CHANGING THE GAME:
INSIGHTS FROM HOWARD-DELAFIELD INTERNATIONAL'S DIGITAL INNOVATION FOR SOCIAL IMPACT IN INDIA

By

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Dedication

This DBA thesis is dedicated…….

To my parents, Prabha Shankar and K. R. Shankar, whose love and sacrifice have been my life's unwavering foundation: In your unconditional support, I find the Truth of Bhagavan Satya Sai Baba's words: "Love all, Serve all." Your love has been my greatest lesson in compassion and selflessness.

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Suhar
Sultanate of Oman
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ABSTRACT

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This doctoral thesis investigates the integration of leadership practices, organizational culture, and risk-taking in Howard-Delafield International's (HDI) development of "Go Nisha Go" (GNG), a mobile game designed to improve reproductive health education among adolescent girls in India. It uses a case study methodology to analyse HDI's creative and multidisciplinary product development approach, including agile leadership practices and alignment with social impact goals. The analysis revealed how HDI's leadership navigated the complexities of digital innovation within a social impact framework, successfully aligning product development with project management objectives amidst the constraints imposed by conventional models. Through qualitative exploration, the thesis explores the nuanced dynamics between leadership, organizational culture, and risk-taking that underpinned HDI's journey. The study concludes that strategic leadership stemming from a culture that embraces risk taking, agile decision making and harnessing emerging technologies for a social impact were key to the successful launch and adoption of this innovative product in India's rapidly evolving digital landscape. This research contributes to the theoretical landscape of digital innovation in social impact projects, providing a detailed blueprint for organizations aiming to leverage digital platforms for societal benefits, especially in the area of reproductive health education.

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CHAPTER I:
INTRODUCTION

1.1 Introduction

India's adolescents, particularly girls, represent a significant demographic, as the country is home to 253 million adolescents, making it the largest adolescent population globally (UNICEF, 2021). Unmarried adolescent girls in India are exceptionally vulnerable, often facing risks such as early marriage, early pregnancy, and the discontinuation of education, which have a long-term impact on their well-being and development. UNICEF also reports that India witnesses nearly 1.5 million child marriages annually, hindering girls' progress and contributing to adverse maternal and child health outcomes (UNICEF, 2019). The nexus between early marriage and the cessation of education is unmistakable, and the withdrawal from education impairs the girls' abilities to develop life skills and to access gainful employment (Nanda, Datta, and Das, 2015).Steeped in conservatism, discussions on reproductive health are rendered taboo due to the socio-cultural landscape of India. Traditional gatekeepers, encompassing parents, elders, and community leaders, often hinder the dissemination of critical information on contraception and reproductive health, exacerbating the existing knowledge and service gaps (Jejeebhoy, Santhya and Acharya, 2014).

In today's digital age, leveraging technology is indispensable in overcoming the existing gaps in information dissemination and access to reproductive health services. Digital platforms can serve as confidential and stigma-free spaces where adolescents can acquire essential knowledge about reproductive health, contraception, and legal rights, bypassing the traditional gatekeepers who might inhibit such education.

In 2018, the world's largest bilateral aid and development agency, United States Agency for International Development (USAID), announced an Innovation Accelerator Challenge to provide solutions for reliable health information in a way that is accessible to adolescents. Howard Delafield International (HDI) is a women-owned small business based in Washington. D.C. For twenty five years since 1995, HDI has built its credibility in providing innovative solutions to help organisation address pressing global health, environmental, and social

challenges and positively impact the health and well-being of people and communities worldwide. HDI responded by proposing the Game of Choice, Not Chance™ (GOC) project that brought a global multidisciplinary consortium together to build an innovative product - a mobile game app - designed to empower girls to make informed choices, develop strong voices, and shape their future with confidence. The game was launched on the Google Play Store in India in June 2022. (USAID a, no date)

The GOC project includes the design, development, implementation, and marketing of an innovative digital product for improving reproductive health outcomes, a mobile game app called Go Nisha Go (GNG). It includes in-game links to products and services, and stands apart as an example of complex product development and project management frameworks in showcasing private sector engagement for sexual reproductive health. We leveraged a global consortium of multidisciplinary expertise for product development of this innovation. The business case study is a compelling narrative on leadership practices, managing multidisciplinary frameworks, and evaluating the product for social impact. This case study shows how behavioural science, human-centred design, and game-based learning can be combined in digital solutions.

This Literature Review aims to support the primary objectives and research questions for a research study on the development of an innovative product, a mobile game app produced by Howard-Delafield International (HDI), a behavioural insights consulting firm to enhance reproductive health outcomes among adolescents in India. To this end, the study aims to describe the journey of HDI through an exploratory case study approach in developing a novel digital product for a social impact goal of improving reproductive health outcomes among adolescents in India. The challenges, complexities, and innovations in project management and leadership practices are explored amid the complex multidisciplinary frameworks that were navigated for new product development. Additionally, behaviour change frameworks, navigating the digital native learning paradigms of game based learning and role play, and challenges of evaluating a novel digital product by industry gold standards are also described. During the product development period and in this study period, the COVID-19 pandemic also emerged as a challenge, and the researcher has included this external uncertainty as an external stimulus to analyse the leadership practices such as risk taking and decision making during this period. Thus, this thesis may serve as a unique case study with lessons learned on outcomes achieved from a

new product development/innovation assessment lens, social impact, and a women-led business perspective.

1.2 Research Problem

While India's adolescent population of 253 million presents both a challenge and an opportunity for its economy, the prevalent gender stereotypes act as a barrier to adolescent girls' health, education, and participation in the workforce. Particularly, the aspects of reproductive health and agency issues can disrupt their aspirations and growth. Sexual reproductive health (SRH) programs, therefore, play an important role in promoting health as well as gender equity. However, there is a clear lack of comprehensive sex education in the country. There is compelling evidence that sexual education can improve knowledge as well as increase self-efficacy and favourable attitudes towards safe sex. This would also improve their overall development and well-being (Patton et al., 2016). Due to reasons such as lack of easy accessibility, low trust with healthcare providers, traditional gatekeepers such as teachers and parents, awareness complexities, stigma, unfavourable laws and policies, etc. lead to unmet sexual health needs in adolescents. Thus, there is a clear need to strengthen SRH programs and use creative, adolescent-responsive media to engage them in SRH conversations and equip them with high quality and accurate information.

The evolving landscape of digital innovations, especially in the field of reproductive health, demands nuanced insights into the multifaceted dynamics of product development, leadership practices, and project management. HDI, an established, women-led behavioural insight organisation, ventured into creating an innovative mobile game app, "Go Nisha Go", aiming to empower adolescent girls in India with knowledge and choices related to SRH. This journey toward development and launch of a novel digital product, over a five year period from 2018- 2022, is marked by complex navigation of multidisciplinary contexts, digital native learning paradigms, behaviour change frameworks, and leadership practices, through challenges, and innovations, particularly under the leadership of a women-led entity. The impact of the COVID-19 pandemic added an additional layer of external uncertainty, necessitating an examination of adaptive leadership practices and strategies during tumultuous times.

Furthermore, the dichotomy between product development and conventional project management practices in health intervention programs requires a meticulous exploration to understand their intersectionality and distinct nuances in the context of developing mobile apps for reproductive health.

1.3 Purpose of Research

This thesis aims to fill the gap in the existing literature by providing profound insights into the interplay between multidisciplinary frameworks, leadership practices, behaviour change, and game-based learning paradigms, within the realm of developing a digital product for social impact. By addressing these research questions, this study aims to unravel the intricate tapestry of multidisciplinary challenges and triumphs experienced by HDI on their journey with Go Nisha Go, providing insights that could pave the way for future innovations aimed at advancing reproductive health outcomes through digital solutions.

1.4 Significance of the Study

The findings from this study will elucidate the strategies developed, challenges faced, and successes achieved in developing a digital innovation for social impact, through the mobile app, Go Nisha Go, serving as a learning repository for academics, practitioners, and organisations aiming to venture into the domain of digital innovations for social impact. Additionally, the study outlines the leadership practices including risk taking and organization culture in a women-led organisation during the development of the digital innovation including during unprecedented times like a pandemic. The case study, directly contributes to the United Nation (UN) Sustainable Development Goal (SDG) 3, which focuses on ensuring healthy lives and promoting well-being at all ages, specifically targeting SDG 3.7 on universal access to sexual and reproductive health-care services. By improving reproductive health education among adolescent girls, this innovation also indirectly supports SDG 5, which aims to achieve gender equality and empower all women and girls. The study showcases how digital innovations can be a powerful tool in advancing education, health, and gender equality on a global scale. The success of "Go Nisha Go" underscores the potential for high social returns on investments in technology-driven solutions. It encourages impact investors to consider funding projects that

leverage digital innovation for social impact, highlighting the importance of supporting initiatives that combine technological advancement with agile leadership and a deep understanding of the target community's needs.

1.5 Research Questions

Given HDI is the primary unit of analysis, and focusing on the intricate balance of new product development, leadership practices, and social impact within a milieu of multidisciplinary frameworks, the following research questions/objectives emerge:

1.5.1. Leadership Practices - How did leadership practices at HDI contribute to developing the impactful digital innovation, Go Nisha Go (GNG)?

A. To identify the outcome expectations of the stakeholder regarding the innovation, along with the level of perceived fulfilment of these expectations.
B. To understand the role of leadership practices such as decision-making processes, organisational culture, risk-taking, and leadership/work styles within HDI in guiding the development of GNG.

1.5.2. Product Development vs Project Management - How were product development outcomes aligned with project management goals at HDI during the development of GNG?

A. To draw insights about the timeliness, quality, and integration of multidisciplinary frameworks of the project for achieving the intended impact of GNG.
B. To draw insights about the perceived innovativeness and potential of GNG.
C. To investigate how the project management goals and product development outcomes for Go Nisha Go aligned or diverged.

1.5.3. Challenges and Learnings - What challenges were encountered and how were they navigated by HDI to create an impactful digital product for reproductive health and inform future innovation efforts in this space?

A. To explore the challenges encountered in creating a cohesive and impactful digital product.

B. To understand how HDI adapted its strategies, frameworks, and practices in response to challenges they faced and the key learning from them.

C. To inform future endeavours in digital innovations for reproductive health.

CHAPTER II:
REVIEW OF LITERATURE

This chapter on the review of literature has ten sections. The first section (Section 2.1) provides a much needed background that will emerge as the problem statement for this research study. The unmet reproductive health needs and vulnerabilities of adolescent girls are described, followed by exploring the digital landscape in Section 2.2, including a market analysis for improving access and availability of reproductive health information, products, and services. In Section 2.3, we dive into theoretical frameworks that form the foundation for behavioural change frameworks and those for game-based learning and gamification before scanning a range of product development frameworks in Section 2.4 that will help us to understand which product development framework would likely fit an innovation like a mobile app in the social impact space. Section 2.5 describes a few traditional and contemporary leadership frameworks that will help in attributing the leadership practices and values endorsed in the firm's culture. In Section 2.6, this literature survey captures the theoretical frameworks for measuring impact that serve as a foundation to understanding the complexities of going beyond a digital product development framework, when the outcomes to be measured have to account for sustainable impact beyond the short term product-related metrics of heuristics: here the concepts of logical framework and theory of change are also described. In Section 2.7, the general strategies of assessing outcomes in the digital sphere is discussed.

Understanding the interplay of multidisciplinary frameworks is outlined in Section 2.8 with examples across various domains to facilitate a better understanding of how they are applicable in this case study. Finally, Section 2.9 draws upon the requisites of understanding the complexities of digital applications for finding solutions that are at the convergence of sensitive information that will impact social norms and produce an innovation within a tight time frame and a tighter budget. Section 2.10 is a summary of this chapter.

2.1 Unmet Reproductive Health Needs in India

2.1.1 The Landscape of Reproductive Health and Unmet Needs in India

"Adolescence" is a formative phase of life between childhood and adulthood, from ages 10 to 19 evolving dynamically and informed through physiologic, psychosocial, temporal, and cultural lenses. Steinberg (2014) has described adolescence as a critical developmental period between the onset of puberty and the establishment of social independence. In addition to the onset of accelerated physical and sexual maturation, there is an increasing scope of emotions throughout adolescence related to progressive cognitive development and cumulative life experience (Rosenblum and Lewis, 2003).

India has one of the largest adolescent populations (253 million) in the world (UNICEF, 2021) representing a demographic challenge and an opportunity for its fast-growing economy. Gendered expectations for adolescent girls remain key barriers to their health, education, and labour force participation. Studies show that 27% of girls are married before the legal age of 18 and 8% of girls aged 15-19 years have begun childbearing (NFHS, 2016). Unplanned pregnancies and health issues can disrupt their educational and career aspirations. Experts like Bhanot (2017) argue that family planning empowers a woman not at only at the individual level, but also her family as it means making choices like pursuing higher education, financial independence, and a career, or building household savings, educating her children, and should be seen as an effective strategy in the fight against poverty to help countries develop socially and economically. Reproductive health programs play a pivotal role in promoting maternal and child health globally, including issues such as adolescent reproductive health, family planning, and gender equity in healthcare (WHO, 2019). These programs aim to improve access to family planning services, ensure safe pregnancies, and reduce maternal and infant mortality rates. They often align with international and national initiatives such as the Sustainable Development Goals (SDGs) and government-sponsored programs. Key objectives include promoting reproductive health education, delaying pregnancy, enhancing access to contraceptives, providing antenatal and postnatal care, and reducing infections such as STIs and HIV/AIDS.

Several programs within health systems include improved access to SRH services, but remain accessible only to older adolescents (Government of India, Ministry of Health and Family Welfare, 2015). SRH services generally cover nine topic areas: (i) contraception/pregnancy prevention, (ii) HIV/AIDS, (iii) sexually transmitted infections (STIs), (iv) abortion, (v) antenatal care/ delivery/postnatal care, (vi) reproductive tract infections, (vii) infertility, (viii)

sexuality, and (ix) partner violence (including violence against women) and related practices (e.g., female genital mutilation) (UNFPA, 2011).

The lack of comprehensive sex education is a critical barrier for adolescents to be equipped with age-appropriate and scientific reproductive health information (Kirby, 2008). Age-appropriate and evidence-based education on topics like menstruation, contraception, STIs, and pregnancy prevention can be an early intervention to prevent or address issues such as infection prevention, unintended pregnancies, or menstrual health problems before they become more severe. There is compelling evidence that comprehensive sexual education in school leads to improved HIV/SRH knowledge, increased condom use, reduction of number of sexual partners, increased self-efficacy against STIs, more favourable attitudes toward safer sex, and delayed sexual debut (Haberland, 2015).

Patton et al., (2016) asserted that the development of future SRH can be influenced by constructing healthy relationships and gaining appropriate knowledge during the adolescent period because puberty, body image, sexual identity, and intimate partnerships are part of normative adolescent development.

Miller (2014) pinpointed other barriers to SRH services among adolescents, including issues related to confidentiality, stigma, embarrassment, and fear. Furthermore, structural hurdles such as expenses, accessibility, transportation, and limited appointment availability can further hinder adolescents' access to services (Carroll. et al, 2012). Johnson (2015) elaborated on the frequency that adolescents reported on unfriendly or judgmental interactions with healthcare providers. Fuentes (2018) confirmed earlier studies (Fox, 2010) that a lack of trust in health care providers was a primary barrier stated by adolescents as reasons for not seeking sexual health. Similarly, Banerjee et al., (2015) noted that young women in India experience considerable challenges in accessing and acquiring the necessary information pertaining to development of their awareness on SRH issues. With about 253 million adolescents living in India, the population experiences increased rates of early marriages and pregnancies, which ultimately affect the health and wellbeing of the child and mother (Siddiqui and Kataria, 2020). Feroz et al., (2021) also argue that most adolescents experience limited access to sexual and reproductive health information due to awareness complexities, stigmatisation, laws, and regulations inhibiting their access to contraceptives and abortion services, and the prevalent judgement from

social and healthcare professionals. Kuortti and Lindfors (2014) have acknowledged that having a partner that is supportive and avoids pressure for sex encourages sexual agency.

Data from the hallmark UDAYA study in India highlighted that Indian unmarried adolescents demand the appropriate knowledge to promote safer sexual behaviour and lead a responsible and healthy lifestyle (Muhammad et al., 2021). However, adolescents' SRH outcomes are influenced by a complex interplay of factors operating at various levels. These young individuals make decisions about their behaviours based on their knowledge, beliefs, and abilities, all within the context of their relationships, families, communities, and economic circumstances (Chandramouli, 2016). Prevailing social norms, traditions, and legal frameworks can either facilitate or hinder their choices, often leaning toward the latter.

While there are efforts in place to make facility-based services and health providers 'adolescent or youth-responsive,' there is a need to strengthen the enabling environment for young adolescents to actually seek care (Svanemyr, 2015).This includes leveraging channels beyond traditional facilities to provide high-quality sexual and reproductive health (SRH) content and information about available services to young people.

Notably, many strategies and creative methods have been employed through mass media to engage and educate youth on a wide array of sexual and reproductive health and rights issues (Adamchak, 2007; Gonsalves, L'Engle and Tamrat, 2017; Krishna, Boren and Balas, 2009). The widespread adoption of mobile technology, particularly among young people, with nearly one-third of the approximately six billion global mobile phone subscribers being under 30, provides an additional avenue to reach this demographic. With the ubiquity of mobile phones, there is an opportunity to deliver personalised sexual and reproductive health content discreetly, free from stigma or judgement, targeting adolescents directly through a direct-to-consumer (DTC) platform and addressing the various challenges presented above.

The development of a digital game-based approach for improving SRH outcomes is a novel idea that this case study aims to explore and discuss through a dissertation.

2.1.2 Analysis of Current Market Trends and Existing Products Aimed at Improving Adolescent Health in India

India, with a significant proportion of its population in the adolescent age group, presents a diverse and dynamic market for products aimed at improving adolescent health. Various trends and products are emerging in this sector, reflecting the socio-cultural and economic fabric of the country. A quick capture of current market trends and existing products in the space of improving adolescent health in India is listed below:

A. Market Trends

a. Growing Awareness and Holistic Approach**:** There is an increasing awareness about adolescent health issues, especially focusing on nutrition (Salam et al., 2016a) , mental health (Rajkumar et al., 2022), and reproductive health (Salam et.al., 2016b), spurred by governmental and non-governmental initiatives. A holistic approach, considering physical, emotional, and mental health, is gaining momentum, with reproductive health products and services aiming at comprehensive well-being (Muttreja and Singh, 2021)

b. Technological Integration**:** The incorporation of technology, especially mobile apps and online platforms, is prevalent to provide adolescents with accessible and confidential health information and support (USAID b, no date)

c. Collaboration and Partnerships: Collaborations between NGOs, governmental bodies, and private entities are seen as a method to reach a wider audience and leverage mutual competencies (Barua et al., 2020).

d. Localised Content: The development of content in local languages and contextualising information to suit varied cultural norms is a prominent trend (USAID b, no date).

B. Existing Products

a. Health Apps and Platforms: Several mobile apps and online platforms are available that provide information, consultation, and support on various health issues, including reproductive health, nutrition, and mental health. For instance, ‘ThatMate’ is an application that helps adolescents make informed decisions about their body, preferences, mental health, and social life (Jadhav, no date). Using Artificial Intelligence, the not-for-profit Girl Effect created a “digital big sister” called BolBehen to help adolescent girls and young women with concerns regarding their general health and sexual health (Girl Effect, 2022). Similarly, chatbots like

SnehAI and Raaji serve similar purposes and aim to talk to girls about sexual harassment and taboo reproductive topics, respectively. More recently, a chatbot named ‘Wulu’ was developed by WeUnlearn, led by young entrepreneurs to engage both boys and girls in conversations around gender stereotypes and help them navigate gender norms in their lives (Agarwal et al., 2021).

b. Educational Initiatives: Numerous educational programs and workshops focus on enhancing awareness and knowledge about health and well-being among adolescents. In 2014, the Ministry of Health and Family Welfare, launched a health program called Rashtriya Kishori Swasthya Karyakram (RKSK) for adolescents, which would target their nutrition, reproductive health, and substance abuse, among other issues. They envisioned enabling all adolescents to realise their full potential by making informed decisions related to their health and well-being (RKSK Strategy Handbook, 2014). A non-profit organisation, Breakthrough, also launched an educational initiative in partnership with Ikea Foundation for empowering adolescents on critical issues like early marriage and pregnancy with a focus on increasing their school retention and reducing child marriage in Godda and Jamtara districts of Jharkhand, India. (Breakthrough, 2014).

c. Counselling and Support Services**:** Various NGOs and organisations offer counselling services and support groups addressing mental health, substance abuse, and reproductive health. Uninhibited is an organisation that seeks to de-stigmatize menstrual and SRH at a household, community, and ecosystem level (Uninhibited, no date). Similarly, *TeenBook* is a digital safe space and resource hub for adolescents to learn essential life skills via e-zones, workshops, podcasts, and counselling services (TeenBook, 2022).

d. Nutritional Supplements and Products**:** The market sees a variety of nutritional supplements and products targeted at addressing nutritional deficiencies prevalent among adolescents in India. The Ministry of Health and Family Welfare, Government of India, launched the Weekly Iron and Folic Acid Supplementation (WIFS) program in 2012 to meet the challenge of high prevalence of anaemia in adolescents. WIFS is an evidence-based response to anaemia and includes supervised ingestion of the supplements, along with a communication program to increase awareness about anaemia (Spring, 2016). Along similar lines, the National Iron Plus

Initiative (NIPI) also targeted adolescents among other age groups to tackle iron and folic acid based nutritional deficiencies in the population (Kapil, Kapil and Gupta, 2019).

e. Reproductive Health Products: Several products, including sanitary products and contraceptives, are aimed at improving reproductive health and hygiene. *Boondh* and *Saral* Pads are among organisations that have initiatives in place to provide access to safe menstrual products like pads and menstrual cups to women across under-resourced parts of the country. A UNICEF-supported product, *OKY*, is a gamified app that helps improve menstrual health and hygiene management for young women and girls (UNICEF, 2020). BBC Media Action (no date) has many mHealth tools, including multimedia campaigns and audio-based educational and communication interventions for frontline workers called 'Mobile Kunji' have been evaluated with positive outcomes. They also produced other audio tools including Kilkari, a weekly stage-appropriate voice message delivered directly to families' mobile phones, and Mobile Academy, a mobile-based audio training course for Frontline Health Workers (FLW), which have also been well received, but no outcome evaluation results have been published.

2.2 New Platforms and the Digital Landscape

Brayboy (2018) reported that while sexual health education programs can provide information and support to improve knowledge, attitudes, and behaviours related to sexual and reproductive health, adolescents prioritise confidentiality and accessibility over accurate medical diagnosis or treatment, and are unlikely to be present in any clinical setting that frequently demands parental involvement. Since the late 90's and early 2000, new platforms have arisen that have been shown to be efficient and accurate modes of information.

Programs using mobile phones have been used in many areas of health care and health promotion globally (Krishna, Boren and Balas, 2009). Reviews of studies (Gurman, Rubin and Roess, 2007; Head et al., 2017) using mobile phones to promote behaviour change have demonstrated mixed to positive effects of such programs. Text messaging programs are the most common approach to behaviour change using mobile technologies, as texting is one of the most frequent forms of mobile phone communication (Pew, 2011), and is available on every mobile phone regardless of phone model or mobile network provider, with minimal costs per message.

Digital interventions targeting a range of populations and SRH topics across different cultural contexts have been shown to be acceptable to the end user and feasible to implement (French et al., 2016; Smith et al., 2017). Digital interventions can also be designed to be accessible across socioeconomic groups and to those at high risk (Free et al., 2016). Levine et al. (2008) demonstrated how health technology tools are acceptable to teens and may be the preferred mode of sexual health education, and also showed that text messaging programs for reproductive health can lead to better sexual health and increased use of health services.

Brayboy (2018) reiterated that technology-based interventions can not only reach larger audiences at lower costs, but also offer increased privacy for teens, and provide flexibility in tailoring messages toward specific populations leading to more effective impacts as compared to more traditional, formal sexual education approaches. Bailey et al. (2015) showed that improvements in knowledge and contraceptives or health-seeking behaviour can be demonstrated. However, not all studies show benefits, for example, a digital SRH intervention in Bangladesh showed no effect on contraceptive use (Bacchus et al., 2019).

Barua et al., (2020) presented a case for increasing demand for digital technologies to provide reliable SRH information to India's rising demographic of adolescents. Driven by availability of cheap mobile data, India’s smartphone market is projected to grow rapidly until 2025 where mobile phone permeability levels are expected to cross one billion users by 2023 (Hindu Business Line, 2022).

There have been efforts to expand mobile health (mHealth) centric communication in India through direct text messages and phone calls (Banerjee, 2013). An emerging body of literature (Modi, 2015; Diamond, 2020) suggests a paradigm shift in the information-seeking behaviour of adolescents where they are likely to receive SRH information from traditional mass media such as print, television, and radio, to social media platforms such as Facebook and WhatsApp. Saha and colleagues studied data in 2022 from a previously collected dataset of unmarried adolescents (known as the UDAYA study implemented by the Population Council and funded by the Bill and Melinda Gates Foundation/BMGF) to provide a comprehensive understanding of the multiple sociodemographic factors linked with exposure to social media. It showed that an increase in exposure to social media connectivity is associated with the enhancement of knowledge of SRH among unmarried adolescents.

King et al., (2014) reported mHealth applications to be an effective conduit for the delivery of health interventions. Within the context of mHealth, particularly within low and middle-income (LMIC) contexts, the concept of "serious games" has emerged as a valuable yet relatively underexplored avenue within the realm of gaming (Susi, 2020). Notably, a systematic scoping review delved into the landscape of games designed to enhance adolescent health outcomes (Andrew et al., 2023). This review primarily focused on domains such as lifestyle, wellness, and nutrition, revealing a substantial body of evidence. This suggests that professionally crafted serious games, fortified with robust theoretical foundations and customised to align with curricular objectives, exhibit the potential to augment knowledge acquisition and influence attitudes. Nuwamanya et al., (2018) described the application of mobile applications to improve and promote SRH education among youth in Kenya. Closer to India, in Nepal, a pilot for a set of four mobile games called "*Nari Paila*" (Women First), were adapted from Nepalese community games called Pragati, to integrate information on menstrual health, fertility, and family planning into a free Android app (Georgetown University, 2019).

A growing facet of mHealth applications, which has gained prominence in recent times for enhancing self-management behaviours, is incorporation of gamification. Badges, leaderboards, points and levels, challenges and quests, as well as social engagement loops and onboarding are among the most commonly implemented mechanics of gamification, as outlined by Zichermann and Cunningham (2011).

Creating a mobile game app draws its development from game design principles; however, game design is not gamification or simply adding levels, trophies, or badges in a product. Incorporating game design principles in product development is a complex process that has foundations in human motivation (Ryan, Rigby, and Przybylski 2006), human centric design (Deterding et al., 2011), game mechanics (Hunicke et al., 2004) and the ability to stay relevant to the end user (Sawyer and Hall, 2003).

To the best of the researcher's knowledge (and based on literature), the mobile game, Go Nisha Go, launched in India in June 2022, and produced by Howard Delafield International is the first of its kind among serious games for adolescents to enhance reproductive health outcomes in India.

The Direct-to-Consumer (DTC) model refers to a business strategy where companies sell their products or services directly to the end users, bypassing intermediaries like wholesalers, retailers, or middlemen. This approach often leverages online channels and digital marketing strategies, allowing businesses to have full control over their brand image, customer experience, and relationships (McKee et al., 2023)

2.3 Diving into Multidisciplinary Theoretical Frameworks

This section provides a comprehensive overview of the frameworks for behaviour change, and those used in game-based learning and digital native learning paradigms. The foundations of understanding digital engagement in individuals have supported the evolution of digital media and technologies, which are integral components of their life and learning experiences. This section elucidates their theoretical underpinnings, applications, evolution, and limitations, thereby offering a holistic understanding of the multifaceted nature of game-based learning in diverse contexts.

2.3.1 Frameworks for Behaviour Change and Reproductive Health

It was Bandura (1986) who first posited the Social Cognitive Theory that learning occurs in a social context with a dynamic and reciprocal interaction of the person, environment, and behaviour. Early interventions focused on leveraging peers and community leaders to educate adolescents about reproductive health, based on the belief that adolescents are more likely to mimic behaviours modelled by similar and credible figures (Bandura, 1986). The Health Belief Model (Rosenstock, Strecher and Becker, 1988) is another theoretical framework to study and understand health behaviours and their underlying beliefs and attitudes. It has been instrumental in developing interventions aimed at altering individual health behaviours by modifying their perceptions of susceptibility and severity, elucidating the benefits of the behaviour change, and reducing perceived barriers, all underpinned by enhancing self-efficacy. The advent of peer education models in the wake of the HIV/AIDs epidemic in the late 1900s and early 2000s saw adolescents educating their peers about sexual and reproductive health internationally (Dilorio et al., 2001; Kirby, 2001) and in India (Siddiqui and Kataria, 2021). Specifically, Carvajal et al., (1999) recognized the influence of peer norms on adolescents' sexual initiation and contraceptive

use. In the early 2000s, Theory-Based Structured Programs were thought to be more effective in inducing positive changes in attitudes, self-efficacy, and behavioural intentions related to reproductive health among adolescents (Smith and Shu, 2000; Caron et al., 1998).

2.3.2. Prensky's Digital Native Theory

Figure 2.1. Comic depiction of Digital Natives vs. Digital Immigrants (Source: Madibi, 2017).

The technological advancements in the healthcare sector, accentuated by the accelerated development of digital solutions, have led to an innovative intersection of health and technology. Marc Prensky's Digital Native Theory is a seminal work that provides an intellectual structure to understand the inherent adaptability and predisposition of modern generations to digital mediums (Prensky, 2001). This theory underscores the divide between individuals born before the advent of digital technology, termed as 'Digital Immigrants,' and those born during or after, known as 'Digital Natives, who are characterised by their intuitive understanding of digital mediums. Prensky posited that the educational realms need to acknowledge and leverage this innate predisposition towards technology to facilitate learning experiences that are engaging, relevant, and intuitive.

Building on Prensky's theory, the development of interactive, persona-centric games becomes crucial in reproductive health. These games, designed with a profound understanding of the target demographic's needs, preferences, and technological interactions, offer learning experiences that are contextually relevant and engaging.

2.3.3. Integrating behavioural Change Theories into Games

In the early rudimentary computer games era, principles from cognitive-behavioural therapy (Beck, 1979) were influential in computer game design. Around the same time, the influence of Bandura's Social Cognitive Theory was evident, positing that players learn by observing in-game characters, imitating positive behaviours, and thus achieving desired outcomes (Bandura, 1986).

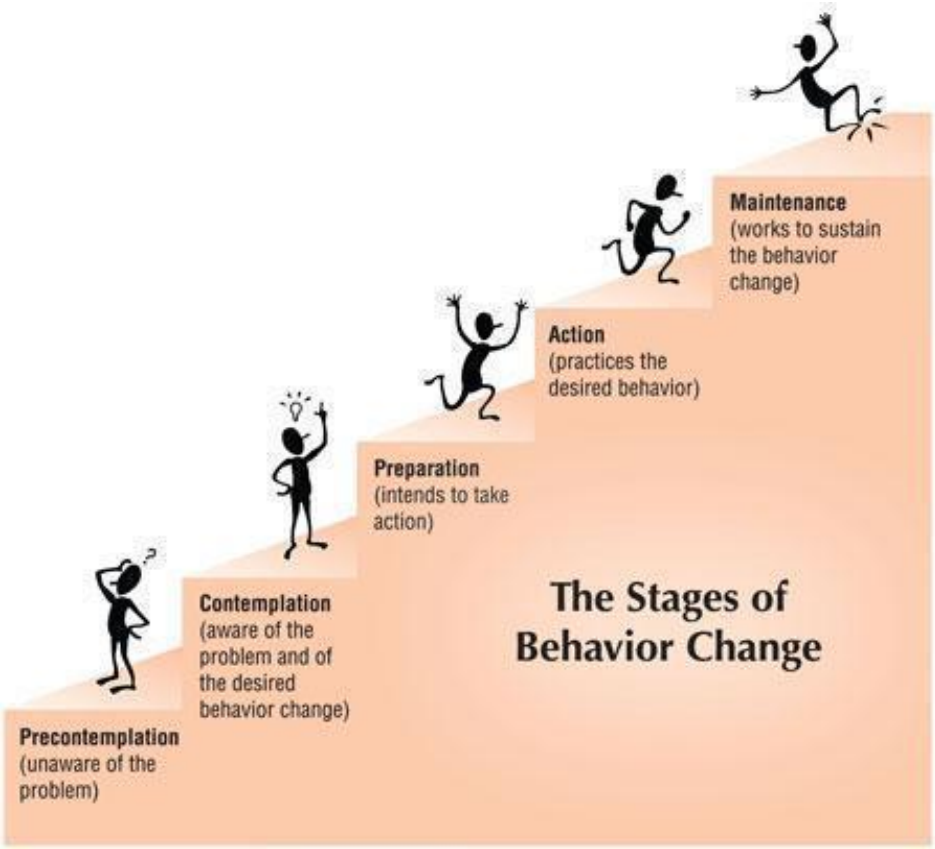


Figure 2.2. The Stages of Behaviour Change (Source: Wrinkler, 2019).

As gaming advanced in the 1990s with more realistic graphics and interactivity, game stories started incorporating more complex models of behaviour change. For example, some games guided players through stages of change, reflecting the Transtheoretical Model (Prochaska and DiClemente, 1983). This showed how games were adopting evidence-based behaviour change techniques. To achieve behaviour change an individual moves through a series of six

stages. In each stage, various change processes and intervention strategies are applied until the person is capable of reaching the last stage (Edberg, 2015). Simultaneously, socio-theoretical frameworks of communication started influencing multiplayer and community-driven games, emphasising social interactions and mutual influence among players. With the dawn of mobile gaming in the early 2000s, health-centric apps tapped into various behaviour change frameworks such as the Theory of Planned Behaviour (Ajzen, 1991) that influenced games geared towards health and well-being. Moreover, Fogg's Behaviour Model began to underpin many games of this era, emphasising the convergence of motivation, ability, and triggers to drive desired behaviours.

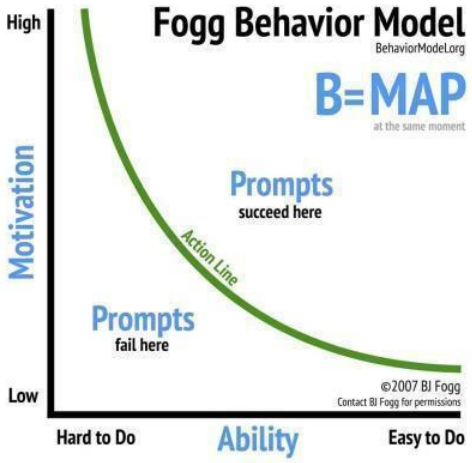


Figure 2.3. Fogg's Behaviour Model (Source: Stanford Behaviour Design Lab, no date)

In the last decade, the digital gaming arena, invigorated by virtual reality (VR) and augmented reality (AR), has reached unprecedented levels of immersion. Games now are heavily influenced by user-centred design principles, intertwined with behaviour change objectives (Norman and Draper, 1986). These experiences, drawing on Bandura's ideas, provided immersive environments where players could witness, learn, and imitate behaviours in realistic, yet controlled, settings.

2.3.4 Serious Games and Behaviour Change Frameworks

Serious games are a subset of digital games designed with educational or health-related objectives. They often benefit from instructional design principles, such as scaffolding and formative assessment (Gee, 2007). Behaviour change frameworks have long played a pivotal role informing the mechanics and narratives of serious games. Anchored in foundational psychological theories, these frameworks strategically guide player behaviours with the aim of achieving meaningful real-world transformations.

2.3.5 Theoretical Frameworks and Efficacy of Game-Based Learning

Game-based learning (GBL) utilises the interactive and engaging nature of games to facilitate learning, cognitive development, and behaviour modification. Among the very first frameworks to understand, design, and assess game-based learning environments was the Theory of Intrinsically Motivating Instruction, which posits that factors like challenge, fantasy, and curiosity are essential elements in designing games that are intrinsically motivating (Malone, 1981). The application of this theory in GBL revolves around creating games that incite interest, elicit engagement, and encourage prolonged interaction, thereby fostering a conducive learning environment. However, the broad scope of intrinsic motivation elements in this theory necessitates extensive customization to adapt to diverse learner needs and contexts. In the early 2000s, James Paul Gee's 36 learning principles outlined the components of effective learning environments within the context of video games (Gee, 2003). These principles emphasise identity, interaction, production, risk-taking, customization, agency, and well-ordered problems, offering insights into the creation of meaningful, learner-centric game-based experiences.

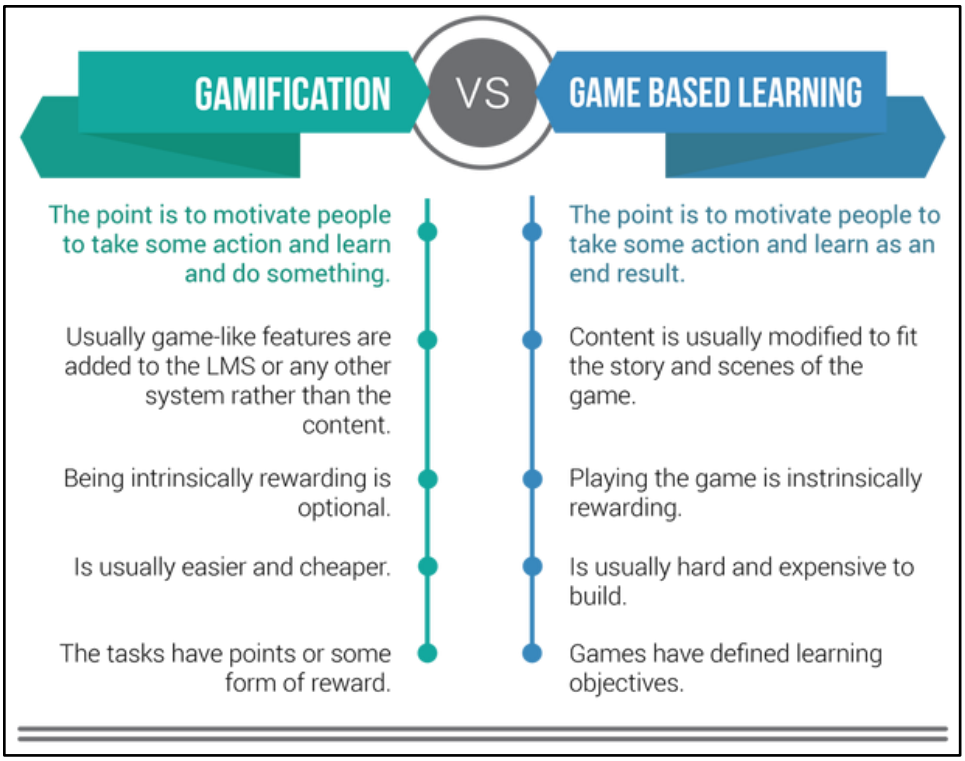


Figure 2.4. Gamification vs. Game Based Learning (Source: How Gamification Works, no date)

However, the multifaceted nature of these principles requires meticulous attention to design, integration, and assessment to ensure optimal learning outcomes. Concomitantly, Kiili (2005) proposed the Experiential Gaming Model focusing on the experiential learning cycle within game-based learning environments. This model emphasises the importance of challenge, skills, immersion, and flow in creating effective learning experiences within games. The model has been instrumental in designing games that balance challenge and skill, promoting a state of flow, and optimising learning.

Over the years, GBL frameworks have been applied across various disciplines, including health education, cognitive science, and behavioural studies. These frameworks have evolved to incorporate advancements in technology, pedagogical insights, and learner feedback, reflecting the dynamic interplay between game design, learning objectives, and user experience. The interactive and immersive nature of games can create experiential learning environments that support the acquisition and application of knowledge and skills (Squire, 2006). For example, games can simulate real-life situations and provide immediate feedback, allowing individuals to learn through experience, reflection, and practice. Several studies have highlighted the potential

of GBL in improving health-related behaviours, outcomes, and attitudes (Baranowski et al., 2008), underscoring its relevance in developing interventions aimed at advancing health and well-being.

While GBL frameworks provide invaluable insights into the design and assessment of game-based learning environments, the inherent variability in learner preferences, learning contexts, and educational objectives necessitates continuous adaptation and customization of these frameworks.

2.3.6 Gamification and Mobile Applications

Gamification frameworks have gained popularity in recent years as they integrate game-like elements into non-game environments, optimising user engagement and facilitating enhanced learning experiences. A literature survey to explore the state of the art in integrating gamification approaches into mobile applications on gamification design elements, psychological outcomes, behavioural outcomes, research areas, and the effect of gamification revealed that rewards are the most commonly used design element of gamification in mobile apps (Hamari, Koivisto, and Sarsa, 2014). Gamification was found to have a potential impact on psychology and behaviour, providing positive benefits. Cognitive theory and situated learning theory are among the relevant theories that support the game-based learning approach. While there is a lack of research into the most widely used gamification design elements and their influence in mobile apps, gamification has shown promise in various fields such as e-health, human resource management, business development, and e-learning. It has become a new trend in education, capturing students' attention and ensuring their full involvement.

2.3.7 Integrating behavioural Science in Product Development

Integrating behavioural science in digital product development is pivotal for creating solutions that align with user behaviour and needs (Michie, Stralen and West, 2011). behavioural science examines how individuals make decisions and form habits, which can inform the design and implementation of products aimed at behaviour change. It emphasises the importance of understanding the psychological and social factors that influence individual actions and provides insights into how products can be designed to foster positive behavioural outcomes (Dolan et al., 2012). For instance, the integration of behavioural science can facilitate the development of user-

centred designs, personalised interventions, and effective incentive structures, enhancing the impact and adoption of the developed products (Thaler and Sunstein, 2008).

2.3.8 Interactivity and Storytelling in Digital Learning

Interactivity and storytelling are integral components of digital learning. They enhance the learning experience by engaging users and facilitating the assimilation of information (Dede, 2009). Interactivity enables users to actively participate in the learning process, adapting the content and pace according to their needs and preferences (Mayer, 2005). Meanwhile, storytelling provides a narrative framework that contextualises information, making it more relatable and memorable (Green and Brock, 2000). The combination of interactivity and storytelling in digital learning can create rich, immersive experiences that cater to diverse learning styles and needs, fostering a deeper understanding and application of learned concepts (Rosenberg, 2006).

2.3.9 Assimilation of Personas, Role Playing Elements and Simulation in Gaming

The roots of experiential learning in product design can be traced back to the mid-70s. Kolb and Fry (1975) highlighted the importance of creating simulations that provide iterative experiences. They proposed a cycle where users constantly transition between experiencing, reflecting, conceptualising, and experimenting, guiding developers to prioritise immersive and cyclic user experiences.

The late '80s also saw the introduction of Activity Theory as a key driver for game mechanism enhancement by Engeström (1987), who postulated that understanding activity systems can significantly improve game mechanics that align better with player motivations. Fisher (1987) introduced the Narrative Paradigm, positing that humans are inherently storytellers making sense of the world and their experiences through narratives. This perspective is critical when examining the rise and success of role-playing games (RPGs) during the 1980s. Fisher's idea pivots on two primary principles: narrative probability (whether a story feels coherent) and narrative fidelity (whether it feels truthful or corresponds to real-life experiences). The RPGs of the '80s, while operating within fantastical universes, often revolved around these principles. For instance, the Ultima Series, particularly "Ultima IV: Quest of the Avatar," not only had a coherent narrative but also challenged players to embody virtues in their journey, emphasising

narrative fidelity to human morals and ethics (Jenkins, 2004). This resonance between game and real-world ethics is a testament to Fisher's idea that we judge stories by how well they align with our lived experiences.

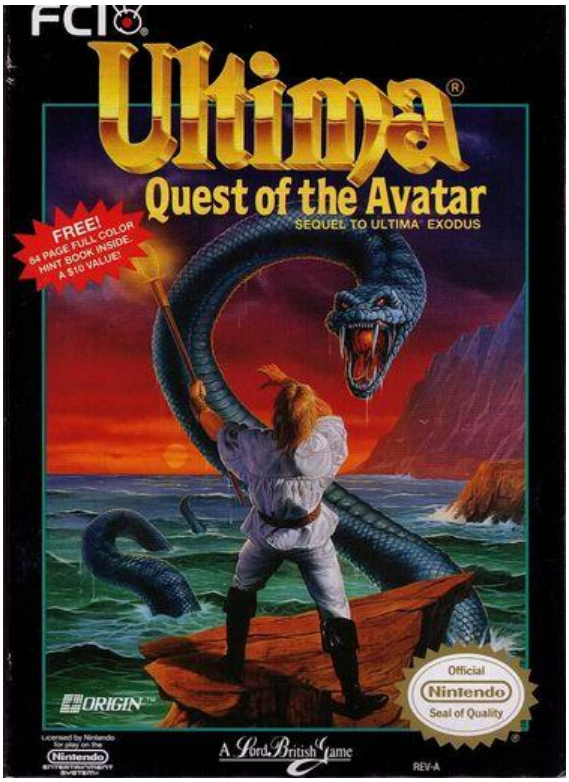


Figure 2.5. Ultima IV: Quest of Avatar Game (Source: IMDb, no date)

As we transitioned into the 90’s, the focus shifted from narrative experiences to those that were educational, instructive and reflective of real world systems. The Constructivist Learning theory (Duffy and Cunnigham, 1996) which posits that learning is an active process for learners to build their knowledge based on their experiences. This paradigm emphasises problem-solving and understanding, as opposed to rote learning. Translated into game design, this meant creating environments where players didn't just follow a story but actively engaged with the game's systems, made decisions, and learned from outcomes.

The nexus between real worlds and virtual worlds was explored by Turkle (1987) who suggested that players often perceive their in-game personas as extensions of their real-world selves. This permeates both RPGs and simulations, as seen with platforms like 'Second Life', where in-game choices often resonate with real-world identities.

By the late 90's, Bartle's (1996) foundational Taxonomy Model dissecting player motivations was instrumental for both RPG and simulation game developers. This model, was based on observing and analysing the behaviours of people playing together in a multi-user dungeon (MUD) game, distinguishing them into four different kinds of players based on their style :

- Killers: interfere with the functioning of the game world or the play experience of other players.
- Achievers: accumulate status tokens by beating the rules-based challenges of the game world.
- Explorers: discover the systems governing the operation of the game world.
- Socializers: form relationships with other players by telling stories within the game world.

Game experiences in titles like 'World of Warcraft' and 'The Sims' have been tailored to these identified archetypes.

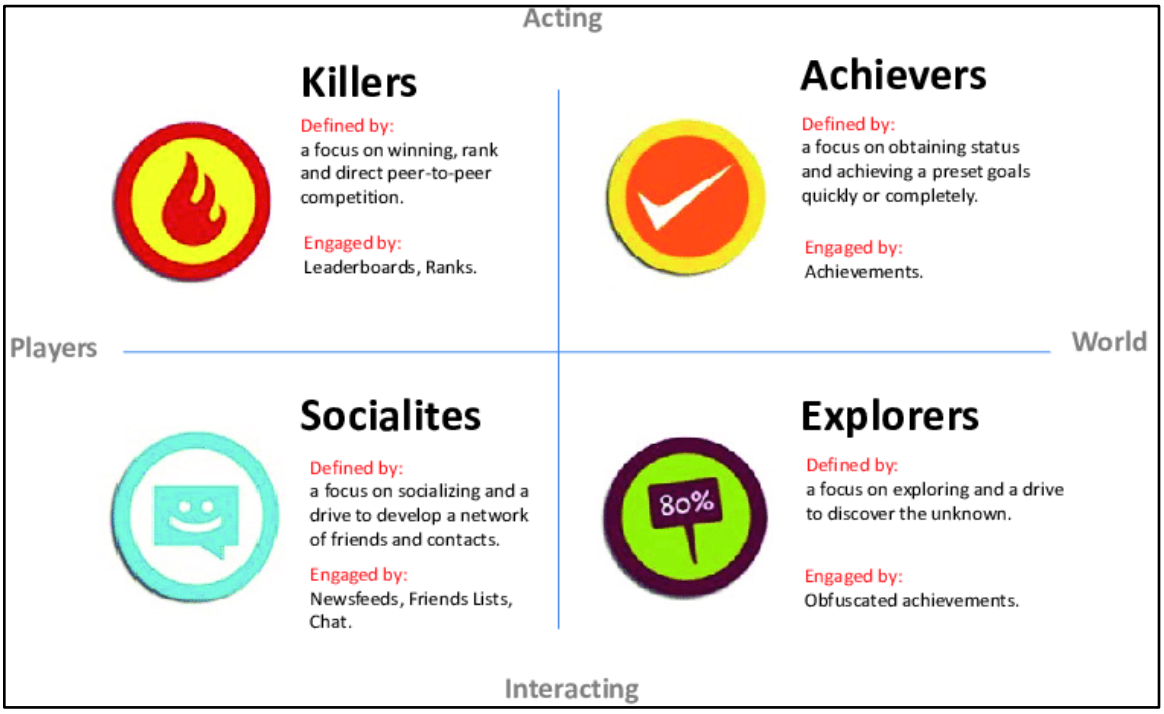


Figure 2.6. Bartle's Player Types (Source: Ērgle, 2016)

2.3.10 The Proteus Effect

The Proteus Effect shows that avatar characteristics alter user behaviour in virtual worlds (Yee and Bailenson, 2007). Named for the Greek god, Proteus, who could change appearances, this phenomenon reveals that changes to avatar-based self-representations transform the self (Yee, Bailenson and Ducheneau, 2009). Avatars impact thoughts, feelings, and actions in virtual environments by priming stereotypes (Sherrick, Hoewe, and Waddel, 2014). For example, taller avatars increase confidence (Yee and Bailenson, 2007), attractive ones promote friendliness (Messinger et al., 2008), and sexualized avatars lead to self-objectification (Fox, Bailenson, and Tricase, 2013). Users exhibit stereotypical behaviours and cognitions matching avatar appearances, often unconsciously (Sherrick, Hoewe, and Waddel, 2014).

The Proteus Effect causes people to adopt biases based on their virtual self-representation (Yee and Bailenson, 2007). Later research showed it extends to online games, where attractive and taller avatars outperform others (Yee, Bailenson and Ducheneau, 2009). Overall, the Proteus Effect reveals avatars' potential for behaviour change applications, as people infer their own traits from avatars (Bem, 1972). Users align actions with avatars by observing avatar behaviour (Yee and Bailenson, 2007).

2.4 Product Development Frameworks: Blueprint for Innovation

The mobile gaming industry has witnessed remarkable growth over the years, driven by advancements in technology and the increasing popularity of smartphones. Successful product development in this competitive sector necessitates the effective utilisation of theoretical frameworks. As this thesis will describe the multidisciplinary challenges of product development through a case study approach, this section explores five prominent theoretical frameworks relevant to the product development cycle of a mobile game app, from ideation to implementation to serve as a foundation for understanding the product development life cycle. For the purpose of the thesis, frameworks that have been examined include Stage-Gate (Stage-Gate™ is a registered trademark of Stage-Gate Inc.), Lean, Agile, Design Thinking, and Scrum.

A quick review of the origin of each framework and its evolution, their comparative advantages, limitations, and suitability for low-budget development are discussed, followed by examples of their adaptation in the industry.

2.4.1. Stage-Gate Framework

The Stage-Gate® Process (Cooper, 1990), sometimes called a Phase Gate Process, is a methodology where new product development is divided into the following stages (or phases) that resolve at major decision points (gates). The 'stages' correspond to the following:

a. Scoping: Preliminary assessment and research for new product.

b. Build Business Case: More detailed investigation, feasibility studies, and product development justification.

c. Development: The actual design and development phase, with prototypes and testing.

d. Testing and Validation: Pilot production and validation with external stakeholders.

e. Launch: Final production and commercial launch.

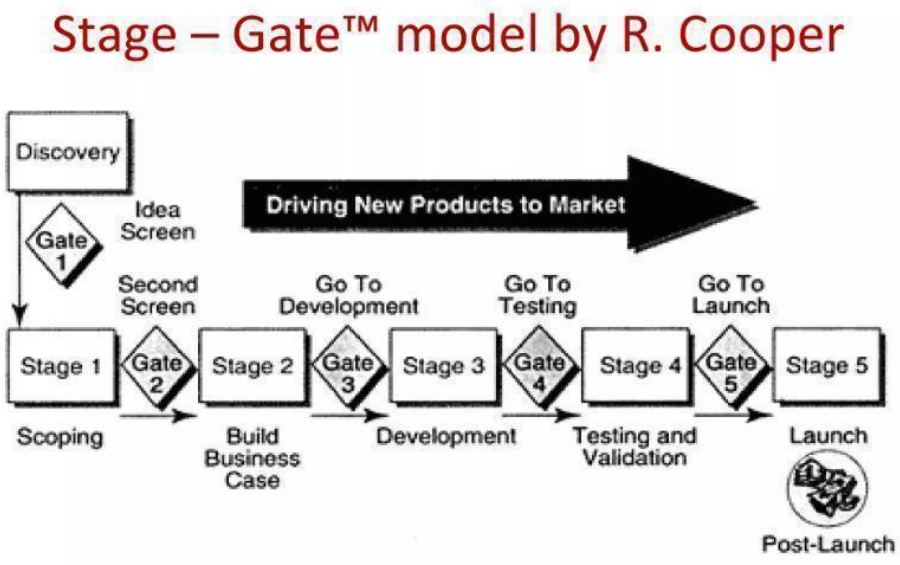


Figure 2.7. Stage Gate Model (Source: Edgett and Cooper, no date)

The Stage Gate process is a phased, sequential method to develop new products. Projects proceed through stages of ideation, business case development, prototype creation, validation, and launch. At each gate or milestone, the project is evaluated before moving to the next stage, ensuring quality and alignment with business goals.

There is a gate for each stage in which the decision-makers assess the quality of execution of the previous phase. After each of these phases, 'gatekeepers' (decision making personnel/product manager or senior managers, or members of a steering committee or other board) conduct a gate review where they confirm that the development team has met all of the goals of each stage/phase, assess the quality of the previous phase, and lead towards a 'gate' or output that could be any of the following (Cooper and Kleinschmidt, 1996):

A. Go: The project moves on to the next phase.
B. Kill: The project is judged unviable and is discontinued.
C. Hold: The project is suspended in the expectation that it will be revived later.
D. Recycle: The project needs fundamental revision, and then it will re-enter the Phase Gate Process.
E. Conditional go: The project enters the next phase, provided that certain specified criteria are met.

The Stage-Gate process offers a clear benefit enabling faster decision making at a team level. It provides opportunities for feedback, learning, and continuous improvement along with clear objectives, activities, and deliverables for each stage. This makes adjustments easier and product development more predictable, as it also allows companies to kill projects with uncertain returns or high risks. It forces teams to have a clear definition for the product and a strong business case that can be reviewed by an independent party of gatekeepers. Other advantages include a focus on quality with systemic reviews for each stage, reducing the time it takes to bring a product from concept to launch, as well as requiring inputs from various departments, encouraging cross-functional collaboration (Griffin, 1997). Apple's iPhone serves as an iconic example of the Stage Gate framework, as it conducted extensive research to validate the concept and understand user needs before committing to the development of the first iPhone (Vance and Schubert, 2007). Procter and Gamble, 3M, and Nestle are other companies that have utilised the framework to manage development projects efficiently (Cooper et al., 2002).

Although the Stage Gate framework is a critical starting point for mobile game app development, it may necessitate substantial initial investments in terms of research and validation, which can pose challenges for low-budget projects (Blank, 2013). Some argue that the Stage-Gate process is not agile as it is a sequential process that may struggle to respond to new information or new market conditions that crop up. However, Cooper himself recognized these challenges and discussed the possibility of integrating the more contemporary agile methods into the Stage Gate to create a hybrid model that combines the strengths of both approaches (Cooper, 2016). Today, the Stage Gate method includes digital tools and customization to align with modern product development needs (Cooper, 2019). Building a business case for game-changing novel innovations may prove hard to fit into the Stage Gate process because the market for innovation has not yet been cultivated or matured. Mullins (2002) argued that while formal processes have their place in corporate settings, they might not be well-suited for all types of projects. Concomitantly, novel innovations may require extended research and development times, and administrative and procedural demands at that time can strain limited resources and detract from the main focus of product development or service delivery.

2.4.2 Lean Framework

Originating in post-World War II Japan, the Lean framework emerged from Toyota engineers' endeavours to refine car production. Their innovative strategy birthed the Toyota Production System (TPS), emphasising waste reduction, incessant refinement, and enhanced customer value (Ohno, 2019).

These principles, initially tailored for manufacturing, experienced a metamorphosis when Eric Ries adapted them, formulating the "Lean Startup" methodology. Prioritising agility and continuous learning, Ries shifted the paradigm from exhaustive planning to swift, iterative development (Ries, 2011). However, the foundational intellect of the Lean Startup can be traced back to Ries' professor, Steve Blank. Blank had pioneered the Customer Development methodology, underscoring direct feedback from potential customers to validate product-related hypotheses (Blank, 2013).

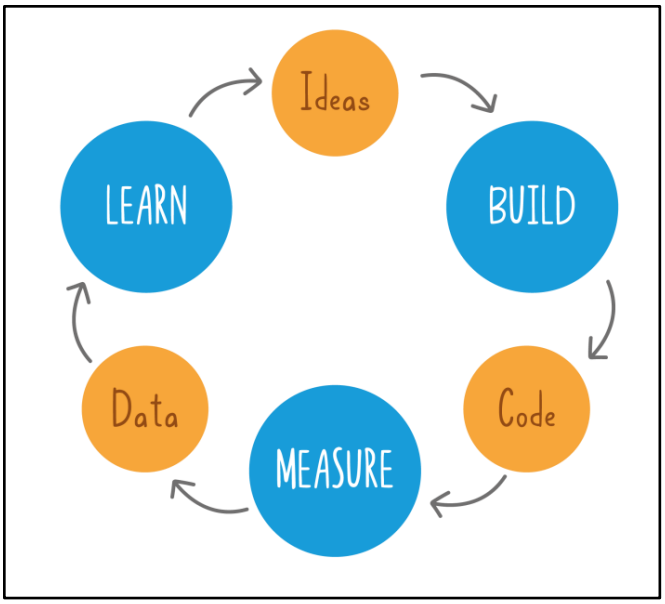


Figure 2.8. Learn, Build, Measure Feedback Loop (Source: Idei.club, no date)

Ries ingeniously integrated Blank's principles, coalescing them with revolutionary concepts like the Minimum Viable Product (MVP) and the Build-Measure-Learn feedback loop. The resultant Lean Startup methodology diverged from traditional business models; instead of rigid planning, it endorsed a dynamic, feedback-driven, iterative learning approach.

In essence, the Lean Startup equips entrepreneurs with a refined process to sculpt their offerings, imbibing core principles of waste elimination, relentless improvement, and direct customer engagement. This approach, particularly celebrated in sectors like gaming, accentuates rapid prototyping and agile adjustments based on genuine user feedback. Notably, the Lean Startup has been lauded for its cost-efficiency, especially apt for endeavours with budgetary constraints, ensuring data-driven decisions (Osterwalder and Pigneur, 2010). Yet, it's worth noting potential pitfalls: as Mauya (2012) highlighted, an overly simplified MVP might inadequately capture the envisioned final product, especially in intricate domains like complex game applications.

Blank proudly states that the "lean start-up," favours experimentation over planning, customer feedback over intuition, and iterative design over traditional "big design up front" development. Its concepts -such as "minimum viable product" and "pivoting"—have quickly taken root in the start-up world, and business schools are already adapting their curricula to teach them.

2.4.3 The Agile Framework: Origins, Evolution, and Impact on the Gaming Industry

The Agile Framework is celebrated for its collaborative, customer-feedback-driven, and iterative approach to software development, marking a significant shift from traditional methodologies. Agile's genesis dates back to the 1990s when prolonged software development cycles often resulted in obsolete products at the time of release (Potel, 1994). However, a watershed moment was in 2001, when 17 software developers, including luminaries like Kent Beck, Martin Fowler, and Jeff Sutherland, convened in Snowbird, Utah. This congregation led to the drafting of the Agile Manifesto, which underlined the framework's core principles (Beck et al., 2001). As Rigby, Sutherland, and Noble (2016) highlight, Agile's tenets have been widely adopted across different sectors over the past decade. Spotify and the Dutch banking giant, ING, embraced Agile methodologies to bring structural changes in their operations but remained aligned to the organisational needs with respect to customer-centric product delivery (Hinz, Lanz and Spann, 2019).

Agile's core strength lies in its adaptability and responsiveness, making it suitable for fast-paced game development. Built-in Agile elements like feedback loops, retrospectives, and daily stand-ups further bolster its resilience and adaptability. However, it requires experienced team members and is characterised by its flexibility, collaboration, and adaptive planning. It involves breaking down the development process into small, manageable increments referred to as "sprints." These iterative cycles allow for frequent reassessment and adaptation (Schwaber and Sutherland, 2017). Another adaptation has been Kanban which is rooted in continuous delivery and perpetual process enhancement, especially for contexts where priorities undergo frequent shifts. The SAFe (Scaled Agile Framework) is another adapted model within the Agile framework that is useful for larger establishments (Robertson and Breen, 2016).

The volatile nature of the gaming industry, with its swift technological evolutions and variable user tastes, found a fitting partner in Agile. Renowned gaming companies like Ubisoft have acknowledged how they iScrum, fostering enhanced inter-departmental collaboration and facilitating quicker, more effective feedback loops. Zynga’s social games like "FarmVille" and "CityVille," have rapid release cycles and frequent in-game updates that are consistent with

Agile methodologies. The development of games like "Fortnite" (Epic Games) often requires agility to handle frequent updates, seasonal changes, and dynamic in-game events.

Agile's transformative journey from a novel software development methodology to a universally applicable strategy underscores its versatility and efficacy, with its impact being particularly pronounced in the gaming sector. This aligns with Agile's emphasis on rapid iterations and prompt feedback assimilation to ensure rapid delivery of products continually aligning with gamer inclinations.

In the context of the research objectives to examine leadership practices that impacted the product development, the Agile Manifesto (Beck et al., 2001) provides guiding values that emphasise adaptability, collaboration, and customer-centricity, and serves as a useful reference point for examining leadership practices impacting product development in this case study. At the heart are its core values:

A. *Individuals and Interactions* over processes and tools.

B. *Working Software* over comprehensive documentation.

C. *Customer Collaboration* over contract negotiation.

D. *Responding to Change* over following a plan.

The Manifesto accords more value to the items on the left (in italics) over those on the right. Beyond these core values, the Agile Manifesto also encompasses 12 guiding principles, which expand upon these values by offering more specific guidelines for Agile software development.

2.4.4 Design Thinking Framework

The Design Thinking methodology finds its origins in the domains of architecture and product design. David Kelley, the founder of the design firm IDEO and Stanford's d.school, played a significant role in bringing the method to the forefront of modern problem-solving strategies (Brown, 2009). Design Thinking is generally outlined as a five-phase process as outlined below along with the outcomes of each process.

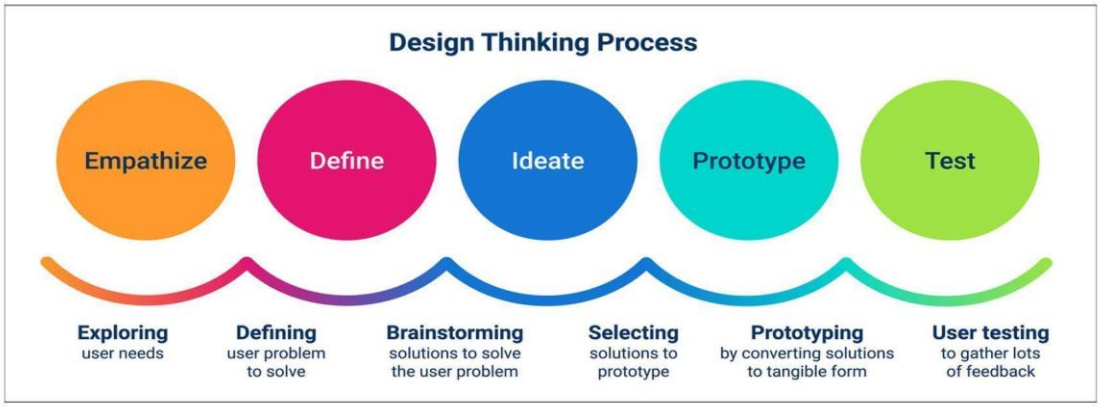


Figure 2.9. Design Thinking Process (Source: Fahy, no date)

A. **Empathise:** This phase involves immersive research to deeply understand the user. Methods include direct observation, ethnographic studies, user interviews, and surveys. The outcome of this phase is evaluated based on the depth and breadth of insights collected. The richer the understanding of the user's motivations, pain points, and contextual realities, the more successful the empathise phase.

B. **Define**: After collecting a broad range of user insights, the next step is to synthesise them to define the core problem. Techniques like affinity mapping, where insights are grouped into themes, and point-of-view (POV) statements, which articulate user needs and challenges, are commonly used. The final problem statement or defined challenge should be actionable, user-centric, and clear. It's crucial to evaluate if the problem statement captures user needs without being too narrow or too broad.

C. **Ideate**: This brainstorming phase is characterised by its emphasis on free thinking and the generation of diverse ideas without immediate judgement (Brown, 2008). As early as 1971, Eberle outlined how SCAMPER, an acronym that stands for Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, and Rearrange could encourage individuals to think about the problem from various angles, pushing for creative solutions. Group brainstorming sessions were also popular during the industrial revolution as a popular technique to foster collaborative idea generation leading to innovative solutions that may not have been achieved individually (Osborn, 1953). More recently, mind mapping (Buzan, 2006) along with Sketching (Rohde, 2013) have emerged as visual tools used to

help structure information, allowing for better analysis and generation of new ideas for potential solutions and their interconnectedness. Ideas are assessed based on feasibility, potential impact, and alignment with user needs. Often, a large number of ideas are tabled before refining them, emphasising creativity over viability in the early stages.

D. **Prototype**: In the Design Thinking process, prototyping is a pivotal phase where selected ideas from the ideation phase are transformed into tangible models (Brown and Wyatt, 2010). Prototypes can vary, ranging from rudimentary sketches to intricate digital mockups or physical renditions. They embody the envisioned solution, converting abstract ideas into something concrete. Prominent tools employed in this phase include rudimentary paper sketches, digital wireframing tools such as Sketch or Figma (Clark, 2015), and, for tangible products, advanced methodologies like 3D printing (Lipson and Kurman, 2013). Prototypes undergo scrutiny based on their functionality, feasibility, and congruence with the determined problem and user requirements (Dam and Siang, 2020). Feedback is avidly acquired, predominantly from a confined group or specific users, to discern aspects that need refinement. In this context, the inadequacies of a prototype are not perceived as failures, but as enlightening opportunities for learning and growth (Brown, 2008) as each iteration, even if not successful in the traditional sense, offers valuable insights into what works, what doesn't, and why. The prototyped solutions are showcased to an extended user base to gather feedback. Rubin and Chisnell (2008) described how this could encompass usability testing where users engage with the solution, while observers discern and document challenges or impediments faced by the users. Similarly, Sauro and Lewis (2016) gleaned insights from post-interaction direct interviews and quantitative surveys.

While not originally designed for product development, it has found applications in the gaming industry. This method fosters user-centricity and innovation, making it ideal for serious games with educational or social impact. Yet, it can be resource-intensive and may lack the structured project management found in other frameworks.

From the point of potential analysis of processes followed in this case study for the thesis, the following points are important to keep in the background. Design Thinking is not necessarily

a linear process (Brown, 2008). Based on feedback and evaluations, teams may loop back to previous stages to refine their understanding or solutions. This iterative approach ensures that the final product or solution is deeply aligned with user needs and has undergone thorough validation and refinement. Throughout these phases, the emphasis is on collaboration among a multidisciplinary team, ensuring diverse perspectives contribute to a holistic understanding and solution development. Additionally, a bias towards action and user-centricity ensures that solutions are both innovative and deeply resonate with end-users.

2.4.5 Scrum Framework in Product Development

Scrum is essentially an Agile framework, initially designed for managing and developing products. Scrum's origins date back to the early 1990s, when Jeff Sutherland and Ken Schwaber conceived the framework by synthesising patterns consistent with the principles underpinning the Agile Manifesto (Schwaber and Beedle, 2001). It drew inspiration from 'The New New Product Development Game' a 1986 paper by Hirotaka Takeuchi and Ikujiro Nonaka that likened high-performing, cross-functional teams to the Scrum formation in rugby (Takeuchi and Nonaka, 1986). While originally utilised in software development, it has since been applied across various fields due to its flexibility and focus on collaboration.

Figure 2.10. Agile vs. Scrum (Source: Williams, 2020)

While Scrum shares Agile's core principles, there are very specific processes in Scrum which have differed from other methodologies in its specific practices and terminologies. For instance, Scrum's emphasis on time-boxed iterations and roles like Scrum Master and Product

Owner differentiate it from methodologies like Kanban, which emphasises continuous flow and lacks prescribed roles (Kniberg and Skarin, 2009).

A. **Sprints:** Time-boxed periods (typically 2-4 weeks) during which a potentially shippable product increment is created.
B. **Daily Scrum or Stand-Up**: A short daily meeting for the development team to synchronise activities and create a plan for the next 24 hours.
C. **Sprint Review**: Held at the end of the Sprint to inspect the outcome and adjust the backlog if necessary.
D. **Sprint Retrospective**: A review of what did and did not go well with actions to make the next Sprint better.

Scrum's iterative and incremental approach is particularly favoured in the gaming industry as it offers a balance between structure and flexibility, making it suitable for many game development projects. However, it requires disciplined adherence to roles and processes which can be challenging for some established companies. The frequent meetings (like daily stand-ups) can sometimes be seen as tedious or redundant, especially if not efficiently managed and if team collaborations are sub optimal.

In the dynamic world of mobile game app development, selecting the right theoretical framework is crucial for success. The Stage-Gate, Lean, Agile, Design Thinking, and Scrum frameworks each offer unique advantages and limitations. While Lean and Agile are well-suited for low-budget projects, other frameworks may find applications in specific contexts. Continual adaptation and integration of these frameworks contribute to the evolving landscape of game development, ensuring that developers can stay competitive and deliver high-quality gaming experiences.

2.5 Leadership Frameworks

Leadership practices within organisation, especially in the fast-paced sector of mobile app development, significantly influence organisational success. Varied leadership frameworks are employed by leaders of such organisations, emphasising different aspects like decision-making, resource allocation, and team collaboration. This literature review delves into various

leadership frameworks and their applications, limitations, and influences, especially in organisations focused on digital innovations.

Contemporary leadership frameworks offer a plethora of perspectives, integrating various approaches to leadership in the modern industry landscape characterised by agility, innovation, and resilience. This section also interweaves such frameworks with real-world insights from both male and female CEOs, particularly those in STEM fields, to present a rich tapestry of leadership paradigms and practices.

Additionally, this section of the survey was undertaken to add a nuanced layer to the case study in question, which is a firm owned by women. A major component of the product design processes, project management, stakeholder and partner management, marketing, and evaluation of the new product were designed, managed, and implemented by women across the global offices of HDI.

2.5.1. Transactional Leadership

Transactional Leadership has its roots in the early writings of Max Weber (1947) and later, Bernard M. Bass (1981). Weber delineated transactional leadership as a structure where leaders offer a form of transaction or agreement with their followers. Bass, on the other hand, conceptualised it as contrasting with transformational leadership, where the focus is on the exchange between leader and follower, usually involving rewards and punishments based on performance. It is particularly effective in scenarios requiring rule adherence and routine tasks, and the organisational culture values order (Bass, 1990) such as in military organisation and manufacturing industries. Transactional leadership has inherent limitations due to its emphasis on short-term tasks and its reactive nature. It fails to address the underlying motivations, aspirations, and needs of individuals (Burns, 1978). The framework can be too simplistic to capture the complexities of human behaviour and organisational dynamics fully (Yukl, 1999). The lack of emphasis on intrinsic motivation and employee development may lead to reduced job satisfaction and commitment in the long term, potentially affecting organisational performance adversely.

This leadership style may not be suitable for environments that require continuous learning and innovation. The approach may stagnate organisational growth as it is primarily

concerned with maintaining the status quo rather than fostering innovation and adaptation (Bass and Bass, 2008).

2.5.2. Situational Leadership Theory

Situational Leadership Theory (SLT) was originally developed by Paul Hersey and Ken Blanchard in 1969. This theory posits that the most effective leadership style is one that varies with the task and organisational context. The core essence of situational leadership categorises leadership styles into four distinct types: Telling, Selling, Participating, and Delegating and revolves around leaders aligning their style to the competence and consistency in endeavours of their subordinates.

The COVID-19 pandemic provided a landscape wherein the applicability of situational leadership theory was discerned in a variety of sectors. Leaders across organisations adapted their styles to navigate the unprecedented challenges brought by the pandemic. Leaders were required to be more direct and decisive in some situations, while being supportive and empathetic in others, adjusting their approach based on the evolving needs of their teams and the context of the situation (Northouse, 2018).

In the initial phase of the pandemic, healthcare executives leveraged a top-down leadership approach to promptly roll out essential protocols. Yet, as the situation continued, there was a strategic pivot towards a more inclusive and empathetic leadership paradigm to cater to the mental and emotional health of the medical personnel (Giltinane, 2013).

In the dynamic and unpredictable environment of startups, situational leadership has also proven to be invaluable. Leaders in startups or those engaged in new product development are often faced with diverse challenges that require them to adapt their leadership styles frequently, depending on the team's experience, the nature of the task, and the overall organisational climate. Within the volatile startup ecosystem, agile leadership practices are imperative. Initially, leaders must adopt a hands-on approach, providing clear direction. However, as the team matures, it becomes essential for leaders to transition to a more hands-off strategy, empowering their teams to spearhead initiatives. This fluid leadership model is pivotal for ensuring optimal performance and adaptability in the dynamic landscape of startups.

Studies show that situational leadership fosters flexibility and allows startup leaders to move from a more directive style in the initial stages of a project to a more delegative style as the team matures to gain competence and confidence (Vecchio, Justin, and Pearce, 2008).

2.5.3 Transformational Leadership

One of the prominent contemporary leadership frameworks is Transformational Leadership, which focuses on inspiring and motivating followers to exceed their self-interests for a greater collective purpose (Bass and Riggio, 2006). Reshma Saujani, the founder of Girls Who Code, exemplifies this through her advocacy for women in technology. Her perspective on leadership underscores the importance of challenging the status quo and striving for broader societal change. As she mentioned in her Ted Talk, "We need to socialise our girls to be comfortable with imperfection, and we need to do it now." (Saujani, 2016).

2.5.4 Servant Leadership

Originated by Greenleaf (1977), Servant Leadership underscores a paradigm wherein the leader's primary responsibility is to serve their followers, ensuring their needs are met and thereby, fostering their development and growth. This framework is operationalized in organisational cultures that emphasise employee welfare and holistic development, prominently in non-profits, education, and certain innovative corporate structures. However, it faces scrutiny for potentially compromising the broader organisational goals and its practicality in intensely competitive landscapes due to its overarching focus on service (Greenleaf, 1977).

2.5.5 Agile Leadership

Propounded by Doz and Kosonen (2008), Agile Leadership is tailored for industries necessitating swift adaptability and responsiveness. It is extensively implemented in tech-driven domains and startups. A prime example of this stewardship is Satya Nadella's transformative leadership at Microsoft, advocating a growth mindset and continuous learning, embodied in his quote, "The learn-it-all does better than the know-it-all." Nonetheless, its limitations arise from possible perceptions of a lack of steadfast strategy and its challenges in traditionally hierarchical organisation (Doz and Kosonen, 2008).

2.5.6 Adaptive Leadership

Developed by Heifetz (1994), Adaptive Leadership emphasises the leader's role in enabling others to navigate and adapt to change by addressing and challenging complex, systemic issues. It is indispensable for organisation in sectors undergoing incessant technological evolution, as evidenced by Dr. Marissa Mayer at Yahoo, emphasising adaptability and innovation. The framework, however**,** encounters resistance from stakeholders clinging to conventional leadership structures and engenders potential conflicts in decision-making processes (Heifetz, 1994).

2.5.7 Authentic Leadership

Explored by Walumbwa et al. (2008), Authentic Leadership underscores a leadership style marked by self-awareness, an internalised moral perspective, balanced processing, and relational transparency. Indra Nooyi's leadership during her tenure at PepsiCo showcases the universal relevance of upholding core values and authenticity. She believed that while it is difficult to precisely define leadership and even harder to determine what makes it truly outstanding, a clear indicator of exemplary leadership is when individuals consistently and unwaveringly stand by and support a leader (Nooyi, 2021). The concept's subjectivity and potential overshadowing of organisational adaptations mark its limitations (Walumbwa et al., 2008).

Contemporary leadership frameworks present multifaceted perspectives, encapsulating transformational, servant, agile, adaptive, and authentic leadership styles. Insights from renowned leaders, both male and female, particularly in the effervescent STEM industry, provide tangible examples of these frameworks in action, emphasising agility, innovation, resilience, and ethical and inclusive leadership practices. These perspectives are particularly relevant in our evolving industrial landscape, wherein the integration of varied leadership practices is crucial for fostering innovation and navigating complexities.

2.6 Frameworks Assessing Social Impact

We will now move to a literature survey on frameworks that have been used to evaluate outcomes and impact as the GOC project was focused on developing a new digital product that would eventually facilitate improved reproductive health outcomes among adolescents in India.

2.6.1 Defining Social Impact Measurement

Social Impact Measurement represents a crucial methodological domain, dedicated to ascertaining the societal value yielded by an organisation or initiative. Its emergence is rooted in the rising emphasis on social accountability, and the idea that social value is quantifiable and integral to organisational assessments (Nicholls, 2009). It provides an analytical lens through which the societal contributions of initiatives, especially those leveraged by digital means, can be comprehensively understood and evaluated.

2.6.2 Approaches and Methodologies

Several robust methodologies mark the landscape of Social Impact Measurement. The Logic Model provides a visual and systematic representation of the relationships among the resources, activities, and the anticipated changes or results (W.K. Kellogg Foundation, 2004). The Social Return on Investment (SROI) offers a monetary perspective, attributing economic value to diverse social and environmental outcomes (Nicholls et al., 2012). These methods are instrumental in deciphering value propositions and facilitating informed decision-making by integrating social perspectives

2.6.3 The Theory of Change Framework

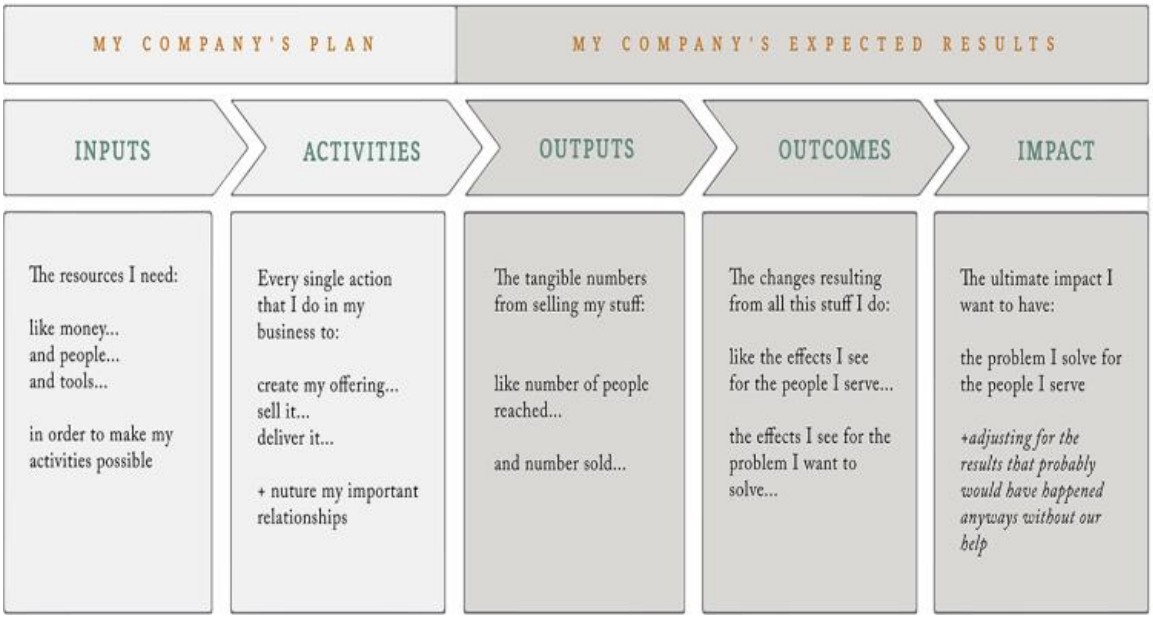


Figure 2.11. The Theory of Change (Source: Enge, no date)

The Theory of Change (TOC) is a structural framework that has found extensive applications in health interventions, specifically in the evaluation of social impact interventions including reproductive health programs. The TOC methodology was first introduced in the 1990s by the Aspen Institute Roundtable on Community Change (Brest, 2001; Weiss, 1995) and was based on the principles that social change is complex and requires a systematic approach to achieve desired outcomes. The logic model or logical framework is generally accepted as the most useful way to unpack the practical implementation of the TOC. The origins of the program logic model are traditionally traced to Suchman (1967), Weiss (1972), Bennett's (1976) hierarchy of evidence, as well as Wholey's (1979) evaluation techniques. The program logic model is an analytical tool that is used to plan, monitor, and evaluate projects. The main links are among inputs, activities, outputs, and outcomes. Generally, the logical framework model will identify the following elements of a intervention:

A. Issues being addressed and the context within which the policy takes place;
B. inputs or resources (money, time, people, skills) that are being invested;
C. activities that need to be undertaken to achieve the policy objectives;
D. initial outputs of the policy;
E. outcomes (short- and medium-term results);
F. anticipated impacts (long-term results); and
G. assumptions made about how these elements link together that will enable the program to successfully progress from one element to the next.

In the context of business, the elements of TOC include strategies, actions, conditions, and resources that facilitate change and achieve outcomes outlining the necessary preconditions to achieve the desired long-term goals.

2.7 Assessment of Outcomes in the Digital Sphere

2.7.1 Need for Assessment of Digital Products

The rapidly evolving digital innovations necessitate adaptable and dynamic frameworks that can capture the transient nature of digital products and their social implications (Clark et al., 2004). Harvey (2016) highlights the importance of leveraging digital technology such as

telemedicine, electronic health records, wearable devices, and mobile health applications, to improve healthcare delivery and outcomes. These technologies can help collect, analyse, store, and share health data, enabling personalised care and better decision-making. However, the paper also acknowledges the challenges associated with digital innovation in reproductive health including poor IT systems implementation, lack of consumer acceptance, and the need for effective digital leadership to drive health projects. Additionally, digital health applications, telemedicine platforms, and health monitoring systems require rigorous evaluation to ensure they are not only user-friendly, but also provide accurate and reliable services (Boulos et al., 2014). For instance, a telemedicine platform that is hard to navigate might discourage patients from seeking help, or worse, could lead to miscommunication about medical issues resulting in dire consequences.

As digital products become increasingly integrated into our lives, they have a potential to impact our potential well being when poorly designed digital products can lead to stress and anxiety (Calvo and Peters, 2015).

2.7.2 Assessment of Games

Historically, game assessment was primarily centred around player experience, gauging factors such as user engagement, fun, and challenge level (Koster, 2005). However, as games began to permeate educational and professional training environments, the evaluation criteria also started encompassing educational outcomes, cognitive improvements, and skill acquisition (Gee, 2003).Theoretical frameworks guiding game evaluations have evolved in parallel.

One of the earliest frameworks was the heuristics-based approach, where games were evaluated against a set of predefined design principles or 'heuristics' (Nielsen, 1994) of four categories: game play, game story, game mechanics, and game usability/interface. Such an approach was beneficial for identifying usability problems but was often criticised for its lack of depth and failure to account for the unique dynamics of each game (Desurvire et al., 2004).

In the early 2000s, the understanding of game dynamics led to the emergence of more comprehensive evaluation methodologies. The MDA framework (Mechanics, Dynamics, and Aesthetics) by Hunicke et al. (2004) is an example, proposing a layered view of games where mechanics lead to dynamics, which then result in the aesthetic experience for the player.

In recent years, there's been an increasing emphasis on holistic and inclusive game evaluation. The Player Experience of Need Satisfaction (PENS) model, for instance, argues for evaluations based on players' psychological needs, suggesting that games are most effective when they satisfy innate human desires for competence, autonomy, and relatedness (Ryan et al.,2006; Abeele et al, 2019).

2.7.3 Assessing Games Based on Outcomes

The effectiveness of games, especially in the medical education context, has been studied by Kato (2010) who emphasises how games can be tailored to specific learning outcomes.

Assessing innovative products like a mobile game app for adolescent girls in the realm of social impact using a Theory of Change (TOC) construct that measures outcomes is critical but fraught with challenges. While the TOC framework provides a comprehensive framework to understand and evaluate the individual, community, and structural factors essential for sustainable behaviour change in adolescents' reproductive health (Vogel, 2012), the inherent challenge in mobile app-based interventions is the measurement of sustainable behaviour change. Additionally, in reproductive health interventions aimed at adolescents, where impacts are multifaceted and intertwined with social and behavioural aspects, assessing the true social value becomes intricate. Employing conventional metrics may result in a potential misalignment, undermining the nuanced impact of digital innovations on reproductive health outcomes.

As has been seen in previous sections (2.6.,5.2), assessments in the digital industry are similar to the principles applied to a TOC construct, but focus on evaluating specific products or services, rather than evaluating programs as a whole. Understanding how conventional metrics can be reconciled with the digital paradigms to assess impact accurately is challenging. These insights are particularly pivotal when considering the multifaceted outcomes in adolescent reproductive health, allowing for the development of interventions that are both impactful and scalable. Nevertheless, HDI was successful in presenting a multidisciplinary TOC framework that was adapted by studying several theoretical frameworks for the development of the novel product, the mobile game app, Go Nisha Go, which was published elsewhere (Shankar, Dixit and Howard, 2023).

2.8 Understanding Multidisciplinary Frameworks in Innovations

Sections 2.3 through 2.7 have described the myriad theoretical frameworks associated with new product development implemented by HDI. They include leadership frameworks because the company's leadership practices for managing multidisciplinary frameworks is a critical function of fostering and managing innovation that this study seeks to document.

Multidisciplinary frameworks involve integrating knowledge, methodologies, and perspectives from various disciplines to tackle complex problems and deliver innovative solutions. The collaborative nature of such frameworks is pivotal in fostering a holistic understanding and approach to problem-solving (Klein, 1990). Integration across disciplines ensures that different aspects of a problem are considered, enriching the product development process with varied perspectives and approaches (Repko and Szostak, 2017). Multidisciplinary frameworks are characterised by adaptability and diversity, allowing for the incorporation of evolving technologies, methodologies, and user needs, which are crucial in the dynamic environment of product development. By amalgamating various disciplines, these approaches enable the development of products that are robust, user-centred, and adaptable to different contexts (Carayannis and Campbell, 2010). For instance, the intersection of technology, design, and behavioural sciences can lead to the creation of products that are not only functional, but also user-friendly and behaviourally effective. The diversity inherent in multidisciplinary approaches promotes creative problem-solving and fosters the generation of innovative ideas, contributing to the advancement of knowledge and the development of groundbreaking solutions (Rosenfield, 1992).

In the context of Go Nisha Go, the incorporation of multidisciplinary frameworks has facilitated the alignment of diverse strategies, approaches, and expertise to develop a product that could address complex issues related to reproductive health and behaviour change effectively.

2.8.1 Challenges and Triumphs in Implementing Multidisciplinary Frameworks

The implementation of multidisciplinary frameworks is not without its challenges. Aligning varied perspectives, methodologies, and objectives can be a complex endeavour, requiring efficient coordination, communication, and conflict resolution (Stember, 1991).

Additionally, the integration of diverse disciplines can lead to complexities in establishing clear goals, methodologies, and evaluation criteria, potentially causing delays and discrepancies in the product development process (Choi and Pak, 2006). However, despite these challenges, multidisciplinary frameworks have been triumphant in delivering innovative products that address multifaceted problems from a holistic standpoint. Indeed, the concept that multidisciplinary frameworks can overcome a plethora of challenges to deliver innovative and comprehensive solutions is supported by myriad examples and scholarly works. Multidisciplinary approaches amalgamate insights, theories, and methodologies from various disciplines to address intricate issues from multiple perspectives, ensuring a more rounded and holistic understanding and solution to problems.

2.8.1.1 Healthcare Innovation

One of the fields where multidisciplinary frameworks have manifested their potential is healthcare. The advent of Health Information Technologies (HIT) is a prime example, where the conjunction of medical knowledge, information technology, and healthcare management has led to the development of innovative products like Electronic Health Records (EHR) and telehealth services (Buntin et al., 2011). These innovations have augmented the healthcare system's capacity to deliver patient-centred care and have streamlined healthcare delivery processes, thereby addressing multifaceted challenges related to accessibility, efficiency, and quality of healthcare services.

2.8.1.2 Sustainable Urban Development

In sustainable urban development, multidisciplinary frameworks have been instrumental in creating urban solutions that are environmentally sustainable, economically viable, and socially equitable. For instance, urban planners, environmental scientists, economists, and sociologists collaborate to design cities that balance ecological conservation, economic growth, and social inclusivity (Wheeler and Beatley, 2014). This collaborative approach has led to innovations like green buildings, sustainable transport systems, and urban farming, addressing the multifaceted challenges posed by rapid urbanisation, climate change, and socio-economic disparities.

2.8.1.3 Education Technology (EdTech)

The EdTech sector exemplifies how multidisciplinary approaches can yield ground-breaking solutions. The amalgamation of pedagogical theories, computer science, and design thinking has facilitated the development of adaptive learning platforms, Virtual Learning Environments (VLEs), and MOOCs (Massive Open Online Courses) that enhance learning experiences and outcomes (Selwyn, 2019). By integrating insights from education, technology, and psychology, EdTech products address diverse learning needs, preferences, and contexts, thus providing holistic solutions to the challenges in education.

2.8.1.4 Public Health Management

An illustrative example of this is the development of cross-disciplinary innovations in addressing public health issues. For instance, the development and implementation of multidisciplinary frameworks in the response to the COVID-19 pandemic have been critical. The convergence of virology, epidemiology, technology, and public policy has enabled the swift development of vaccines, the creation of contact tracing apps, and the formulation of effective public health strategies to mitigate the impact of the virus (Polack et al., 2020).

These examples underscore the triumph of multidisciplinary frameworks in delivering innovations that holistically address multifaceted and complex challenges across various domains. The triumphs of such frameworks lie in their ability to facilitate the development of solutions that are comprehensive, adaptable, and inclusive, catering to the diverse needs and preferences of the users and stakeholders involved (Newell, 2001).

2.9 Bridging the Gap for Culturally-Tailored Product Development Theories in the Social Impact Space

The emergence of mHealth and digital interventions since the early 2000's has opened up avenues for health solutions with a global perspective (Free et al., 2016). The development of applications focusing on adolescent reproductive health, particularly within the unique cultural contexts of India, has been growing. A thorough review of the existing literature unveils significant gaps in applying and adapting product development theories specifically to mobile apps, aiming to improve adolescent reproductive health outcomes. Recent research indicates a

growing application of user-centred design (UCD) in reproductive health in India. Huang et al. (2022) demonstrate the feasibility and acceptance of digital health strategies for adolescent SRH in low-and-middle-income countries, including India. Another study by Parmar (2010) demonstrates how a user-centred design framework effectively enhanced maternal health knowledge and practices among rural Indian women, showcasing its significant impact on healthcare delivery in rural India. There is growing interest in and validation for a bottom-up approach to health information systems that involves users in content development and design, incorporating social and cultural adaptations specific to India (Mukherjee et al., 2023).

Given the sensitivity of adolescent reproductive health in Indian communities, there is a pressing need to tailor product development theories to address concerns related to privacy, trust, and safety (Chandra-Mouli, Camacho and Michaud 2013). Traditional product development theories and assessments, often conducted by manufacturers or third-party evaluators, typically focus on market needs, prototyping, iterative testing, quality, safety, and efficacy (Moore, 2010; Black, 2013). However, the intersection of adolescent behaviour and reproductive health necessitates specialised considerations and an understanding of adolescents' distinct interaction patterns and preferences, which may not align with conventional design tenets.

The TOC, offering a holistic perspective, emerges as a pivotal framework, focusing on understanding the intricate pathways to intended outcomes rather than isolating specific products or services (Vogel, 2012; Weiss, 1995). It goes beyond assessing specific product attributes, considering individual beliefs, community support, structural factors, and the mechanisms through which interventions induce sustainable changes in attitudes and behaviours (Anderson, 2005). The amalgamation of both product assessment frameworks and ToC can potentially yield enriched insights into both the quality and efficacy of products and the holistic impact of programs (Bamberger, 2012).

The existing frameworks, such as the Health Belief Model and the Theory of Planned behaviour, while pivotal for health interventions and behaviour change, exhibit limited integration into the digital app design and development processes. This scenario accentuates the urgency for cross-disciplinary frameworks incorporating principles of health psychology, digital user experience, and adolescent sociology to create effective, engaging, and culturally sensitive mobile apps targeting adolescent reproductive health.

In light of the discussed literature, this research is pivotal to address the evident gaps in the multidisciplinary framework settings for a new product development in the social impact space for adolescent reproductive health evaluation, particularly in culturally nuanced environments like India. The scarcity of literature regarding innovation assessments using comprehensive applications of user-centred design, cultural adaptations, data privacy, trust, and safety in product development theories and TOC frameworks in this domain underscores the need for this research.

There is a need for comparative analysis of product development approaches with conventional project management practices to better understand the social impact of digital innovations**.** In the realm of digital innovation, the integration of product development with project management is crucial for ensuring the successful delivery of projects that meet market needs and customer expectations. The concept of product development revolves around creating solutions that address specific market problems or customer desires (Cooper, 2019).

Concurrently, project management, as defined by the Project Management Institute, focuses on the temporary, organised efforts to achieve particular goals, often related to the delivery of these innovative products (Kerzner and Kerzner, 2017). The synergy between these two disciplines is essential for aligning the long-term strategic vision of product managers, with the tactical day-to-day focus of project managers, facilitating the efficient and effective realisation of business objectives (Shenhar and Dvir, 2007). This integration is particularly significant in the fast-paced digital sector, where adaptability and responsiveness are key to success.

Exploring how HDI navigated through the complexities of multidisciplinary frameworks, leadership practices, and innovative strategies during the development and assessment of GNG will shed light on the nuanced domain, where the adolescent girl user's psychosocial context and digital literacy levels intertwine. Delving deep into the intersections of adolescent reproductive health, digital user experience, organisational leadership practices, and cultural adaptations for new product development, will offer valuable insights for future endeavours in developing impactful and sustainable digital health solutions for adolescent reproductive health in diverse cultural contexts. By amalgamating the principles of various evaluative approaches and frameworks in managing product development outcomes with project management goals, this

research is poised to contribute significantly to the enriched understanding of social impact interventions, considering both product efficacy and the holistic impact of programs.

This DBA thesis will touch briefly upon challenges in the processes for designing and implementation of the evaluation of the new product assessment and effectiveness. The actual evaluation and impact of the GNG mobile game app, and how it aims to improve knowledge and behaviours among adolescents in India, is beyond the purview of this study and has been undertaken as a separate independent study by the organisation. The study protocol for that is co-authored by this researcher and published as the first ever study protocol of an RCT-led encouragement design methodology for the evaluation of a mobile game app (Saha, A. et al, 2023).

2.10 Summary

This chapter provides a comprehensive overview of various domains essential to the research study. It begins with a detailed background to understand the reproductive health challenges faced by adolescent girls in India, which is crucial for framing the research problem. The chapter then delves into the digital landscape, offering a market analysis for improving access to reproductive health information, products, and services.

The literature survey discusses multiple theoretical frameworks underpinning behavioural change, game-based learning, and gamification. It also examines a range of product development frameworks to identify which might best suit mobile apps in the social impact space. The chapter highlights the importance of leadership frameworks in managing complex, multidisciplinary projects like this, emphasising practical leadership styles and practices.

The need for measuring the impact of such projects is another focus of this chapter, exploring theoretical frameworks for assessing social impact and considering sustainable impact beyond short-term metrics. Additionally, broader strategies for assessing outcomes in digital contexts and the interplay of various frameworks across different domains are also described. The complexities involved in creating digital solutions that handle sensitive information and

significantly influence social norms, particularly within tight timelines and budgets, is also highlighted.

Furthermore, the literature survey identifies critical gaps in existing research, particularly in integrating principles of behaviour change paradigms, digital user experience, and adolescent sociology, into digital app design and development processes. The research emphasises the need for cross-disciplinary frameworks to create effective, engaging, and culturally sensitive mobile apps targeting adolescent reproductive health. It highlights the scarcity of literature regarding innovation assessments that use comprehensive applications of user-centred design, cultural adaptation, data privacy, trust, and safety in product development theories, especially in culturally nuanced environments like India. This gap underscores the need for this research and the importance of a comparative analysis of product development strategies in this domain.

CHAPTER III:
METHODOLOGY

This chapter outlines the research problem undertaken in this case study and details the dual role of the researcher, who also serves as a consultant for the firm under study. It provides an in-depth description of the study's participants, methodologies, target population, and sampling strategies. The chapter also details the data collection techniques employed and the rigorous processes implemented to ensure the study's reliability and validity. Additionally, the chapter contains information about sample selection with reference to the participant identification and selection procedures, underscoring adherence to ethical responsibilities throughout the research. This allows a smooth segue into the next chapter on results, following the methodology for this case study.

3.1 Overview of the Research Problem

India's sizable adolescent population, totaling 253 million, poses unique challenges and opportunities, especially regarding gender stereotypes that affect girls' health, education, and workforce participation. Critical among these issues is reproductive health, where a lack of comprehensive sex education hampers adolescent development and well-being. Traditional healthcare approaches face obstacles like accessibility, trust issues, and societal stigma, highlighting the need for innovative, youth-friendly SRH programs.

In this context, HDI, a women-led behavioural insights firm, developed "GNG", a mobile game app designed to educate and empower Indian adolescent girls about SRH. The development of this app from 2018 to 2022 represents a significant case study in multi-disciplinary product development, digital learning, and adaptive leadership, especially considering the challenges posed by the COVID-19 pandemic. This project's journey underlines the complexities of integrating digital innovation with traditional project management in health interventions. The thesis aims to explore these dynamics, focusing on the nuances of developing

a digital product for reproductive health, and the intersection of modern technology with established health education practices.

3.2 Operationalization of Theoretical Constructs

Studying innovation development, where evolution is rapid and the landscape constantly shifts, requires understanding the past and present through real-life cases that can pave the way for future advancements. The case study (CS) methodology stands out as a premier tool in business research, particularly in understanding innovations, due to its depth, flexibility, and comprehensive nature. Deeply rooted in qualitative research, it is an in-depth exploration of a particular issue or phenomenon within its real-life context, often using multiple sources of evidence (Yin, 2014).

In this thesis, the researcher used an exploratory CS approach to explore the complex interplay of various variables and interdependencies of leadership practices, and challenges of managing multidisciplinary frameworks in the context of product development by HDI for a novel innovation for social impact.

The researcher has completed a preliminary literature survey to study the topics embedded in the problem statement, through a comprehensive review of frameworks, theoretical systems, and other relevant information for the CS research. The researcher outlined the design for case study research, the protocol and methodology of data collection, the sampling frame and size, the timeline, survey tools, and analysis plan in the approved research proposal.

3.2.1 Definitions and Boundaries of the Case Study Research

In terms of design, two variants are typically described for a *single case* study research: holistic designs and those using embedded units of analysis (Yin, 2014).

a. The definition of the CS here is the behavioural insights consulting firm. HDI. Based in Washington, D.C, the 25 year old, women-owned firm dived into contemporary behaviour change approaches, TOC, and product development frameworks to develop

an innovative product designed for digital natives. The innovative product, GNG, was produced under the aegis of the Game of Choice, Not Chance Project funded by USAID (Cooperative Agreement No. 7200AA18CA00046).

b. The CS pertains to the processes, challenges, and operations during product development of the innovation that HDI implemented from October 2018 through July 2022 when GNG was launched on Google Play, until November 2023, when the RCT outcome evaluation of the game (not part of this research), and assessment of innovation using the Business Canvas Model (BMC) by internal and external stakeholders were completed.

This CS involves exploratory research to answer the research objectives specified in the next section. The primary unit of analysis will be HDI as the organisation for the CS research with focus on studying the three aspects detailed below:

1. Leadership practices at HDI that contributed to developing the impactful digital innovation, Go Nisha Go mobile game app.
2. Examination of the alignment of product development outcomes within project management goal at HDI during the development of GNG.
3. The challenges navigated by HDI to create an impactful digital product for reproductive health and inform future innovation efforts in this space.

3.3 Research Purpose and Questions

The firm, HDI, is the primary unit of analysis for this thesis. Given the intricate balance of new product development, leadership practices, and social impact within a milieu of multidisciplinary frameworks amidst project management and innovation assessment challenges, the following research questions/objectives emerged. These were initially arranged broadly into three themes of Leadership Practices, Innovation Assessment, and Exploration of Multidisciplinary Frameworks at the time of submission of the research proposal:

3.3.1 Leadership Practices

A. What role did leadership practices such as decision-making processes, organisational culture, and risk-taking within HDI play while guiding the development and implementation of GNG?
B. How did HDI adapt its strategies, frameworks, and practices in response to uncertainties during the project period that encompassed the COVID-19 pandemic?
C. What key learnings were derived that could inform future endeavours in digital innovations for reproductive health?

3.3.2 Innovation Assessment

D. How did HDI navigate the complexities of product development to assess the effectiveness of GNG as a product to align with the intended reproductive health outcomes for adolescents in India?
E. How were the project management goals and product development outcomes for GNG aligned or diverged with reference to the Business Canvas Model?
F. What insights can be drawn about optimising both product development and project management for achieving impactful innovations in reproductive health?

3.3.3 Exploration of Multidisciplinary Frameworks

G. How did HDI integrate various multidisciplinary frameworks in developing an impactful digital product?
H. What challenges were encountered while amalgamating these diverse frameworks for a solution to create a cohesive and impactful digital product?

However, due to new insights, feedback from qualitative research experts and peers, and preliminary analyses of qualitative study findings, some changes were warranted in rearranging the themes for the research questions. Hence the research questions were rearranged as follows:

Table 3.1. Revised Restructuring of Research Questions

Title	Research Question	Objective	Element Assessed in Interview
Leadership Practices	1. How did leadership practices at HDI contribute to developing the impactful digital innovation, GNG?	To identify the outcome expectations of the stakeholder regarding the innovation, along with the level of perceived fulfilment of these expectations	Vision
		To understand the role of leadership practices such as decision-making processes, organisational culture, risk-taking, and leadership/work styles within HDI in guiding the development of GNG	Decision-making, Risk-Taking, organisational Culture, and Workstyles
Product Development vs. Project Management	2. How are product development outcomes aligned with project management goals at HDI during the development of GNG?	To draw insights about timeliness, quality, and integration of multidisciplinary frameworks of the project, for achieving the intended impact of GNG	Timeliness of deliverables and Quality of product
		To investigate how the project management goals and product development outcomes for GNG aligned or diverged	Product Development Issues vs. Project Management
		To draw insights about the perceived innovativeness and potential of the product	Innovation, Perception, Potential of Product

		GNG by HDI	
Challenges and Learnings	3.What challenges were encountered, and how were they navigated by HDI to create an impactful digital product for reproductive health and inform future innovation efforts in this space?	To explore the challenges encountered in creating a cohesive and impactful digital product	Exploration of Categories of Challenges- Systemic, Product Related and External Factors
		To understand how HDI adapted its strategies, frameworks, and practices in response to challenges they faced and key learnings from it	Learnings and Insights
		To inform future endeavours in digital innovations for reproductive health	Way Forward

3.3.4 Rationale and Impact of Revising the Research Objectives

The rearranging of themes from Leadership Practices, Innovation Assessment, and Exploration of Theoretical Frameworks, to Leadership Practices, Exploration of Product Development and Project Management, and Challenges and Learning, to a simpler thematic division enhanced the overall research objectives of broadening the scope and depth of challenges encountered by HDI during the development of GNG and contributed to a clearer focus, better alignment with objectives, or improved feasibility.

These modifications have not altered the fundamental objectives of the research, but have sharpened its scope, leading to a more targeted and effective investigation. Additionally, the methodology, data collection process, survey tools, as well as data analysis were not impacted due to these rearranged research objectives. The restructured themes ensured a coherent and

robust approach to exploring these refined questions. This revision process was conducted in consultation with qualitative research experts, with due consideration for continued maintenance of ethical standards.

3.4 Role of the Researcher

As my research study was undertaken at the firm where I am currently employed as a consultant, the following steps were undertaken to conduct research to avoid a potential conflict of interest (COI).

1. Since the research objectives did not have any conflict on the firm or the project or product in question, the researcher obtained a 'No Objection Certificate' (Appendix E) from her employers to undertake the DBA study, and written permission for using HDI's name in this case study.
2. To reduce bias, as well as reduce any perception of potential risks to participants or eliminate elements of coercion to the study, all interviews with internal and external stakeholders were conducted by an external research assistant, hired for the period of conducting interviews, who also anonymized all personal data into coded data, and converted all transcripts into coded data ready for analysis by the researcher.
3. An interview protocol was developed outlining the interview procedure with guidance for the interviewing process (Patton, 2015). All participants had the opportunity to respond to and obtain clarifications in reference to the questions. They were also provided the option to decline from the interview, even during the interview process.
4. As the researcher, I followed the Belmont Report's ethical protocols for research involving human research (National Commission for the Protection of Human Subjects of Biomedical and behavioural Research (1979). In addition, I also completed the Collaborative Institutional Training Initiative (CITI) certificate training for qualification for interviewing human subjects in my research, which is valid for three years until March 2024.
5. All participants were provided details on the study purpose, procedures, risks/benefits, privacy protections, and the voluntary nature of participation. Each participant was provided a consent form and options for setting the interview time and date at their

convenience prior to the interview. Participants were encouraged to ask questions and opt out at any time, even during the interview, if they had any objection to the questions.

6. Confidentiality was maintained at all times with all transcripts being anonymized and coded by a qualified research assistant. I did not have access to any personal identifiable information before proceeding to data analyses in the study.

3.5 Research Design

Studying innovation development, where evolution is rapid and the landscape constantly shifts, requires understanding the past and present through real-life cases that can pave the way for future advancements. The CS methodology stands out as a premier tool in business research, particularly in understanding innovations, due to its depth, flexibility, and comprehensive nature. Deeply rooted in qualitative research, it is an in-depth exploration of a particular issue or phenomenon within its real-life context, often using multiple sources of evidence (Yin, 2014).

In this thesis, the researcher shall use an exploratory CS approach to explore the complex interplay of various variables and interdependencies of leadership practices, and challenges of managing multidisciplinary frameworks in the context of product development, by a behavioural insights consulting firm, HDI, for a novel innovation for social impact.

The realm of business administration has witnessed a transformation in its study of decision-making, owing significantly to the case study methodology. Thomke and Feinberg's seminal Harvard Business School Case (2009) on the introduction and success of Apple's iPod delved deep into Apple's strategies, challenges, market research, and the technological landscape at that time, offering rich insights into why and how the iPod became a game-changer. The case study analysed how while other MP3 players existed before the iPod, Apple's innovation was integrating hardware, software (iTunes), and a business model that transformed the music industry.

Case studies have also been pivotal in identifying business challenges and proposing solutions. A classic example is the turnaround of Starbucks. When the coffee giant faced stagnation in the late 2000s, researchers and analysts employed the CS method to dissect the

company's woes. These studies illuminated issues like brand dilution, rapid expansion, and a drift away from core values. Drawing from these insights, Starbucks made pivotal decisions, including closing stores and reinvesting in employee training, which eventually rejuvenated its brand and customer experience (Koehn, Besharov, and Miller, 2008).

While exploratory studies may or may not have a proposition, the design of the CS should state the purpose, as well as criteria by which an exploration will be judged successful (or not). For instance, to illustrate how national policies influence foreign investments, a specific country CS in Singapore showcased a nested unit of analysis about the development of an Apple computer factory inside the country (Magaziner and Patinkin, 1989). For a nuanced exploration, Yin (2014) encourages the researcher to leverage varied data sources, including documents, interviews with pivotal stakeholders, meticulous observations, and secondary analyses. Yin (2014) also outlines the need for defining and bounding the case once the case has been identified. In this thesis, the CS will show how an organisation's leadership practices were honed to balance product development goals within a framework of project development that warranted demonstration of outcomes.

3.6 Population and Sample

Purposive sampling, a non-random technique wherein researchers rely on their judgement to select participants (Palinkas et al., 2015) was used in this research study. The primary rationale was the need for specific insights from individuals directly involved in the project. Given the complexity and the niche nature of this endeavour – combining game based learning, digital technology, and adolescent health in India – it would be critical to obtain the unique and valuable perspective of key participants involved in the product and project management at HDI in answering the research objectives. As a global multidisciplinary team is engaged in the product development and project management of the app, with purposive sampling, one could ensure that the chosen respondents are knowledgeable about the subject matter, providing rich, detailed, and relevant data. The multidisciplinary nature of the project means stakeholders from various backgrounds – gaming technology, behavioural science and research, visual designers, adolescent reproductive health, marketing, project managers, and operations administrators were

interviewed. Purposive sampling allowed the researcher to ensure a balanced representation from each of these fields, leading to a comprehensive understanding of the innovation (Guest, Namey, and Mitchell, 2013).

Subedi (2021) has opined that even small samples are accepted for a case study methodology and that the number of participants is usually determined by the methodology, nature of the study, and information to be collected. Given the nature of our study that requires collecting of data from various multidisciplinary stakeholders engaged in the project at HDI, this would mean getting inputs from most of the employees of this small, women-led business. The rationale for selecting a total of 12 participants was to ensure adequate and sufficient data for addressing the study's research questions. The participant's interviewing process can stop when saturation is evident (Choudrie and Culkin, 2013). Each participant for the study met the following criteria: (a) who was either employed through HDI as a consultant, or vendor, or partner of the GOC consortium, or serves or served with the donor USAID during the product development period of GNG (b) who was engaged with HDI during the game development process for a period of at least 18 months as of October 2023, (c) who was available for an interview between 15 October -15 December 2023, and (d) who had signed the a consent form.

3.7 Participant Selection

A total of 17 internal and external stakeholders were approached for voluntary participation in this research study. The interviews were held between October 15 and November 15, 2023. The final sampling comprised eight internal stakeholders (IS) and four external stakeholders (ES). Internal stakeholders were defined as consultants employed by HDI and engaged with the project for at least 18 months from October 2018 to October 2023. External stakeholders included consortium partners from the GOC project, donors, and vendors involved in product development during the same period. Among these, only one stakeholder opted to complete the questionnaire rather than participate in a one-on-one interview. Three stakeholders (one internal and two external) did not respond to the invitation, and one agreed participant was unable to attend due to travel commitments.

3.7.1 Recruitment and Consent Process

An expression of interest was sent via email, detailing the study's objectives, the voluntary nature of participation, the options for engaging in one-on-one interviews or completing a structured questionnaire, and the measures taken to ensure privacy, data compliance, and confidentiality. Those who provided voluntary consent were furnished with a consent form outlining data protection practices and compliance requirements. Interviews were scheduled only after receiving written consent from the participants.

3.7.2 Research Approval and Participant Contact

Before initiating contact with potential participants, the research proposal, which included the participant consent template, was approved by my Research Advisor from SSBM, Dr. Anna Provodnikova. This approval marked the formal commencement of the research process.

3.7.3 Conduct of Interviews/Survey

All interviews were conducted by a qualified research assistant, an expert in qualitative research methods, utilising Zoom as the platform for interaction. Each interview varied in length, ranging from a minimum of 60 minutes to a maximum of 120 minutes. This approach ensured a comprehensive and in-depth exploration of the participants' perspectives and experiences related to the study. The survey was administered to one respondent via Google Forms.

3.8 Instrumentation

3.8.1 Development and Implementation of Open-Ended Questionnaires

For this descriptive case study analysis, an open-ended questionnaire was developed to facilitate exploratory and descriptive data collection. This tool was specifically designed to gather in-depth insights from both internal (IS) and external (ES) stakeholders. The

questionnaire's design aimed to capture the nuanced complexities within the embedded units of analysis in the case study.

3.8.2 Conducting One-on-One Interviews

Data collection was primarily conducted through one-on-one interviews, employing qualitative surveys. These interviews were designed to delve into the organisation's leadership practices and the challenges encountered during product development and project management within the study period. Participants were given the option to engage in guided interviews or to provide self-reported responses via open-ended written surveys, based on their preference.

3.8.3 Validation of Data Collection Tools

The tools for data collection, including the questionnaire and interview protocols, were rigorously reviewed and validated. This process involved consultation with experts in qualitative research design from India and Canada, ensuring robustness and relevance of the instruments. Additionally, invaluable support and guidance were received from Dr.Anna Provodnikova, my Research Advisor, who played a crucial role in refining these tools.

3.8.4 Holistic Data Collection Approach

As part of a comprehensive understanding for the CS, the research extended beyond traditional data collection methods to include the development of the game's value proposition, customer segments, and an analysis of the game's business model using the Business Model Canvas (BMC). Such a holistic approach, as informed by Creswell and Poth's (2018) methodology, provided a richer view of the subject matter.

3.8.5 Business Canvas Model (BMC) Framework Utilisation and Interpretation

While participants involved in the interviews were offered the opportunity to complete the BMC framework themselves, many expressed a need for additional time and guidance.

Consequently, to ensure timely data collection and leverage the availability of secondary resources, the researcher compiled an integrated consolidated BMC interpretation for the GNG project as shown in Figure 12. The same was shared at a retreat organized by HDI in January 2024, where all employees (including participants to this study) reviewed the BMC and provided critical inputs. This interpretation has focused on exploring aspects related to customer segments and the game's value proposition.

3.8.6 Review of Secondary Research Documents

In addition to primary data collection, an extensive review of secondary research documents was conducted. This review encompassed quarterly progress reports of the GOC project from October 2018, game design documentation detailing the product development team's processes and decisions, and various materials from HDI resources, including abstracts, publications, and presentations at meetings and international conferences. These documents provided valuable insights into the documented challenges faced during product development, enriching the depth and breadth of the research study.

3.9 Data Collection Procedures

3.9.1 Recruitment and Consent of Stakeholders

Letters of invitation were sent to potential stakeholders associated with HDI, inviting them to voluntarily participate in the data collection process. Stakeholders were given the option to engage in one-on-one 90-minute interviews or, alternatively, to submit responses using a self-administered open-ended questionnaire. Additionally, they were provided with a Business Model Canvas (BMC) template to complete and submit via a designated email. Each participant was provided with a consent form to complete before any data collection commenced. Care was taken to ensure that no personally identifiable data was collected from the participants.

3.9.2 Instruments for Data Collection

The primary tools for data collection included a semi-structured interview questionnaire, an open-ended survey questionnaire for those preferring not to participate in one-on-one interviews, and the BMC template. These instruments were carefully designed to elicit detailed and relevant information from the respondents.

3.9.3 Conducting and Recording Interviews

Interviews were conducted digitally and recorded using Zoom. This approach facilitated an efficient data collection process, enabling the capture of nuanced verbal expressions and ensuring a rich dataset. The audio files from these interviews were then transcribed into text format for further analysis.

3.9.4 Data Storage

All transcripts, survey responses, and BMC templates were securely stored on the researchers' protected laptops, with any identifiable information removed to maintain confidentiality.

3.10 Data Analysis

Only anonymized transcripts and coded data were used for analysis. This process involved using pseudonyms or random letters in place of respondents' names to ensure anonymity during collective data analysis. Coding and thematic analysis techniques (Moustakas, 1994) were employed to dissect the data, identifying patterns, elements, and themes that would contribute to meaningful conclusions. Since the sample size was small, all the transcripts were coded and analysed manually without the use of any software.

This analytical process was integral to understanding the nuances of the collected data in relation to the research questions. Four sensemaking workshops, facilitated by an expert in qualitative research, were conducted to review the data analysis and examine the various themes

that emerged from the coding. This workshop focused on interpreting the results in the context of the research questions, providing a critical platform for validating and refining the findings.

The culmination of this research process involved the preparation of a final thesis report, detailing the findings and discussing the results of the CS. This report was subsequently submitted to the Research Advisor, followed by a formal presentation of the study's outcomes. This comprehensive reporting process ensured a thorough and transparent account of the research conducted, its findings, and its implications.

3.11 Research Design Limitations

This exploratory case study offers valuable insights into the development of a digital innovation for social impact. However, there are inherent challenges in conducting research as an employee of the firm being studied. While careful methodological design and a commitment to objectivity and transparency can minimise biases, some limitations persist:

- As the researcher and participants share the same lived experience working in the organisation studied, there may be some hesitancy in respondents speaking openly about challenges encountered at work. Steps to anonymize data help mitigate this, but it remains a factor.
- This research explores a complex topic at the intersection of multiple disciplines - technology, health, social impact, product development, leadership, and various theoretical frameworks. Integrating perspectives across these diverse fields posed challenges in fully capturing the nuances of each. The multidisciplinary scope enriches the analysis, but also constrains delving into specialised depth within each domain.
- Specifically, reproductive health represents a sensitive subject posing unique considerations for research access, methods, and protocols. Navigating this multifaceted landscape stretched the boundaries of a single CS.
- The complex, multi-layered topic warrants more extensive investigation than was feasible for this study to cover all aspects in depth. Prioritisation and focus on the most salient facets were necessary given scope constraints.

- The researcher has limited experience with digital product development, so analysis relies heavily on participant perspectives. An outsider view could provide additional dimensions.
- The small, concentrated population/universe of the study within one organisation presents limitations in diversity of perspectives.
- Time constraints on busy participant schedules condensed data collection. More spacing between interviews could have allowed deeper reflection.
- Overall, while a single exploratory case enables an in-depth look at a specific phenomenon, examining multiple cases can expand perspectives and strengthen the transferability of conclusions. This limitation could be addressed in future research by analysing and comparing across several cases of digital innovation development.
- While the cross-disciplinary nature provides valuable breadth, it also inherently limits the degree of specialised insight.

3.12 Conclusion

In conclusion, this research demanded a qualitative, exploratory CS approach given the complex, multidimensional topic and the need to deeply explore leadership, product development, and project management nuances. Quantifying these subjective, experiential factors would have limited capturing of rich descriptions and insights. The case analysis methodology allowed holistically examining a novel phenomenon within its real-world context through varied lenses. While a quantitative experimental study could isolate and measure discrete variables, this exploratory endeavour required flexible, open-ended inquiry to elucidate the 'how' and 'why' within a dynamic, evolving landscape. By focusing on the experiences and views of the participants, who are also stakeholders to the product development, this approach not only answers the current research questions, but also sets the stage for future studies, including more data-driven research and comparisons between different cases as they emerge. Embracing the detailed and descriptive nature of a CS was essential to investigate the overlap and interactions between various disciplines and practices effectively. Overall, while a single exploratory case enables an in-depth look at a specific phenomenon, examining multiple cases can expand perspectives and strengthen the transferability of conclusions. This limitation could

be addressed in future research by analysing and comparing across several cases of digital innovation development. Further studies could selectively focus on specific aspects within this matrix based on the groundwork established here. Nevertheless, this initial multi-faceted analysis offers a useful foundation and perspective at the convergence of these diverse fields and frameworks.

CHAPTER IV:
RESULTS

4.1 Research Question One: How Did Leadership Practices at HDI Contribute to Developing the Impactful Digital Innovation, Go Nisha Go?

The survey for determining leadership practices at HDI encompassed a range of questions aimed at eliciting detailed insights from respondents (Appendix C). These included challenges faced by individuals in their roles during the three phases of the project, with probing for examples. An exploration of why these were perceived as challenges and what could have aided in overcoming them was also discussed. At all interactions, participants were encouraged to provide examples and reasons behind these challenges.

With a view to evaluate project management during product development, questions regarding the timeliness and quality of the product during delivery of project milestones, including any interdependencies that might have impacted timeliness, were included. The quality of the product was examined in relation to initial expectations versus current reality, with focus on identifying interdependencies affecting quality, examples of these, and suggestions for improvement.

Respondents were asked to reflect on their perception of HDI, specifically concerning leadership within the organisation. Decisions that stood out in terms of impact were explored. The culture at HDI for developing a product like GNG was probed. Finally, the survey sought to understand the perceived risks taken in the product development of GNG, reasons for labelling these as risks, their outcomes, and whether they paid off.

4.1.1 Perception and Evolution of Vision of the Product

To understand the role that leadership practices played during product development, respondents were asked about their vision for the product along with the level of perceived fulfilment of those expectations when they joined the project. Most respondents shared that the initial stages of product development was marked by poor clarity or insufficient vision of the innovative product. Respondent OG stated: ‘It was so nebulous at that point that I didn't really

have an idea about what it would look like, but just the idea of it was very exciting.' Similarly, respondent IY stated: 'All I knew was that it was going to be a role-playing interactive game, multi choice, and things like that.' Additionally, the overall idea of success for the product seemed to revolve around developing specific game features and narrative elements, rather than a comprehensive view of the game's potential impact and innovation. At least two internal stakeholders felt that the team's initial success criteria may have been more about exploring possibilities and developing a prototype, rather than achieving specific, measurable outcomes. More than half the respondents acknowledged that HDI's vision was centred on creating a narrative-driven experience with elements of choice for the players. This focus on narrative and choice indicates an intent to make the game engaging and interactive, allowing players to influence the game's outcomes based on their decisions, providing resources, and a safe space. When asked about the vision for the game, only one internal stakeholder suggested to the donor that it was meant to achieve certain outcomes, and agreed it currently accomplishes building knowledge about monthly cycle, fostering positive attitudes about contraception, improving negotiation skills with partners, facilitating entry points to products/services, changes in behavioural intent and practice. However, there was an underlying and almost unanimous intent to create a successful and impactful product, despite the lack of a clear and unified vision. Additionally, stakeholders' perspective on success also seems to have included creating a positive team atmosphere and maintaining collaborative work ethic. This suggests that success, from the team's point of view, also encompassed a healthy and productive working environment.

As the project evolved, these initial concepts of success appeared to develop into more focused and impact-driven aspirations. For many internal stakeholders, the discussion on vision differentiated between technical and non-technical aspects with considerations to both, the gameplay mechanics and the SRH appropriate content or story side of the game. Unknown to most stakeholders, this ability to draw such a distinction is crucial in product development, as it balances the technical functionality with the creative and narrative aspects of the game, and may be seen as having some basic idea about what constitutes a successful product in terms of vision.

As the project advanced, the stakeholders reflected that the initial notions of success matured into more defined, impact-oriented goals. Respondents highlighted the evolving

discourse on vision, emphasising the balance between technical gameplay mechanics and the content relevant to

SRH. This distinction, though not evident to all stakeholders, was critical in the product's development. It ensured a harmonious blend of the game's technical prowess with its creative and narrative elements. This evolution from a fragmented to a more integrated understanding of success marked a significant transition in the project's trajectory, reflecting a deeper comprehension of the intricate interplay between the game's technical features and its impactful storytelling. Eventually this vision developed into a more holistic understanding of the game's potential, encompassing both its technical aspects and its impact as an innovative digital product as was evident from respondents. For example, respondent QK mentioned, “It was a much shorter game. We didn't have things like the microsite. All the partnerships we have…it started off…as a small, a mid-size version. And then it became a huge version, a large, very extra large version game from what was initially proposed.”.

The game downloads have surpassed 400,000 downloads (GOC Project semi-annual report, Q1, 2024) since the game launched in June 2022.

4.1.2 Taking Risks

In terms of risk-taking, survey participants highlighted various challenges that HDI embraced head on. These included producing bold content in the face of societal taboos, tackling sensitive topics in the game like contraception and consent in sensitive socio-political milieus, and redoing an entire episode and level after its development. They also mentioned revisiting the outcome evaluation methods and replacement of vendors who didn't meet HDI's standards for integrity and reliability. One stakeholder noted that cautiously opposing donors when necessary, when they insisted on including gender-based violence into the game was also a risk that HDI took with mutual respect and success. Additionally, stakeholders pointed out HDI's commitment to crisis management for mitigating any backlash and legal support to handle potential resistance from the community, government, and media. This was seen as a necessary compromise to ensure the innovative product was both available and accessible to the crucial end-users. Other risks that were mentioned by stakeholders involved how the target audience would perceive the

game and maintaining sustained user engagement. This included decisions on marketing tactics, user experience design, and continuous game support and updates. A key challenge was to balance the aspiration for innovative game features with what was technically and practically possible, requiring leadership to evaluate what could be achieved with available resources and technical capabilities.

4.1.3 Organisational Culture

The comprehensive review of the coded data provided an in-depth understanding of the organisational culture at HDI that was characterised by a complex interplay of various elements and sub-elements that collectively influenced the game's development, teamwork, and risk-taking approaches.

Open communication and the embracement of innovation were prominently featured in the data regarding HDI's culture. The insights from the respondents highlight this theme. Respondent AJ emphasised the importance of allowing room for experimentation and the acceptance of failure as a part of the innovation process, stating: "How do you get innovative without failing?...So you know, we allow for experimentation, we allow for failure. And I think that's part of our secret sauce." Similarly, respondent XS shed light on the strength of the culture in fostering idea-sharing, though acknowledging occasional lapses, "I think the culture really is strong in the sense, people being able to share their ideas for the most part. We did have some (instances) when not everyone felt they could share. But in general, I think that we have open discussions, and so that supports (the) right creativity and innovation". These perspectives collectively underscore the significance of open communication in promoting creativity and innovation within the organisation.

Stakeholders' statements reflect that they felt empowered to propose unconventional solutions, which was crucial for a project as ambitious as GNG. It was highlighted that the culture was collegiate, supportive, friendly, but some are hard to work with, which indicated how adaptability is another key trait that surfaced in the findings. The ability to pivot and adjust to new challenges was essential in the fast-paced environment of game development. Respondent OG stated, "Figuring out a new way to do something that was going on all the time…It was

iterative...it was very adaptive. That's the word." This adaptability was particularly evident when the team had to go back to the drawing board after developing an entire episode and level.

4.1.4 Working and Leadership Style

Building relationships and collaboration was also seen as a vital element of the leadership style that the organisational culture encouraged across all respondent data. Cross-departmental teamwork was encouraged, with respondent QK noting, “Teamwork can work…, I would say 80 to 90% of the members of our team are committed, totally committed...We've been fortunate… as a very small group of individuals, and working with our vendors, our sub-awardees have been great overall." However, there were also mentions of occasional inter-departmental silos that created gaps in workflow. While building relationships and openness was largely beneficial, it also presented challenges as outlined by internal and external stakeholders. An external stakeholder pointed out that being too open sometimes led to an overload of ideas, making it difficult to decide on a clear direction. This was also echoed by internal stakeholders who indicated that the abundance of ideas sometimes led to decision paralysis. Additionally, the lack of established systems for decision-making was pointed out as a hindrance, leading to delays in development and project management inefficiencies.

The organisational culture's approach to overwork and burnout also emerged in the findings, almost always with internal stakeholders. While there was a strong emphasis on meeting project deadlines and pushing the limits of innovation, respondents expressed concern that this sometimes resulted in extended working hours. One respondent mentioned, "There is (sic) moments where there wasn't enough structure…there was a consequence for that because at times, ...if the behaviours become problematic, .. you have to bring people in and you have to do it fast. And that didn't always happen at HDI."

Varying time zones was also attributed by more than one internal stakeholder as stressful. However, it was also noted that respondents also praised HDI for taking steps to address this issue, with initiatives to promote work-life balance and provide support for employee well-being. Leadership has encouraged candid feedback, fosters learning, and demonstrated openness to critique that has supported continual learning and improvement in teamwork and collaboration.

Overall, respondents felt that HDI has cultivated an organisational culture that encourages owning failures, learning from mistakes, and iterating solutions. Respondents had divergent views on their perception of HDI's producing the GNG game, aligning with HDI's values, with only internal stakeholders remarking that the unique and fun launch, insistence on high standards, personal growth in decision-making, and remarkable dedication from team members mimicked the organisation culture. At least one stakeholder observed that in the past, HDI's culture suffered from misalignment, partly due to unrecognised contributions. However, they noted a significant shift, indicating that the organisation's culture is now poised to strongly resonate with and be aligned to the GNG initiative.

4.1.5 Decision-Making

Speaking of the organisational culture at HDI, respondents' statements were marked by a blend of positive traits such as open communication, adaptability, collaboration, and a shared vision, all of which contributed to the game's successful development. This aligns with their adaptive leadership style. However, the culture also faced challenges related to decision-making processes, inter-departmental collaboration, and the handling of overwork and burnout. The leadership style combines elements of situational leadership (assessing what each circumstance requires) and adaptive leadership (empowering others and driving change); however, leadership still needs to adapt to individual styles which are diverse within a multidisciplinary global team. Understanding these dynamics is crucial for comprehending how the organisational culture influenced not only the development of GNG, but also the team's overall work environment and approach to digital innovation.

4.2 Research Question Two: Product Development vs Project Management

How Were Product Development Outcomes Aligned with Project Management Goals at HDI during Development of an Impactful Digital Innovation?

4.2.1 Innovation Assessment

To gain insights into HDI's optimization of product development and project management for GNG, which was proposed as an innovation product, respondents were

presented with a series of questions that delved into their perceptions of innovation, specifically whether GNG was considered innovative and the reasons for this classification. The qualitative discussion extended to factors facilitating effective project management in relation to product development. Key questions included: discerning if GNG was seen primarily as a digital innovation or as a reproductive health initiative, and the reasoning behind this perspective; and comparing the focus on project management against the nuances of product development. This approach aimed to unravel the intricate balance between managing the project's operational aspects and nurturing the innovative essence of the product. Shenhar and Dvit (2007) had highlighted how the synergy between these two disciplines is essential for aligning the long-term strategic vision of product managers with the tactical, day-to-day focus of project managers, facilitating the efficient and effective realisation of business objectives. This Chapter describes respondents' views on these issues.

Most respondents viewed GNG as innovative, judging by metrics used to measure its effectiveness. The primary metric was the impact and reception from end users, including Google Play store ratings and reviews, which indicated relatability with the target audience. Real-life impact and multiple evaluation metrics, such as in-app link clicks and downloads, player engagement, information retention, and messaging appropriateness, were highlighted as indicators of innovation. The idea of external validation to benchmark innovation was supported, with one respondent suggesting that adapting the game based on analytics for positive impact elsewhere, could affirm GNG as a hallmark of innovation. Concerns were raised about HDI's current infrastructure, suggesting it might hinder measuring innovation effectively.

Other perceptions of GNG that varied among respondents, were viewing GNG as a digital innovation, or a reproductive health initiative, and some seeing it as a blend of both, with more than one respondent sharing the view that meeting the needs of the end-user qualifies as an innovation, which could be underscoring the multifaceted nature of the project. At least half of the respondents suggested that Direct to Consumer (DTC) approaches with in-game links, and the predictive analytics woven in the game, made it a digital innovation. An equal number agreed that the assessment currently focuses on traditional indicators related to SRH, measuring knowledge, attitudes, and practices. However, the team acknowledged the challenge of quantifying the innovation. Respondent AJ stated, “We're looking at indicators related to sexual

reproductive health…we are measuring increase in knowledge and attitude and practice, and all of the traditional indicators that a program would measure. And I think this is an outstanding question, because no, we're not really measuring innovation."

4.2.2 Product development outcomes or project management goal

The perceptions about the digital innovation varied, with some members viewing it as a product, while others, including the funders, saw it as a project. Many members leaned towards perceiving it as a product. However, the funder was described as understanding, cooperative, and open to the nuances of product development despite having a project perspective. More than one respondent highlighted tensions within the team, stemming from disparate views and lack of clarity between product and project differences. Some members were uncertain in their categorization given limited interactions, though described funders as fast decision makers. External stakeholders saw it as a novel venture with a steep learning curve, making definitive categorization difficult. Overall, there were divided perspectives, but a predominant view that funders perceived it as a project. Key recommendations were that funders providing grants for product development should utilise product-focused metrics and monitoring tools, along with branding it as a product rather than a project. There was also recognition that projects end but products live on, as one respondent XS reported: "People ten years now aren't gonna remember the project. The artefact, so to speak, from all of this will be the product. That's the thing that now has life… the project has moved on to other things. But when you go home, you take it as a product so products should be the focus, which could have included sustainability measures". The varied perceptions, tensions, and learnings highlight the importance of aligning understanding of product versus project elements when collaborating across different disciplines.

This segues into understanding stakeholders' perceptions of aligning project management goals with product development outcomes. Perceptions on whether tradeoffs occurred between meeting project and product needs varied among participants. Some noted no major trade offs, while others described instances where product development needs were prioritised over project timelines and metrics. Leadership was viewed as balancing tradeoffs by seeking opportunities beyond the project/product scope. Mostly external stakeholders who were technical, concurred that everyone was invested in product development, and product quality was favoured over

project timelines. For example, respondent ZN stated: “Like HDI, their goal is that they have to meet certain metrics right, that these are things we promised our donors. So we are going to make sure this happens. Even if that messes up in the product. It's fine because it's a trade off, right”? However, an equal number and almost all internal stakeholders mentioned that managers avoided conflicts by not addressing product challenges, favouring the project needs in those cases. After launch, tradeoffs arose during product promotion activities. There were also clashes around portraying the product perspective versus outcomes. Overall, there was no uniformity in the perceived tradeoffs among technical and non-technical stakeholders. The qualitative inputs revealed a modest number of responses related to project management with factors related to delays, their causes, and impact. Almost all respondents agreed that technical deliverables related to the product development were mostly timely, and if delayed, were more to do with systemic issues at HDI. Delays were attributed to detailed content reviews, coordination challenges during the pandemic, and decision-making bottlenecks about the content of the survey tools for evaluation.

Despite the setbacks, the majority of respondents agreed that these delays ultimately contributed to improving the quality of the product. Almost all respondents unanimously indicated that the high quality came from factors related to the game features, its relatability and design, with positive feedback from players on providing good information, its uniqueness, engaging and interactive content, and comprehensive nature. Stakeholders mentioned that positive feedback was received from players who expressed emotional connections, and teachers who showed interest in the product. Aesthetic aspects like beautiful visuals and realistic designs contributed to the perceived quality. One stakeholder mentioned it could be viewed as an effective educational tool that succeeded in breaking taboos. While another stakeholder mentioned it was a lack of comparable tools in the market that raised this product as a high quality product.

Some respondents noted room for improvement. A lack of technological expertise and resolution of language issues were seen as factors that could have contributed to a better quality under product development. Most respondents concurred that the project predominantly concentrated on product-based attributes, and adapting to emerging trends would be constrained due to content-related interdependencies and issues with timeliness. It was suggested that the

quality of production might have been higher in a commercial space where delays are less tolerated. At least two respondents observed that the preferences of certain individuals influenced the game's aesthetics, including elements such as skin colour, attire, setting, and physical interactions. Despite its notable quality, the product's scalability and elevated acquisition costs were highlighted as areas of concern. As respondent NX stated, “The team truly rendered the idea of a role-playing game and the predictive analysis very well…but in the business side of things it failed.” Almost all external stakeholders felt that the monetization component for the product could have been planned more strategically, while an equal number felt that providing the product free of cost to the end user was a social impact that outweighed commercial benefits.

All respondents agreed that the focus on product development was affected by project management timelines and vice versa. Secondary data review from semi-annual reports over four years of project management suggests that the COVID-19 pandemic significantly disrupted design testing and field visits, marketing timelines, and related activities for the game led to the most delayed milestones, setting off timelines by eight to 12 months.

4.2.3 Integration of Multidisciplinary Frameworks

Respondents agreed that HDI had navigated the complexities of product development ambitiously in the integration of various multidisciplinary frameworks, while developing an impactful digital product**.** Majority respondents identified formative research, with its beneficiary insights and needs, and the development of game learning objectives as driving factors in the product development process, that also rendered credibility to funders and partners.

Respondents were able to name theoretical frameworks that validate improved learning outcomes through gameplay and roleplaying among frameworks that GNG is based on. At least three respondents mentioned that principles of human centric design principles were used to guide product development. Only internal stakeholders enumerated the Proteus Effect and emphasised the creation of avatars resembling users for relatability and decision-making alignment. Some respondents mentioned incorporating elements of challenge, conflict, discovery, and feedback to enhance various metrics such as health, relationships, and confidence,

but were not able to name theoretical frameworks that validated this approach. One internal stakeholder mentioned that gamification elements were integrated into the game, alongside a senior leadership's thesis on application of games for behaviour change. Social behaviour and learning theories were mentioned by one stakeholder each. The TOC was recalled by a majority of internal stakeholders that underscored the need for improving game outcomes by influencing knowledge, attitudes, and behaviours among players. Frameworks related to nudges or consumer behaviour, which are outlined in HDIs' publication on design led theory of change (Shankar, Dixit and Howard, 2023), were not mentioned by any stakeholder.

4.2.4 Management of Timelines and Deliverables

Respondents also unanimously agreed that more than product development, marketing issues that were monitored, tracked, and delivered, were not as timely. Originally planning expanded social media promotion and website launch aligned with an October 2021 game release, was pushed back due to pandemic delays, hindering full digital marketing strategy implementation. Almost 6 to 8 months were focused on merchandising products that was not relevant at that early stage in product development. Contracting the marketing agency also took longer than expected, due to an extensive procurement process. Design revisions outside the original scope led to timeline extensions. Feedback incorporation and iterative alignment across partners slowed episode finalisation. Consensus-building processes to ensure quality also caused delays. Extended reviews of scripts/storyboards by USAID and changes after the Minimum Viable Product (MVP) demo, further impacted timelines. Recruitment of voice over artists and recordings were postponed as well. Ultimately, the launch was pushed off by nine months from October 2021 to June 2022.

A review of the semi-annual reports from 2021-2023 indicates that the marketing media strategy struggled to reach the target audience. This insufficient market penetration stemmed from an inadequate understanding of the media landscape and difficulty identifying the most effective communication channels. Crafting resonant messages and content proved challenging given the game addressed sensitive topics like empowerment and reproductive health. This required extensive consensus-building among stakeholders and careful consideration to ensure appropriate, sensitive, and engaging marketing. Partnership engagements, a key marketing

strategy, needed alignment on the game's goals and messaging, often causing delays or inconsistencies. Budget and personnel constraints affected the scale and reach of marketing campaigns. With limited resources, the team prioritised certain activities over others, potentially limiting market penetration. Difficulties measuring marketing effectiveness hindered adaptation. This includes tracking user engagement and conversions from different marketing channels to optimise impact. Despite the game's significant success in garnering downloads and user engagement, the encountered marketing challenges underscore the intricate nature of promoting digital initiatives in varied and evolving settings, particularly impacting the timeliness - a crucial aspect of project management. The collaboration with partners like Girl Effect, known for its Cha Jaa campaign, which already had a successful reach of a million girls, was expected to yield mutual benefits. However, this partnership did not demonstrate the anticipated synergistic effect, highlighting the need for more effective collaborative strategies in future projects. The team's learnings can inform future strategies for more effective, impactful outreach to the target audience through ensuring marketing strategies are strategically developed during product development.

4.2.5 Steering Game Evaluation Challenges

Information from the semi annual reports offer data about delays in the outcome evaluation, primarily initiated by the change in vendors and consultants. This led to a six-month postponement in the execution of the outcome evaluation. The development phase was marked by extensive deliberations over the research design, including repeated revisions of survey tools, and determining the most suitable survey method for unmarried adolescents facing sensitive SRH questions. Addressing potential community and parental concerns, as well as coordinating with community-based organisations for participant recruitment, added further complexity to the process. Obtaining local IRB approval was another hurdle, particularly due to changes in the research methodology. To ensure the feasibility of the research design encouragement study and survey tools, a pilot study was essential, given the novel approach of conducting a randomised controlled trial (RCT) to evaluate a mobile game app focused on SRH issues. The RCT finally commenced with a baseline survey in December 2022 and the endline surveys concluded in September 2023. The baseline survey itself faced delays due to the limited availability of girls,

largely because of their exam schedules. Additionally, incorporating critical tasks, such as profile code extraction into the existing agreement with the vendor, further impeded timelines. While the addition of the profile code was necessary, it triggered a domino effect, delaying subsequent activities. Despite these challenges, negotiations for high-quality deliverables with vendors were crucial in ensuring the delivery of robust and reliable outcomes.

4.2.6 Aligning Product Development Outcomes with Project Management Goals

From the RCT findings, it appears that combining digital innovation and SRH education with the alignment of product development outcomes with project management goals, was partially successful. The product was recognized for its innovation, gauged by user engagement and Google App Store feedback. Despite its creative approach, GNG faced challenges, particularly in project management.

Respondents agreed that the project's strength was its high-quality, educational content. However, it encountered delays due to HDI's internal issues and pandemic-related disruptions, affecting timelines, but contributing to quality improvement. As seen above, technical deliverables were mostly on time, though impacted by content reviews and decision-making processes. Most respondents believed that the marketing and outcome evaluation aspects of the project experienced the most delays, with struggles in reaching the target audience, delays in research design, and survey implementation. Overall, while HDI effectively delivered a complex, impactful product, the project underscored the necessity for a more balanced approach in harmonising project management with innovative product development, especially in multifaceted and innovative initiatives like GNG.

4.3 Research Question Three: What Were the Key Learnings from the Challenges Faced by HDI in the Development of GNG and How Can These Insights Inform Future Digital Innovation Efforts for SRH or other Multidisciplinary Collaborations in the Social Impact Space?

4.3.1 Systemic Challenges

Almost all respondents, encompassing both internal and external stakeholders, identified work hours and the challenges of remote work as significant issues. The necessity to coordinate across different time zones often led to delayed responses and meetings at unconventional hours. A majority of internal stakeholders specifically pointed out the detrimental impact on work-life balance, attributing it to prolonged virtual calls held at odd hours. At least two stakeholders provided examples illustrating how remote work diminished human connections, leading to miscommunications and interpersonal challenges. The lack of personal interaction in a virtual work environment was also cited as a factor negatively impacting team coordination.

Issues related to human resources were frequently mentioned. These included role confusion and unrealistic expectations, which contributed to workplace tensions. While team collaboration was generally viewed positively and credited for the development of a high-quality product, deeper discussions about team dynamics during remote work revealed a more varied response. Only two stakeholders described scenarios of difficult personalities, tensions, and micromanagement by supervisors. The same respondents mentioned the absence of agreed-upon norms for effective and safe communication, leading to tensions caused by conflicting project and product mindsets. There was a perception that working with certain team members resulted in suboptimal outcomes. Despite a seemingly flat hierarchy, there were perceptions of imbalanced power dynamics. It was noted that conflicts arising in team discussions often had to be resolved internally, even though decisions were ultimately made by the leadership.

Over half of internal stakeholders admitted to experiencing burnout. Concerns were raised about the growing workload, which seemed to increase even with new hires. The issue of staff redundancies, leading to additional workload and messy transitions, was also brought up. As respondent QK reported, “ We brought on some more staff..but it's been very difficult. I've been thrown a lot of responsibilities that I still have. Some others were let go. The last 12 months have been very, very busy.”

At the project management level, some stakeholders felt that the dependency on research inputs for product development and the iterative nature of developing a novel product were

demanding. Many expressed concerns about the lack of clear, common goals, despite having detailed personal scopes of work.

Discussion on organisational challenges from respondents elicited a variety of views. A primary challenge stemmed from HDI's unfamiliarity with being the prime grantee of a substantial grant. This role entailed a comprehensive responsibility for all reports, regulations, and the creation of various deliverables like work plans, branding strategies, and recruitment processes. Additionally, navigating funding avenues in the context of traditional NGO models, which didn't align well with HDI's unique work, presented difficulties. Decision-making processes were often protracted due to multiple rounds and a lack of efficient tools, with a noticeable reluctance to adopt new, more agile technological tools. Building an understanding of the project's nuances, especially for new members, was challenging.

Building an understanding of the nuances of the project was particularly challenging for new team members, who had to quickly acclimate to the project's scope and objectives. This included explaining to the team, partners, and external stakeholders the evolving nature of the innovation, a task that proved to be complex given the project's dynamic development.

4.3.2 Technical Challenges

A key game-related challenge that respondents highlighted involved complexities in integrating sensitive SRH educational content within the game mechanics. This task required a careful balance between maintaining user engagement and ensuring the educational value of the game. Internal respondents who had a technical background shared that developing a pioneering game in the SRH/family planning space, without an existing model in the gaming space among unmarried adolescents in India, posed unique challenges. It required extensive research, collaboration with vendors, pushing developers to innovate and aligning the game's content with user needs, demanding innovative approaches for continuous adaptability. Most respondents acknowledged that the pioneering nature of the game development, particularly in the context of family planning and SRH posed its own set of challenges. There was a need to navigate uncharted territories, with limited prior examples or benchmarks to guide the development

process. External stakeholders identified aligning the game mechanics with HDI's complex decision-making processes as a significant challenge, particularly in accurately reflecting and influencing the users' decision-making in sensitive areas like SRH.

At least one internal and one external stakeholder identified one of the initial setbacks as the game's linear level progression, which restricted players from accessing content of their choice directly. This design flaw was counterproductive to the objective of engaging adolescents in a flexible learning environment. Two stakeholders who had technical and product development qualifications pointed out that GNG product development relied only on a technical Game Design Document as the sole guide for content and messaging. This limited the scope for incorporating diverse educational strategies and insights, as well as the opportunity for integration of a holistic product development playbook, beyond the MVP or beta prototype development and its launch.

A respondent highlighted another game related hurdle of the simultaneous launch of all five game levels after a lengthy development cycle of almost 2 years. The internal stakeholder opined that such an approach seen in management of USAID funded projects, hindered the ability to incorporate early user feedback which is crucial for iterative 'product development' in digital platforms. Another insight from several internal stakeholders was the integration of videos and supplemental learning materials within the game that was perceived as intrusive by players, disrupting the learning and educational flow.

Several respondents, all internal stakeholders, highlighted HDI's experience with integrating donor-requested topics like gender-based violence into the game. This integration needed careful handling to align with the game's narrative while not overshadowing the original content. However, upon assessing end-user perceptions, it became necessary to redevelop the narrative from scratch, incurring additional costs. Respondent AJ stated, "The lesson learned from that is to put the girl at the centre… and be able to push back on your boundaries with the funder…gender based violence wasn't part of our original objectives. So, being able to challenge that… if you think about all of the factors that contribute to gender-based violence. It's the ability to communicate the ability to negotiate openness, all of that is in the game. So that's what we were able to convince them."

Both internal and external stakeholders expressed that marketing the game brought about significant challenges. In terms of communicating its value proposition to the intended audience, at least two stakeholders observed with examples of missing the mark in audience alignment, crucial for effective marketing. This was seen as a critical oversight, as the audience, while aspirational, was also deeply ingrained in cultural norms and traditions. The respondents highlighted the need for a marketing strategy that recognizes and integrates these regional nuances, especially with respect to use of social media and influencers to effectively connect with a larger proportion of the target audience. The difficulty in bridging the gap between the game's innovative features and the actual needs and cultural contexts of its audience was a recurrent theme in their feedback. Some respondents shared that the COVID-19 pandemic and conflicting approaches to game promotion further complicated the testing and launch phases. Additionally, with the integration of videos and learning materials, initially disrupting the educational flow, the microsite, a dedicated page led to the creation of a separate platform for resources, which introduced a trade-off, as the DTC approach lacked seamless integration, underscoring the need for expertise in developing such educational tools. Respondent ZN stated, "It was clear to us from testing sessions that people just found this stuff disruptive to the process. You know, you're immersed in a story. The narrative is actually moving. And then suddenly, you're like, hey, here are five products, you have to click on them to move ahead. And we're like, this doesn't work because you are interrupting the experience. If we always knew this was going to be a DTC product, we should have found partners who could have been integrated into the storyline itself."

A majority of the respondents identified several game assessment and evaluation related issues during the discussions about the challenges of GNG development. While the primary concern was the uncertainty regarding the effectiveness of various game features and their impact, there were difficulties in determining the extent to which the game influenced behaviours and knowledge of its target audience. At least two stakeholders with product development backgrounds questioned the reliance on traditional offline methods for evaluating the game's impact, as it posed logistical and financial challenges undermining the effectiveness of the assessment. A majority of internal stakeholders raised concerns about the multiple assessment vendors, who were responsible for evaluating outcomes, based on behavioural parameters

through an expensive randomised Controlled Trial (RCT) study. These vendors were perceived as slow and traditional in their approach, lacking the innovative thinking necessary for designing an assessment that met the unique needs to evaluate a digital game. Their focus on behavioural outcomes, although crucial, was seen as too narrow and hindered the accurate measurement of the game's overall success. Moreover, the research process encountered several challenges, notably in obtaining local Institutional Review Board (IRB) approval for working with adolescents on sensitive subjects. Delays in acquiring local IRB approvals significantly impacted the initiation of field research, which in turn deferred the analysis of data and distillation of findings.

4.3.3 External Challenges

A. Uncertainties during COVID-19

During the project period, the COVID-19 pandemic profoundly affected the timeline and execution of the GOC Project's initiatives. Respondents shared how HDI adapted its strategies, frameworks, and practices in several ways to address the uncertainties and challenges brought about by the global health crisis. Most stakeholders maintained that the HDI team always worked remotely and the global pandemic did not usher in any changes in workplace/due to the pandemic. HDI also invested in virtual collaboration tools and redefined meeting structures to maintain a collaborative spirit in a virtual setting.

Stakeholders pointed that product development was at a critical juncture and travel restrictions imposed considerable constraints on research activities. The pandemic led to cancellation of field-level design testing with adolescent girls, a key demographic for the GNG project. This necessitated conducting all design testing activities remotely, which was a significant departure from usual field-based work that would have allowed for better interface with end users. External and internal stakeholders highlighted that remote research and prototyping forced the team to work unusual hours to accommodate respondents' schedules, leading to dilated working hours and challenges in balancing business-as-usual activities. While remote meetings replaced in-person interactions, there were concerns voiced by a couple of stakeholders regarding the effectiveness of digital methods without visual evidence.

While fieldwork experienced significant delays, almost all respondents had health challenges with several internal and external stakeholders affected by COVID-19, either as caregivers or through their own health issues. However, almost all respondents acknowledged that HDI prioritised employee well-being, which was crucial in maintaining team morale and productivity during these challenging times.

This disruption extended beyond research endeavours and product development of the game, to participation in national and international conferences, resulting in a series of postponements, cancellations, or necessary modifications to the original plans. At least three internal stakeholders highlighted the challenges in navigating and negotiating financial resources with donors during this period, affecting project funding and timelines.

B. Funder Issues

Technical internal stakeholders who had worked earlier with USAID mentioned that understanding and adapting to the American government's perspective on reproductive issues, while establishing trust with a first time prime partner about developing a high quality innovative product, presented significant obstacles. The project encountered bureaucratic and compliance-related delays initially. Integrating gender-based violence (GBV) content into the project, as per the funder's requirements adversely affected the storyline. However, the funder eventually endorsed and financed a substantial revision. Additionally, a shutdown of the US Government critically hindered USAID's functionality, leading to postponed reviews and approvals of work plans and budgets, subsequently impacting the project's schedule and submission of deliverables.

It is important to acknowledge that almost all stakeholders universally recognized the funder's cooperative and responsive nature. Decision-making processes with USAID in Washington D.C. were seen as notably swift and effective. However, bureaucratic delays from the USAID India Mission for reimbursement of local taxes that were to be reclaimed after local government tax exemption procedures were challenging and took over two years. Furthermore, many stakeholders highlighted the funder's flexibility, particularly in weighing the demands of project management against the need for enhancements in product development. Respondent QK mentioned, “USAID was very, very supportive. The good thing was just about five months

before Covid hit… we had a meeting of key staff with USAID… they told us we can get more budget…we can extend our plan up to five years. And we could basically get a substantial budget, so we were able to upgrade to that." This openness to the intricacies of product development was especially crucial when navigating between project management objectives and product improvement.

C. Vendor Related

Survey respondents highlighted several challenges in managing vendors during the project. Key difficulties included aligning vendors with the project's vision and ensuring they met our standards. Late changes in research teams, and the shift from a non-contextual to an Indian game developer also posed problems. Although HDI collaborated with a consortium of partners, some respondents felt that these partners, while cooperative, did not fully engage with HDI in a mutually beneficial manner, and instead saw their role more as service providers. Vendors were often perceived as lacking innovation and enthusiasm for working on a novel project. Managing these vendor relationships required significant time and effort from internal stakeholders, even with detailed scopes of work and timelines in place. Respondent OG mentioned, "The (vendors) that we hired were unbelievably slow, and the person that they assigned this to was a junior, who didn't know what they were doing. They have been unbelievably unresponsive and they just don't seem to care about it. I mean, it was very low on their totem pole." Furthermore, vendors frequently charged extra for additional work, which respondents attributed to lack of onboarding systems before agreements were prepared to delineate the requirements from the technical teams. This situation added to the complexity and resource demands of the project's vendor management aspect.

D. Legal

Respondents shared that the sensitive nature of the topic necessitated legal advice from Indian experts. Additionally, the Indian government's introduction of new laws to update IT compliance, especially for digital and social media, led to complex decisions regarding data privacy and protection during the game's launch phase. Although GNG didn't collect any personally identifiable information, it still had to comply with numerous regulations, including

enhanced governance and encrypted data storage at the systemic level. Furthermore, USAID's General Service Administration (GSA)/SAM's shift to a new Unique Entity Number (UEI) system posed difficulties in finalising contracts promptly.

4.3.4 Product Potential

Input to the Business Canvas Model, the product's potential and monetization capability was discussed where respondents shared several insights. Many acknowledged the project's financial potential, but said it faces challenges gaining investors who prefer established competitors. Participants revealed that while expensive to maintain and expand, sponsors should fund costs so beneficiaries aren't charged.

When asked about avenues for monetization, respondents proposed corporate social responsibility, government funding, paid apps, partnerships, and impact bonds. Some suggested monetizing in-game links through profitable partners, and strategic marketing efforts like small-scale pilots. However, some respondents questioned the project's commercial viability, citing high production costs that could make the first product unsustainable. Participants also noted a lack of expertise in monetization and unactualized financial potential from high acquisition costs and scalability issues. Several revealed that people rarely pay for apps, especially the target audience, the underserved, posing difficulties. Options like advertising and subscriptions were explored, but required ethical considerations and implementation challenges. Targeting partners and CSR was seen as potential by many, with Google ads a last resort.

Leveraging Artificial Intelligence (AI) was seen by some respondents as a crucial element for GNG's growth and expansion, showing awareness of the evolving technological landscape and the advantages AI could bring. However, opinions varied regarding the overall potential, acknowledging the challenges of rapidly changing technologies. Concerns about backend issues, such as the lack of open-source access and budget constraints, were noted as potential obstacles, highlighting the practical limitations affecting the products' scaling potential.

4.4 Summary of Findings

The results show that the development of GNG was shaped by HDI's leadership practices. Initially, the focus was on game features and narratives, lacking a clear, unified vision. As the project evolved, a more integrated understanding emerged, balancing technical gameplay with SR content. Risk-taking in content production and addressing sensitive topics like gender-based violence were key. The organisational culture at HDI, marked by open communication and innovation, played a crucial role, although challenges like decision paralysis and balancing project-product mindsets existed.

In terms of the alignment of product development outcomes with project management goals, the results revealed complexities. The game was seen as innovative based on user engagement and impact. However, different perceptions of it as a digital innovation or a SRH initiative created tensions, highlighting the need for common understanding of a unified approach. Challenges in marketing and outcome evaluation were notable, impacting project timelines. Despite these, respondents unanimously lauded the game's quality, but raised concerns over scalability and cost.

The results also show development of GNG presented challenges that were systemic, technical, and related to external variables, such as the COVD-19 pandemic, vendor management, and the funder. Systemic issues included remote work difficulties, role clarity of personnel, and impact on work-life balance. Technical challenges revolved around integrating SRH content into the game and marketing it to a diverse audience. External factors like the COVID-19 pandemic and new government regulations on IT compliance affected the project. Vendor management was also a hurdle, requiring significant effort from internal stakeholders. These insights underscore the need for clear vision, communication, adaptability, and a balanced approach to innovation and project management in developing impactful digital products.

The product's potential lies in its financial viability, but challenges exist in attracting investors who prefer established competitors. Monetization avenues include corporate social responsibility, government funding, paid apps, partnerships, and impact bonds. Some expressed concerns about high production costs and scalability issues, while targeting partners and CSR were viewed as potential strategies.

4.5 Conclusion

From results of the exploratory qualitative survey, the challenges navigated by HDI while developing an innovative digital product, the following results were presented: initially lacking a clear vision, HDI cultivated a culture of innovation and risk-taking. The game was seen as an innovative digital product, but different perspectives created tensions between product development and project management. While the quality was praised, concerns existed around scalability and costs. Key hurdles were systemic issues, like remote work difficulties, integrating sensitive content, implementing appropriate marketing strategies to the target audience, COVID-19 disruptions, complex vendor relationships, and navigating regulations. Insights include the need for unified vision, communication, adaptability, and balancing innovation with project management. The product has financial potential through channels like corporate partnerships, but production expenses pose viability concerns. Overall, the mobile app "Go Nisha Go" underscores how HDI navigated impactful digital innovation by harmonising vision, transformational leadership practices especially promoting a non-hierarchical culture of risk taking and decentralised decision making, balancing product development priorities over project management outcomes, contextual adaptability, and a human-centric focus committed toward social impact.

CHAPTER V:
DISCUSSION

5.1 Discussion of Results

In this discussion chapter, a thorough analysis of HDI's leadership role in the development of GNG is provided. The analysis focuses on three key leadership styles: Situational, Transformational, and Agile Leadership, which were observed throughout implementation of this digital innovation. Furthermore, I assessed the challenges encountered in project management and product development. Finally, the discussion looks at strategies that can improve HDI's adaptability, stakeholder engagement, and risk management for future digital innovation readiness.

5.2 Discussion on Leadership Practices at HDI

The journey of HDI in developing GNG underscores the critical role of leadership and organisational culture in digital innovation. The leadership frameworks that prominently emerged were a blend of Situational and Transformational Leadership, supplemented by Agile Leadership principles.

5.2.1 Leadership and organisational Culture in Digital Innovation

The exploration of leadership practices at HDI during development of GNG reveals a multifaceted journey, marked by both accomplishments and challenges. Initially, the project grappled with a lack of clear vision, but evolved into a focused and innovative endeavour under dynamic leadership. The adaptability of leadership styles, transitioning from directive to empowering, was crucial in responding to the project's evolving needs.

HDI's leadership adapted their style to the evolving needs and maturity levels of their team, demonstrating the principles of Situational Leadership (Hersey and Blanchard, 1969). This adaptability was vital in navigating the diverse challenges of a rapidly evolving complex digital innovation project, particularly within the South Asian cultural context where hierarchical and

seniority aspects played a significant role. Additionally, the Transformational Leadership framework was evident in the way HDI's leadership inspired and motivated the team towards embracing the game's potential for breaking societal taboos (Bass and Riggio, 2006). This leadership style was instrumental in fostering a sense of purpose and commitment, encouraging innovation and creativity. HDI's leadership also demonstrated agility and adaptability, echoing the Agile Manifesto's principles. This approach was pivotal in navigating complexities of digital game development, underscoring the values of adaptability, collaboration, and customer-centricity (Beck et al., 2001). The leadership's evolution from a directive to an empowering style facilitated a culture of open communication and innovation, aligning with Agile principles of valuing individuals and interactions over processes and tools (Highsmith, 2002). Agile Leadership principles were also crucial in managing risks and uncertainties. This approach, which emphasises adaptability, responsiveness to change, and continuous improvement, was essential in the rapidly evolving landscape of digital game development (Cohen, Lindvall, and Costa, 2004).

However, the leadership and organisational culture at HDI were not without challenges. The team dynamics faced issues like uneven workload distribution, stress, and burnout (Moe et al., 2010), reflecting areas for improvement in leadership and organisational practices.

In decision-making, the blend of strategic initiatives and challenging choices highlighted the complexity of leading innovative projects. Decision-making processes were complex, with some decisions criticised for misalignment with the product's strategic goals, highlighting the need for a balanced approach. The leadership’s approach to risk-taking fostered creativity and innovation, but also brought to light the pitfalls of strategic risks. Some decisions, especially those described as "agenda-driven," were critiqued for misalignment with the product's strategic goals, underscoring the need for a more nuanced and balanced approach to decision-making. Decisions on complex predictive analytics caused confusion, potentially diverting resources from the core project, with unclear integration impact.

The findings suggest HDI's leadership effectively navigated intricacies of digital innovation by blending different leadership styles. However, the journey also highlighted the necessity for more nuanced decision-making processes and strategies to manage workload and

prevent burnout. The organisational culture at HDI was instrumental in influencing risk-taking and decision-making, with various leadership styles contributing to the project's innovative thrust. However, this culture also led to instances where the balance between innovation and practicality could have been optimally managed, resulting in improved efficiency of investments. While the leadership at HDI demonstrated significant strengths in guiding the GNG product development, the findings highlight the importance of clarity in vision, balanced risk-taking, effective workload distribution, and the need for leadership styles that not only inspire innovation but also ensure practical and strategic alignment with project goals. This dynamic interplay of leadership practices, organisational culture, and strategic decision-making shaped the development of GNG, which offer valuable insights into both the successes and areas for improvement in leading innovative digital projects.

5.3 Discussion on Product Management vs Product Development

5.3.1 Project Management and Product Development

The development of digital innovation presented challenges to HDI in balancing project management goals with the innovative essence of product development. While the innovative aspects of the project were highly praised for their design and relatability, the project management aspect faced several challenges, including delays and coordination issues, especially during the COVID-19 pandemic. These challenges highlight the complex interplay between maintaining product quality and adhering to project timelines, a balance that is critical in digital innovation projects. The findings indicate that while technical deliverables related to product development were mostly on time, marketing and outcome evaluation aspects experienced the most delays.

The delays encountered in the project, largely attributed to detailed content reviews and coordination challenges, reflect the challenges faced in agile project environments where adaptability and responsiveness are key (Serrador and Pinto, 2015). Despite these challenges, delays were paradoxically beneficial, enhancing the product's quality and ensuring that the final product resonated well with its target audience. This outcome aligns with the Agile Manifesto's emphasis on working software and customer collaboration over strict adherence to plans and

contracts (Beck et al., 2001). However, it also raises questions about the efficiency of project management practices in innovation-driven environments.

Moreover, the modest responses related to project management in the data suggest a need for more robust project management methodologies that can accommodate the fluid nature of digital product development. Traditional project management approaches often emphasise structure and predictability, which may conflict with the dynamic requirements of digital innovation projects (Shenhar and Dvir, 2007). HDI's experience highlights the need for project management approaches that are flexible, yet structured enough to ensure timely delivery and effective resource utilisation.

The product development cycle for GNG followed a mixed methodology of Agile and Lean Startup frameworks. However, given the very long product development cycle, HDI could adopt an agile development process like Scrum to allow for iterative product increments and flexibility to change direction based on customer feedback. Sprint cycles can rapidly test new features. Although Lean Startup methods promote creating minimum viable products (MVP) which were created by GNG, it is better to validate product ideas early with customers, rather than launching products up front and then fully developing the product features. Additionally, a hypothesis-driven development could integrate the TOC assumptions about the product and examine customer needs, and then design experiments and prototypes to test those assumptions, which could be an improved option for future products. Using behavioural data at regular intervals to pivot product directions would also be useful.

In summary, while the project faced challenges, particularly related to product related decision making and systemic frameworks, there was significant emphasis on maintaining high quality and innovation potential. The ability to adapt new trends and apply relevant theories in product development were critical success factors. Testing assumptions early and often with real users is key, hence getting user feedback that allows users to interact and provide input on social features in real time could have been an advantage.

5.4 Discussion on Challenges and Learnings

HDI’s responses in navigating multidisciplinary challenges are a case for flexible project management for digital innovation, alignment of priorities, and continuous adaptation in product development to meet evolving audience needs.

5.4.1 Dealing with Systemic Challenges

Systemic challenges emerged prominently with remote work being a significant obstacle. Coordinating across different time zones often led to delays and disrupted work-life balance. Issues such as role confusion, unrealistic expectations, and power dynamics within the team contributed to workplace tensions. Burnout and staff redundancies were prevalent concerns, affecting the team's well-being. The absence of clear communication norms and efficient team dynamics further compounded these challenges.

HDI's organisational culture, characterised by a commitment to fostering collaboration and investing in long-term relationships, proved to be instrumental in managing product development outcomes within the context of a project management mindset. HDI's ability to balance technical excellence, good design, and innovation in product development while adhering to project management goals were key factors in its success.

The flat hierarchy culture also played a role in addressing challenges in personnel issues. The organisation's nimble decision-making and adoption of productivity tools like Slack contributed to more efficient processes. One notable initiative by HDI was the introduction of the RASCI framework, a project management and organisational structure tool used to clarify roles and responsibilities within a team or organisation (Suhanda and Pratami, 2021). It defines five key roles: assigning Responsibility, providing Accountability, bringing Support, being Consulted, and being Informed in a role to decentralise decision making. This framework helped clarify roles and expectations within the organisation, identifying tasks and responsibilities for team members, and facilitating responsiveness by streamlining operations, while leaving accountability with the owner. However, as emerged from the results, the key is to use a consistent tool, not one-off bracketing of roles in an evolving product development matrix for team members to take ownership of their responsibilities, even if they are not in the "Accountable" role. While RASCI is applicable to agile project management, schools of thought

vary on whether it is necessary for an agile context, and whether it focuses too much on tasks and activities, and does not simplify the process. An alternative, simpler process that focuses on decision making processes with a clear framework for ‘Approval’ and avoiding ambiguity in decision roles, would help in a culture that embraces a flat hierarchy (Morrison, 2023).

Based on feedback about team communication, HDI also took steps to enhance its supervisory accountability in conflict resolution and introduced a 360-degree feedback system for all employees. These efforts aimed to create an empowered, safe, and open workplace culture, where feedback and improvement aligns with a flat hierarchy, and can lead to more innovation and problem-solving. Regular check-ins with leadership, irrespective of hierarchy, were institutionalised to promote communication and collaboration. HDI leadership also recognized and celebrated achievements at weekly meetings to boost morale.

To further enhance its workplace culture, HDI could consider introducing mandatory completion of short Diversity, Equity, and Inclusion (DEI) and related inclusive communication and conflict resolution modules, scheduled during on-boarding or at regular intervals. These programs can foster a more inclusive and diverse work environment, ensuring that all employees feel valued and heard. Continuously investing in such initiatives can contribute to the ongoing improvement of the organisation's culture and effectiveness.

Other systemic issues that can be addressed include creating efficiencies around meetings, by leveraging digital collaboration tools that are currently used such as Slack which can streamline communication and reduce reliance on frequent meetings, enabling real-time updates and discussions. HDI can also promote a culture of continuous improvement by encouraging real-time feedback loops within teams. Additionally, implementing decision frameworks that empower teams to make independent decisions within their areas of responsibility aligns with HDI's flat hierarchy, reducing the need for extensive meeting discussions.

As vision alignment was raised during the survey, HDI can use an institutionalised process of onboarding to introduce new team members to the organisation's vision, mission, and values with a mechanism of feedback loops articulated clearly. Additionally, setting the

foundation for common understanding of overarching goals is critical, so that each member can visualise their personal contribution to clearly defined organisational goals, and not just project or product development outcomes. Periodically, team meetings or huddles could be organised to reinforce the common vision and priorities for each person, collectively. Sharing success stories and case studies related to the organisation's vision can illustrate its real-world impact.

5.4.2 Addressing Innovation Product Challenges

HDI faced various product-related challenges in developing GNG. These challenges included finding the right balance between technical innovation and integrating sensitive SRH educational content. HDI worked with multiple stakeholders, including the funder and end users, to meet diverse expectations. To address these challenges, HDI needs to adopt a user-centric design approach, incorporate user feedback effectively, and explore innovative evaluation techniques for online platforms. Comprehensive playbooks, not just product design documents, for future products should be developed including feasibility testing of marketing strategies for multiple social media and user centric channels of choice, market research, and a thorough TOC assessment. Involving parents, especially mothers, in discussions about sensitive topics during the design phase could have helped avoid misinterpretation and backlash. Additionally, HDI should establish robust mechanisms for continuous user feedback collection, and develop comprehensive innovation assessment models to ensure effectiveness and impact of its digital innovations.

Marketing GNG presented its own set of hurdles. The onset of the COVID-19 pandemic further complicated marketing strategies and testing approaches. Effectively communicating the game's value proposition to the target audience was challenging. The initial marketing approach was perceived as disconnected from the more tradition-oriented demographic, failing to resonate with them. Bridging the gap between innovative game features and cultural contexts proved to be a complex task.

5.4.3 Dealing with External Variables

External factors, including the COVID-19 pandemic, disrupted project timelines, research

activities, and fieldwork. HDI had to quickly adapt to remote work and embrace virtual collaboration tools. Health challenges emerged among both internal and external stakeholders. However, HDI adapted by shifting game design testing activities online, reconfiguring future research activities, and maintaining regular communication through team calls and conferences. Despite these efforts, the pandemic still impacted the project's ability to achieve a few objectives, and participation in national and international conferences was affected. The project also navigated cost-share challenges with USAID and developed strategies to accommodate monetization through in-game advertising. The ability to coordinate new teams and partners, particularly those with limited experience on USAID-funded projects, was a key focus area, along with managing field partners and building capacity among remote field staff. HDI's prioritisation of employee well-being played a crucial role in maintaining team morale and productivity during these challenging times.

A. Balancing Innovation and Compliance with the Funder

HDI's relationship with its funder, USAID, presented an intriguing paradox. While USAID introduced the innovation challenge with the expectation of harnessing new-age technological disruption in the direct-to-consumer space to positively impact adolescent SRH outcomes, it also brought forth a set of challenges rooted in bureaucratic processes and compliance that appeared somewhat anachronistic in the context of digital innovation. This duality highlights the complex dynamics often encountered when navigating the intersection of traditional donor expectations and the innovative demands of digital product development in the social impact space. Integrating an agency priority of gender-based violence content into the project, as per the funder's requirements, impacted the game's storyline. Nonetheless, the funder's responsiveness and flexibility in understanding the intricacies of product development proved beneficial.

B. Vendor Management

The intricate nature of vendor management also reveals a multitude of complexities. Aligning vendors with the project's vision, addressing late and constant changes in research teams, and managing vendor charges were challenges that demanded substantial time and effort

to be resolved effectively. Notably, HDI's role as a first-time prime partner in collaboration with USAID played a commendable role in handling these complexities. As a women-owned, small business operating in the private sector, HDI brought in systems and accountability typically associated with the private sector. This approach allowed HDI to adeptly navigate challenges posed by vendor management. Additionally, HDI's willingness to take risks and embrace adaptive leadership played a pivotal role in prioritizing effective solutions to the myriad challenges and uncertainties it faced. This proactive approach allowed HDI to navigate these complexities with agility and resilience, ensuring that the project continued to progress effectively.

Overall, HDI's successful emergence as a leader in digital innovation in the SRH domain involved overcoming a multitude of multidisciplinary challenges. These challenges ranged from technical innovation and systemic issues to marketing hurdles, evaluation complexities, adaptation to external factors like the pandemic, managing donor expectations, vendor complexities, and legal and regulatory compliance considerations. HDI's ability to navigate and overcome these challenges offers valuable insights for future digital innovation efforts in the social impact space. However, a framework for vendor selection in the first place that highlights the norms of partnership such that it not only complements mutual strengths but is aligned to HDI’s culture and values would be beneficial going forward.

C. Ensuring Legal and Regulatory Compliance

HDI's legal team employed a multifaceted strategy encompassing content review, privacy protection, risk mitigation, contract diligence, and continuous alignment with regulations during the game's development. This allowed effectively balancing innovative content with compliance. The Terms of Service document for GNG highlights that the game content related to sensitive topics like contraception, consent, gender-based violence, and SRH was reviewed by legal experts in India. This helped ensure alignment with local sociocultural norms and regulations, while retaining the educational value on issues affecting adolescents. A review of the Privacy Policy for the GNG states that no personally identifying user information is collected by the game. However, as indicated in the Terms of Service, enhanced encrypted data storage and governance protocols were implemented at a systemic level, to comply with new Indian IT rules

on data privacy and protection. To address legal risks involved with the sensitive content, the legal team advised strategies to manage potential resistance from the community, government, or media. This included crisis response plans to ensure continued availability of the game. Additionally, both documents reiterate that despite sensitive topics covered, the game is intended purely for educational purposes to promote health and wellbeing among adolescents. This was highlighted to mitigate potential allegations of encouraging risky behaviour.

5.4.4 Creating a Business Canvas Model (BCM) and Value Proposition for GNG

Ostelwalder and Pigneur (2007) created the Business Model Canvas (BMC) as a strategic management tool for developing new business models that can be used to assess innovations. It includes documenting the value proposition, infrastructure, resources, customer segmentation, and finances, including monetization potential to help organisations align their activities by illustrating potential trade-offs.

This study was also used to apply the BMC matrix to the GNG digital innovation. The BMC matrix, as shown in Figure 12, highlighted the game's target market (adolescent girls in India), customer relationship dynamics, key activities like content creation and marketing, and potential revenue streams through in-game purchases and partnerships. The analysis also underscored the importance of leveraging AI and chatbots for enhanced personalization and user engagement. By addressing each component of the BMC, insights into GNG's value proposition, operational structure, and future potential were also determined. This holistic view is crucial for fine-tuning GNG's strategy, ensuring it effectively meets its goals of educating and empowering its target audience, while also exploring sustainable revenue models as a social enterprise. For instance, from the secondary research documents, the value proposition for GNG can be described as follows:

a) Innovative Ed-Tech Game:

- Tailored for adolescent girls in India, blending interactive gameplay with essential SRH education.

b) Direct to Consumer Strategy:

- In-game links for menstrual health products.
- Chatbot integration for safe, private SRH learning.
- Bypasses traditional information gatekeepers.

c) Predictive Analytics:

- Personalised content for enhanced user engagement.
- Drives potential monetization and user retention.

d) Monetization and Market Reach:

- Taps into a vast demographic with one million people turning 18 every month in India.
- Strong appeal to a large, underserved audience who are adolescents: potential consumers, parents, and data consumers within the next decade.
- Positioned in India's rapidly expanding digital gaming sector, offering numerous monetization opportunities.

e) Prospective Scalability and AI Integration:

- Partnerships potential with CSR initiatives and health organisations.
- AI-driven features for continuous innovation and user engagement.
- Prospects in a global gaming market projected to reach $682 billion by 2030.
- A unique blend of education and entertainment for meaningful social impact.
- Advancing SDG 2030 goals through digital innovation for social future potential.

In the broader gaming industry context, which is projected to reach $682 billion by 2030 from the current (2022) global gaming market valued at $246 billion (Vantage Market Research), the survey saw significant opportunities for GNG. In India too, this industry's expansion attributed to factors such as the rise in online gaming, high bandwidth network connectivity, and continuous demand for innovative gaming experiences, augurs well for scaling opportunities for GNG, and introducing other digital products aimed at improving social outcomes that combine entertainment with education. This awareness underscores the potential for tapping into the

industry's growth, contingent on overcoming these challenges, and keeping pace with technological advancements.

Business Model Canvas

BUSINESS MODEL CANVAS

KEY PARTNERS

Metamersive- Game Developer
USAID- Funder
Vihara- Game design/Test
MLLG- Marketing
Girl Effect- Formative Research
PCC-RCT- Outcome evaluation
Cycle Beads- In game link-partner
TEEN BOOK- In-game link partner

BARRIERS

Cultural and societal norms in India

Technological challenges

Possible resistance from traditional gatekeepers like parents, teachers, and community leaders

Compliance for data privacy

External Factors: COVID-19 pandemic affected

MOTIVATIONS FOR PARTNERSHIPS

Reduction of Risk and Uncertainty: Collaborations with federal and state government, technological consortiums, gaming associations, digital health chamber of commerce, memberships, status as national health Resource under National Menstrual Health Policy

Acquisition of Particular Resources and Activities: Engaging with various stakeholders,game developers, social media platform partnerships, including health technology providers, local government bodies

Behavior Change and Engagement: On boarding for In-game partnerships, schools, governments

Operational Efficiency: Development of an internal dashboard for monitoring progress and ensuring data quality

KEY ACTIVITIES

Developing and updating the mobile game app

Culturally relevant content creation to address SRH

Building and maintaining user friendly digital platform

KEY RESOURCES

Physical Resources

Hardware infrastructure / servers to host and run the mobile game app

Intellectual Resources

The GNG brand, logo, and trademark

Copyrights on game content, storylines, characters, visual assets etc.

Predictive analytics algorithm and chatbot technology

Market research data on target audience preferences and behaviors

Impact data (in game + RCT data)

Human Resources

Game developers, designers, artists for content creation

Technology experts for app development and maintenance

Marketing and communications professionals

Behavioral scientists for impact content

Project managers and product leads

Financial Resources

Funding for initial app development and ongoing maintenance

Budget for marketing activities and user acquisition

Resources for future growth like partnerships and expansion

COST STRUCTURE

MAIN COSTS

Technology Development: Developing and maintaining GNG app

Content Creation: Designing culturally appropriate/engaging content

Key Activities: Marketing and Outreach, and Research and Development

BUSINESS MODEL

A mix of Cost-Driven and Value-Driven approaches: Focus on value creation through unique content and user experience, with emphasis on keeping costs manageable, particularly in a social enterprise setting

Fixed Costs: Salaries for the development and content team, office rent, utilities, data servers

Variable Costs: Marketing expenses, offline user engagement activities

Economies of Scale: 300,000+ users: $0.26 per/installation (Dec 2023)

VALUE PROPOSITIONS

Tailored for adolescent girls in India, blending interactive gameplay with essential sexual and reproductive health education

Direct to Consumer Strategy

In-game links for menstrual health products
Chatbot integration for safe, private SRH learning
Bypasses traditional information gatekeepers

CHARACTERISTICS

Newness: High

Performance: RCT proven metrics, improving SRH knowledge and empowerment among adolescent girls

Customization: Content relevant to its target audience's specific needs and cultural context; precision messaging through predictive analytics

"Getting the Job Done": Fulfills unmet need for confidential, accessible reproductive health education in India

Design: User-friendly/interface, engaging, interactive design appeal to adolescents

Brand/Status: increasing: Global recognition awards, Leveraging USAID, first virtual ambassador for SRH

Price: Free to download by Android users

Cost Reduction: High compared to traditional educational methods

Risk Reduction: Provides safe, stigma-free access to sensitive information, reducing health and social risks for adolescents, bypasses traditional gatekeepers

Accessibility: High, especially with the widespread use of Android smartphones among the target demographic

Convenience/Usability: Mobile apps offer convenient, anytime access, which is crucial for the target audience

*RCT evidence shows shared phones or owned phones has same outcomes

CUSTOMER RELATIONSHIPS

RELATIONSHIP TYPE

Educational
Supportive and trust-building
Interactive and Empowering
Confidential and Safe

CHANNELS

Current Reach Methods: Social media platforms, Targeted Influencers

Cost-Efficiency and Effectiveness: Social media channels are cost-efficient (0.26cents/installation) due wide reach and the ability to target specific demographics. Allows for direct engagement and feedback from users

CUSTOMER SEGMENTS

Value created for: Adolescent girls (15-19 yrs) in lower income households

CUSTOMER BASE CLASSIFICATION

Niche Market: adolescent girls in India /specific needs and challenges concerning reproductive health education

Segmented: based on different parameters are age (15-19), education level (educated high school), geographic location (Hindi speaking states, cities with Hindi)) and socio-economic background (lower SEC C,D)

POTENTIAL FOR DIVERSIFIED OR MULTI-SIDED PLATFORMS

Expansion to boys (new product) product
New country (Nepal)
Multisided platforms (nutrition, climate change, mental health)

REVENUE STREAMS

Value for Customers: Free-to-use

Monetization through in-game purchases, targeted, non-intrusive advertising related to health and education could not be explored due to compliance regulations

Assets in GNG are trademarked and could be explored for monetized partnerships

FUTURE POTENTIAL

Market and Content Expansion
AI and Chatbot Integration
Strategic Partnerships
Data-Driven Insights

Figure 5.1: Business Model Canvas (Exclusively created for this DBA Thesis by Nithya Subramanian, PoppadomCo (c), January 2024)

CHAPTER VI:
SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

6.1 Summary

The research on HDI's digital innovation venture provides crucial insights into managing digital innovation, particularly in the social impact sector. The findings emphasise the necessity of a strong, unified vision and alignment of teams with common goals from the project's outset. Leadership in such initiatives is a balancing act, requiring a blend of strategic alignment and innovation. This necessitates a culture that fosters open communication, collaboration, and innovation, while also recognizing the potential for decision paralysis due to excessive openness.

The research highlights the importance of understanding differences in perception between a project and a product. This understanding is crucial for maintaining alignment and avoiding tensions that arise from differing viewpoints. The study also underscores the importance of role clarity, remote work coordination, and strategies to mitigate burnout, emphasising that these systemic challenges should be addressed through organisational culture and practices. Additionally, it points out the complexity of balancing entertainment and impactful content in game-specific challenges, and the importance of continuous user feedback. Marketing sensitive topics appropriately and understanding cultural nuances are vital, despite the challenges they pose. The research also identifies the need for resilience in the face of external uncertainties, such as the pandemic, and prioritising employee wellbeing.

The study finds application of the Business Canvas Model (BCM) that revealed GNG's unique value proposition, focusing on educational gaming for adolescent girls in India, offering direct-to-consumer strategies, and personalised learning through AI and chatbots. It highlighted key activities like content creation, marketing, and potential revenue streams, including in-game purchases and partnerships.

This case study makes significant contributions to bridging theoretical gaps in digital innovation, especially within social impact contexts. It demonstrates the critical integration of product development and project management, emphasizing user-centered design and the

necessity for cultural adaptations in mobile health applications. The research calls for interdisciplinary frameworks that meld technology, creativity, and behavioral change, challenging conventional project management models with more agile, iterative approaches suited to digital environments. It highlights the scarcity of comparative analyses between product and project management and the need for models specifically tailored to mobile health apps, thereby advancing theoretical knowledge in digital innovation.

The study's implications extend to the industry and sustainable development goals (SDGs), illustrating how digital tools can address societal challenges, contributing notably to SDG 3 by enhancing reproductive health education and indirectly supporting gender equality (SDG 5). This underscores the role of digital innovations in advancing global education, health, and gender equality, and highlights the potential for impact investing in technology-driven solutions.

Sustainability and long-term engagement with 'Go Nisha Go' hinge on continuous updates, leveraging user feedback, and integrating emerging technologies. A community-based approach and partnerships with educational and health organizations are suggested to maintain relevance and engagement. Furthermore, integrating the app with existing health systems and policies, such as the National Menstrual Hygiene Policy, through advocacy and aligning content with educational standards, can enhance its impact.

Lastly, this case study offers valuable insights for organizations in the digital innovation space, underlining the importance of a holistic approach that combines vision, leadership, adaptability, and sustainable impact measurement. It provides a roadmap for navigating digital innovation complexities, emphasizing the necessity of clear vision, innovation culture, and effective stakeholder management for achieving impactful digital innovations.

6.2 Implications

6.2.1 Implication 1: for Leadership in Managing Digital Innovation and Future Research.

The implications of the findings reveal the importance of establishing a clear, unified vision and aligning teams to common goals early on. Leadership must balance innovation with practical strategic alignment through nuanced decision-making. Nurturing a culture of open communication, collaboration, and innovation is vital, but excessive openness can cause decision paralysis, requiring occasional decisive leadership. Differences in perceiving initiatives as products versus projects can create tensions; a shared understanding is crucial. Systemic challenges like role clarity, remote work coordination, and burnout need mitigation through organisational culture and practices.

Game-specific challenges in balancing entertainment and impactful content highlight the complexity of integrating gameplay with education. Continuous user feedback is key. Marketing sensitive topics appropriately and understanding cultural nuances poses hurdles, but is indispensable. Adapting product development frameworks for digital impact assessment remains difficult; integrated evaluation models are beneficial.

Externally, uncertainties like the pandemic require resilience through adaptation, openness, and prioritising employee wellbeing. The findings contribute to understanding leadership, product development, and project management in digital innovation, while revealing gaps like integrated impact assessment models and marketing approaches tailored to cultural contexts.

These insights can help organisations refine practices in establishing alignment, embracing adaptability, promoting collaboration, and balancing innovation with strategic practicalities. They underscore needs for clear vision, nuanced leadership decisions, shared understanding of goals, and addressing systemic organisational challenges.

6.2.2 Implication 2: Aligning Product Development Goals in a Project Management Mindset

The study highlights the critical role of a dedicated product manager in preventing timeline delays. The presence of a product manager is essential in the context of digital innovations, as they can streamline communication, set clear priorities, and ensure that the project adheres to timelines effectively. Despite facing numerous challenges, the research

underscores the impressive quality of the final product. This demonstrates that even in the face of complexities and hurdles, a committed and adaptable team can achieve excellence in product development.

The study emphasises the importance of evidence in the innovation process, as it serves as a foundation upon which further improvements can be built. The efforts made at different stages of the project were commensurate with its complexity, indicating a thoughtful and strategic approach to development. A significant recommendation of the research is the proposal to create a comprehensive report card for the assessment of innovation. This report card would include traditional metrics, a landscape review, and even failures as valuable learning experiences. True innovation, as the study suggests, involves identifying real needs, collaborating with end-users, embracing failure as a stepping stone to success, and avoiding micromanagement or central decision-making. A sample report card could be a valuable tool for organisations pursuing innovation.

The study also draws attention to potential mismatch in perceptions between the product and project aspects of initiatives. Clarifying differentiation between these two dimensions during onboarding is crucial to align goals effectively and prevent misunderstandings that could lead to misalignment. To avoid trade-offs, the study suggests that the matrix for decision-making should align with the product versus project perspective, ensuring reliability and consistency in decision criteria.

Lastly, the research points out the importance of recognizing differences in perception between funders and developers. Understanding these differences is essential for effective communication and collaboration, as it can help bridge gaps and align expectations more accurately.

6.2.3 Implication 3: Multidisciplinary Challenges in Digital Innovation Ventures:

The study highlights the need for organisations working on innovations to be prepared with a proactive strategy to safeguard their competitive advantage.

Additionally, the research underscores the need to plan sustainable digital innovations given the complexity of subscription models in the social impact space, and the need for careful curation of ads within digital innovations. Creative alternatives to monetization are deemed necessary, but their implementation can be challenging. Therefore, it becomes imperative to develop a well thought out monetization strategy as an integral part of the project's planning process, ensuring that revenue generation is aligned with user experience and content quality.

Moreover, the study suggests that organisations engaged in digital innovations should consider investing in a detailed onboarding procedure and robust vendor management as part of overcoming challenges. Ensuring competition among vendors is essential for cost effective models. These aspects are often overlooked but can significantly contribute to the project's success by streamlining processes, reducing inefficiencies, and enhancing overall project management.

Using the Business ModelCanvas (BMC) by Osterwalder and Pigneur (2002), GNG was assessed as a strategic innovation. The BCM analysis highlighted GNG's value proposition, targeting adolescent girls in India with an educational game on SRH, integrating AI for personalised learning. Key activities include content creation, marketing, and leveraging in-game purchases and partnerships for revenue. Positioned in India's burgeoning digital gaming market, GNG's potential for scalability and societal impact is significant, especially considering the global gaming industry's projected growth. This strategic overview is vital for GNG's effective implementation as a social enterprise in the evolving gaming sector. Creating the BMC also helped to look at the emerging opportunities and challenges in the organizational strategy and resources for a long term vision to produce more digital innovation tools for social impact. For HDI to stay relevant in this space, investments in talent retention and creating an enabling environment for multidisciplinary teams with a focus on building in-house resources in IT and social media marketing will be inevitable.

All these insights provide valuable guidance for organisations looking to navigate the complex landscape of digital innovation effectively, ensuring sustainable success, and user satisfaction.

6.3 Recommendations for Future Research

In terms of future research, the study suggests areas such as the development of integrated evaluation models for digital impact assessment, further investigations into product development frameworks, and a more focused look at multidisciplinary challenges in the leadership and project management aspects of digital innovations. The insights gained can guide organisations in refining their practices, especially in establishing alignment, embracing adaptability, promoting collaboration, and finding the right balance between innovation and practical strategic decisions.

Additionally, the findings highlight areas for further research, such as comparisons of multiple cases of digital innovation and focused investigations of salient success factors that could be relevant in multidisciplinary settings for innovation development. The study provides a foundation for unlocking the potential of digital innovation to drive social progress. Practical application, policy evolution, and future research building on these findings can accelerate our understanding and use of digital technologies for impact.

The study could also further explore the long-term sustainability of the app "Go Nisha Go" beyond its initial impact. This includes examining the ongoing engagement strategies to keep the target audience engaged and the app's adaptability to changing technological landscapes and health education needs. Additionally, exploring the scalability of such digital innovations to other regions or sectors facing similar challenges could add to the study. Investigating the potential for integrating this digital tool into formal education systems or government health initiatives might also provide insights into broader applicability and impact.

6.4 Conclusion

6.4.1 A Case Study of Digital Innovation

In conclusion, this case study of the HDI journey in digital innovation provides valuable guidance for organisations engaged in digital innovation, emphasising the need for successful leadership practices, evidence-based approaches, and alignment of goals of product development and management perspectives of timeliness, and quality to achieve successful outcomes. Future research should focus on providing guidance, facilitating comparisons of digital products in the market for adolescent health or for social impact, conducting in-depth analyses, and offering practical recommendations for organisation embarking on digital innovation ventures in the SRH space ,or for other equally sensitive issues that an audiences are seeking to access through safe spaces. Additionally, by studying how successful case studies overcame multidisciplinary challenges, researchers can contribute to the development of a robust knowledge base that supports the successful development, implementation, and evaluation of digital tools for social impact. The Business Model Canvas by Osterwalder and Pigneur (2002) was used to assess GNG as an educational game for Indian girls. The BCM analysis forecasted GNG's potential in its niche of educational gaming for adolescent girls, emphasising its value proposition in personalised learning and health empowerment in India's expanding gaming sector, which is poised to grow significantly by 2030.

6.4.2 Bridging Theoretical Gaps in Digital Innovation

Additionally, this case study bridges critical gaps in digital innovation research, particularly in social impact contexts. It integrates product development with project management, highlighting the importance of user-centred design and cultural adaptations in mobile health apps. The research underscores the need for interdisciplinary frameworks combining technology, creativity, and behaviour change. It validates blended leadership styles and reveals the limitations of conventional project management models in agile, iterative digital environments. The study addresses the scarcity of comparative analyses in product versus project management, and the absence of comprehensive models tailored for mobile health apps. By offering empirical insights into leadership, technology acceptance, and product development challenges, the study advances theoretical knowledge in digital innovation, particularly in socially impactful initiatives.

6.4.3 Impact on Industry, SDG Goals and Social Impact

For the market and digital industry, this study exemplifies how digital tools and apps can be leveraged to not only serve commercial interests but also address societal challenges, thereby opening up new avenues for social entrepreneurship and impact investing.

The thesis directly contributes to Sustainable Development Goal (SDG) 3, which focuses on ensuring healthy lives and promoting well-being at all ages, specifically targeting SDG 3.7 on universal access to sexual and reproductive health-care services. By improving reproductive health education among adolescent girls, this innovation also indirectly supports SDG 5, which aims to achieve gender equality and empower all women and girls. The study showcases how digital innovations can be a powerful tool in advancing education, health, and gender equality on a global scale.

For impact investors, this thesis presents a compelling case for investing in digital innovations that address critical social issues. The success of "Go Nisha Go" underscores the potential for high social returns on investments in technology-driven solutions. It encourages impact investors to consider funding projects that leverage digital innovation for social impact, highlighting the importance of supporting initiatives that combine technological advancement with agile leadership and a deep understanding of the target community's needs.

6.4.3 Impact on Sustainability and Long-Term Engagement

From the BMC analysis, the sustainability of 'Go Nisha Go' can be anchored in continuous content updates, user feedback integration, and leveraging emerging technologies to keep the app engaging. To ensure long-term user engagement, adopting a community-based approach that involves users in content creation and feedback mechanisms can be effective. Additionally, partnerships with educational institutions and health organizations can provide avenues for HDI for regular content updates and ensure the app remains relevant to the target demographic's evolving needs.

6.4.4. Integration with Existing Systems and Policies

Integrating 'Go Nisha Go' with existing health systems, educational curricula, or government policies involves collaborating with stakeholders, including policymakers, educators, and health professionals. The development of the National Menstrual Hygiene Policy

(Ministry of Health and Family Welfare, 2023) is an excellent opportunity to use advocacy and present evidence of the app's impact for inclusion of GNG as a cost effective, open source resource for improving SRH outcomes. Extensions to the app's development and deployment strategy might include aligning content with other national education standards and health guidelines, ensuring the app supports existing public health campaigns, and leveraging governmental and institutional channels for distribution.

6.4.5. Relevance of this case study

By sharing HDI's experiences, challenges, and learning, this case study provides valuable insights and best practices for other organizations venturing into the digital innovation space for social impact. It highlights the complexities involved and the need for a holistic approach that integrates vision, leadership, adaptability, stakeholder management, and sustainable impact measurement. By learning from HDI's journey, organizations can better navigate the intricacies of digital innovation and maximize their potential for creating lasting positive change. Emphasizing clear vision, fostering a culture of innovation, balancing project and product needs, and effectively managing external relationships are key takeaways that can guide other organizations towards achieving their innovation and social impact goals.

APPENDIX A

SURVEY COVER LETTER

Subject: Inviting you to be a part of my research!

Dear _____,

I've got something pretty cool to share with you! I'm putting together a research study for my Doctorate in Business Administration, along with my Research Assistant - Nivya. My thesis is a case study that is all about our very own Go Nisha Go, the product and its development, and I'd love for you to be a part of it!

About the Study:

The purpose of this research study is to conduct an in-depth case study analysis of the development of the innovative product, "Go Nisha Go," produced by Howard-Delafield International (HDI). Our study seeks to describe the journey of HDI through an exploratory case study approach, focusing on the leadership practices and challenges during the development of this novel digital product for the social impact goal of improving reproductive health outcomes among adolescents in India.

Why Your Participation Matters:

Your unique perspective and insights are invaluable to our research. By participating, you can contribute to a greater understanding of how innovative digital solutions can positively impact the health and well-being of adolescents in India. Your input will help academicians and the industry to uncover the challenges and successes of this groundbreaking project, ultimately shaping the future of such initiatives.

What Participation Involves:

Should you choose to participate, you will have the opportunity to share your thoughts and experiences through a 1-on-1 interview spanning 90 minutes OR an open-ended survey self-

administered survey form estimated to take you 30-40 minutes to fill, depending on your preference. You will also be given a business framework template to fill in, which will take 10-20 minutes. These interviews will be conducted during the period from October 15th to November 5th and you can choose a slot most convenient to you.

Your Voice Matters and is Safe with us:

We believe that your voice and experiences are essential in the shaping of HDI's future endeavors as well as adolescent reproductive health initiatives in India. We have taken all the required measures to ensure a safe space for your voice. Lalita has secured the required permission from HDI as well as the Ethics Committee to carry out this study. Moreover, the interviews and surveys will be conducted only by Nivya (Research Assistant) who will assign a unique and anonymous code to you, thus ensuring that none of your responses are directly identifiable with you. In this manner, your insights will be kept confidential and anonymous and will only be used for the case study purposes. Participation is voluntary and you may decline to participate (yes, even once the interview has begun!)

How can you participate:

If you're excited about contributing to this academic endeavor: please reply to this email by copy pasting one of the following responses, and Nivya will get in touch with you for further steps.

A. I would love to participate, I am in for an interview!
B. I would love to participate! I'd prefer responding to the survey form.
C. I will not be able to participate.

To learn more about this research opportunity, please reply to this email or contact us at thisismydbaresearch@gmail.com
Thank you for your consideration, and we look forward to the possibility of your participation!

Warm regards,
Lalita Shankar

APPENDIX B

INFORMED CONSENT

Title of Research Study - CHANGING THE GAME: INSIGHTS FROM HOWARD-DELAFIELD INTERNATIONAL'S DIGITAL INNOVATION FOR SOCIAL IMPACT IN INDIA

Principal Investigator: Lalita Shankar

Research Assistant: Nivya Raghunandan

Affiliation: Swiss School of Business Management

Contact Information: thisismydbaresearch@gmail.com

I, ……... agree to be interviewed/surveyed for the research which will be conducted by Lalita Shankar, a doctoral student at the Swiss School of Business and Management, Geneva, Switzerland.

I certify that I have been told of the confidentiality of information collected for this research and the anonymity of my participation; that I have been given satisfactory answers to my inquiries concerning research procedures and other matters; and that I have been advised that I am free to withdraw my consent and to discontinue participation in the research or activity at any time without prejudice.

I agree to participate in one electronically recorded interview OR an open-ended survey along with filling a business framework template for this research. I agree that any information obtained from this research may be used to interpret results to inform the research objectives of this thesisI understand that such materials will be kept completely anonymous and that the results of this study may be published in any form for discussion and dissemination.

Signature of Interviewee **Date**

APPENDIX C

INTERVIEW GUIDE

QUALITATIVE SURVEY
ONE ON ONE INTERVIEW QUESTIONNAIRE (Semi-structure)
Internal Stakeholder ☐ External Stakeholder ☐
RESPONDENT CODE_____ DATE OF INTERVIEW:_____

Introduction and Rapport Building (5min)

Hi, _____. It's lovely to meet you. How are you?

Thank you for responding to our request to voluntarily participate in this one on one interview as part of the research study that Lalita Shankar is working on as part of her doctoral thesis.

- I'm Nivya and I am currently working with Lalita as her research assistant for this case study. I have a background in psychology and have worked mainly in the social impact field, specifically on gender-focused digital innovations and research, especially qualitative research.
- This interview will be completely confidential and anonymous. Your responses will be analysed collectively with others', no data will be attributed to you personally. We are just talking about internal and external stakeholders here so you can be completely honest and keep in mind that there are no right or wrong answers. The format is a semi structured and open questionnaire and will take approximately 90 minutes. I hope you are ready and comfortable?

A. Study brief + Permissions (5 minutes)

- Before we begin, I'll brief you a little bit about the study.
- We are doing a case study on HDI and its proprietary innovation Go Nisha Go. The research aims to study the leadership practices and the multidisciplinary approaches that were involved in the creation of an innovation like GNG.
- So the way this is structured is : we have the first section that focuses on leadership practices during the game or product development as we call it; then we will follow it up with questions about challenges during product development, then we will talk about GNG as an innovation and finally we want to hear from you about how the innovation is positioned now and the way forward.
- I will be recording this meeting now. We will only use your transcript for the analysis, not the video and we will be deleting all recorded audio/video except

the written transcripts as required by the data privacy and ethics requirements. Hope that is ok?

- Before I begin the recording, do you have any questions?

B. Questions on Leadership Practices (30 minutes)

1. <u>Vision Before Development</u> (5 minutes)

To begin, let's go back in time. When did you join HDI and start working on GNG?

1.1. At the time of joining, when you were presented with the idea of GNG, what did you think the game was going to be like? (*what did you think the end user would do/experience? what impact would it make?)*

1.2. What was your definition of success for that product at that time? and what is it now in October 2023? (*Do you think that vision has been achieved? How so?)*

2. **<u>Leadership Practices (20 minutes)</u>**

Now I am going to talk to you about the product GNG and its life cycle in 3 phases - the design phase, the testing phase, and the launch phase. Do you recall these 3 distinct phases? (for external stakeholders - you might have been outside of HDI but we are looking at the product as centre of scrutiny)

2.1. What were the challenges in your role in these 3 phases? Can you give examples? What would have helped? *(Why do you think it was a challenge? probe - was it a challenge or was it a given? probe on the challenges within the given)*

2.2. What do you think is the role of team dynamics and work styles when building such an innovation? Can you give examples? Why do you think it was a challenge? How did you overcome them? Do these challenges still exist? *(remind- you don't have to take names, even if you do I will be replacing them with pseudonyms)*

2.3. What do you have to say about the timeliness of the deliverables during the project? Can you think of any interdependencies because of which timeliness got impacted? Can you give examples? *(if they say delayed - What would have helped for it not to be delayed? What were the things on time?)(explore the interdependencies)*

2.4. What would you say about the quality of GNG in terms of a similar tool for adolescents in the same category currently available? Can you think of any interdependencies the quality was dependent on? Can you give examples? What would have helped? *(explore the*

interdependencies)

2.5. As an organisation when you think of HDI, what comes to your mind when I say leadership? (*use what they say go towards - decision making, org culture ,or risk taking)*

2.6. Can you recall any decisions taken that really stood out to you in terms of the impact? *(speed, freedom etc. - it can include your own decision, or anyone else's, you can just describe the leadership practice)*

2.7. How would you describe the culture at HDI for developing a product like GNG? Can you think of any specific events/situation/traits? *(values, integrity, team etc. - you don't have to mention names, i don't know anyone, even if you mention i will be changing them to pseudonyms)*

2.8. What were some of the risks according to you that were taken in the product development of GNG? Why do you call it a risk? Has it paid off? *(accountable, uncertainties, admitting wrongs, course correction, etc)*

3. <u>Challenges of the Pandemic (5 minutes)</u>

As you might recall, the Covid-19 pandemic happened during the game design and development phase, so I'd like to delve into the experiences of that time.

3.1. What was your experience with respect to your role in that period? What do you recollect? Which of the 3 phases were impacted the most? Can you give an example? (*probe on org's resilience, adaptability etc)*

3.2. Have there been any surprises that were cheerworthy or shocking at this time that impacted your role? How did that impact the game development?

C. Questions on Innovation Assessment (30 minutes)

GNG has been getting a lot of accolades now. It recently won an award for the best learning game 2023 in New York, right? And now again it's nominated for another European Award. So I want to steer the conversation towards innovations now..

1. <u>Product vs Project. (15 minutes)</u>

1.1. Why is GNG an innovation according to you? What does innovation mean according to you? What kind of innovation is GNG? (*one of the following needs to come out - digital product OR reproductive health outcome)*

1.2. Did you see this innovation as a digital product or as a reproductive health outcome for a project? Why do you say that? (if they say both - *Is*

there a tilt towards any one side? What and why did you focus on more?)

1.3. If you look at managing a project vs looking at a product being developed - would you differentiate between them and how so? (*have you done it earlier? If not for your previous background, then how would you have approached developing GNG? So what you are saying is ___ different or same/similar- do you have any examples probe - ask about certain things in the BMC)*

1.4. Were there trade-offs between product development goals and project management goals? Can you give an example? How was it navigated? (*there were certain milestones that had to be achieved, competencies required etc. in the GOC project. as a product it had an MVP, accessibility, appealing, marketable, etc.and as a project - quality and timeliness - what is different in terms of the above)*

1.5. Do you think others in the GOC team also saw it that way? For example, stakeholders like USAID, the funder? What did they see it as? Can you give examples?

1.6. What about different members of HDI? How do you think they saw the development of GNG as? A project or they understood it as a product being developed? What did you think the leadership at HDI saw it as? Why so? (*Was it well managed? Are there any best practices? <u>Are there any continuing challenges?)</u>*

1.7. Is the GNG innovation aligned with HDI's identity and culture according to you? Why so? (*bring back their response from above from 2.7 org culture - if external - whatever little you know from interacting with them)*

2. <u>Challenges in Assessment (15 minutes)</u>

2.1. You said __ is the reason this is an innovation. How do you think innovations can be assessed? Has that part of the innovation been assessed or validated for GNG? How so? (*there have been attempts to assess impact and also as a product but as an innovation? How would you assess an innovation? How would you measure this success? Is it possible to do what you say now? Is it being done? (If no) Why not?)*

2.2. What were the challenges for assessing the effectiveness of GNG? How did HDI navigate them? *As noted in the previous question (if they are not aware then - how would you assess this as a product and as an innovation ?)*

2.3. What potential of GNG as an innovation has been showcased to the world so far? Do you think HDI has shown evidence of the financial

potential of the innovation? How?/Why not? Should it be done? *(financial potential = monetization - would people be willing to pay?)*

2.4. Do you see any competition for GNG in the next 2 years? What category of innovation does it fall under? On a scale of 1-5 where would you position it as a reproductive health innovation tool as perceived in India? *(Would you like/give your daughter/son to play this)*

2.5. Will GNG be able to adapt emerging trends and market shifts in the next 2 years? Has it adapted to any known trends? Give examples (if not also). Is there something that HDI has not thought of yet with respect to competition or emerging threats? *(be aware of what they say in 2.4 and build on it as the questions are similar - use their ratings)*

2.6. What is the way forward for GNG, according to you? Where do you see GNG in 2025, what is it doing? (*How many people would have played it? Is HDI ready? Does HDI have those skills? What kind of skills does HDI need to go there?)*

D. Questions on Multidisciplinary Frameworks (25 minutes)

- **Check in - How are feeling so far? Hope you're not too tired. Do you need a small break? We are now moving on to the last section of questions.**

1. <u>Theories and Frameworks (10 minutes)</u>

In my understanding there were various theories and frameworks that guided the making of GNG. We will talk about some of them. You can mention what you recall, please remember that this is not to test your knowledge at all so you can say whatever comes to your mind.

1.1. I believe for this innovation there was evidence that was generated for the rationality of this product? Can you think of some?

1.2. What was done for the evidence to be generated? What kind of background frameworks or info was required to be studied for the same? *(if they cant think of anything - mention ToC, gamification, cognitive behavioural theory, game based learning etc.)*

1.3. Are there any other frameworks that you think have impacted the development of this product? I<u>s it important to industry (gaming sector/ community/ corporations/ partnerships) or to donors?</u> (*what else other than the evidence generated or ToC?*

1.4. Were you aware that you were integrating multiple theoretical frameworks in your product? How was your experience working with multiple theories and frameworks? How did it affect your work? *(about behaviours, gamification etc)*

1.5. Now let's talk about you. You said you work here since ___. What

would you say your leadership style is/ style of working? When you are interacting with internal or external stakeholders, when you need to get deliverables done? Can you give examples where your leadership style played out in the product development? *(Give examples of theories and ask - do you think this other style__ is good?' - we are looking at different frameworks, we are trying to see what is conducive)*

2. **<u>Key Learnings (10 minutes)</u>**

2.1. Scenario: A young entrepreneur approaches you to help make a digital product for social impact, say climate change, so what are some things you would advise them NOT to do based on your experiences of working at HDI with GNG? *Is this coming from failures you have experienced?*

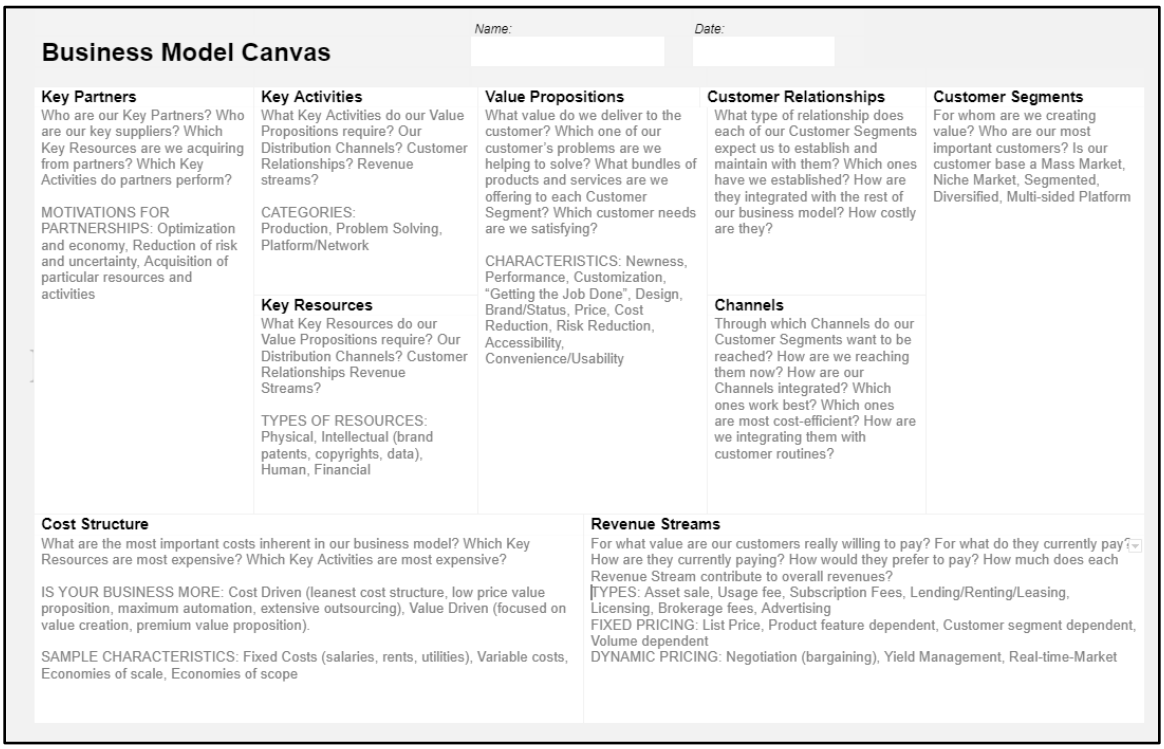
2.2. Scenario: Harvard wants to include GNG as a case study for its class of 2024. What high-impact practices at HDI should we include in the case study, according to you?

E. Answering Participants Questions (5 minutes)

- ➔ That's all the questions I had for you! Thank you so much for patiently answering them.
- ➔ Do you have any questions about the study or the conversation we had today?
- ➔ If you have questions at any point of time, you can reach out to us!
- ➔ Thank you so much once again, have a nice rest of the day, bye!

APPENDIX D

BUSINESS MODEL CANVAS- TEMPLATE



Business Model Canvas

Name: *Date:*

Key Partners
Who are our Key Partners? Who are our key suppliers? Which Key Resources are we acquiring from partners? Which Key Activities do partners perform?

MOTIVATIONS FOR PARTNERSHIPS: Optimization and economy, Reduction of risk and uncertainty, Acquisition of particular resources and activities

Key Activities
What Key Activities do our Value Propositions require? Our Distribution Channels? Customer Relationships? Revenue streams?

CATEGORIES: Production, Problem Solving, Platform/Network

Key Resources
What Key Resources do our Value Propositions require? Our Distribution Channels? Customer Relationships Revenue Streams?

TYPES OF RESOURCES: Physical, Intellectual (brand patents, copyrights, data), Human, Financial

Value Propositions
What value do we deliver to the customer? Which one of our customer's problems are we helping to solve? What bundles of products and services are we offering to each Customer Segment? Which customer needs are we satisfying?

CHARACTERISTICS: Newness, Performance, Customization, "Getting the Job Done", Design, Brand/Status, Price, Cost Reduction, Risk Reduction, Accessibility, Convenience/Usability

Customer Relationships
What type of relationship does each of our Customer Segments expect us to establish and maintain with them? Which ones have we established? How are they integrated with the rest of our business model? How costly are they?

Channels
Through which Channels do our Customer Segments want to be reached? How are we reaching them now? How are our Channels integrated? Which ones work best? Which ones are most cost-efficient? How are we integrating them with customer routines?

Customer Segments
For whom are we creating value? Who are our most important customers? Is our customer base a Mass Market, Niche Market, Segmented, Diversified, Multi-sided Platform

Cost Structure
What are the most important costs inherent in our business model? Which Key Resources are most expensive? Which Key Activities are most expensive?

IS YOUR BUSINESS MORE: Cost Driven (leanest cost structure, low price value proposition, maximum automation, extensive outsourcing), Value Driven (focused on value creation, premium value proposition).

SAMPLE CHARACTERISTICS: Fixed Costs (salaries, rents, utilities), Variable costs, Economies of scale, Economies of scope

Revenue Streams
For what value are our customers really willing to pay? For what do they currently pay? How are they currently paying? How would they prefer to pay? How much does each Revenue Stream contribute to overall revenues?
TYPES: Asset sale, Usage fee, Subscription Fees, Lending/Renting/Leasing, Licensing, Brokerage fees, Advertising
FIXED PRICING: List Price, Product feature dependent, Customer segment dependent, Volume dependent
DYNAMIC PRICING: Negotiation (bargaining), Yield Management, Real-time-Market

APPENDIX E

NO OBJECTION CERTIFICATE FROM EMPLOYER

Howard Delafield International
Possibility, Powered by Imagination

October 13, 2023

Ms. Lalita Shankar
DBA Enrollment No **27302**
Swiss School of Business and Management (SSBM)
Avenue des Morgines 12 1213
Genève, Switzerland
www.ssbm.ch

Subject: Approval for Use of Howard Delafield International as a Case in Your Academic Study leading to a Doctoral Degree in Business Administration

Dear Lalita:

We have reviewed your letter dated October 12, 2023, requesting the use of our organisation's name, Howard Delafield International (HDI) as a *case* in your exploratory *case study* research titled 'CHANGING THE GAME: Insights from Howard Delafield International's digital innovation for social impact in India', leading to a Doctoral Degree in Business Administration. I understand that the main Research Questions in the case study shall include exploring the following:

- ***Leadership Practices*** **-** How did leadership practices at HDI contribute to developing the impactful digital innovation, Go Nisha Go (™) mobile

game app?

- ***Product Development vs. Project Management*** **-** How are product development outcomes aligned with project management goals at HDI during the development of the Go Nisha Go (™) mobile game app?
- What is the **Business Model Canvas** (BMC) framework for the proprietary Go Nisha Go (™) mobile game app?
- ***Challenges and Learnings*** **-** What challenges were encountered and how were they navigated by HDI to create an impactful digital product for reproductive health and inform future innovation efforts in this space?

We are writing to extend our official approval for the said purpose. Our consent is given to you to use Howard Delafield International and its acronym HDI for the purpose of the intended case study research leading to your doctoral thesis. The realm of leadership, innovation, and social impact transcends industry boundaries, and your thesis could be a guiding light for other sectors looking to adopt and learn from the practices identified in your study.

As co-founders, Sylvia and I note with appreciation your commitment to acknowledge HDI's contributions by affiliating all publications emanating from this research to HDI.

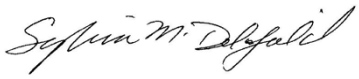
We understand that in this process you will be speaking to approximately 10-12 of our consultants (internal stakeholders) and partners and vendors (external stakeholders). Please ensure that any proprietary information from HDI, as well as data from your research is handled with confidentiality and integrity.

As a professor myself, I find the process of research is as enlightening as the findings themselves. Indeed, such a case study is a testament to the synergy between academia and industry, and we are thankful for this recognition and your commitment to

contribute towards the knowledge management of the novel innovation produced by HDI with USAID funding. I am confident that your dedication and efforts will culminate in a study that shall not only benefit academicians, but also interest development professionals and industry practitioners as well. We look forward to reading the outcomes of your study and are excited about the potential contributions it can make to both academia and industry.

We extend our best wishes to you for your research. Once again, thank you for considering HDI as a pivotal part of your academic endeavor.

With warm regards,



Susan Howard
Co-Founder and Managing Director

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