performance)	-Learn about the actions and consequences -Targeted, user-specific feedback	-Targeted feedback (Kapp, 2012) -Dynamic difficulty adjustment (Zohaib, 2018)
Game components	Aesthetics: visuals/graphics and narration	-Accommodate different learning styles -Context-specific -Organisation-specific	-Learning cycle (Kolb, 1984) -Learning Styles (Lu et al., 2007; Gardner & Thomas, 2014) modality principle (Mousavi & Sweller, 1995; Mayer & Moreno, 1998) multimedia principle/dual coding theory (Clark & Mayer, 2011; Mayer et al., 1996).
	Points/Score	Performance indicator/assessment based on inputted decisions	Targeted feedback (Kapp, 2012)

The proposed learning component relies on narrative-driven storytelling that provides employees with an interactive web-enabled interface where they can experience an illustrated story and interact with it through character driven decisions. The intended learning outcomes

will be encapsulated into consecutive chapters/levels, with a progressive and increasing difficulty level that simulates real life cyberthreats. For example, earlier levels will target basic knowledge acquisition around password strength and later ones will target more complex social engineering phishing attacks. Players will roleplay as a character in the interactive story, where they will need to input their decision at certain points, which affects how the story progresses in a branching scenario-driven mechanism to see the consequences of their actions. The following subsections elaborate the four game elements utilised in the learning component and the rationale behind their selection in details.

3.1.1 Storytelling Elements

People learn faster when facts are embedded within a story (Kapp, 2012). On this basis, problem-based storytelling is introduced as a fun element for providing an engaging and rich medium for employees, while promoting problem-solving knowledge transfer through retrieving apt story-based memory schemas (Hull et al., 2019). This is also further explained by cognitive theory, based on which people learn when they are motivated to solve a problem, and do so by accessing long-term memory to retrieve a schema. According to Bartlett (1932), retrieving a schema here is a cognitive device for indexing paired knowledge of what to do (declarative knowledge) and how to do it (procedural knowledge). This is followed by registering that schema within working memory and processing it in relation to sensory inputs associated with the problem to be solved (Sweller, 2008). Therefore, the learning component should be designed around a story that conveys the relevant declarative knowledge (e.g. follow tight secure policies) and procedural knowledge (e.g. choose a stronger password) (Sweller, 2011). This can then promote the "protect" function of the cybersecurity infrastructure within an organisation through knowledge transfer to maintain and increase security awareness in an effective and practical manner that does not solely rely on didactic learning (which cannot be easily transferred to applied and declarative knowledge).

The story should also feature characters whom the learner can identify as authentic (even if fictional), following the principles of narrative transportation theory (Green & Brock, 2000). This narrative form of sense-making also functions to link learners/employees to "real-life" situations, which has been proven to be an engaging and effective learning method in many contexts (see Hakkarainen et al. (2007)). For example, a critical analysis of a typical social engineering practicability can be difficult to illustrate otherwise. Social engineers typically use psychological manipulation of people into performing actions or divulging confidential information through emails or other communication forms (such as phones) (Mitnick & Simon, 2002). A narrative format can easily elucidate such dialogues or email exchanges to learners to demonstrate how social engineers can build rapport and trust to abuse it later

(declarative knowledge), and how to avoid falling victim to these decoys by embedding the relevant procedural knowledge.

3.1.2 Trial and Error within Branching Scenarios

Second, using interactive stories as a learning medium provides room for exploration (freedom to fail), which presents users with the opportunity to experiment without fear of irreversible damage. As a result, users would be eager to explore (e.g. the consequences of opening a spam email), make decisions (e.g. open an email or not) and take chances since stakes are low within the simulated storyline environment (Lee & Hammer, 2009). In an educational/learning environment, this would typically encourage experimentation to understand the consequences of different actions, or even the lack of taking an action (Pope, 2003), which will have a positive impact on employees' cybersecurity compliance behaviour as demonstrated by Li et al. (2019). For example, access control (managing who accesses which files and resources (Mitnick & Simon, 2002)) and intrusion detection can benefit from the trial and error mechanism. Learners will get the opportunity to witness the consequences of giving out sensitive information (e.g. sending a critical file) to an unauthorised individual and how it can damage or harm the organisation in a simulated and safe environment. This knowledge by itself can act as a motivational antecedent for users going forward to follow proper access control measures, which not only increases awareness (cybersecurity "protect" function) but also simulates the "detect" and "respond" cybersecurity functions through risk-free/simulated environments that help prepare users for real-world threat response strategies (Jensen et al., 2020).

3.1.3 User-Centric Feedback and Self-Regulation

Third, the freedom to explore explained above will be coupled with rapid feedback to help users quickly understand the impacts of their choices on individual and organisational levels. Kapp (2012) shows a positive correlation between effective learning and how frequent and targeted the feedback is. Examples may include hints, comments, quantifiable score based on performance (decision-based scoring) or even a story detour that illustrates the users' decision outcomes (Gee, 2008). Users may need to restart a level if the learning outcomes were not met (e.g. failed to reach a satisfying story ending or behave properly against a cyberthreat). Therefore, this feedback will determine how the story (and consequently the level) progresses. This would allow room for different employees to progress at their own pace and overcome the pacing issues identified earlier.

Progression is an important element here since it acts as a performance monitoring and control tool to support and guide users by adequately implementing an interest curve (Sheldon, 2012; Hidi & Renniger, 2006). This will also help in developing and maintaining a state of "flow" for users. In this way, quick learners and tech savvies will be able to progress through the levels faster and not feel bored. Conversely, less tech savvy employees will have the time they need to learn from their mistakes and will not feel overwhelmed by laborious learning requirements considering that they may not move to advanced concepts until they master the basic ones first. Dynamic difficulty adjustment (DDA) can also be integrated here, which is an automated method for modifying the difficulty level in real-time, depending on the user's skill level, to maintain flow (Zohaib, 2018). For example, learners may first learn a typical social engineered scenario (through trial and error), they would then advance to learn about access control and the dangers of revealing sensitive information. After that, as they progress through levels, they get to learn about data classification (which data is sensitive and which is not) and how to maintain an audit log when sensitive data is shared, which can be used in the intrusion detection process, once an anomaly is detected. Therefore, levels should be designed with an increasing degree of difficulty related to trainees' knowledge and application of different and relevant cybersecurity topics. Typically, these topics should vary from declarative and informative ones suitable for promoting awareness (e.g. cyberthreats, their types and definitions) to more sophisticated practices for preventing, detecting and responding to cyberthreats. A summary of a typical curriculum (based on NIST (2020)) that can be mapped to a gamified level-based training course is shown in Table 5.

Table 5: Mapping NIST training topics to game levels with increasing difficulty

NIST Functions	Training topics	Difficulty	Game Level
Identify	Roles and responsibilities towards cybersecurity (employee specific)	Beginner	1
	Cybersecurity policy and implication of non-compliance (organisation specific)	Beginner	2
	Asset vulnerabilities	Intermediate	6
	Possible internal and external threats	Intermediate	7
Protect	Authentication of users and assets (e.g. passwords)	Beginner	3
	Protection software usage and update (e.g. antivirus, antispyware and firewall)	Beginner	4
	Permission, authorisation and access control (physical and remote) (e.g. privileges)	Intermediate	8
	Audit/log records	Intermediate	9
	Data handling and destruction procedure (e.g. encryption, confidentiality)	Advanced	14
Detect	Spam and email	Beginner	5
	Anomalies	Intermediate	10
	Incident alert thresholds	Intermediate	11
	Social engineering	Advanced	15
	Monitoring events, devices and activities	Advanced	16
Respond	Incident response and report (who to contact)	Intermediate	12
	Information sharing	Advanced	17
Recover	Update lessons learned and vulnerabilities	Intermediate	13
	Manage public relations	Advanced	18
	Data backup and storage	Advanced	19

3.1.4 User Interface and Aesthetics

Fourth, the choice of aesthetics is also important. For this purpose, a graphic novel style is proposed with accompanying audio narration. This format provides users with the visual elements, audio and textual features, accommodating different learning styles and preferences as discussed earlier. The choice of art style and story should be context-specific and user-specific to maintain relevance to the company's workforce demographics and avoid getting too gimmicky or too formal (Elsayed et al., 2019). A tough balance should be considered here,

since a realistic design has a notable difference on the effectiveness of the learning outcomes as demonstrated by Ros et al. (2020) and Santhanam (2016), but a solemn one can take the whole system into a more boresome territory (Elsayed et al., 2019).

A summarised illustration of the learning component with all its elements is shown in Figure 1. All these elements comprise the learning component of the model, which once completed triggers the next component: the behavioural element.
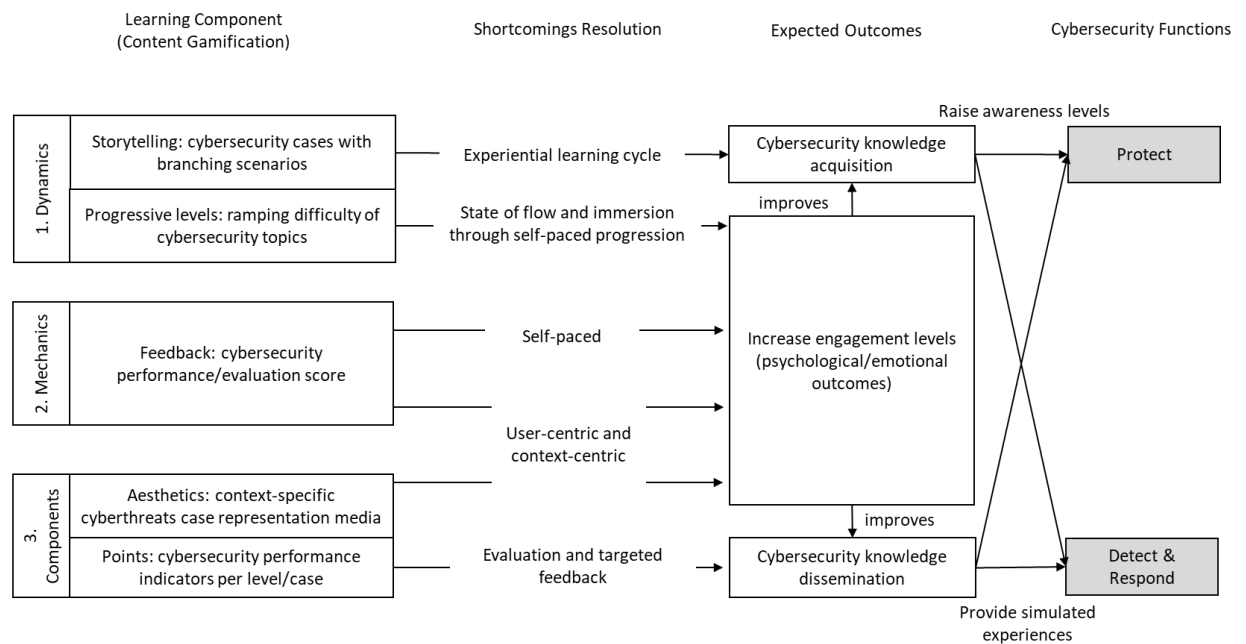

Figure 1: Learning component of the proposed conceptual model for building cybersecurity capabilities using gamification

3.2 Structural Gamification for Changing Behaviour

The second component proposed by the model is the behavioural component, which is concerned with structural gamification, i.e. gamifying the structure beyond the learning phase to motivate real behavioural changes (Kapp, 2013). This aspect is totally absent in most of the current cybersecurity awareness programs, which are usually not concerned with user behaviour beyond the training phase (Nobles, 2018; IBM, 2018). Therefore, this component is a cornerstone in the proposed system as it motivates employees to apply what they have learned in their daily jobs. The game elements proposed in this phase are summarised in Table 6. We will discuss further how these elements can be utilised to provide an engagement loop for employees that motivates, incentivises and rewards them for utilising the knowledge from the previous phase into their daily jobs to advance and build the cybersecurity capabilities for the company.

Table 6: A summary of the game elements used in the proposed behavioural component

Game Elements	Selected Elements	Benefits	Theoretical underpinnings
Game dynamics	Goal	-Motivate cyber aware behaviour	-Goal achievement (Dignan, 2011)
	Progression	-Autonomy -Flow zone (balance skills and challenges)	-State of Flow (Csikszentmihalyi, 1990) -Self-determination Theory (Kahn, 1990) -Segmenting Principle (Clark & Mayer, 2011)
Game mechanics	Feedback	-Behavioural learning (reinforce positive/cyber aware behaviour)	-Targeted feedback (Kapp, 2012) -Self-determination Theory (Kahn, 1990)
Game components	Points	-Incentivise desired behaviour (cybersecurity knowledge application) for realised absorptive capacity	-Motivational affordance (Hamari et al. 2014) -Absorptive capacity (Zahra & George, 2002)
	Badges		
	Leaderboards		

The proposed behavioural component integrates with the learning component, where users shall unlock certain tasks as they progress through the story. For example, level 1 in the story can demonstrate the 'strong vs weak password' situation in an immersive story format. Once the user successfully completes this level, a 'change your password' task will be unlocked and presented to them. This task, unlike the simulated story, requires the employees to actually update their real passwords and follow the company's guidelines (cybersecurity policies) for selecting a strong password. The user will then acquire some points (score) once they successfully complete this task and report it through the system. Users will accumulate points from different tasks (such as reporting a phishing email or updating firewall programs) and compete against each other in a companywide leaderboard, which demonstrates adopters and cybersecurity compliant employees. Relevant and adequately chosen rewards (e.g. badges or even monetary ones) should be made available at different milestones to reward progression. The following subsections elaborate the two game elements utilised in the behavioural component and the rationale behind their selection in details.

3.2.1 Behavioural Engagement Loops

A structural framework can potentially create engagement loops that motivates behavioural changes and remedy the missing link of policy enforcement in the current cybersecurity awareness programs. In explaining the reasons that make gamification successful in changing user behaviour, Robson et al. (2016) and Higgins (2006) assert that reinforcements (extrinsic motivators such as money and fame) and emotions are the main factors. This is because gamification can reinforce repetition of desired behaviours by tying it to satisfying outcomes (e.g. winning company-wide badges or topping the leaderboards), leading to habit formation and application (Duhigg, 2012). Therefore, tying in cybersecurity compliance to a shared scoring system that links to extrinsic rewards such as prizes and/or money, and intrinsic rewards such as fun and engaging experiences can be used to derive the desired employee behaviour (Herger, 2013; Robson et al., 2015).

This also aligns with the widely accepted gamification framework introduced by Dignan (2011) which utilised different gamification elements to provide a continuous engagement cycle that ensures knowledge application and transforms potential absorptive capacity into realised absorptive capacity. For example, a positive behaviour such as following a strict authentication procedure before disclosing sensitive information can be rewarded with an "excellence compliance" badge that can act as an achievement incentive to reinforce positive behaviour through compliance. Similarly, actions like updating passwords with stronger ones to prevent dictionary attacks (a password detection system that tries commonly used English vocabulary words (Mitnick & Simon, 2002)) and brute-force attacks (a password detection system that tries all alphanumeric combinations to reach the right password (Mitnick & Simon, 2002)) should be adequately rewarded.

The development of these engagement loops should be designed around the "detect" and "response" cybersecurity functions of the NIST framework, derived from the organisation's cyberthreats response strategy to promote hygienic cybersecurity behaviour. The more the users adhere to cybersecurity best practices compiled by the organisation in the "identify" cybersecurity function area, the better their evaluation is and hence the higher the reward (in the form of relevant and adequate incentives) (Rapp, 2015). A positive reinforcement loop (Huotari & Hamari, 2017; Robson et al., 2016) can as the result develop across the organisation that recognises complaint cybersecurity behaviour and encourages and rewards fast followers.

3.2.2 User-Centric Design

The proposed system does not only accommodate for different learning styles, but also different motivational styles. Understanding users' typology is an important aspect in gamification due to individual differences, since users are motivated differently and the gamification model design process addresses this issue. Based on this argument, Dixon (2011) proposed a user typology framework illustrating how it can be used in gamification to appeal to different users. For example, the proposed elements may cater for the "killers" type (by providing leaderboards to fulfil their competitive nature), "achievers" type (by providing different levels that need to be completed, milestones and behavioural-related badges to fulfil their sense of achievement) and "explorers" type (by providing story driven adventures to fulfil their sense of adventure and discovery). However, a company may need to cater for other types such as socialisers (those who seek social connections), for which they may need to add a community of practice, where employees can post and share their views about individual story chapters, learning outcomes or suggestions. Consideration of contextual and individual differences are critical in designing and developing an appropriate programme.

Figure 2 shows the whole conceptual model, integrating the two components (learning and behavioural) and their corresponding gamification design approaches. The initial cybersecurity policy would typically be established in the "identify" stage, which would then shape up the learning and behavioural components of the gamified system to determine the important security topics to gamify and to identify the desired compliant behaviour to incentives. However, the continuous interaction between the two systems (cybersecurity framework and gamified system) entails continuous development and adjustments. This is evident in the lessons learned and performance evaluation phases that result from both the learning and behavioural components of the system, which can be a major contribution to the updating of the established policies ("identify" and "recover" function). This is expected since new cases will arise, new procedures will need to be established and new responses will be required as new cyberthreats arise. A very important by-product of this gamified system is the availability of all the relevant information needed to monitor and identify new cases and monitor how the users have responded to them (if any) using the behavioural component performance measurements. The cyclical and continuous nature of the proposed model contributes to upgrading and adjustment of the whole policy.
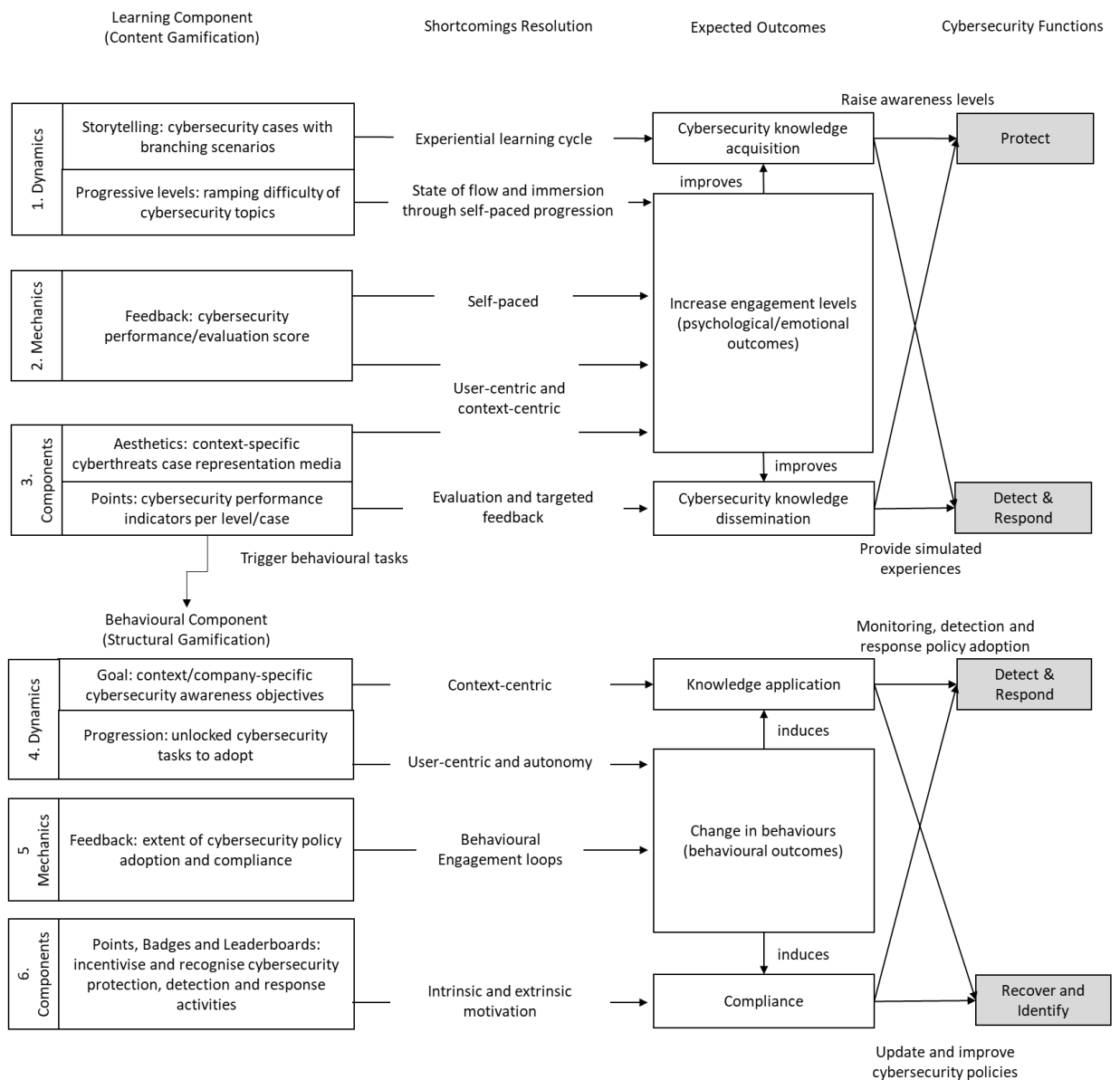
Figure 2: Conceptual model with two components for building cybersecurity capabilities using Gamification

4. Discussion and Conclusion

Emerging IS/IT technologies have brought new and complex challenges to organisations, which may also have solutions in employing complementary technologies available to them. Cybersecurity, a stark case of such risk for most modern organisations, is shown however to be largely associated with the human element in organisations, in both direct and indirect forms. While facilitated training and awareness programmes for employees can be critical in building the required capabilities and resilience, it is about how effective such programmes are and more importantly how they can be designed and delivered to serve the purposes

sought. Our theoretical review supported gamification as a solution with serious offerings to address the existing issues in providing effective awareness programmes.

Gamification as a complex and iterative process should be aligned with strategic objectives of the firm to achieve/enhance certain performances and build the required capabilities. The model introduced for this purpose helps bridge the gap of how gamification may be deployed to complete the learning cycle in organisations and how it can lead to realised absorptive capacities, connecting knowing and doing for achieving the desired effects. Gamification, if tailored to purpose and context, brings about motivation and engagement and consequently creates behavioural changes that would positively impact cybersecurity awareness and adoption levels. Disengaged and neutral employees can be tuned into actively engaged ones in the process, positively influencing organisational cyber resilience capabilities. The perspective on gamification adopted in this study, combining two key features of gamification, content gamification and structural gamification, presents a new outlook for addressing capability building efforts in organisations. Solving the broken learning cycle through a bespoke engaging experience for heterogeneous users (with different knowledge, skills and motivations) would facilitate the learning process to go beyond the knowledge acquisition phase. In practice, this is achieved by targeting more indirect human elements that help in building and enforcing policies. Adding the behavioural component also helps filling a major gap in the existing practices for security awareness programs, encouraging policy adherence through application of knowledge in day-to-day activities.

The conceptual model, while objectively targeted for developing purpose-built cybersecurity awareness programmes, can arguably be used as a generic model for supporting capability developments in firms, where learning and behavioural changes are the main concerns. The key tenets of the proposed approach and model are: creating engaging and immersive learning experiences that positively influence users/employees' awareness level as the outcome; and motivating behavioural changes to help building the human element in key organisational processes, as key organisational resources or otherwise the weakest link in organisational capabilities. An example may be learning to use a certain technology or certain process within the workplace, where the model may guide the development and devise of the right solution and game elements to fit the ultimate objective of the exercise.

The model addresses the need for a carefully selected set of performance measures as was recommended by Elsayed et al. (2019). Using works of Hogg (2017), Gardner and Thomas (2014) and Mitnick and Simon (2002), the research offers a rigorous and informative built-in set of metrics for cybersecurity awareness programmes. These metrics address the three main constructs of a cybersecurity program that formulate its initial objective. The measurement elements include: measures for the cognitive elements (i.e. how effective was the system in

transferring knowledge, and how did it impact the employees' awareness levels); measures for the engagement levels (e.g. how engaging is the system for employees during the learning phase and application phase); and measures for the adoption and behavioural changes (i.e. how far can the system positively impact employee behaviour regarding cybersecurity and how sustainable is it) as the most crucial metrics. A summary of these metrics and how they are built in the proposed platform is shown in Table 7.

Table 7: A summary of the performance metrics and the model built-in indicators

Metrics	Details	Indicators
Cybersecurity awareness level (cognitive element)	Knowledge acquisition: -Did they learn anything? -What did they learn? -How fast did they learn it? -How effective was the system?	-Performance indicators after each level per user (score, accuracy, time)
	-Knowledge dissemination: -How many employees started/continued to learn? -How much did they learn?	-Performance indicators per user (cumulative score, number of chapters completed, number of chapters learned per day/week/month)
Engagement level	-How engaged are they with the system? -How many users/employees were attracted to use/keep using the system?	-Number of chapters completed per user -Number of users who consistently use the system (daily/weekly/monthly) Engagement surveys
Policy adoption level	Knowledge application: -Did it change any behaviour? -How did it change this behaviour?	-Number of fulfilled tasks/policies per user (e.g. number of reported security incidents) -Number of cyberattacks

The theoretical foundation set in the study explores other perspectives including development of egalitarian models for solving similar issues. As a conceptual work, the proposed ideas are yet to be tested and validated empirically, for which longitudinal case studies may be the best fit. Generalisation of the model can also be tested in various contexts, which would certainly bring the ideas to new lights and contribute to its maturity. Comparative studies would also

help examine the strength and validity of the approach against other competing awareness programs (e.g. traditional, web-based...etc.). Although the benefits of the proposed model have been argued for in this study, yet there are other learning elements which are not present in the current framework such as presence of a tutor and the cost/benefit analysis of the model against other available solutions.

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Building Organisational Capabilities Using Gamification; An Action Research

This paper examines and tests the potentiality of gamification to act as a strategic complementarity through a longitudinal field study. From 2018 till 2020, the researcher worked in collaboration with Beta, the case company, to implement a gamified solution that addresses a) their employee engagement issues and their antecedents, b) the resultant decline in customer satisfaction levels due to inadequate customer service quality and c) the lack of effective and engaging strategy communication mechanisms that can close the gap between the new leadership team and employees after the recent merger. Going through an action research cycle of identifying the problem, planning, acting and evaluating, the researcher managed to successfully implement a gamified system utilising Elsayed et al. (2019) design framework and measure its impacts and perceived benefits on Beta. Outcomes such as increasing employee engagement, breaking silos, increasing awareness levels of the company's strategy and developing learning and training capabilities were identified through quantitative online surveys and qualitative focus groups as part of the evaluation phase of the action research. The outcomes detail a roadmap for organisations on how to take advantage of the strategic complementarity benefits of gamification (that has been previously overlooked and narrowed down to limited short-term engagement tools) to develop a competitive edge through building relevant organisational capabilities.

Keywords: Gamification, Organisational Capabilities, Strategy Communication, Longitudinal Case Study, Action Research

1. Introduction

The concept of gamification has been advocated and promoted as an example of how innovative technologies may bring direct and indirect positive changes and effects to organisations (Elsayed et al., 2018; Hamari et al., 2014; Zichermann & Cunningham, 2011). The growing literature on the subject has shown potential implications of applying gamification within areas such as engagement, motivation, collaboration, knowledge sharing, learning and even stimulating innovation (Lucasse & Jansen, 2014; Ryan & Deci, 2000; Kapp, 2012)). However, more recent research suggests that wider and more strategic effects shall be expected from technologies like gamification. In their research, Elsayed et al. (2018) and Elsayed et al. (2019) took a step to consider gamification beyond a tool set and instead, as a technology facilitator and strategic catalyst for social change to help in building organisational capabilities.

The literature on this side of gamification is however, quite new and evidence showing how such strategic effects may be expected and how gamification may act to bring positive change to organisations is quite rare. Motivated by this gap in the subject knowledge, the lead author of this article seized an opportunity that presented itself, to research and develop a gamified platform for a leading gas production and distribution firm in the United Kingdom, that may serve a more long-term strategic purpose. The company, referred to as "Beta", had been through a difficult time after a major merger, which had shown some counter effects on their performance reflected on the decline in their customer satisfaction rates, decrease in employee engagement levels and even an increasing churn rate. As part of their new digitalisation strategy, the company was keen on communicating their new, post-merger, strategy to their employees in an effective, engaging and technology-facilitated mechanism to address the counter effects of the merger and motivate compliance to customer service best practices.

In a consultancy capacity, the lead author was given an insider position to study the firm and the problems in hand, develop and implement solutions and test them through a full action research capacity. Having access to the company's data and several managerial meetings provided the required context for undertaking an action based longitudinal research, of 24 months period, to empirically examine two key aspects of theories related to gamification, while supporting the strategic transformation of the case: 1) how gamification can contribute to capability development; 2) how gamification should be designed to align with the strategic objectives sought, and deliver the results expected. These theoretical notions were parts of the concepts and frameworks introduced by Elsayed et al. (2019), suggesting that through a purposeful design process (for which a method was introduced), gamification can facilitate the development of complementary capabilities to support key and strategic capabilities in the firm.

In developing a gamified solution that delivers the identified objectives, the gamification design framework by Elsayed et al. (2019) was adopted to provide an engaging and effective strategy communication platform for the firm's employees. Several theoretical threads from the customer/employee engagement literature (e.g. Purcell (2006), Truss et al. (2006) and HBR Analytic Services (2013)) and the gamification design literature (e.g. Elsayed et al. (2019) and Hallifax et al. (2018)) were researched and studied to understand how motivational affordances can be developed to engage employees in an educational/training journey that effectively communicates the company's strategy in a method that goes beyond plain conceptualisation. The utilised game elements were wrapped inside a user-oriented and goal-oriented design approach (as detailed by Elsayed et a., 2019) to target real behavioural changes through incentives that monitor, motivate and reward employees to increase the usage of the gamified training platform and stimulate technology adoption.

This practical case study provided the required insights to theoretically examine the adopted frameworks in terms of how that may work in a real environment. Primary data from the results of the implemented gamification solution was collected using varied research methods including online surveys, focus groups and firm performance data. The data was used to provide a validation of the examined theories which has brought new insights to our understanding of the role of gamification to support organisations strategically. The results from this study offer theoretical insights extendable to other aspects of employee education/training in similar organisational settings. Organisational training and strategic communication in fact provide a highly potent ground for theorisation as discussed in the paper.

2. Beta' Case

Beta is a large multinational gas company based in the UK, with over 30,000 employees across several continents and annual sales that exceed the £10 billion mark. The company has expanded from a small oxygen company in the 1900s to become the largest indigenous company in the industrial gases industry in the UK in the 2000s, which is one of the most heavily concentrated sectors of the chemical industry (Mintel, 2015).

2.1 Problem Overview

The company has been going through several mergers recently (the latest being in 2016), some of which have negatively impacted their employees' engagement levels, creating a major gap between their workforce and the leadership team. The company had observed some alarming

trends evident in their customers' feedback, indicating potential customer service issues which resulted in a high churn rate of 9.5%; a defection rate that has been on the rise. Given that the industry is dominated by small factories, with almost half of them operating fewer than 10 people, it was alarming for Beta to lose so many customers to smaller, more flexible/tech-savvy and less bureaucratic suppliers. This developed a sense of urgency to understand the reasons behind such disengagement and respond by communicating the new organisational strategy (after the latest merger) in an engaging and effective way (especially on how to maintain high customer service standards), as an effort to address the engagement issues and provide better customer satisfaction.

Therefore, the researcher was brought in as a gamification specialist to 1) understand the root causes of the customer and employee dissatisfaction; and 2) design a gamified system accordingly to engage employees with the company's strategy and train employees on customer service best practices. An action research approach was adopted since the researcher was involved in the analysis, design and implementation of the system and then the researcher reflected upon the strategic long-term outcomes through a collaborative inquiry process (Whyte, 1991; Miller & Salkind, 2002).

2.2 Research Methods Overview

First, the researcher was introduced to the problem through managerial meetings in April 2018. Second, the researcher analysed some secondary data to understand the root causes of the issues. Customer satisfaction surveys till July 2018 were analysed using theoretical and practical customer satisfaction frameworks (Purcell, 2006; Truss et al. 2006; HBR Analytic Services, 2013), which highlighted service quality issues attributed to employees' behaviours. Therefore, employee engagement surveys till September 2018 were analysed afterwards using relevant employee engagement and satisfaction frameworks (Kahn, 1990; Maslach et al., 2001; Maslach & Leiter, 2008). The results indicated a lack of proper communication channels between employees and the leadership team and a disengagement from the company's strategy after the merger. Third, the iterative design process of the gamified system used these findings and took off in September 2018, utilising Elsayed et al. (2019) framework to address the identified strategic issues, and was then piloted in June 2019. Fourth, the final system was ready in November 2019 after several iterations and was launched in January 2020 to be available for Beta's customer service team. Finally, user feedback was collected through quantitative online surveys and qualitative focus groups in March 2020 that was then analysed in April 2020 (See Figure 1) to test the extent to which gamification actually helped in building strategic capabilities through effective and engaging communication channels. The results highlighted substantial impacts on employee engagement levels, effective communication

medium establishment, organisational learning capabilities and even had positive by-products such as breaking silos and the introduction of effective behavioural metrics for the organisation to use in the future.
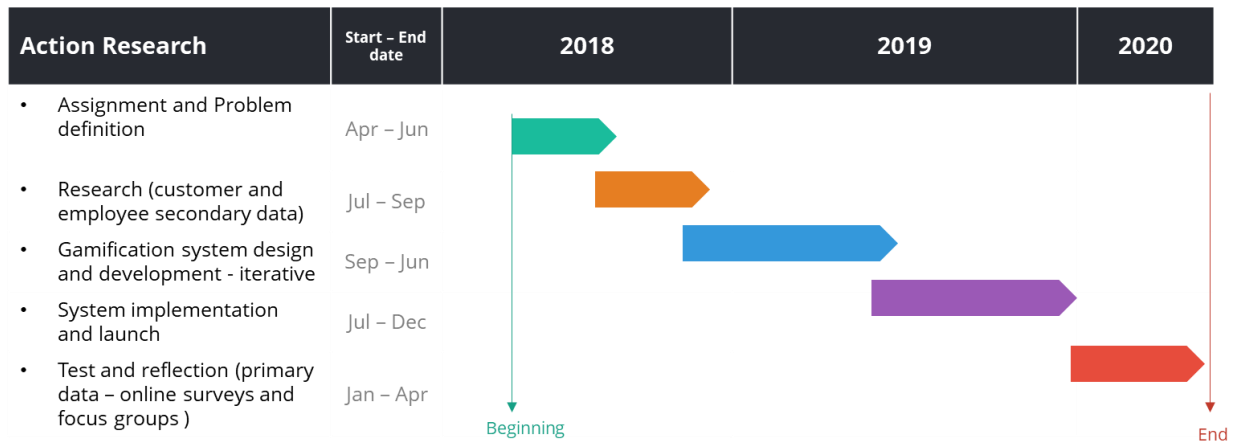
Action Research	Start – End date	2018	2019	2020
• Assignment and Problem definition	Apr – Jun			
• Research (customer and employee secondary data)	Jul – Sep			
• Gamification system design and development - iterative	Sep – Jun			
• System implementation and launch	Jul – Dec			
• Test and reflection (primary data – online surveys and focus groups)	Jan – Apr			

Figure 1: A timeline of the steps conducted for Beta's longitudinal case study

3. Research Background

The focus of this research is exploring gamification as a complementary asset for building strategic capabilities for Beta through effective and engaging strategy communication. The main purpose was to provide a better environment for the propagation and acceptance of the new direction/strategy for the firm, developed as an effort to tackle the issues affecting customer satisfaction. Hence, the need to enhance staff engagement through effective strategy communication platforms in the form of a technology-facilitated solution (i.e. gamification). Therefore, two main theoretical threads were utilised. First, customer and employee satisfaction frameworks were utilised to understand Beta's internal issues and the reasons behind them. Second, gamification design for complementarity frameworks were used to address these identified issues through relevant capability building efforts. Hence, this section is structured accordingly, to first review customer and employee satisfaction models, then to discuss pertinent gamification design approaches.

3.1 Customer Satisfaction and Employee Engagement

Employee engagement is an essential component in the process of developing customer satisfaction as evident in the Satisfaction-Engagement framework introduced by Purcell (2006) and Truss et al. (2006). This is suggested in the literature to be due to the positive

correlation between employees' attitude, engagement and overall business performance (Harter et al., 2002; HBR Analytic Services, 2013). From a customer's standpoint, several factors contribute to customer satisfaction through the process of value creation. Beaumont and Leland (1996) presented such factors through what is known as the customer value tree which includes: product performance, price, service and customer relationship. Although elements such as product performance and price play a crucial role in determining the value, yet the customer service aspect alongside the customer relationship aspect also have prominent roles (Kahle & Xie, 2008). These arguments were utilised in the customer satisfaction survey analysis (in Section 6.1) to determine the impact of the quality of the customer service provided by Beta on its customers.

This perspective also heightened the motivation to understand the issues from the employees' point of view. For this, several employee engagement frameworks were examined and utilised. From a theoretical perspective, Kahn (1990) argued that there are three main psychological states related to employee engagement: meaningfulness, safety and resource availability. He argued that engagement levels increase in situations that offer more psychological meaningfulness, which in return brings performance up. He defined meaningfulness as the state where employees add value to the work they are doing and receive positive feedback about the significance of this value. Safety, on the other hand, is all about the employees' trust in the working environment. Finally, availability is the firm's possession of adequate resources to assist employees to complete a specific job. Maslach et al. (2001) extended Kahn's model, adding the effects of what is known as job burnout. They identified six elements that can lead to engagement or the erosion of it: workload, reward and recognition, control, social support, sense of community, values and perceived fairness. They argue that, similar to the hygiene factors (Herzberg, 1964), which is another widely-utilised employee satisfaction framework used by practitioners and academics, the lack of these elements can result in job burnout that would totally impact engagement. These frameworks were utilised to understand the main issues and antecedents of Beta's employees' disengagement, detailed in Section 6.2.

3.2 Gamification

To address the employee disengagement issues resulting in customer dissatisfaction through effective and innovative strategy communication technique, gamification was chosen as a technology-assisted solution as advocated by the literature for being an engagement antecedent (Hamari et al., 2014; Hamari, 2013; Osak, 2013) with potential strategic impacts (Elsayed et al., 2019). Gamification is defined as the use of different game design elements within non-game contexts (Zichermann & Cunningham 2011). Gamification aim to derive certain user behaviours, utilising the concept of play that is known to positively affect

individuals through creating more imaginative, creative and fun experience for them (Kolb and Kolb, 2010; Fogg 2003).

A wide array of organisations has already used gamification to leverage employee engagement (Gartner, 2012), while others have sought results such as developing enjoyable and fun experiences, which helped facilitate employees training that is usually boring and less absorbing (Brandon, 2015). The literature has already demonstrated how gamification has been successfully applied as a fun tool for engaging and immersing individuals in what can be perceived as mundane tasks regardless of the scope on implementation (Zichermann & Linder, 2013), making fun a central motivational factor in gamification that can drive certain behaviours and activities (Werbach, 2014). As an engagement antecedent, gamification makes a highly relevant idea for building organisational capabilities (such as strategic communication capabilities needed by Beta) due to the demographic distribution of the workforce, i.e. generations X and Y, who have grown up amidst the videogame era and now constitute the majority of current and future workforce (Elsayed et al., 2019; Gartner, 2019). Gartner (2011) advocated the use of gamification techniques as they would resonate with the demographic's personality, relate to their lifestyle and even create a sense of belonging.

3.2.1 Elements of Gamification

The power of gamification lies in the integration of its main building blocks (namely dynamics, mechanics and comments) that share the purpose of creating an engaging gamified environment (Werbach, 2014) through stimulating intrinsic motivators such as autonomy, competence and relatedness (known as the elements of self-determination theory) (Bakker, 2011; Ryan et al., 2006; Ryan & Deci, 2000). First, game dynamics are the general set of rules, aims and objectives that serve as an overall framework for the gamification model (e.g. game constraints, goals, story and progression process) (Bess, 2013). An adequate balance between challenge, control and progression, when highly engaged in an activity, develops what is known as the "flow" state, which is considered one of the main strengths of gamification (Kapp, 2012). Second, game mechanics are the elements that drive the game forwards such as instant feedback and user-specific incentives and rewards. Tapping into users' intrinsic motivators can be achieved by utilising feedback loops and operant conditioning through associating the desired behaviour or activity to different rewards (Gazzaniga, 2010). Finally, game components are the instantiations of mechanics and dynamics that can appear in the form of achievements, badges, points or leaderboards (Werbach, 2014) to provide social promotion, challenges or dictate the system's aesthetics based on user-specific preferences/typology (Hamari and Koivisto, 2015).

3.2.2 Gamification Design for Complementarity

Elsayed et al. (2019) contends that gamification can act as complementary assets, which are defined as the capabilities and/or resources that help firms capitalise on the profits and outcomes associated with a technology (Orlikowski, 2000), strategy or even an innovation (Teece, 1986), if properly designed. Their framework presented gamification as a technology facilitator for social change to help in building organisational capabilities (Elsayed et al, 2018; Elsayed et al, 2019). To achieve this, the model suggested utilising the gamification design cycle through the right choice of game elements, aligning strategic business objectives through capability building metrics and devising the appropriate engagement loops by eliciting the appropriate psychological and emotional antecedents of human resources (See Figure 2).
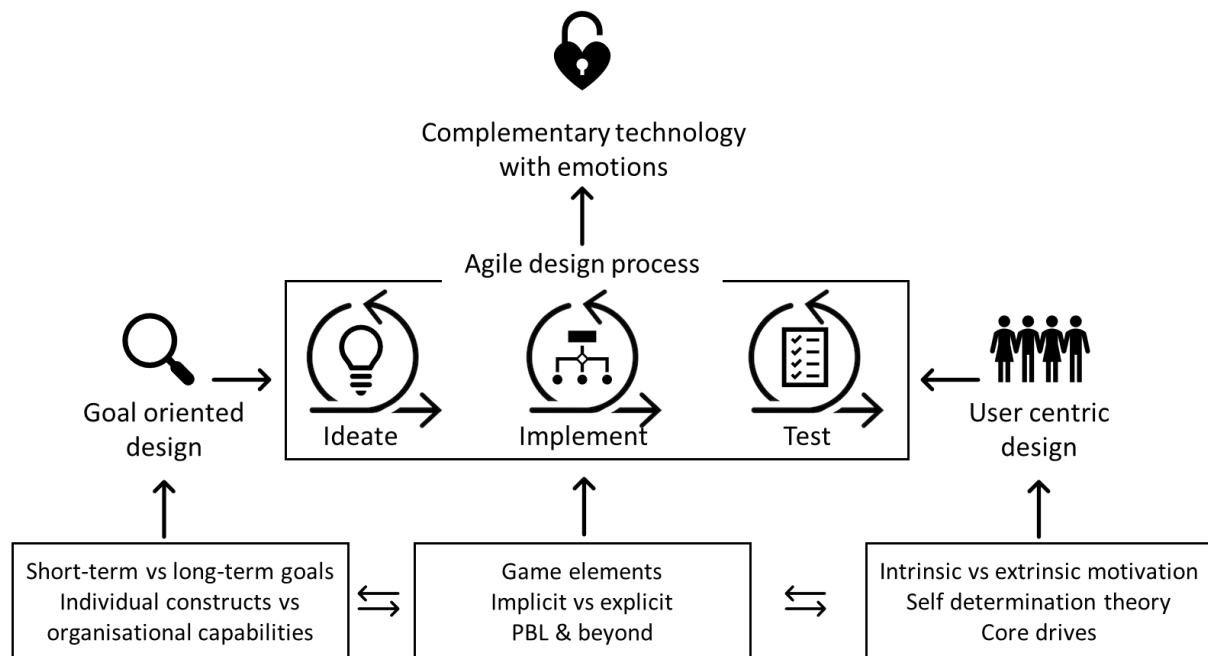
Figure 2: gamification design framework for complementarity (Elsayed et al., 2019)

The ability to effectively and engagingly communicate the company's strategy can be an example of such capabilities (see Ulrich and Smallwood (2004) and Ulrick and Lake (1991)) that, theoretically, can be built with the support and craft of proper gamification design elements that manage to immerse employees, train/educate employees about specific customer service behaviours, reward compliant behaviour and communicate the firm's strategy using Elsayed et al. (2019) gamification design framework that can be summarised as follows:

1. Goal-oriented design approach: identify the (individual or organizational-wide) capabilities and/or capability constructs that need intervention.

2. Human-centric design approach: understand organisational context, potential users and their respective playing typology to identify the right intrinsic motivators and design approach (e.g. intrinsic vs extrinsic gamification).

3. Motivational affordance design: select the relevant emotions to invoke, the basic human needs to motivate (psychological outcomes) and the core drives to target to develop behavioural changes through engagement loops and states of flow targeted towards achieving the goal(s) identified by fulfilling users' intrinsic needs.

4. Game elements design: select the corresponding elements that trigger the core drives and targeted behaviours and illicit the intrinsic motivators for long-term sustainable impacts.

5. Performance testing: devise long-term/strategic testing metrics, short-term proxy metrics based on the goals and constructs or meta-data that reflect the human capital.

6. Iterative design: develop system increments based on ideation, implementation and testing phases (through performance metrics) in a cyclic manner, where feedback is used to recalibrate and inform the next development cycle till the whole system is developed.

4. Aim and Objectives

Based on the researched literature and Elsayed et al.'s (2019) framework, the aim of this study is to explore the complementarity offerings of gamification that can assist Beta in building the required organisational capabilities to develop an effective and engaging strategy communication platform that would manage to increase compliance rates.

Research question: How, and to what extent, can gamification, as a complementary asset, support Beta in building the required organisational capabilities to address their internal strategic shortcomings?

The intended exploration is pursued by defining the following objectives:

1. Explore and understand the nature of the disengagement issues facing Beta from customers' and employees' perspectives.
2. Explore the extent to which gamification, as a complementarity, can address these issues through effective and engaging strategy communication/learning methods.

3. Develop a gamified system that triggers specific psychological, behavioural and emotional outcomes to facilitate the communication of the company's strategy to the employees and engage them in its effectuation.

4. Observe the learning, engagement and communication impacts of the gamified system on employees and their strategic impacts on the organisation.

5. Methods

Gamification research is in its early stages of development, where most of the efforts in the literature are primarily descriptive efforts that do not usually focus on reporting the effects and impacts from an empirical inferential standpoint (Hamari et al., 2014). But since the research in hand aims to explore the effects and impacts of gamification on Beta's capabilities, an interpretivist longitudinal action research approach was selected for three key reasons.

First, an *interpretivist approach* is deemed appropriate since gamification relies on behavioural changes and social settings that are heavily context dependent and form complex behavioural and social constructs (Robson et al., 2015; McCallum, 2012). Different social actors and their behaviours need to be understood beside the motivating actions behind such behavioural changes (e.g. the antecedents to Beta's disengaged workforce and how to overcome them). This view reinforces the fact that the knowledge that needs to be generated, captured and accepted within these social contexts would need deep understanding and digging beneath the surface of what is an observable phenomenon in order to understand the reality of such details. This is also supported by von Wright's (1997) view on the differences between understanding (more interpretivist) and explanations that typically lack the intentionalist or semantic dimension of understanding. In summary, an interpretivist approach is more suitable in this case since facts and causal laws would not adequately explain and illustrate the motives and meanings behind the actions that are deeply rooted within psychological and behavioural constructs (Gummesson, 2003; Saunders et al., 2016).

Second, the *longitudinal case study* nature of the research would also help in tracking and observing changes in behaviour over time and facilitate theory building (Gummesson, 2007) by triangulating different methods and sources of data such as surveys, focused group, case study observations and the gathered primary and secondary data (Bryman & Bell, 2011). Since gamification relies heavily on developing virtual worlds that are immersive and simulated, a longitudinal approach would help in understanding the dynamics between different units, objects and boundaries in-between. This would give the researcher the ability to focus on enacted situations and dynamic relationships between objects (i.e. between Beta's users, their engagement levels and the adoption levels of the gamified system) and the fluidity of

boundaries created as a result, instead of relying on independent object assumptions that presume consistency and stability of different entities (Schultze & Orlikowski, 2010). This is important in such situations in order to view reality as a "doing" within an ongoing practice, instead of looking at an independent fixed entity such as the ostensive view of reality (Thrift, 2003). In the context of gamification, this method is deemed useful since the main focus is not only how users use the gamified systems, but how they both interact and interrelate to produce organisational effects and outcomes (Law & Singleton, 2000). Therefore, this approach would help in addressing the research question of understanding different units of analysis such as users, processes, capabilities and performance metrics for a period that spans for nearly 24 months.

Third, *action research* has always been an integral part of organisational development works (Coghlan, 2012), where academic researchers and practitioners collaborate together towards addressing complex issues of organisational change (Shani & Coghlan, 2014). In Beta's case, an action research approach was selected since the company is dealing with context-bound knowledge where the researcher, in collaboration with the management team, was involved in the diagnosing, planning, analysis, design and implementation processes (Whyte, 1991; Eden & Ackermann, 2018). This is because action research incorporates an emergent and iterative process of inquiry that is designed to develop solutions to real organisational problems (See Figure 3) through a participative and collaborative approach, in which different forms of knowledge are utilised (Coghlan, 2011; Coghlan & Brannick, 2014; Eden & Ackermann, 2018). The following sections detail different action research phases employed in this research, elaborating the data collection methods, analysis procedures and the results of each.
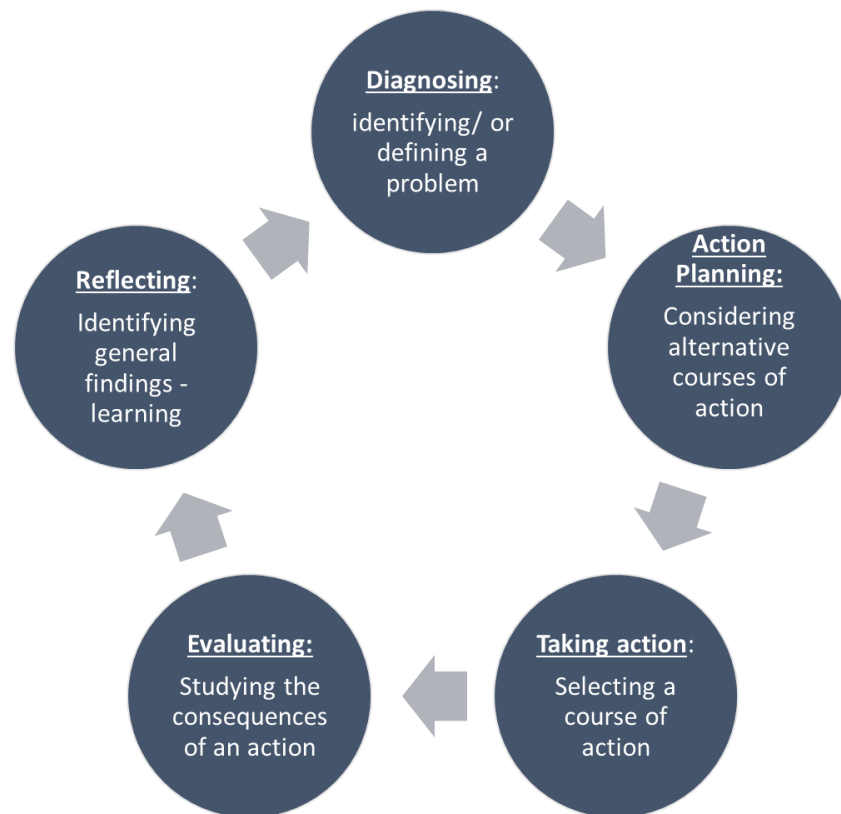
Figure 3: Action research framework adapted from adapted from Susman and Evered (1978, p. 588) and Eden and Ackermann (2018)

6. Action Research Process

Throughout this longitudinal case study that spanned a duration of 24 months, different data collection methods were chosen at different points to develop a concrete understanding of: a) the problem, b) the required design and c) the developed capabilities. For the *diagnosis phase*, archival data of customer and employee surveys were used for root cause analysis of the issues Beta is facing. Since these surveys were intended to test satisfaction levels of customers and engagement levels of employees, their nature and original purpose fit the objective of this research (Hakim, 2000). First, the researcher analysed the annual customer feedback for year 2018 to understand the customers' pain points as perceived by them. The results highlighted potential employee engagement issues resulting in poor customer service. Second, to triangulate the results of the customer surveys and understand the internal issues, the researcher analysed two internal employee surveys (called pulse surveys) that spanned across 2018. A qualitative thematic analysis was conducted to understand, from the employees' perspectives, Beta's internal issues and how they affect the workforce as well as customer service quality levels. The results highlighted a major gap between the leadership team and

employees due to recent mergers and poor strategy communication due to the lack of proper communication channels.

Elsayed et al.'s (2019) gamification design framework utilised the outcomes of these surveys to assist in building a bespoke gamified platform that addresses the identified engagement issues in the *planning phase*. Core issues were to be addressed through a gamified solution based on priority (i.e. issues highly impacting employees and customers) and feasibility (i.e. those that can be addressed through digital/gamified solutions). For the *action phase*, a gamified system was designed with support from the management team and in collaboration with the target users (employees) using Elsayed et al. (2019) design framework. The gamified system was developed, piloted and deployed to Beta's customer service team in different iterations throughout 2019 till the final system was launched in 2020.

After designing and deploying the system, online surveys were sent to users, and focus groups were conducted with users and managers to explore the system's impacts on an individual level and an organisational level as part of the *evaluation and reflection phases*. These phases helped develop an in-depth understanding from the users and managers about the strategic impacts of the system experienced to build a concrete picture of the impacts, benefits and shortcoming of the gamified system and the implemented design process for gamification to act as a complementarity. Table 1 summarises each one of these steps, highlighting the methods, analysis and objectives of each stage.

Table 1: A summary of the conducted action research process

Phase	Step	Method	Data	Objective
1. Diagnosis	Customer satisfaction analysis	Qualitative thematic analysis of transcribed customer feedback using total population sampling	28,940 entries, collected from email, SMS and recorded audio over a period of 12 months till July 2018	Research objective 1
2. Diagnosis (cont'd)	Employee engagement analysis	Qualitative thematic analysis of transcribed two employee engagement surveys using total population sampling	1262 entries, collected from online surveys during March and September 2018	Research objective 1
3. Plan and action	Gamification system design	Elsayed et al. (2019) complementarity design framework	Used results from the previous two steps plus archival data, meetings outcomes and pilot results	Research objectives 2 and 3
4. Evaluate and reflect	Preliminary user feedback	Online surveys sent to all users after 1 month of playing	Descriptive analysis of all the 26 responses	Research objective 4
5. Evaluate and reflect (cont'd)	In-depth focus group feedback analysis	Qualitative thematic analysis of transcribed focus group data using stratified sampling	5 participants detailed the psychological, behavioural and capability impacts of the system	Research objective 4

6.1 Customers' Perception (Phase 1: Diagnosis)

The first step in the diagnosis phase entailed an in-depth understanding of Beta's issues from the customer's viewpoint. For this purpose, customer satisfaction data was accessed and utilised to discover the inherent issues in that domain. For which the appropriate data collection and analysis methods were used as follows.

6.1.1 Customer Satisfaction Data Collection

Secondary archival data of an online customer satisfaction survey was accessed and analysed to feed into the satisfaction-engagement framework identified from the literature to understand Beta's shortcomings from the customer's perspective. 28,940 customer feedback records were available that had been collected by Beta via several channels including email,

SMS and recorded voice messages over a period of 12 months till July 2018. Customers would typically send their feedback after a purchase or a customer service encounter, therefore multiple feedbacks from the same customer was expected. A basic feedback structure was in place: a score from 1 to 5 (1 denoting lowest satisfaction and 5 denoting highest satisfaction), accompanied by a text field (or voice recording) for further optional elaboration by customers, presented as "do you have any additional comments?".

6.1.2 Customer Satisfaction Survey Analysis

Following Miller and Salkind's (2002) recommendations, a total population sampling process of 28,940 entries was selected in order to understand the customer's unbiased perception about the identified pain points, especially due to the large sample size. The data was transcribed and thematic analysis based on pattern coding was used in order to identify the main themes and reasons behind the ratings, especially the lower ones (Miles & Huberman, 1994). A three-stage coding technique was used to generate inductive themes that were verified using triangulation (across different feedbacks) as shown in Figure 4. Open coding was first generated based on participants' responses, then axial and selective codes were generated based on the identified patterns and recurring themes. As part of ensuring the research's validity, low-inference descriptors were used by using direct quotations from participants.

1. Data reduction
- Transcribing interview data
- Priori themes
- Inductive coding

2. Data display
- Hierarchal categories
- Thematic analysis

3. Conclusions and verification
- Low inference descriptors
- Triangulation
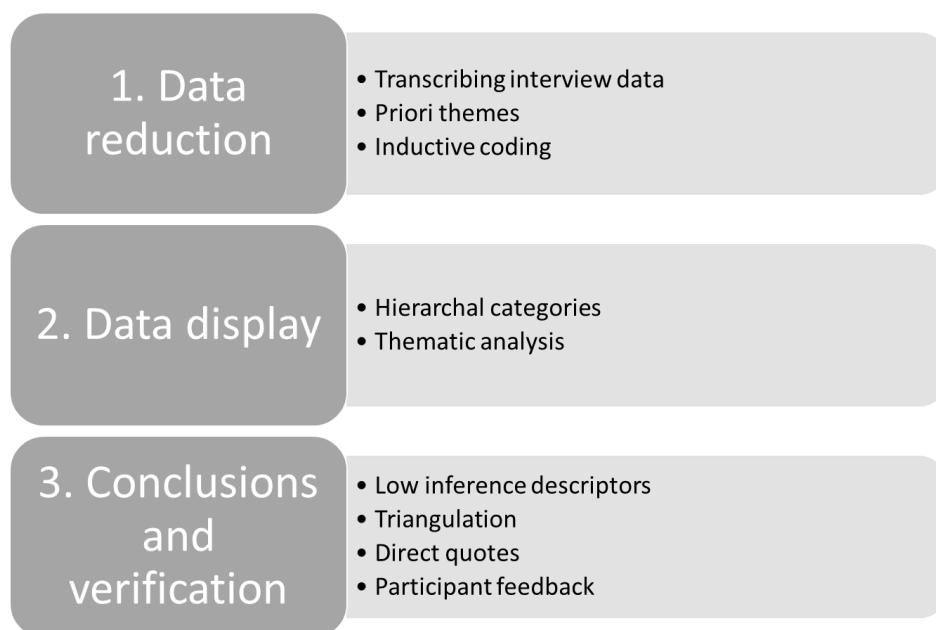- Direct quotes
- Participant feedback

Figure 4: Qualitative data analysis procedure based on Miles and Huberman's (1994) framework

6.1.3 Customer Satisfaction Results

Descriptive analysis of the scores followed by in-depth qualitative analysis of the records were conducted. For the descriptive analysis (shown in Figure 5), although the majority of customer feedback was positive (almost 86.5% of the records had a 4 or 5 score rating), the negative feedback (1 and 2 score ratings representing 9.4% of the records) translated to 1,418 records, which was a remarkably significant increase over the past year's figures (which were around 7%) and showed a positive statistical correlation with the defection rate (based on an available secondary data analysis conducted by the firm).
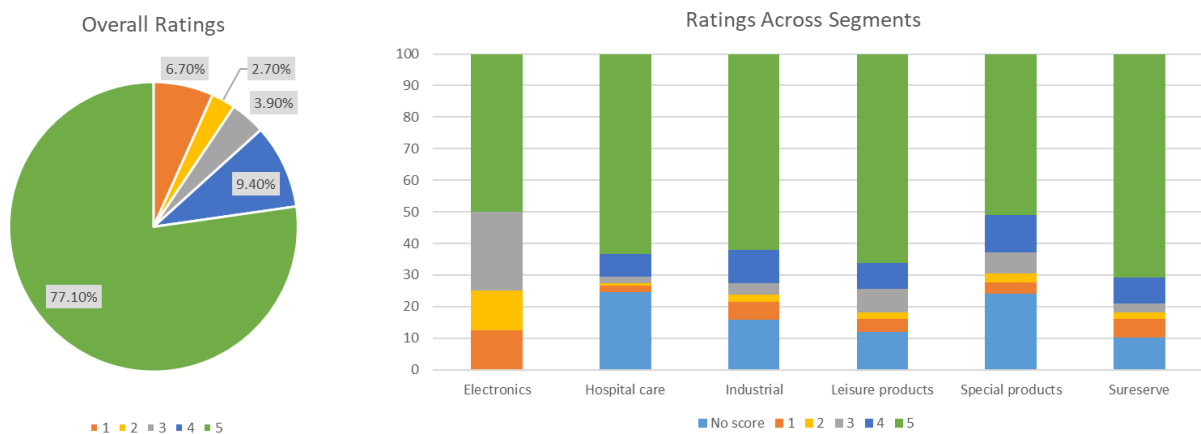

Figure 5: customer survey description summary

For the in-depth qualitative analysis of the records, NVivo was used, the data was coded, word frequencies were calculated and priori themes were generated using the employee-customer profit chain model (HBR Analytic Services, 2013; Beaumont & Leland, 1996). This model explains how employees' behaviour affects the value and service perceived by the customer and hence the customer satisfaction (or complaints) level.

The main issues identified are presented in Table 2, grouped under relevant customer value tree components using Beaumont and Leland (1996) model. Issues such as distribution costs (due to delivery charges) and life cycle costs (due to cylinder rental charges) were expected, since Beta's smaller competitors did not charge as much, which contributed considerably to the vexation the customers expressed in their feedback. However, an interesting point is for a factor such as "*customer service*" to dominate the negative comments for a giant like Beta, with around 500 employees dedicated to customer services alone (called CSC team).

Table 2: Customer survey thematic issues

Customer Value Tree	Issues	Examples	Frequency
Customer relationship	-Customer service (contact)	Order difficulty, complexity, quality issues, chase deliveries	466
	-Account management (billing)	Idle time, stock out, not notified, no proactivity	
		Late fees, account issues, wrong invoicing	
Delivery and service	-Availability	Late, postponed, driver issues, incomplete deliveries/order	331
	-Ease of service		
Price	-Distribution costs	Price, rental charges, competitors	145
	-Life cycle costs		

Customers expressed their frustration with the customer service due to several reasons including: "we are being treated as number not customer", "customer track record is ignored", customers chasing Beta to remove gas cylinders or fulfil orders, inadequate staff treatment (drivers and service team over the phone), and delays in fixing issues. Some of these issues, like delays and one-off mistakes, although troublesome, are common for such large businesses. However, issues relating to customer treatment and failure to respond to issues in a timely manner by the customer service team was considered a red flag for Beta, given the major investments the company continuously pumps into customer service training.

As part of the triangulation process, the researcher presented these findings to the leadership team in order to understand their perceptions on the potential root causes of these issues. Their response highlighted potential malfunctioning processes that they believe could have led to the current unsatisfactory customer service. First, the company had undergone a recent major merger and many employees were vocal about the lost identity of the company. Something which may have negatively affected employees, disengaged them and factored in the resultant unsatisfactory customer service. This was evident in the poor account management and stock issues (such as stock idle time and clients running out of stock) reported by customers, due to the lack of proper information dissemination channels to the customers. Second, a fragmented approach had been noticed within and across departments expressed in the persistent silos, inflexibility and lack of integration and communication of relevant information, processes and procedures. This created information gaps and failed to provide the resources needed to aid the customer service team to provide adequate service/quality to their customers (see Figure 6).
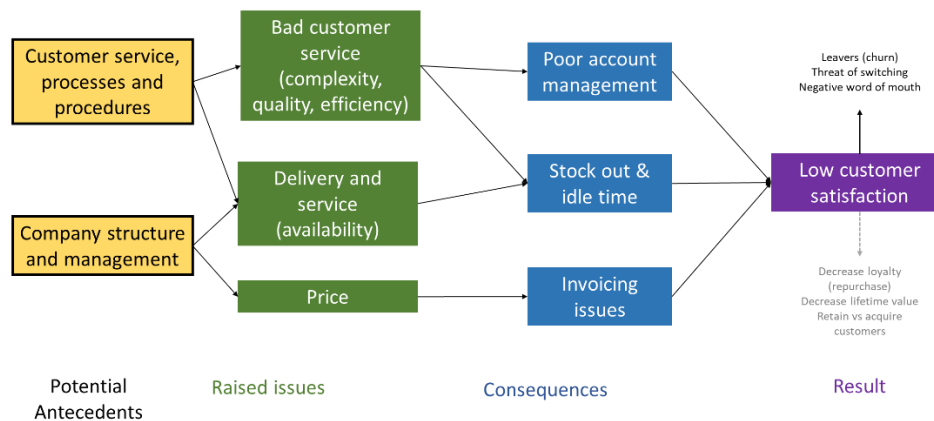
Figure 6: Customer survey results summary

Although several efforts within Beta have recently taken place (such as the digitisation initiative in 2016) in order to partially address some of these issues, they have not yet proven impactful. The company's strategic direction has been embedded into what is called the reimagine strategy, but was not well communicated to all employees. Major training and employee engagement efforts have been experimented, but the outcomes have not been promising, reflected in the rigid silos and declining employee satisfaction scores during 2016 and 2017. Therefore, an analysis of the employees and their perspectives was required to craft a better and more reliable picture of the real root causes of the identified issues.

6.2 Employees' Perception (Phase 1: Diagnosis – cont'd)

Following the outcomes of the customer survey, internal employee analysis needed to take place to understand the underlying reasons behind the poor performance and deficient customer service evident in customer feedback.

6.2.1 Employee Engagement Data Collection

Beta usually sends pulse surveys to its staff (quick employee satisfaction surveys) that consist of a single question. Archival data of two pulse surveys were accessed and analysed to identify the main issues perceived by employees that contribute to their disengagement and hence to customer dissatisfaction. The first survey was conducted in March 2018, where employees were asked the following: "If you had to give one example of something that has made you feel positive about work recently, what would that be?" online. The second survey was sent out in September 2018, where employees were asked: "If you had the power to change one thing at Beta, what would that be?"

6.2.2 Employee Engagement Survey Analysis

Similar to the customer survey analysis method, the coded data was analysed and thematic analysis based on pattern coding was used in order to identify main themes and reasons behind the dissatisfied workforce (Miles & Huberman, 1994). A three-stage coding technique was also used to generate inductive themes that were verified using triangulation (across responses from both surveys). Priori themes were chosen based on employee's satisfaction/engagement models such as the Need-Satisfying framework (Kahn, 1990), the Burnout-Antithesis framework (Maslach et al., 2001) and Herzberg's (1964) motivation-hygiene factors.

6.2.3 Employee Satisfaction Results

Our descriptive analysis indicated some major issues from the employees' side. September's survey (what to change) received 835 responses compared to March's survey (give one positive example), which had received only 427 responses, almost half the number of the previous one. This clearly indicated potential disengagement, especially since almost half of the responders were even reluctant to report one positive attribute about the company. To conduct an in-depth qualitative analysis, NVivo was used again, the data was coded and word frequencies were calculated. An interesting observation was extracted from the frequency count that showed 24% of the 427 responses were actually "nothing" in response to the "one good example" question.

The issues that were extracted from the data and were raised by employees have been categorised to the relevant theme based on two of the utilised models: burnout-antithesis (Maslach et al., 2001) (e.g. issues relating to work culture, workload and reward and recognition), Herzberg's (1964) motivational factors (e.g. personal growth and achievement) and Herzberg's (1964) hygiene factors (e.g. supervision, pay and work conditions). The third, need-satisfying framework (Kahn, 1990) was utilised to explain the relationship between the issues identified and the lack of engagement and hence motivation. The analysis highlighted how dissatisfied employees felt undervalued, lost their trust in the company and perceived the working conditions as unsupportive. The themes also indicated how feeling undervalued stemmed from the bureaucratic structure, the lack of communication and involvement as explained by several respondents and the lost identity due to several mergers.

The first root cause identified from the employees' views was the bureaucratic structure that comes as a natural cause due to the size of the company and the ever-growing nature of it, manifested in the number of international mergers. The analysis shows that this growth had its adverse effects of creating long and rigid processes and procedures that made it difficult for

employees to learn (know what they should do) and follow certain routines and processes (know how to do it). This was reflected in the customers' feedback as well regarding issues with customer service and the lack of meaningful responses from the customer service team about certain customers' enquiries. From the employees' standpoint, this issue was attributable to the rigid inflexible structure of Beta and the silo approach within and between departments, making information finding a difficult task, which again highlights the persistent issues with the communication of best-practices and procedures (through training materials) to better equip employees in serving the customers. The silo/fragmented company structure (which typical hinders collaboration and organisational learning (Gulati, 2007)) that lacked the necessary training and support functionalities towards employees, was reflected in customers complaints in terms of lack of feedback, notification and the fact that they have to chase the company for deliveries not the other way around.

The following root cause identified was the lack of proper communication channels, which was voiced as one of the main dissatisfaction factors perceived by employees. They attributed this to the leadership team that did not properly communicate the company's strategic directions, especially after several mergers. Employees expressed that this lack of communication created an environment that lacked clear direction, vision, transparency and trust. This was also accompanied by the lack of resources, tools and support functions that were needed (e.g. training and intra-departmental communication) to help employees in their daily jobs, which affected them physically and mentally as it constitutes a crucial element in the need-satisfying framework.

Table 3: Employee survey results summary

Raised issues	Frequency	Category	Example
Lack of meaningful and valued work	30	Role fit and job involvement	-Neglect customer -Not involved in changes/strategy -Lack of autonomy
Lack of supportive work environment	35	Silo	-Dysfunctional HR – lack of collaboration -Cross functional lack of support
underpaid	53	Reward and recognition	-No appreciation for years -More outsourcing -No pay equality
Lack of learning and support	74	Resource availability	-Lack of support resources/tools, insufficient/ineffective training -Dismissed personal growth
Lack of senior management support and communication	30	Supervision quality	-No strategic direction -Lack of communication Staff is neglected

6.3 Gamification System (Phase 2: Action Plan)

After diagnosing the problem, the next step was to decide about which root causes to address, and design a solution accordingly. As part of the collaborative action research between the researcher and Beta, several management meetings were conducted to present the findings of the surveys' analysis and decide on the best course of action going forward. Due to the positive reputation of gamification dealing with similar issues (including engagement, learning and communication capabilities) and due to Beta's appetite to develop a cutting-edge technology as part of its new digitalisation strategy that aimed at transforming the company into a technology leader for younger generation of employees, gamification was selected as the candidate solution. This created an opportunity for utilising Elsayed et al.'s (2019) gamification design guidelines in developing the system, with its potential strategic impacts that are crucial and relevant in Beta's case.

One of the main components of Elsayed et al. (2019) framework was the goal-oriented design. Therefore, the customer and employee survey analysis results were used to understand the issues and delineate the targets and goals the gamification system needs to achieve prior to the design process. Understanding these shortcomings helped in identifying the

organisational and individual capabilities that needed addressing and, as a result, guided the design process and choice of game elements. Based on the survey analysis and agreement with the leadership team, the following items were selected for targeting:

1. Individual:
   a. learning (through effective and engaging training) to tackle the "lack of training and support" issue
   b. teamwork within departments (intradepartmental collaboration) to tackle the "lack of supportive environment" issue
2. Organisational:
   a. breaking silos across departments (interdepartmental collaboration) to tackle the "lack of supportive environment" issue
   b. organisational knowledge (aggregate learning) to tackle the "lack of training and support" issue
   c. strategy communication (identity, clarity and meaningfulness) to tackle the "lack of senior management support and communication" issues
   d. customer service to tackle the "customer negligent and account management" issues

These items were assigned as high priority and the system's primary target was customer service employees (around 500) in the main headquarters to address the momentous customer service issues.

6.3.1 System Design

Due to the big target audience size, the demographics entailed a smart balance between implicit and explicit gamification (Elsayed et al., 2019) to appeal to both Generation X and Y employees (i.e. the system should not be too gimmicky to alienate older users nor too formal to repel younger users). Therefore, the game was designed as an app (available on Android and Apple devices) that simulates Beta's gas delivery in the UK, where users take the role of a Beta driver and go through a typical journey of picking up gas cylinders and delivering them to customers. Players face several challenges such as how to efficiently manage the truck capacity by avoiding free riders or over packed cylinders, delivering gas on time, strategically handling traffic jams and upgrading their vehicles.

The game encapsulated two basic learning elements: customer service processes (as an implicit training package) and the new organisational strategy after merger (as a strategy communication package). Two content gamification methods (Hallifax et al., 2018; Kapp, 2012) were utilised to wrap these two learning components into the game in an effective and

engaging method. The first content gamification element was implemented as a multiple-choice interactive scenario, where users were given a customer scenario (e.g. query) and were asked to choose the most appropriate response while playing the game. This format was also used to introduce the direction and values of the new strategy due to the recent merger. The second content gamification element was gamifying the game objectives and aligning them to serve the required learning outcomes (e.g. balance quality and speed while delivering gas to customers to maintain a certain satisfaction level).

The game was designed as a simple point and click adventure game, where users start with an empty gas truck and click on adjacent locations to create a path (trip) to start their journey. In a typical journey, the game objectives were:

- Picking up gas cylinders (by efficiently managing the truck capacity)
- Completing deliveries on time to get higher scores (aligned with company values and strategy)
- Answering strategy/customer questions correctly to gain additional points (to learn about customer service best practices)
- Avoid traffic jams and road blocks (to learn how to calculate routes and efficiently schedule deliveries)
- Upgrading the vehicle by unlocking individual and team-based achievements (to collaborate with other team members)

A score is calculated at the end of each journey to reflect user performance:

- The best score is saved and compared to other colleagues (to stimulate a positive competitive environment)
- The total score (sum of all your journeys) is also saved and is compared to others (to increase engagement through competition)
- The team's best and total scores are displayed in a league table and are compared to other teams (to stimulate collaboration and communication within and across teams)

A collaborative (6 members per team) competitive format (team vs team) was designed to stimulate teamwork and break silos. The total scores (based on timely gas deliveries and correct multiple-choice answers) were published to recognise teams, with monetary rewards awarded to highest performing teams. A detailed description of the game elements (dynamics, mechanics and components) used in the design and the rationale behind them are detailed in the following subsections.

6.3.2 Designed Game Dynamics

The research conducted by Scott and Neustaedter (2014) highlight two main gamification dynamics, argued to be more popular and successful than others, used for learning and/or training. These dynamics are storytelling and progression. The proposed gamified system relies on simulated storytelling that provides employees with an interactive scenario of delivering gas and answering customer queries. The intended learning outcomes were encapsulated inside the levels as level objectives and multiple-choice questions (MCQs), where users were required to answer correctly to unlock better vehicle upgrades that would help them progress through the game and achieve higher scores.

The first game dynamic used was the *storytelling* element. People learn faster when facts are embedded within a story (Kapp, 2012). On this basis, problem-based storytelling was introduced as a fun element for providing an engaging and rich medium for employees, while promoting problem-solving knowledge transfer through retrieving apt story-based memory schemas (Hull et al., 2019). Therefore, the training component was designed as a simulated story of a daily gas delivery, with several customer service interventions that may take place. The story also featured characters whom the learner can identify as authentic (such as drivers and customer service officers), following the principles of narrative transportation theory (Green & Brock, 2000). This narrative form of sense-making functions to link learners/employees to "real-life" customer service situations, which has been proved to be an engaging and effective learning method in many contexts (see Hakkarainen et al., 2007). In this case, players also interact with fictional customers to learn about customer service best-practices through a simulated decision-driven scene.

This form of simulated stories, as a learning medium, has the advantage of providing room for exploration (freedom to fail), which presents users with the opportunity to experiment without fear of irreversible damage. As a result, users/employees would be eager to explore (e.g. find relevant pieces of information to respond to a customer query), make decisions (e.g. respond to a customer in a certain way) and take chances since stakes are low within the simulated storyline environment (Lee & Hammer, 2009). In an educational/learning environment, this would typically encourage experimentation to understand the consequences of different actions (e.g. customer satisfaction/dissatisfaction), or even the lack of taking an action (Pope, 2003), which can have a positive impact on employees' behaviour towards customers as demonstrated by Li et al. (2019).

The second game dynamic utilised was adequate *progression* mechanics. Levelling up and progressing forward are important elements, since they act as a performance tool to support and guide users by adequately implementing an interest curve (Sheldon, 2012; Hidi & Renniger, 2006). This can also help in developing and maintaining a state of "flow" for users.

In this way, quick learners will be able to progress through the levels faster, achieve high scores and not feel bored. Conversely, less trained employees will have the time they need to learn from their mistakes and will start reaping the benefits (in terms of score) once they master the training materials and become more knowledgeable about the communicated strategy. Collaboration and teamwork are crucial at this point, since users will have to work together and help one another to rapidly develop their individual skills (learning material) to achieve higher (aggregate) team scores.

6.3.3 Designed Game Mechanics

Since game mechanics are the elements that drive the game forward, choosing the right ones to engage the users with the system while delivering on the required learning and training objectives, was crucial for this system. Therefore user-specific behavioural engagement loops and rapid/personalised feedback mechanics were implemented to maintain this delicate balance.

First, behavioural *engagement loops* were maintained to positively influence employees' behaviours. In explaining the reasons that make gamification successful in changing user behaviour, Robson et al. (2016) assert that reinforcements (extrinsic motivators such as money and fame/recognition) and emotions are the main factors (Higgins, 2006). This is because gamification can reinforce repetition of desired behaviours by tying it to satisfying outcomes (e.g. winning company-wide badges and topping the leaderboards), leading to habit formation (Duhigg, 2012). Therefore, tying in training (problem-solving skills) and strategy communication (though playing the game) to a shared scoring system that links to extrinsic rewards such as prizes and/or money, and intrinsic rewards such as fun and engaging experiences, were both utilised to derive the desired employee behaviour (Herger, 2013; Robson et al., 2015). This also aligns with the widely accepted gamification framework introduced by Dignan (2011) which utilised different gamification elements to provide a continuous engagement cycle.

Second*, rapid feedback* was provided to help users quickly understand the impacts of their behaviours on individual and organisational levels. Kapp (2012) shows a positive correlation between effective learning and how frequent and targeted the feedback is. In this case, employees get to know instantly whether they have chosen the best possible answer (based on the simulated customer feedback) or not and get scored accordingly. They also get to know the correct answer (e.g. best response to a customer query) if they make a mistake to encourage them to learn from their mistakes and respond correctly the next time they play the game to achieve a higher score.

6.3.4 Designed Game Components

User-centric components and aesthetics were utilised to motivate real behavioural changes. Users acquire some points (score) once they successfully complete each level in the game. The better their performance (timely deliveries, correct answers to customers queries and demonstrating more awareness about Beta's strategy) the more points they will accumulate to compete against each other in a companywide league table, which demonstrates the highest adopters and strategy-aware employees. Relevant and adequately chosen rewards (e.g. badges and monetary incentives) were made available at different milestones to reward progression (i.e. training advancements).

As for the *user-centric* design approach, the proposed system did not only accommodate for different learning styles, but also different motivational styles. Understanding users' typology is an important aspect in gamification due to individual differences, since users are motivated differently and the gamification model design process addresses this issue (Kapp, 2012). Based on this argument, Dixon (2011) proposed a user typology framework illustrating how it would appeal to different users. For example, the proposed elements cater for the killer's type (by providing leaderboards to fulfil their competitive nature), achievers (by providing different achievements to be unlocked and a training set to master to fulfil their sense of achievement), explorers (by providing story driven scenarios to fulfil their sense of adventure and discovery) and socialisers (by providing team scores and leaderboards to fulfil their social connections needs).

As for the choice of *aesthetics* a professional looking graphics was used to illustrate the vehicles, deliveries and customers to fit the diverse demographics. A friendly voice-over that explained the user actions and his/her requirements for each level was provided by one of the customer service team members to maintain relevance and authenticity. This format provided the users with the visual elements, audio and textual features, accommodating for different learning styles and preferences (Clark and Mayer, 2011). The choice of art style and story was inspired by the company's colour scheme to maintain context-specificity as well as user-specificity and provide relevance to the company's workforce demographics (balancing implicit and explicit game elements) and avoid getting too gimmicky or too formal (Elsayed et al., 2018). Piloting the game helped achieve this balance, as the art direction was later enhanced based on users' feedback.

6.4 Implementation (Phase 3: Taking Action)

An incremental design approach based on rapid prototyping was used to: a) pilot an initial beta version of the system, b) acquire feedback from several pilot participants and c) redesign

accordingly. The researcher worked closely with the Quality Development and Training Manager during the design and piloting phase to maintain an agile and customer-oriented design approach. The piloting period was one month, where the app was distributed to 5 employees for testing. The initial feedback was mostly positive, highlighting how the gamified system, as quoted by users a) "reinforced behaviours and processes", b) "brought the basic functions of the system to life", c) "helped in building people's knowledge" and d) was "a lot of fun and addictive". The only negative aspect identified was the lack of a detailed tutorial. Therefore, a step by step tutorial was integrated into the app to help new users understand how to use the system and the objectives behind the app.

The system was deployed on both Android and iOS smartphones (using a cross-platform development process) to cover all 412 employees within the intended audience. The target audience was the CSC team (customer service centre) that included employees from: sales, orders, queries, support services, revenues, healthcare, homecare, quality assurance and IS to cover the main pain points required to address the issues raised by customers (regarding poor customer service). The app was published to the app store, and in January 2020, an email was sent to the target employees with an introduction of the app, its purpose and download instructions. The users were allowed to play for one month, then data collection through online surveys took place. The league table was publicly shared among participants and the top performing team was promised a reward from Beta by the end of the month to stimulate a positive competitive environment between teams. The system also included an admin dashboard for management to keep track of usage and performance. Several indicators were incorporated such as individual and team scores (to assess performance levels), achievements (to assess knowledge levels), and number of logins (to track usage).

6.5 User feedback (Phase 4: Evaluation)

Twenty-four teams downloaded and played the game, with 42 recurring players (individuals who have played the game more than once). An online survey was developed and sent to users to capture a preliminary overview of their feelings towards the gamified system. This step was important to help design the focus group questions that would go in-depth with the aim of understanding the impacts of the system from an emotional, behavioural and capability building standpoints. Employees who played the game defined the purposeful sampling (Miller & Salkind, 2002) selection criteria to send the online survey. However, convenience sampling, which was defined by constraints such as limited time and availability of the contacted employees, was also employed, yielding a total of 26 responses, which was expected given the busy and preoccupied nature of the contacted field employees. Although a sample of 26 participants is relatively small, saturation was achieved after the sixteenth survey.

The survey consisted of several sections to develop a comprehensive user feedback regarding: a) the game design (e.g. gameplay, difficulty...etc.), b) observable impacts (e.g. learning, training, collaboration...etc.) and c) performance (effectiveness, adoption rate...etc.). The results of the descriptive analysis are detailed in Appendix B and can be summarised as follows:

- 26 participants filled in the online survey.
- 88% of the participants agreed that the app helped develop Beta's People Workstream, which is a company initiative that aims at developing a culture of connections through an engaged and passionate workforce.
- 25 out of 26 participants gave a positive rating of the system and 23 out of 26 found the app very engaging.
- 24 out of 26 participants believed this training technique is more effective and a better alternative to traditional unengaging training methods.
- 96% of the participants believed this should be scaled up to other businesses/training areas within Beta including new starters and within other departments; a consensus that more levels and questions are needed to cover more training areas, using the same engaging technique.
- Emotional outcomes: most participants were motivated and excited to get a high score and compete with one another to climb the league table.
- Behavioural outcomes: most participants indicated that the gamified system helped them learn more about Beta's strategy/philosophy (strategy communication), understand the bigger picture and the company's direction and memorise some responses to customer interactions by heart.
- Participants indicated that the system was unique, challenging, different, fun, easy to follow and required effective team work.
- Different participants favoured different game elements, from leaderboards to team scores to unlocking different achievements, which was expected given the varied user typology and the different preference of each type, hence mixed game elements were implemented in the first place to cover all types.
- Participants reported that the system was addictive with enjoyable competitive structure, which made them always come back for more.

These outcomes entailed a more in-depth study to develop a concrete understanding of the impacts of the system, not only from the user's perspectives, but also the management team's perspective, to identify any successes towards the individual and organisational goals that shaped up the design of the system in the first place. Therefore, a focus group approach was found supportive of this objective which is detailed in the following section.

6.6 Outcomes and Impacts (Phases 4 & 5: Evaluation & Reflection)

Qualitative interviews were to be conducted to understand more about the psycho-behavioural impacts of the system and the resultant capabilities from the user/employees' perspective and their managers'. However, due to time and space restrictions (due to Covid-19), the one-on-one interview format was replaced with internet-mediated focus groups. Priori themes were chosen based on the employee and customer survey results and based on the online survey results and Elsayed et al.'s (2019) framework, to reflect the main objectives of the study as shown in Table 7 (a full list of the focus group discussion items is shown in Appendix C). These themes were used to structure the focus group around the following four main areas:

- Shortcomings addressed
- Emotional, psychological and behavioural outcomes
- Game mechanics relevance and effectiveness
- Individual and organisational-wide impacts

Table 7. Mapping focus group questions to priori themes based on Elsayed et al. (2019) framework and the fourth research objective

Priori themes	Focus group Questions	Areas
I. Gamification as a game		Game mechanics relevance and effectiveness
Game elements	Question 1	
Gamification vs traditional methods	Question 2	
II. Motivational affordances		Emotional, psychological and behavioural outcomes
Psychological and behavioural impacts	Questions 3 & 4	
III. Capability Building		Shortcomings addressed
Individual impacts	Question 5	Individual and organisational-wide impacts
Organisational impacts	Question 6	
IV. Complementarity		Strategic complementarity
Short term vs long term effects	Questions 7	
Performance metrics & complementarity	Questions 8	

6.6.1 Focus Group Data Collection

As an interpretivist research, the focus group discussion method was used as a means to construct meanings through social interaction and sense making of the system's impacts, since the method helps in probing sensitive issues and respondents can answer in their own preferred way (Bradley, 2013), encouraging discussion among participants and sharing of perceptions in an open and tolerant environment (Krueger & Casey, 2009). Furthermore, the method aims to analyse how participant interactions and group dynamics lead to the construction of shared meanings (Belzile & Oberg, 2012), which was essential at this stage to tap into users' experience with the system and the witnessed outcomes/impacts (if any).

A semi-structured, internet-mediated, open ended questionnaire format (Miles & Huberman, 1994) was designed in order to gain insights from different staff members about their perception of the gamification system's impacts. A stratified sampling process (Miller & Salkind, 2002) was selected in order to get representatives from different teams and managers). Constraints such as time and availability limited the sample size to only 5 participants, which is relatively small, yet careful sampling and thorough data collection through in-depth focus groups can result in insights, capable of answering and addressing the objectives of the study as advocated by Holloway (1997). Participants agreed to a 30-minute focus group format, where confidentiality and anonymity were maintained.

6.6.2 Focus Group Analysis

The focus group was recorded and transcribed manually. Thematic analysis based on pattern coding was used in order to identify the main themes (Miles & Huberman, 1994). A three-stage coding technique was used to generate inductive themes that were verified using triangulation across 5 different participants and against the online survey and the employee and customer surveys. The focus group questions were piloted with two research supervisors and one representative from Beta. As part of ensuring the research's validity, low-inference descriptors were used by using direct quotations from participants. Participant feedback was also maintained to check the consistency and validity of the participant's interpretations of all the responses.

Participants:

A: Administration support team leader; looks after various teams in support services

B: Training development specialist/team; soft skills training officer

C: Communication compliance specialist

D: Communication compliance specialist

E: Business Development supervisor

6.6.3 Focus Group Results

The focus group participants provided valuable insights regarding a) the objectives that were met after utilising the system, b) the advantages of employing the gamified system over traditional communication/training methods, c) the psycho-behavioural outcomes that were evident as a result of consistent usage, d) the individual and organisational impacts they had been observed/witnessed as an outcome of using the gamified system and e) the complementarity potential of gamification in addressing other issues within the organisation through proper strategic integration. In the following, the identified themes derived from participants' discussions are explored.

The *first* discussion item revolved around the objectives that the gamified system had successfully met. Participants agreed on two main outcomes that they felt the app had accomplished. First, reaching out to employees through an innovative and engaging technique that resonates with the workforce demographic. This in fact implied, as decidedly put in design, that the gamified nature of the training was able to attract disengaged employees, especially Generation Y.

> Participant A: "*From my point of view, from a training perspective, I think it's helping younger employees who are more used to play like different games on their phones and things like that. I think that's a good way for us to reach another, I don't want to say another generation, because I am older than everyone on the call, but, just get it out there guys, yeah, as we get new people into the organisation. They are a different generation. They do things differently and have different expectations. So, from the business perspective, it was a really great opportunity, going through the whole digitalisation programs well.*"

Second, the group reached a consensus that the system was able to "embed" both the strategy and the training material in a way that is appealing as well as effective. Participants identified some game elements such as "competition", as a unique method of learning through repetition. They agreed that the "story" and "case-based" nature of the training managed to capture the "principles" needed to be understood and delivered to the staff in a "light-hearted" way that managed to convert the "dry" nature of the subject matter into an engaging cycle of learning (through correctly answering questions to gain some points) and climbing the leaderboards (motivated to play again, learn again and get more points), which followed the exact engagement loop intended by the designed system to achieve flow. This point perfectly

aligns with Kotter's (2007) recipe for leading change, which includes forming a strategic vision and articulating the connections between new behaviours and organisational performance. This was maintained by the gamified system through the story-based simulation design format that provided users with custom feedback about their performance and how it affects customers and eventually the company as a whole.

> Participant C: "*I suppose the main thing that I probably got from it was embedding the principles that we were desperately trying to put in to our staff when the way it was delivered to them was quite high level, an organisational level, while this it was sort of being embedded without even realising through the questions and the amount of questions you were being asked and that was really handy*."

The *second* discussion item complemented the first one, by asking the participants to compare the system to other (older/traditional) training methods in terms of effectiveness of its unique features. Participants identified several items that they believed differentiate this gamified system from past interventions. First, the level of engagement due to the fun, immersing and competitive nature of the system was unprecedented. Participants were surprised that the app managed to "change people's behaviour" to download it on their own phones (not the company's phones) and use it even outside their working hours, and at home. An interesting point that was raised in the discussion was the fact that the system managed to change people's behaviours and teach them about the strategy and processes in an indirect "subliminal" way.

> Participant B: "*The main difference for me is that if you have a training intervention in work, some of them are optional, but most of them are: this is a training you going on Tuesday and most people go: oh I got another training course on Tuesday, where is this people are doing it in their own time, at home, downloading it to their own device without being forced to do it*."

Second, participants agreed that the system's collaborative nature won over employees and encouraged users to work as a team and "communicate with each other in new ways" to "learn how they can make things" and "encourage each other to get further". Since one of the main objectives of the system was to break silos and create new communication channels, participants agreed that this was successfully accomplished in a way they have never seen before.

> Participant B: "*But newbies come in or people come to the organisation, and something like this can break the ice to the newbies, and they get to meet people they might only talk to them on the phone but there is necessarily no kind of thing like the app*."

The *third* item the group discussed was the emotional and behavioural outcomes of the system, which relate to the motivational affordance capability of gamification discussed in Section 3.2. From an emotional perspective, all participants confirmed the urge they felt to climb the leaderboards and compete (specially collaboratively within their team) to get a higher score. They highlighted two main feelings, namely: the sense of accomplishment and the sense of recognition, that they would feel as they surpass a team in the league table. This relates to the core drives (such as accomplishment, meaning and empowerment) discussed by Elsayed et al. (2019) that were incorporated into the design to stimulate intrinsic motivation to engage users. By designing a team-based aggregate scoring system, the system tapped into the sense of pride and elitism (as explained by the Elsayed et al. (2019)). The varied elements used were also able to attract different users with different preferences (which aligned with Dixon's (2011) typology model), although the prominent typology that stood out from the focus group was the "achiever" typology, as most participants identified the competitive nature of the leaderboard as the main driving force for them to keep using the app.

> Participant B: "*Sometimes I was there 11:30pm at night and I say: oh my God, put it down you need to sleep, got work at 6 in the morning. But this is a little bit the competitive side of me getting out because I wanted to get better and wanted to achieve more and unlock more things*".

From a behavioural perspective, participants had already mentioned the change they witnessed regarding working hours and using the system at home. Participants added that new communication channels and more conversations took place between users/employees that were not in place before the introduction of the app. The group mentioned "more face-to-face conversations" and "messaging each other at home to check progress" as new norms that they were able to observe. Since encouraging collaboration and breaking silos were two important objectives of the system, it is considered a success to reach this point, especially since such cooperation and development of unique communication channels is a typical silo busting mechanism as explained by Gulati (2007).

> Participant A: "*For me, it encouraged this whole talking with other people face-to-face. I would say to "other employee's name": Oh my God you must have this app on so many devices, because you are playing it so much and bla bla bla. We have different kinds of conversations that what we normally do in the office because work and life don't cross over that much so this is a good way of plugging that and encouraging some kind of conversations with other people.*"

Although all participants seemed happy about the used mechanics and the elicited emotions that resulted from them, they recommended the incorporation of more social interactions from within the system itself (e.g. chats). This again conforms with the typology design that

was utilised, as the game elements targeted different preferences such as achiever, explorers and killers. However, more explicit emphasis was needed for socialisers.

> Participant D: "*I just wish it would have had a feature where you can chat with the people. I wanted to tell 'another employee's name' just get off this game*"

The *fourth* discussion point dug deeper into the witnessed impacts of the gamified system, on an individual level and organisational capability level. Three main themes emerged from the discussion. First, the group agreed about the visible effects on teamwork, collaboration (within teams and across departments) and the breaking silos aspect of it, as they cross-referenced other instances during the focus group. Second, the group reached a consensus that individual knowledge and the resultant overall organisational learning was a major part of the system. They praised the fact that the training was "subliminally" happening while they were engaged with the system (highlighting the importance of implicit gamification as discussed in the literature by Elsayed et al. (2019)). They also shed some light on the questions format (case-based multiple-choice questions), which they believe helped in engraving the required information (training aspects and communicated strategy) due to repetition, that was not forced but pursued by the users. From a theoretical perspective, the recurring nature of the questions embedded within every playthrough resonate with the spaced-retrieval literature regarding the memory schemas and the cognitive advantages of hooking users into repetitive loops (Carey, 2015) to develop what the participants called "muscle memories". This again, complements the designed engagement loop features that appear to have succeeded in accomplishing the spaced repetition formula for memory retention.

> Participant E: "*Definitely knowledge and learning for me. Because they played the game so much one person in particular was even to give me like a perfect answer for every question in the game. Because they have memorised it from the app.*"

The successful design of the engagement loops was also obvious in the third theme, as the participants were vocal about how the app was "addictive". As a recurring theme throughout the focus group discussion, participants compared the system to other/older training alternatives (previously used by Beta) and expressed their past frustration and "struggle to get participation" from employees. An interesting point raised was the accessibility of the system that helped facilitate its adoption within and across departments. Unlike traditional training days, participants found the gamified platform convenient, which allowed them to "use it anytime and anywhere". This goes back to the technology considerations that were studied prior to the system design to utilise the accessible features of gamification to create an accessible, mobile-enabled online platform. This specifically aligns with Kotter's (2007) formula for successful transformation, which includes removing change barriers, which in our case were attending traditional/mundane training sessions in large groups. With the

introduction of the gamified system, this was replaced with accessible and engaging digital training alternatives.

> Participant B: "*But it is all about the usage rate. It was just crazy. My husband was asleep and told me: are you turning that off? Oh my God I need to turn it off, it is pretty late now. Yeah it was good.*"

Finally, the group moved to the strategic integration of gamification (as a complementarity) within the organisation. Unsurprisingly, participants were all supportive to the idea of utilising gamification to solve similar issues in other areas across Beta. Onboarding, recruitment, induction and subsequent training were all examples suggested by the participants as ways of scaling up the system to cover new areas. Participants believe the system was innovatively designed to fulfil certain targeted capabilities (such as learning, engagement and strategy communication) and believe it would be paramount to follow the same gamification method to target other crucial capabilities across the business. However, they had different opinions on the best method of integration. Some of the participants believed it should be developed in-house as long as the resources and support are available. This way, cost can be controlled and ongoing support will not be a challenge as opposed to contracting, where they have experienced several issues with external parties before. On the other hand, some participants were in favour of outsourcing the gamification aspect since a company like Beta does not poise, from their point of view, the right skills and expertise to develop and manage it internally because it is not a tech company after all. This, of course, is going to come at the expense of costs, as budgeting for something like this is not always straightforward.

> Participant B: "*So it is two-fold, yes I do believe it has a place but the caveat is you need to have the right resources and funding in place.*"

This "in-house vs contracting" argument has been a major discussion point in the literature regarding complementary assets in general. Teece (1988) distinguishes between integration-based and contractual-based modes of engagement with assets like that and contends that a decision may boil down to the given appropriability regime (Teece, 1986). A tight regime exists when innovations are hard to imitate and their value needs to be captured by the firm through patents for example (Teece, 1986). On the other hand, weak regimes exist when the market is uncertain and imitators face low entry barriers (Teece, 1986). In our case, due to the bespoke nature of the gamified system derived from the user-specific and context-specific nature of the design process, we would argue that it is not easily imitable, presenting an opportunity for Beta to capitalise on its innovative value and develop such processes in-house, in the future, to capture their innovation-related rents. Of course, this will only be feasible if gamification is adopted as a strategic capability, allocating the appropriate resources in-house to acquire the

ability to design and develop innovative interventions that can align and target respective capabilities, which is the central thesis of this research.

7. Discussion and Concluding Remarks

Although mergers and acquisitions have become a normal practice within the current rapidly changing environment, yet most of such organisational practices do not meet the expectations and do not yield the desired performance results (Marks & Mirvis, 2010; Gill, 2012). Beta, the case study of this research was no exception. The company managed to benefit from diversifying and merging with other international conglomerates, but failed to do so without stumbling upon several issues, especially ones related to their leadership team, employees and adequately communicating the company's unified strategy to them in an engaging and effective manner. This came as no surprise, since it aligns with merger and acquisitions (M&A) theories that demonstrate the importance of the leadership team their crucial change management process (including employees onboarding and strategy communication) that ultimately influences employees' attitudes, readiness to change and even resistance to change, which in turn have major impacts on M&A outcomes (Rafferty & Gary, 2016).

Elsayed et al.'s (2019) framework was utilised to address these issues since it contends that gamification, if tailored to purpose and context, brings about motivation and engagement that can communicate the company's strategy effectively and consequently, creates behavioural changes that would bypass the merger hurdles and eventually impact the quality of customer service positively. Using user-centric and goal-oriented design approaches, disengaged and neutral employees were successfully tuned into actively engaged ones in the process, positively influencing organisational learning capabilities and strategy communication capabilities. Solving the ineffective training issue through an engaging experience for heterogeneous users (with different knowledge, skills and motivations) managed to facilitate the learning process. Implicitly encapsulating the company's strategy using content gamification also helped in communicating the strategy to a wider audience in a simple yet effective manner, which also encouraged customer service policy adherence through simulated experiences that demonstrate potential value of such adherence and incentivise it.

From *a theoretical perspective*, the study contributes to the sparse interpretivist literature of developing gamification complementarity. The user-centric and goal-oriented approaches proved efficacious, which helped in designing the gamified system to solve persistent issues from the targeted users' perspective. This approach also managed to provide valuable insights into the game design process as to which game elements would be relevant to adequately engage and impact users' motivational antecedents. The study provides an invaluable

opportunity to demonstrate the process of identifying organisational shortcomings, targeting them through a gamification design process that dictated the dynamics, mechanics and components that need to be utilised in order to deliver on the intended strategic impacts through the right device of engagement loops. One of the main contributions is the successful demonstration of engaging employees within an effective strategy communication and training tool. Although, as repeatedly highlighted, this engagement should never be considered as an end-goal by itself, it was important in this case study to demonstrate such achievement since it was used as the main facilitator for the targeted strategic objectives such as strategic communication, breaking silos and organisational learning.

From *a practical perspective*, the application of the former frameworks and models is demonstrated in a real case that has the advantage of being characterised as a longitudinal action research. The study identifies the stratified capabilities of gamification beyond its traditional lenses and presents practitioners with a concrete case of a typical capability building exercise that face organisations on a daily basis. The study explicates the whole processes from a) problem identification, b) analysing several data sources to understand issues, antecedents and users' perspectives, c) utilising the purposeful game design framework and using appropriate game elements to respond to the identified individual and organisational shortcomings, d) evaluating and reflecting upon individual and strategic impacts of gamification.

The gamification process employed aligns with Kotter's (2007) pre-requisites for successful change and transformation, creating substantial value for organisations functioning in such a rapidly changing environment. From effectively communicating a vision (through engaging learning methods), removing inefficient barriers (through digitally accessible formats), busting silos (through stimulating and motivating collaboration), generating short term wins (through behavioural incentives), to instituting change (through articulating vivid connections between behaviours, success metrics and organisational impacts), all of which were effectively addressed through the gamified system to facilitate and accelerate change towards building relevant capabilities (e.g. strategy communication, organisational learning and compliance).

The study is also an example application of the iterative design cycle required to develop a gamified solution that uses engagement as a tool for accomplishing higher-end long-term outcomes. The number of inquiry methods employed can be used as a road map of how practitioners can collect data, plug them into gamification design, apply the user-centric and goal-oriented design methods in real context-bound situations, implement an adequate gamification solution and reap the benefits of complementarity on individual and organisational levels. The research also explored the strategic integration of gamification (as a complementarity) within the organisation. Several capability building processes were

studied to support this claim, others have been suggested such as onboarding, recruitment, induction and diverse training. However, the method of integration was a crucial point for adoption and investment decisions, whether it is in-house implementation or external outsourcing. Each method was demonstrated to have its pros and cons depending on the company's point of view, the available skills, budget, rationale, strategic objective, appropriability regime and the required expertise to develop and manage it on an ongoing basis.

Therefore, this research demonstrates that gamification can help overcome social inertia that can hinder the usage and interaction with technologies and help in building relevant capabilities using the right design approach, psycho-behavioural triggers (e.g. engagement, team work, communication) and game elements. Although the research in hand can be perceived as an effort of developing a substantive theory compared to middle range and Grand theories, future contributions and advances within the field have the potential of reaching (and possibly exceeding) those of the middle-range ones. This is due to the fact that this research, as any substantive work might be, is bounded and restricted by time and place (even for specific organisations) (Saunders et al., 2016). However, as an initial effort of changing the ways managers deal with the theories of human motivation internally (while engaging employees) and externally (to satisfy customers), this research utilises theories and empirical approaches to formulate innovative technology-led behavioural changing tools. This would also align with the pragmatism philosophy regarding the importance of relevancy of the conducted research to practice (Watson, 2011), highlighting the importance of the theoretical and practical contributions and implications of this research.

Undoubtedly, this study had its limitations such as being a single case study, being difficult to generalise and having some concerns regarding validity of the results, as is the case with typical case study research. However, rigorous research can be achieved by careful selection of case studies and using techniques like triangulation from different sources (such as qualitative focus groups/surveys) to help in increasing the validity of the findings (Lewis, 1998). Another important aspect is that even though limited statistical analysis (if any) could be applied in this case, still the real benefit in selecting Beta as a case study relies on the fact that these studies can potentially lead to richer, new and more creative insights (as was the case with Beta's users' feedback). This was considered by maintaining internal validity (Yin, 1994), which can be achieved within qualitative research, specifically within case study approaches, by deploying some tactics such as the pattern matching technique that was adopted during analysing customer, employee and user feedback. On the other hand, Leonard-Barton (1990) discussed how even measurement validity can be achieved within qualitative research as multiple data sources and evidence are used which would be the main data

collection objective in the research in hand (triangulation process utilised throughout this research).

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Discussion

Gamification has gone through a strenuous cycle throughout the past decade. Following its formal introduction in 2011, gamification was met with a lot of anticipation, which reached its peak around 2013 (Scheibenreif & Hagemeyer, 2014). Practitioners and researchers were bedazzled by its offerings and diverse implementations across several industries, such as health, educational and engagement applications. However, this hype started to quickly decline a couple of years later, going through the painful trough of disillusionment. Several contributing factors were identified to have caused such decline (as discussed throughout the four papers). First, the limited scope of gamification design that focused on superficial structural game elements such as points, badges and leaderboards (PBL) and lacked any real intrinsic motivational design to develop long-term engaging experiences. Second, and as a result of this, the perception of gamification applications has been confined into a rigid moulding manifested solely as an engagement tool, sacrificing all the anticipated potential and capabilities such gamified technologies can achieve. Third, effective gamification technologies faded in the horizon and were replaced by gimmicky designs that were utilised by organisations as an effort to catch-up with the competition in the race of becoming (or even looking) as a technology adopter. This led to the pursuit of such technologies as an end-goal, and not strategic facilitators, for the sake of joining the crowd as late adopters or even laggards, with no real long-term outcomes expected as a result. Finally, and as expected, major gamification providers managed to capitalise on this opportunity and instead of developing bespoke gamified systems for their clients that would address real strategic objectives, generic off-the-shelf designs were implemented to satisfy the superficial demand of late adopters and laggards. All of which have affected the perception of gamification and the benefits sought, leading to a rapid decline in the usage and utilisation of such promising technologies.

This research is an attempt to fix this perception by employing a new lens that presents gamification as a technology-enabled capability that has complementarity features which can help organisations build complex capabilities. The studies presented here aim to push gamification from the trough of disillusionment up the slope of enlightenment and place it on the first steps of the plateau of productivity, for practitioners and academics to be able to harness the full potential of such promising technologies. Using a technology-in-practice perspective the four papers presented in this research explored the extent to which gamification can act as a complementary asset and its capacity in utilising/exploiting resources in the procession of building complex organisational capabilities. The idea pursued in the study was if (and how) fostering gamification as a complementary asset, through the right design methods and approaches, would facilitate building relevant organisational capabilities that would help develop a competitive edge for companies. In the process of the

research, several theoretical and practical implications and contributions were adopted, developed and shed light on as follows.

1. Theoretical Contributions

The research demonstrated that gamification, unlike its proliferation in the literature as a superficial engagement tool, is indeed a complex concept that requires a carefully crafted strategic purpose, for which an iterative design process is essential. The process should encompass defining goals and objectives, understanding users/players and designing the corresponding user journey that immerses the players in engaging loops using the right gamification tools and elements. These elements also must be in alignment with strategic objectives to achieve/enhance certain performance metrics through building the required capabilities.

The *first paper* developed a theoretical framework by combining views of gamification from a play perspective, a motivational affordance perspective and a technology-in-practice perspective. The study explained how gamified platforms play an important role in creating engaging and immersive experiences that can positively influence employees within organisations and motivate positive behavioural changes based on long-term strategic/organisational objectives. Several organisational capabilities were studied and analysed such as stimulating collaboration, innovation and even organisational learning to discuss how different gamification elements (through variable dynamics, mechanics and components) can act as motivational affordances to induce positive psychological outcomes such as engagement and motivation and eventually lead to building relevant constructs needed to develop those capabilities.

The technology-in-practice lens employed helped in articulating gamification as a complementary capability able to build other required capabilities through the utilisation of the power of play. This works by tapping into basic intrinsic motivation and through providing autonomy, competence and relatedness (elements of self-determination theory (Ryan & Deci, 2000)) and developing a state of flow (Csikszentmihalyi, 1990) through various tools and elements. The potential of gamification to act as a technology facilitator was also discussed, expounding how gamification can help overcome the social inertia that can hinder the usage of (and interaction with) technologies and act as a facilitator of technology adoption to quickly reach the state of social change. This is considered a substantial addition to the literature as it takes Orlikowski's (2000) work into a new dimension and answers some questions regarding the required tools to effectively and efficiently achieve social change.

The value of gamification, as a complementary asset, lies also in its ability to leverage specialised resources and capabilities within the firm to achieve the required competitive edge. From this angle, the proposed perspective departs from the existing literature and contends a purposeful choice of game elements that elicit specific psychological and behavioural outcomes through custom-built motivational affordances. The approach in this way will be directed towards aligning employees' performance with the intended strategic objectives, and as such engagement shall be utilised as a facilitating capability instead of an end product. Considering the RBV's VRIN's attributes (Ambrosini & Bowman, 2009), gamification systems can potentially target specific/valuable strategic objectives by building relevant (and firm-specific) capabilities, making these gamified systems unique and specific by design to a) the firm's objectives (through goal alignment), b) context (through implementation environment) and c) users/employees (through alignment of users' intrinsic motivation), providing long-term impacts which can in turn be rare and hardly imitable by other firms.

Expanding on the "expected theory of motivation" (Vroom & Deci, 1995), gamification was also shown as a potential goal-attainment catalyst through aligning employees' motivation with certain organisational goals through the craft of user-specific and context-specific game elements. These elements should a) take employees' skill/competence level into considerations, b) build the required competence level through bespoke/user-specific progression loop, c) provide instant, clear and informative user feedback that articulates current and required performance levels, d) communicate individual and/or organisational goals and the impacts of task completion and/or behavioural changes on them and e) adequately reward/recognise desired behaviours in a fair and transparent way.

The *second paper* explored the required gamification design methods to achieve complementarity and their potential strategic implications. The outcome of this study was a gamification design framework for practitioners and academics to aid in the strategic design process. The main contributions of this design framework included user-centric and goal-oriented design approaches that were recommended by gamification experts, as tools for mobilising and realising it as complementary capability, harnessing gamification potential as a strategic asset. The design methods introduced expand the current literature of the subject by liberating gamification from the restrictive implementation methods by providing a clear and robust roadmap of design features to translate long-term strategic goals into specific and organised choice of game elements that can be utilised by academics and practitioners.

The human-centric design approach provides an explanation on how to utilise different game elements beyond PBL (such as story, narrative and feedback) to target more sustainable long-term intrinsic engagement. This was achieved through the introduction of a major theoretical contribution, namely core drives, that provide a clear direction of how game elements can

translate into intrinsic motivators. Core drives were identified by experts as important constructs that reside between game elements and targeted emotions and behaviours. Instead of using arbitrary elements (mainly points, badges and leaderboards), more sophisticated understanding of the targeted core drives is required in order to select the relevant game elements to develop long-term engagement loops. The goal-oriented design element also complements the human-centric one by defining and aligning the targeted individual behaviours and organisational constructs to the design process and choice of elements to achieve the required strategic impacts. From a theoretical perspective, the goal-oriented design supported the prevalence of content gamification over structural gamification, which is another important addition to the literature. This is because content gamification is a much more powerful intrinsic motivator than superficially adding game elements (such as scores or leaderboards) around a pre-existing activity (i.e. structural gamification that is widely spread in the literature) just to make it look more fun aimed at attracting users through unsustainable incentive systems.

The proposed design considerations are also in accord with the technology-in-practice perspective (Orlikowski, 2000; Schultze & Orlikowski, 2010), since it helps in understanding how organisations can use gamification as a facilitator to convert the induced enactments of social inertia (that usually face function-focused software platforms) to social change (which can be achieved through gamified, user-specific design methods) through acknowledging and maintaining user experiences and emotions while interacting with the system. This is inherently incorporated in the proposed design method, borrowing the incremental and agile development processes from software engineering processes (i.e. feature/goal-oriented design method) and the motivational affordances engagement loops from games (i.e. user-centric design method).

The *third paper* implements the design framework that was developed in the second paper to examine the use of the approach in facing and managing a major risk for most modern organisations, which is cyber risk. A conceptual model was proposed offering a unique approach to the development of human capabilities for cybersecurity using content and structural gamification as an effort to develop effective awareness programmes in organisations. The study first examined the literature of the subject that led to the identification of current shortcomings within cybersecurity training programmes. Low cybersecurity awareness levels due to the lack of engagement, lack of compliance and a broken learning cycle were discovered to be the main antecedents of the high security threats posed by the human element within organisations.

The study worked on addressing these factors and the shortcomings in the cybersecurity training programmes. It was discussed that even the programmes that utilise gamification

demonstrate the lack of the complementarity aspect usually leading to ineffective and incomplete learning processes. Therefore, the study proposed a solution to the broken learning cycle through a bespoke engaging experience for heterogeneous users (with different knowledge, skills and motivations) that would facilitate the learning process beyond the knowledge acquisition phase. Adding a behavioural component also helped filling a major gap in the existing practices/literature for security awareness programs, encouraging policy adherence through application of knowledge in day-to-day activities.

Although from a theoretical perspective the conceptual model targets the development of purpose-built cybersecurity awareness programmes, it can arguably be used as a generic model for supporting capability developments efforts in firms, where learning and behavioural changes are the main concerns. The key tenets of the proposed approach are: creating engaging and immersive learning experiences that positively influence users/employees' awareness level as the outcome, and motivating behavioural changes to help build the human element in key organisational processes. This can be utilised to solve similar issues such as adopting a certain new technology or process within the workplace, where the model can guide the development of the right solution and game elements to support objective and effective learning processes.

The *fourth paper* puts the theoretical framework of the first paper and the design framework of the second paper to the test in a longitudinal field study. The study contributes to the sparse interpretivist literature of developing gamification complementarity. The choice of the action research method helped in delineating the process of diagnosis, planning, implementing, evaluating and reflecting upon the gamified system's development process. The user-centric approach proved successful, which helped in designing the gamified system to solve some persistent issues in the target organisation (from the targeted users' perspective). This approach also managed to provide valuable insights into the game design process as to which game elements would be relevant to adequately engage and impact users' motivational antecedents and behaviours. The role of the goal-oriented design also proved salient in the gamification process to identify the targeted organisational goals to aim for and how to target them with the right incentives and behavioural adjustments. The study provided an invaluable opportunity to demonstrate the process of identifying and targeting organisational shortcomings, addressing them through a gamification design process that objectively guided the dynamics, mechanics and components that needed to be utilised in order to deliver on the intended strategic impacts through engagement loops.

One of the main contributions is the successful demonstration of engaging disengaged employees. Although, as has been highlighted before, engagement should never be considered as an end-goal by itself. It was important in this case study to demonstrate such achievement

since it was used as the main facilitator for the targeted strategic objectives such as strategic communication, breaking silos and organisational learning. Disengaged and neutral employees were successfully turned into actively engaged ones in the process, positively influencing organisational learning capabilities and strategy communication capabilities. Implicitly encapsulating the company's strategy using content gamification also proved successful in helping in communicating the strategy to a wider audience. Therefore, the study managed to demonstrate that gamification can help overcome the social inertia (as proposed by the previous papers) that can hinder the usage and interaction with technologies and help in building relevant capabilities using the right design approach.

In summary, the research provides academics with the blueprints needed for understanding and exploring gamification as a complementary asset. As an interdisciplinary research, the studies included within the four papers provide various theoretical angles that support and justify the propositions, including but not limited to: a) psychological and behavioural constructs to evidence the strengths of gamification in terms of engagement, motivation and behavioural changing antecedent, b) intrinsic motivation, self-determination and core drives relevant to the user journey that can be targeted and aligned with required goals, c) gamification design guidelines with relevant user-centric game elements choice and goal-oriented strategic relevancies to help build real value through firm-specific capability building efforts d) theoretical application of these concepts to an important capability such as elevating organisational learning, demonstrating the design process and implications of utilising gamification as a complementarity on an instantiated example of urgent issues that face organisations such as cybersecurity, e) practical application of the proposed design guidelines to another set of diverse and relevant organisational capabilities, showcasing the design process in action and the positive outcomes of adopting such a complementarity approach and f) setting the stage for expansions and applications of the same design method in other comparable and analogous areas, where technology-led gamification can be of strategic benefit for organisations.

2. Practical Implications

The constructivist approach employed in the research maintained a practical lens to provide roadmaps and implications for practitioners as well as academics. This is evident in the choice of methods such as the experts/practitioners' interviews in the second paper and the action research in the fourth paper. The studies also maintained relevance to the current dynamic environment and persistent issues that face organisations through the choice of topics and capabilities to seek, such as the cybersecurity issue that was remedied in the third paper and

the organisational training/learning issues and strategy communication issues that were addressed in the fourth paper. This is because a practical lens was employed throughout the research and therefore several processes of inquiry and methods of research designed to develop solutions for real organisational problems were incorporated.

In the *first paper*, although the main outcome was the complementarity theoretical framework, yet the practical implications are critical and emphasised on. The study highlighted the negative impacts of designing and implementing gamification with engagement in itself as the end-goal. A complementary alternative was presented, demonstrating the long-term strategic benefits that can be expected from such design. Several implications were presented to practitioners as a result to explore the complementary potential of important processes such as building learning capabilities, building collaboration capabilities, building innovation capabilities and achieving compliance.

The study's main practical contribution was the delineation and analysis of different game elements, including dynamics, mechanics and components, to present practitioners with a diverse toolset to choose from while devising their gamified systems. The study also explained how these game elements induce different psycho-behavioural outcomes through self-determination factors and flow states. Several real organisational examples were discussed, demonstrating how the alignment of employee behaviour with strategic objectives can help build respective capabilities. This proved paramount in the process of building individual and organisational capabilities, drawing a roadmap for practitioners to follow in the pursuit of strategic implications that can potentially give them a competitive edge.

One major outcome is the multi-faceted approach employed, incorporating threads from technology development/management, game design and human resource/engagement management to be able to develop VRIN (valuable, rare, inimitable and non-substitutable) attributes (Ambrosini & Bowman, 2009) in today's dynamic and rapidly changing environments. Drawing parallels to the strategic cybersecurity efforts employed by most organisations nowadays, that need buy-in across the board to yield effective outcomes, gamification efforts should also be embedded within the overall firm's strategy. Gamification design and development also need fluid utilisation of resources across different departments. For example, HRM efforts are needed to properly assess and utilise engagement according to identified user typologies and decide on relevant reward and appraisal structures. IT efforts are required to design and develop the necessary gamification system based on user typologies, context formality and organisational goals. Senior management is also needed to decide on the strategic goals to target using gamified tactics and the choice of development methods, whether they are in-house development or outsourced efforts, depending on the industry's appropriability regime (Teece, 1986). Accordingly, organisations may need

dedicated gamification departments, just as they currently have their dedicated security departments to build cybersecurity capabilities, to be able to manage, coordinate and implement powerful gamification solutions needed to develop a wider range of crucial capabilities for the organisation.

In the *second paper*, a gamification design for complementarity framework was developed through interviewing experts, making it a design framework by practitioners for practitioners. The study managed to provide invaluable insights, from experts' viewpoints, about the definition of gamification, its value and proper design considerations to liberate it from short-sighted short-term utilisation into what proved to be a valuable strategic asset. Presented as a technology-enabled solution with emotions, gamification practitioners get to access a concrete roadmap through the findings of this study that can assist them in the process of designing and developing effective gamification systems.

The framework elucidates a number of design considerations such as: a) the goal-oriented design that identifies individual and/or organisational objectives to target, b) the user-centric design that shapes up the design elements and motivational affordances based on the targeted users and their typology to guarantee an intrinsically motivating and engaging experience, c) the choice of game elements that trigger the relevant core drives to maintain positive behavioural alignment with long-term strategic objectives, d) the performance evaluation metrics and mechanics that need to be embedded in the gamified system for tracking, monitoring and maintaining a sustainable system and e) the iterative design cycle induced from the agile software design approach to finetune and recalibrate design elements accordingly.

Although the derived framework is largely based on existing literature and success stories, yet the possibilities for exploring it and introducing it to wider applications are extensive. Potential implementations may target persisting issues within the practical world such as addressing the process of developing relevant dynamic capabilities (Teece, 2007) or achieving ambidexterity (O'Reilly & Tushman, 2008) for example. Teece's (2007) dynamic capabilities foundations explicate three important constructs: sensing opportunities, seizing opportunities and reconfiguring resources for transformations to cope with the dynamism of the market. Employing the proposed lens and derived gamification framework, gamification can potentially impact/influence some of these constructs. First, for sensing capabilities, gamification can stimulate collaboration internally and externally, which are important factors beside open innovation efforts that are required to scan the market for opportunities and work with different parties such as suppliers and customers seeking new technologies. Second, for seizing opportunities, purpose-built gamification designs can also be utilised to select the right structures and mechanisms of incentivising creative efforts, necessary for capturing the right

opportunities. Finally, for reconfiguration and transformation, gamified platforms can provide accessible, effective and efficient knowledge sharing and management mechanisms and training platforms that are engaging, visually appealing and informative, which can facilitate the required transformational efforts.

As for ambidexterity, organisations usually struggle to develop structures that are efficient and fluid/flexible at the same time to maintain and adapt to rapid market changes by balancing explorative and exploitative activities (O'Reilly & Tushman, 2008). Gamification has the potential of acting as a lever in this case by impacting certain ambidexterity constructs such as innovation and collaboration efforts required for balancing exploitation and exploration activities. Gamification can be used as a behavioural change mechanism that can engage employees within exploitation units to increase productivity and can be deployed for exploration units as well to incentivise idea generation and stimulate creativity. Besides, gamification can be used to facilitate collaboration within and across these units. This would allow for creating a transparent, incentivising and knowledge enriching environment that can be used to facilitate and manage ambidexterity across organisations.

In the *third paper*, a gamified model that addresses a major risk that face organisations and practitioners is presented. Cybersecurity, which is considered to be one of the most petrifying risks facing businesses, has been gaining more attention as companies are still looking for ways to address the issues of effectiveness within their training awareness programmes that absorb considerable resources from them. The study presents the importance and differences between concepts such as content gamification and structural gamification to practitioners. Both methods were utilised in a practical replicable model to address major shortcomings relating to current cybersecurity awareness programs. The presented model responds to two main practical questions: a) what should organisations do to overcome cyber risks? and b) how to do it? The framework presents a clear roadmap of increasing cybersecurity awareness to cybersecurity weakest link, the human element, and details the gamification design process needed in order to develop an effective training system.

The study provided an extensive analysis of the current state of cybersecurity training programs to help organisations understand the pros and cons of each training method and give them the opportunity for reflecting on their employed methods (if any). The study also explained different learning methods, highlighting the advantages and disadvantages of each. This review of the methods and techniques can help organisations select, adjust or maintain different training methods for such a crucial topic such as cybersecurity, highlighting the prominent role of the human element for a robust security defence structure.

As a practical by-product of the model, rigorous and informative sets of metrics for cybersecurity awareness programmes were presented as an essential outcome of such

implementation. The measurement elements include: measures for the cognitive elements (i.e. how effective was the system in transferring knowledge, and how did it impact the employees' awareness levels); measures for the engagement levels (e.g. how engaging is the system for employees during the learning phase and application phase); and measures for the adoption and behavioural changes (i.e. how far can the system positively impact employee behaviour regarding cybersecurity and how sustainable is it) as the most crucial metrics. These metrics can be used as performance indicators of awareness levels, engagement levels and efficacy level of the program reflecting upon knowledge acquisition, dissemination and application capacities.

The study also proposed opportunities to engage with other complementary technologies such as artificial intelligence (AI) to extend the effectiveness of gamification for the purposes sought. Decision trees and dynamic difficulty adjustments (DDA) were two of the examples that utilised AI techniques, but a bidirectional relationship between gamification systems and AI systems is a very likely prospect. Cybersecurity's gamification by-products (e.g. cybersecurity awareness level) for example can feed into the knowledge base of a typical AI-supported prediction system (Krasnoproshin et al, 2016), facilitating the evaluation and assessment of current and future performance levels (e.g. cybersecurity threat level). On the other hand, the outputs from such AI-enabled systems can feed into gamification systems simultaneously to adjust difficulty levels (i.e. of security training for example), direct users towards important and urgent topics/behaviours (e.g. newly identified security breaches) or even recalibrate the reward structure, depending on potential threat levels or available budget.

Such implementations of gamification to facilitate training and technology adoption are deemed crucial nowadays, especially after the recent Covid-19 pandemic and the new demands entailed by remote workforces. Most companies are utilising new technologies to cope with the new unfortunate and restrictive work environment, creating more demand for technology facilitators and catalysts such as gamification than ever before. Given the proposed design methods, gamification can be of multi-layered aid during such times by removing technology adoption barriers, providing more effective and efficient training alternatives and providing digital platforms capable of collecting relevant metrics (such as performance levels, engagement, participation and adoption levels) that are necessary to capture in such a remote working environment.

In the *fourth paper*, a practical application of the former frameworks and models is demonstrated in a real case that has the advantage of being a longitudinal action research. The study presents practitioners with a concrete case of a typical capability building exercise that faces organisations on a daily basis. The study explicates the whole processes from a) problem identification, b) analysing several data sources to understand issues, antecedents and users'

perspectives, c) utilising the purposeful game design framework, and using appropriate game elements to respond to the identified individual and organisational shortcomings, and d) evaluating and reflecting upon the individual and strategic impacts of the gamified system.

The case represents a success story of the utilisation of gamification to engage employees, break silos, develop an immersive and effective training experience and to adequately bridge the gap between the management team and employees using innovative strategy communication methods that employ capable game elements and engagement loops. The study can be perceived as an example application of the iterative design cycle required to develop a gamified solution that uses engagement as a tool for accomplishing higher-end long-term outcomes. The number of inquiry methods employed can be used as a road map of how practitioners can collect data, plug them into gamification their design loops, apply the user-centric and goal-oriented design methods in real context-bound situations, implement an adequate gamification solution and reap the benefits of complementarity on individual and organisational levels.

The research explored other potential strategic integration of gamification (as a complementarity) within an organisation with some extended suggestions such as onboarding, recruitment, induction and diverse training. However, an important practical outcome to highlight was the method of integration (i.e. in-house implementation of gamification systems or external outsourcing), which is a crucial point for adoption and investment decisions. Each method has its pros and cons depending on the company's point of view, the available skills, budget, rationale, strategic objective and expertise to develop and manage it on an ongoing basis.

Although it is usually a strenuous and convoluted process to try measuring IT returns, the new proposed lens and design framework can arguably make a useful case for investing (or outsourcing) in such complementing technologies. Given the goal-oriented gamification design method proposed, a more robust and systematic cost-benefit analysis approach can be in place given the tangible capability building efforts and impacts that can be measured, providing a more informative and wider perspective for evaluation. In the case of cybersecurity, performance metrics (see Slack et al., 2004) such as cost (e.g. difference between investment costs in effective training/awareness and costs of cybercrime) and dependability (e.g. cost of system availability compared to system failure) can act as decisive factors in evaluating investment options. This approach can also be expanded to interventions other than cybersecurity. A similar approach can be pursued to evaluate gamified options in comparison to other digital/non-digital alternatives to justify investments. Following the proposed complementary approach, the impacts of gamification efforts can then be assessed against expected/different performance objectives (Julien et al., 2010) such as efficiency,

effectiveness, responsiveness or agility to determine potential values and aid with investment decisions.

These evaluation strategies are feasible in the case of gamification due to several reasons. First, return on investment calculations can be derived from costs and financial benefits. Costs can be estimated based on the game elements identified in the gamification design phase, which explicate the resources needed, the software development requirements and the incentives included. The financial benefits can be derived from the system's expected value through targeted goals/capabilities and impacts. This can be implicit and/or explicit value such as process improvements, saved costs (e.g. due to better training or better coordination due to the availability of by-product performance data), increased efficiency or better governance/control. All of this is supported by the proposed agile process that can benefit from developing leading indicators to improve predictions and estimates in a cyclic manner throughout the development phase and not solely at the end, i.e. to update payback period, internal rate of return, net present value and residual income figures with more accurate estimates at multiple points during implementation.

3. Publications and Awards

The research, comprising four papers, has managed to create some positive impacts in the academic and practical spheres. The first paper won the "best paper" award in the British Academy of Management for the e-Business and e-Government track in 2018. The following year, the second paper also won the "best paper" award in the British Academy of Management for the Operations, Logistics and Supply Chain Management track in 2019. The year after, the third paper was submitted and accepted in the British Academy of Management for the Knowledge and Learning track (in 2020) and achieved a high score of 96/100. The interdisciplinary nature of the research was evident in its ability to contribute to (and win awards in) some diverse fields (i.e. different track each year). The proposed design framework of the second paper was also implemented in a different health context (different from the cybersecurity context of the third paper) as a training platform for doctors. The system used the same content and structural game elements presented in the papers and managed to achieve the second prize in ECGBL's International Educational Games Digital Games competition in 2020. A master's dissertation that used the platform as a practical case study for IT innovation received a distinction, and the master's student managed to win the student of the year award after being supervised by the researcher. Furthermore, by the time of submission of the thesis the first (conceptual) paper has been submitted to the International Journal of Operations and Production Management (IJOPM) and the third (cybersecurity)

paper has been submitted to Information Systems Research (ISR), both of which are currently under review.

4. Limitations

Although the research made efforts to encompass several practical problems and concerns for organisations, yet there are still some limitations that can be addressed in future studies. First, the main scope for the whole research has been internal organisation gamification (i.e. gamification for internal units such as employees to build individual and/or organisational capabilities). External gamification was not explored in detail in this research, i.e. orienting the process of gamification towards customers (or other stakeholders) external to the organisation. Although similar design methods may be applicable in these cases, yet robust research methods with proper testing are needed for proper validation and verification.

Second, the sample size of 10 participants in the second paper can be pointed to as a limiting factor. Although this was dictated by constraints such as the population size of such experts (with organisational gamification focus) as well as their limited time and availability yet a larger (and more diverse) sample can be considered for further studies to critically explore more in-depth insights from practitioners. This expansion can definitely help provide more insights from more experts that would serve as an addition to the design framework presented. Continuously updating the framework with design principles and considerations is highly recommended to cover more insights, incorporate more updated and up-to-date recommendations, include more real-life examples and expertise regarding gamification design and protect the model from getting obsolete.

Third, the cybersecurity case study is one possible example for implementing the proposed design framework (beside the fourth paper) that still needs more testing and expansion. Although the conceptual model provides replicability options for implementation within similar organisational learning contexts with similar egalitarian models, yet more detailed research needs to take place to showcase this applicability. As a conceptual work the proposed ideas are yet to be tested and validated empirically. Generalisation of the model can also be tested in various contexts, which would certainly bring the ideas to new lights and contribute to its maturity.

Fourth, the longitudinal case study in the fourth paper was bounded by time (24 months) and availability constraints from the researcher's side as well as the company's. As a one-case study, generalisations issues may be considered even though validity was adequately maintained during the process. Another important limitation is the limited statistical analysis due to limited data availability, which could have led to richer new insights. Post

implementation data was not available for pre and post intervention analysis. The fact that it is a sole case study also hindered devising a comparative study to test the effects and impacts (if any) of the intervention compared to others (including control groups), which shall be of future routes for extending the research.

5. Future Research

The essence of this research is to shift the perspective of academics and practitioners and present gamification as a strategic powerhouse that poses potential long-term complementarity features. This position in itself opens up research in this area since this lens has been rarely addressed by academics. More studies are needed to explore in detail gamification's impacts on different capabilities, provide more insights and updates to the design process and considerations and to test the measurable impacts of such intervention.

To extend the proposed design framework of the *second paper*, a bigger (and more diverse) sample of more than 10 experts is advised for further studies to critically explore more in-depth insights from practitioners/experts. Different design techniques and approaches can be utilised to explore the complementarity process more rigorously. Company-wide capability metrics should be discussed to discover the impacts of different gamification elements on the strategic process embedment. All of which can update the best practices recommended as an outcome of the second paper beside verifying the complementarity process concluded from the study in hand. Having a large sample size also opens up the door for more quantitative and mixed methods utilisation of data, which can provide more testing, verification and causal rigor to the outcomes.

As for the *third paper*, further studies similar to the cybersecurity building exercise need to be conducted. These studies can explore the extent to which gamification, as a complementarity, can help in addressing urgent issues such as sustainability, stimulating green behaviour, maintaining energy usage, impact quality management, stimulate innovation (including open innovation) and engaging customers. As for the cybersecurity example case, the proposed ideas are yet to be tested and validated empirically, for which longitudinal case studies may be of best fit. Comparative studies would also help examine the strength and validity of the approach against other competing awareness programs (e.g. traditional, web-based...etc.). Although the benefits of the proposed model have been argued for in this study, yet there are other learning elements which are not present in the current framework such as the presence of a tutor and the cost/benefit analysis of the model against other available options.

In the *fourth paper*, the research demonstrated that gamification can help overcome the social inertia that can hinder the usage and interaction with technologies and help in building

relevant capabilities using the right design approach. Future contributions and advances within the field have the potential of reaching (and possibly exceeding) those practical implications by changing the ways managers deal with the theories of human motivation internally (in engaging employees) and externally (to satisfy customers). Therefore, future research can potentially utilise similar theories and empirical approaches to formulate behavioural changing tools based on huge advances in information technologies to address urging issues that have parallels with the addressed ones. Different contexts and different companies need to be tested to support the generalisation aspect of the findings, although measures like increasing research validity through triangulation and careful case selection has been followed to develop rigorous reach findings.

Finally, an interesting area for future research would be exploring the relationship between gamification and AI. Decision trees and DDA were two angles that were explored in this research, but more avenues can be explored given how AI is currently changing how we see technology and is also shaping up what technology can deliver. Valuable synergies (e.g. sophisticated and intelligent data analytics of extracted data from gamified systems such as behavioural metrics and organisational metrics/trends) can be developed and enriched through smart integration of the two concepts, impacting how each is implemented and utilised.

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Appendices

Appendix A

INTERVIEW QUESTIONS

GAMIFICATION EXPERTS & SERVICE PROVIDERS

Participant Demographics

Name	
Title	
Position	
Organization	
Industry/Sector	
Gender	
Age	
Years of Experience	

Section 1: Design for Complementarity

This item relates to gamification as a platform/solution and the elements of play including game dynamics, mechanics and components that are implemented.

1. How would you define gamification [from your own point of view] and the value in gamification (in your product development and for your market/customers)?
2. Please describe the existing game design process you apply, and how are clients engaged in this process?
3. Can you provide some examples of the main/different game design elements utilized by your organization? [Interviewer can give explanatory examples such as badges, points, leaderboards…etc.]
4. How do you choose these elements (on what basis)? Are there any technology affordances for different objectives/user tasks?

Section 2: Motivational Affordances

This item relates to gamification from an engagement perspective and how it can result in different psychological and behavioural outcomes.

5. Do you believe specific psychological outcomes can be derived from the use of gamification solutions (e.g. motivation, immersion, excitement...etc.)? *Probing: what are they and how do they work in practice? Examples?*

6. Do you believe specific behavioural outcomes can be derived from the use of gamification solutions (e.g. participation, adoption, learning, productivity...etc.)? *Probing: what are they and how do they work in practice? Examples?*

Section 3: Organisational Capabilities

This item relates to the potential impact of gamification in building organizational capabilities.

7. Do you believe gamified solutions can have impacts on building your clients' organizational capabilities (i.e. innovation, collaboration, knowledge, talent...etc.)? *Probing: How?*

8. Based on the previous question, were these impacts planned or are they only implications which may or may not take place (after effects)?

9. Do you find a relation between gamification outcomes (psychological or behavioural) and potential build up or improvement of clients' capabilities? *Probing: Examples?*

10. From a design/plan or experience of observing implications, do you find gamification to have any impact on any of the following organizational capabilities? *Probing: How?*
    i. Talent (talent acquisition, retention, engagement and management)
    ii. Collaboration (within and across teams/departments or even exogenous collaborative efforts)
    iii. Innovation (exploratory or exploitative innovation)
    iv. Knowledge and learning (knowledge dissemination, absorptive capacity)
    v. Customer relationship management (engagement, adoption, need-satisfaction)
    vi. Agility (flexibility and speed of responsiveness)
    vii. Dynamicity (sensing, seizing and integrating opportunities)
    viii. Ambidexterity (balancing exploitation and explorations practices)

11. How about the impact of gamification on any of the following performance metrics:
    i. Cost (of production)
    ii. Efficiency (of tasks)
    iii. Quality (of outputs)
    iv. Speed (of delivery)
    v. Other

Section 4: Strategic Impacts

This item relates to the proposed strategic view/integration of gamification as a complementary asset.

12. Were you able to witness/measure any short-term or long-term impacts of gamification as a solution or platform? *Probing: Examples?*

13. To what extent can gamification strategically integrate within organizations as a complementary asset? *Probing: How? What role?*

Appendix B

Game design online survey results

How would you rate the following aspects of the game?	Very Low	Low	Medium	High	Very High
Visual elements and graphical user interface (GUI)					
Count	2	0	11	11	3
%	7.40%	0.00%	40.70%	40.70%	11.10%
Gameplay (fun elements)					
Count	0	0	14	9	4
%	0.00%	0.00%	51.90%	33.30%	14.80%
Difficulty level of the game					
Count	1	6	9	8	3
%	3.70%	22.20%	33.30%	29.60%	11.10%
Instruction set and tutorial					
Count	1	4	5	11	6
%	3.70%	14.80%	18.50%	40.70%	22.20%
Ease of use/navigation (through screens, tabs etc)					
Count	2	0	4	13	8
%	7.40%	0.00%	14.80%	48.10%	29.60%

System impacts online survey results

Did you find the app to have an impact on any of the following?	Very Low	Low	Medium	High	Very High
Teamwork (between teams)					

Count	3	6	5	9	4
%	11.10%	22.20%	18.50%	33.30%	14.80%

Collaboration (within departments)

Count	2	6	7	9	3
%	7.40%	22.20%	25.90%	33.30%	11.10%

Breaking silos (across departments)

Count	2	7	8	6	3
%	7.70%	26.90%	30.80%	23.10%	11.50%

Knowledge and learning (e.g. Beta's behaviours)

Count	2	1	8	10	6
%	7.40%	3.70%	29.60%	37.00%	22.20%

Communication of high-level strategies (e.g. Beta's strategy)

Count	3	3	10	6	5
%	11.10%	11.10%	37.00%	22.20%	18.50%

Visualisation of certain processes (e.g. gas delivery)

Count	2	4	9	10	2
%	7.40%	14.80%	33.30%	37.00%	7.40%

Usage rate (colleagues use the app more because of its fun/engaging elements)

Count	2	4	7	9	4
%	7.70%	15.40%	26.90%	34.60%	15.40%

Adoption rate (more colleagues using the app to climb the leaderboards)

Count		2	1	3	15	6
%		7.40%	3.70%	11.10%	55.60%	22.20%

Performance outcomes online survey results

Does the app have a potential impact on any of the following performance metrics?					
	Very Low	**Low**	**Medium**	**High**	**Very High**
Efficiency (e.g. build the required skills and behaviours to quickly and efficiently respond to customers)					
Count	2	5	9	7	4
%	7.40%	18.50%	33.30%	25.90%	14.80%
Effectiveness (e.g. build the required skills and behaviours to accurately and effectively respond to customers)					
Count	2	3	8	10	4
%	7.40%	11.10%	29.60%	37.00%	14.80%
Adoption (e.g. adopting Beta's behaviours by colleagues)					
Count	2	1	11	9	4
%	7.40%	3.70%	40.70%	33.30%	14.80%

Appendix C

FOCUS GROUP QUESTIONS/DISCUSSION ITEMS

Participant Demographics

Name

Title

Position

Organization

Industry/Sector

Gender

Age

Years of Experience

Section 1: Gamification as a Game

This section relates to gamification as a platform/solution and the rationale behind utilizing gamification.

1.   What drove you/your company to adopt gamification as a choice for implementation through the Foot on Gas app?

2.   In your view, what differentiates apps like this from other methods/training techniques as a tool for acquiring certain skills (e.g. Learning about Beta's strategy)?

Section 2: Motivational Affordances

This section relates to gamification from an engagement perspective and how it can result in different psychological and behavioral outcomes.

3.   Were there any observable psychological/emotional changes in the app users (e.g. motivation, immersion, excitement…etc.) as a result of adopting and using it? Probing: Which and How? Examples?

4.   Were there any observable behavioral changes/outcomes derived from the use of the app (e.g. participation, adoption, learning, productivity…etc.)? Probing: Which and How? Examples?

Section 3: Organizational Capabilities

This section relates to the potential impact of gamification in building organizational capabilities.

5.   Did you find the app to have an impact on any of the following? Probing: and how? [The interviewer will provide more explanation and examples for each item upon request]:

i.   Teamwork (e.g. between game teams)

ii.   Collaboration and breaking silos (within and across teams/departments)

iii.   Knowledge and learning (e.g. Beta's behaviours)

iv.   Customer relationship management (e.g. application of learned Beta's behaviours while dealing with customers)

v.   Communication of high-level strategies (e.g. Beta's strategy)

vi.   Usage rate (e.g. colleagues use the app frequently because of its fun/engaging elements)

vii.   Adoption rate (e.g. more colleagues using the app to climb the leaderboards)

viii.

6   Can you identify a correlation between outcomes (psychological or behavioral) and building/improving those capabilities (if any)? Probing: Examples?

Section 4: Gamification as a Complementary Asset

This item relates to the proposed strategic view/integration of gamification as a complementary asset (the capabilities and/or resources that help firms capitalize on the and outcomes associated with using/introducing a technology, strategy or even an innovation).

7.   Were you able to witness/measure any short-term or long-term impacts of the app on any organizational metrics (e.g. employee engagement/pulse surveys, customer satisfaction...etc.)? Probing: Examples?

8.   How successful was the app from your own point of view (e.g. any positive benefits) and would you adopt a similar approach to solve other problems?

9.   To what extent can gamification strategically integrate within your organization as a complementary asset (as defined above)? Probing: How? What role?