MODDERS' MOTIVATIONS IN THE EVOLVING LANDSCAPE OF VIDEO GAME INNOVATION

Master's Thesis

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Abstract

This study explores the motivations driving video game modders, focusing on intrinsic and extrinsic factors, emotional rewards from community interactions, and the impact of financial incentives such as donation systems. Despite the recognition of modding's benefits in extending game lifecycles and fostering player retention, the literature on modders' motivations remains limited and fragmented. Prior research has often been constrained to specific games or communities, leaving a gap in understanding the broader modding landscape. Using a mixed-method approach combining a survey and interviews, the research gathers data on modders' motivations from platforms such as ModDB and Nexus Mods. The findings reveal that intrinsic motivations, particularly the enjoyment of the creative process is predominant among modders. Emotional rewards also emerged as an important component of the modding experience as modders derive significant satisfaction from community appreciation. Financial incentives such as donation systems were found to be important to a smaller portion of modders, providing them support for sustained modding activities. By addressing these motivational dynamics, the study contributes to the academic literature on user-driven innovation and offers practical insights for game developers and publishers.

Keywords: Video Game Modding, User-driven Innovation, Modders' Motivations

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1. Introduction

As of 2023, the video game industry stands as one of the foremost entertainment sectors, amassing sales over 184 billion US dollars and boasting a player base of 3.38 billion with projections indicating that it will continue to expand significantly in the coming years, maintaining its status as a rapidly growing and dynamic market (Newzoo, 2023). Within this expansive landscape, the PC gaming sector plays a significant role, comprising approximately 22 percent of the overall market and contributing $41.9 billion in revenue. (Clement, 2023). Due to the massive scale of the industry, and the complexity of video games, it has become difficult to publish games that are successful in covering their costs and retaining their player base. Player retention is an important factor in the success of video games as long-time players extend the life cycle of video games by attracting new players and they are more likely to generate future revenue for publishers (Lee et al., 2020). However, as player's needs are ever-changing, it has become increasingly difficult to attract players to the same game in the long-term. One practice that has been found to increase sales and player retention of video games is modding (Poretski & Arazy, 2017). Modding can be described as a user innovation practice that modifies or alters existing video games through the creation and implementation of custom modifications or so called "mods" (Poretski & Arazy, 2017; Scacchi, 2011). Mods can range from bug-fixing or patching to complete overhauls and the addition of new content (Sotamaa, 2022). Mods have been around in PC gaming for decades, proving their worth as an enduring mode of player-generated content. This form of player production has the ability to enrich and extend the gameplay experience of video games by enhancing existing content and introducing new elements (Sotamaa, 2010). Moreover, modding is a great example of user innovation as many new, novel ideas arise due to modding, which could sometimes result in completely new products such as the case of Counter-Strike: Global Offensive shows, which started off as a mod for the first-person shooter game Half-Life, and later evolved into one the most successful video games of all time (Kretzschmar & Stanfill, 2019).

Since modding seems to play an important role in the video game industry, it is worth looking into the creation of mods, specifically the motivations of mod creators or "modders" as they are also called. The modding community is diverse, encompassing individuals with varied skills and backgrounds, including those without formal game development training, making it even more interesting to discover the motivations of various modders (Schreiner & von Mammen,

2021). There had been research articles that examined the topic of modders' motivations such as Postigo (2007) who studied the value of mods and interviewed modders of popular first-person shooter games such as Call of Duty and Battlefield. Sotamaa (2010) who studied the case of the shooter-game Operation Flashpoint and the modding scene around it through interviews with modders of the game. Kahnert et al. (2012) who studied the case of game developer Crytek where the modding community often interacts with the developer which was found to have an impact on modders' motivation as well. However, most of these academic papers examine only a small portion of the modding community, often related only to one or two video games. A study worth mentioning is Poor (2014) who reached three distinct modding communities using a mixed methods approach to research modders' motivations, combining quantitative survey data with qualitative interviews. Nevertheless, the amount of literature regarding modders' motivations still remains relatively small with many modding communities remaining unapproached and unrepresented, forming an obstacle to the generalizability of prior findings. Therefore, there is a current gap in the academic literature about the motivations of modders as a study that reaches a wide range of modders and investigates their underlying motivations is missing.

In addition, community seems to play an important role in video games and in the modding scene, however, the amount of literature on the topic is sparse. Sotamaa (2010) investigated collaborative work between modders of the video game Operation Flashpoint and concluded that one the of key motivations in modding is cooperation. Another study, by Poor (2014), focused on the sense of community of modders and how it influenced modding, and found that the majority of the modders in his sample felt there was a community around the games they make mods for, and community members interact with modders. Therefore, it seems that the community provides an emotional reward to modders which can influence their motivations. While the findings of Sotamaa (2010) and Poor (2014) are highly valuable, their sample was limited to a few games which might not be representative of the diverse modding scene of video games. Therefore, the next gap in literature is presented, as there is a need for a new, current, investigation on how emotional rewards from the community affect modders' motivations.

Lastly, it has been a decade since most prior studies surveyed or interviewed modders regarding their motivations, in which time period changes could have occurred in the industry

affecting modders' motivations. One such example of a change was the introduction of a "Donation Point System" in 2018 by Nexus Mods, one of the largest mod hosting platforms in the PC gaming community, which introduced a new type of financial incentive to the modding scene. The impact of the introduction of the donation point system was recently researched by Schopman (2023) through secondary data analysis, claiming that the system had a positive impact on user innovation. However, as Schopman (2023) used secondary data on the game level, she suggests that future research should approach the topic on the modders' personal level in order to gather data about the effect of the donation-based system on modders' motivations. Therefore, another gap in current literature presents itself as a study investigating the effect of donation systems on the motivations of various types of modders is missing.

Consequently, the primary objective of this research was to explore the current state of the video game modding scene with regards to the motivations of modders and explore the effect of intrinsic and extrinsic motivation alignment on modders' behaviour. This research can fill the current gap in academic literature by investigating the intrinsic and extrinsic motivations of a wide variety modders and including current developments in the modding scene such as the effects of donation systems, and the effects of modders' community interactions on their behaviour.

Therefore, the following research questions are formulated:

RQ1: What are the various intrinsic and extrinsic motivational factors associated with modding?

RQ2: How do modders' intrinsic and extrinsic motivation alignment affect video game user innovation?

RQ3: How do emotional rewards and donations systems affect video game user innovation?

This research can contribute to the academic literature in multiple ways. Firstly, as the existing literature on this topic is relatively small, the findings of this study can strengthen or weaken the generalizability of prior studies by exploring modder communities previously not studied, therefore achieving a more complete academic understanding of the topic. Furthermore, the introduction of novel elements, such as the Donation Point System by Nexus Mods in 2018,

has altered the modding landscape, creating a need for contemporary research on how these changes affect modders' motivations (Schopman, 2023). Previous studies have predominantly examined motivations over a decade ago, potentially overlooking shifts in the industry that may impact modders' incentives. Moreover, this study contributes to the academic literature of user driven innovation, in the context of a highly turbulent industry that is the video game industry. In addition to the academic relevance of this paper, businesses, such as video game developers, could benefit from the findings of this research as well. Since modding has been recognized to be beneficial to video games by multiple authors (e.g. Lee et al., 2020; Poretski & Arazy, 2017; Sotamaa, 2010), understanding the driving forces for modding could provide useful insights for game developers and publishers on how to stimulate user innovation such as modding in the future.

1.1 Research Design

To answer the research questions, a mixed method approach was utilised in the form of a survey and qualitative interviews. The survey allows for data collection from a high number of modders in limited amount of time and allows for statistical analysis of the data to derive insights about the various motivational forces that contribute to user innovation.

Firstly, the survey questions dive into the intrinsic and extrinsic motivational forces, and their significance from modders' perspective in order to determine whether modders are intrinsically or extrinsically aligned in terms of motivation. In addition, modders are asked about their interactions with the community to see whether the community provides a significant incentive to modding. Furthermore, questions pertaining to donation systems such as Patreon are included to gain insights about the experiences of modders regarding this special type of extrinsic incentive. Once the survey was developed, it is distributed through relevant channels such as through modding community forums like ModDB, Nexus Mods, and dedicated Discord servers. In addition, respondents to the survey are asked to share the survey with other modders they are in contact with, aiming to achieve a snowballing effect to gather more responses.

Meanwhile, qualitative interviews are conducted to allow for deeper data extraction on the individual level, resulting in a better understanding of modders' motivations. In addition, a literature review is conducted to provide a theoretical framework regarding user innovation

in video games and explore the various intrinsic and extrinsic motivation factors associated with modding. For the literature review, information is gathered from academic journals through the utilization of search engines such as Google Scholar and by accessing the Tilburg University Library. The interview subjects are recruited using similar communication channels as the survey.

Lastly, this paper utilizes the assistance of the AI tool ChatGPT for rephrasing and paraphrasing sentences that were originally not adequately phrased according to the rules of academic writing or did not follow the rules of English grammar properly. Such examples involved long, run-on sentences or informal words and phrases. It is important to note that ChatGPT was not used to conduct any part of the research; it was used only as a writing tool to create a coherent, grammatically correct academic paper.

1.2 Structure of the Study

This paper is organized in the following way: Chapter 2 provides the theoretical framework by analysing existing literature in the field of video game user innovation. Chapter 3 describes the methodology of designing, running, and analysing the survey. Chapter 4 presents the findings of this research. Chapter 5 further discusses the findings, and discusses the limitations, implications and future research opportunities of this study. Finally, Chapter 6 draws the conclusions of the study.

2. Theoretical Framework

2.1 Modding Motivations

Modders can be motivated by a wide variety of intrinsic and extrinsic factors that drive them to create mods. In this chapter, prior literature related to modding is analysed to identify the most common intrinsic and extrinsic factors that play a role in modders' motivations.

The first common intrinsic motivational factor that is present in literature is "fun". Poor (2014) and Sotamaa (2010) have both found, in their respective sample of modders, that many modders find the activity of modding itself to be an entertaining engagement, which in itself can be enough reason to do certain activities. Also related to fun, is that many modders seem to engage in modding with the purpose of making video games more enjoyable to play for themselves, which is ultimately one of the key purposes of playing video games (Poor, 2014; Sotamaa, 2010; Postigo, 2007). In addition to making games more enjoyable for themselves, studies by Poor (2014) and Postigo (2007) have also found that modders like to contribute to the community by creating mods that make games more enjoyable for others in the community, not only for themselves. One modder in Postigo's (2007) research states that what motivates him is that when he makes new content to the game, he can see other players enjoying it, which in turn brings him joy. In addition to increasing the enjoyment factor for video games, some modders have other intrinsic motivations as well. According to Poor (2014), a large portion of modders enjoy modding because of the challenges it can present. Modding can present new, interesting, and complex problems that one needs to solve in order to reach their goal, which some individuals can find thrilling. Through tackling these challenges, modders can also learn a lot of about how games function and obtain new knowledge and skills that can serve them well in the future. This is in line with Sotamaa's (2010) research where several modders reported that they started modding because they were curious about how games worked. Lastly, one of the most dominant intrinsic motivations that prior research has found is that modders view modding as a creative outlet through which they can express themselves (Sotamaa, 2010; Postigo, 2007). Therefore, the experience of creation seems to be a major factor in modders' motivations.

In addition to intrinsic factors, there are certain extrinsic factors that have been found to motivate modders. One extrinsic factor that is present across multiple studies (Postigo, 2007; Sotamaa, 2010; Poor, 2014) is the prospect of getting a career in the video game industry. While not as dominant as some other motivational factors, across studies there is consistently a portion of modders who want a job in the video game industry and see modding as a good way of acquiring skills and improving their portfolio for future employment (Sotamaa, 2010). Furthermore, it is interesting to note that both Sotamaa (2010) and Poor (2014) have found that it is mostly the younger modders who see future employment as a tempting possibility, while older, more experienced modders are more sceptical about it. Another extrinsic motivational factor is the prospect of earning financial gains from modding (Sotamaa, 2010). However, there is a likely overlap between those who are modding for financial gains and those who seek future employment in the video game industry. Lastly, there seems to be some modders who are encouraged by the popularity, and recognition they can gain from creating mods, boosting their ego by showing that they are better than other modders (Sotamaa, 2010).

Considering the existing literature on the motivations of modders, it seems that some modders are more intrinsically aligned is terms of their motivations, while others are more extrinsically aligned. As either intrinsically or extrinsically motivated individuals can engage in modding the following hypotheses are formed:

H1: Intrinsic Motivation Alignment have a positive effect on Modding Effort.

H2: Extrinsic Motivation Alignment have a positive effect on Modding Effort.

In addition, based on the literature, it seems that intrinsic motivational factors play a more significant part in modders' motivations than extrinsic factors. Across multiple studies such as Poor (2014), Sotamaa (2010), and Postigo (2007), the majority of modders in their respective samples gave answers regarding their motivations that are more closely associated with intrinsic motivation. Therefore, another hypothesis is formed:

H3: Intrinsic Motivation Alignment in more dominant than Extrinsic Motivation Alignment in the modding community.

2.2 Emotional Rewards

A special factor found to have an influence on modders' behaviour is the community around the games they make mods for. Poor (2014) has found that modders who feel like part of the community and interact with the community generally publish more mods than those who do not feel part of the community. Moreover, the interviews conducted by Sotamaa (2010) have also revealed that many modders feel joy when others in the community show appreciation and affection towards their work. Considering that the gains from these community interactions are mostly emotional, it presents a special case where an extrinsic factor primarily influences the intrinsic motivation of individuals. This phenomenon can be explained by drawing from the field of business ethics. Bruni et al. (2020) discusses incentives and prizes as different types of rewards which can influence the motivations of individuals. In their research, Bruni, and his colleagues have concluded that certain types of rewards can crowd-in intrinsic motivation, meaning that an individual will continue doing an activity primarily for intrinsic motivational reasons. These types of rewards have the characteristics of having no monetary content, gained only after an activity is concluded, are uncertain, and given for achieving positive external effects (Bruni et al., 2020). These characteristics can be found in the interactions between modders and the community as well. The appreciation from the community is gained only if the mod has brought joy to others, modders cannot be certain that their mod will bring them support from the community, and receiving positive comments has no monetary value. Therefore, the support provided by the community in the modding scene can be regarded as an emotional reward.

Considering the literature on the possible impact of the community on modders, it is expected that modders who receive emotional rewards will increase their engagement in modding activities. Therefore, the following hypothesis is formed:

H4: Emotional Rewards positively affect Modding Effort.

In addition, it is assumed that emotional rewards will primarily have a positive impact on intrinsically aligned modders. Therefore, the following hypothesis is formed:

H5: Emotional Rewards have a positive moderating effect on the relationship between Intrinsic Motivation Alignment and Modding Effort.

2.3 Donation Systems

Financial incentives play a role in many activities in life, and user innovation practices such as modding are no exception. Prior literature has studied the role of financial incentives in affecting individuals' motivations, however, results are mixed. On one hand, experimental research by Deci et al. (1999) has found that tangible incentives such as money have a negative effect on intrinsic motivation, decreasing the intrinsic value of performing a certain activity. Moreover, Bruni et al. (2020) has also found in their research on rewards that tangible extrinsic rewards, that serve as an incentive, can have a crowding-out effect on intrinsic motivation. In addition, Amabile (1985) has found that extrinsic rewards can hinder the creativity of individuals, which is required for many activities, such as modding as well. On the other hand, Lakhani and Wolf (2003) found in the Open-Source Software (OSS) community that contributors spend more time working on projects when they are paid compared to the unpaid contributors. Wang et al. (2021) also discusses the possible positive spillover effects from introducing monetary incentives such as increased reciprocity in user contribution, however states that there can be negative effects as well, such as the crowding-out of intrinsic motivation.

Most research mentioned so far viewed financial incentives as an expected sum of monetary gain, however, there are other sources of financial rewards that are different in nature and can have different effects. Donation based funding is one such source of financial incentive. Donation based funding is a form of crowdfunding, where one can donate funds to someone, without expecting any tangible rewards in return (Hossain & Oparaocha, 2017). For content creators, such as modders, the most popular way of receiving financial contributions is through Patreon, a patronage platform similar to crowdfunding platforms (Bonifacio et al., 2021). Patreon has grown enormously over the last few years as it represents an alternative revenue model for content creators of all size, where fans can express their support towards them for their work (Bonifacio et al., 2021). Donations through Patreon are different than traditional means of financial incentives, as content creators do not expect to receive a fix amount of donations, and rather view donations as a way of gratitude given for their work that they would have done regardless of donations (Bonifacio et al., 2021).

In the modding scene, an interesting solution was implemented by Nexus Mods to provide mod creators with an opportunity to gain some finances for their work. In 2018, a Donation Points System was introduced, where mod creators receive donation points determined by the number of unique downloads their mods accumulate each month (Scott, 2018). These donation points can then be converted into money payout, rewards in the Nexus Mods donation points store, or donated for charity purposes (Scott, 2018). This system can encourage creators to increase their modding effort by either creating more mods or creating better quality mods. In addition, it encourages creators to upload their mods on Nexus Mods instead of other mod platforms such as ModDB. The impact of the Donation Points System on the quantity and quality of mods on Nexus Mods was studied by Schopman (2023) through utilizing secondary data from Nexus Mods and Steam Workshop. Schopman (2023) concluded that the introduction of Donation Points System increased both the quantity and quality of mods on Nexus Mods.

Considering the existing literature regarding the effect of donations on user innovation, it is expected that modders who receive donations will increase their engagement in modding activities. Therefore, the following hypothesis is formed:

H6: Donation Systems positively affect Modding Effort

Moreover, it is expected that donation systems will primarily have a positive impact on extrinsically aligned modders as donations are a special case of extrinsic motivation. Therefore, the following hypothesis is formed:

H7: Donation Systems have a positive moderating effect on the relationship between Extrinsic Motivation Alignment and Modding Effort.

2.4 Conceptual Model

Based on the literature review and the formed hypotheses, a conceptual model is designed to visually represent the proposed relationships between the variables in Figure 1. The six intrinsic motivation factors, and two extrinsic motivation factors identified in the literature review form the independent variables of Intrinsic Motivation Alignment and Extrinsic Motivation Alignment representing which motivation is more dominant for individual modders. Emotional Rewards, and Donation Systems are quasi moderator variables as they are expected to affect the relationship between the independent and dependent variables while at the same time, are independently associated to the dependent variable. The dependent variable Modding Effort represents individual modders' level of engagement in modding activities in terms of number of mods created and the time spent working on mods.

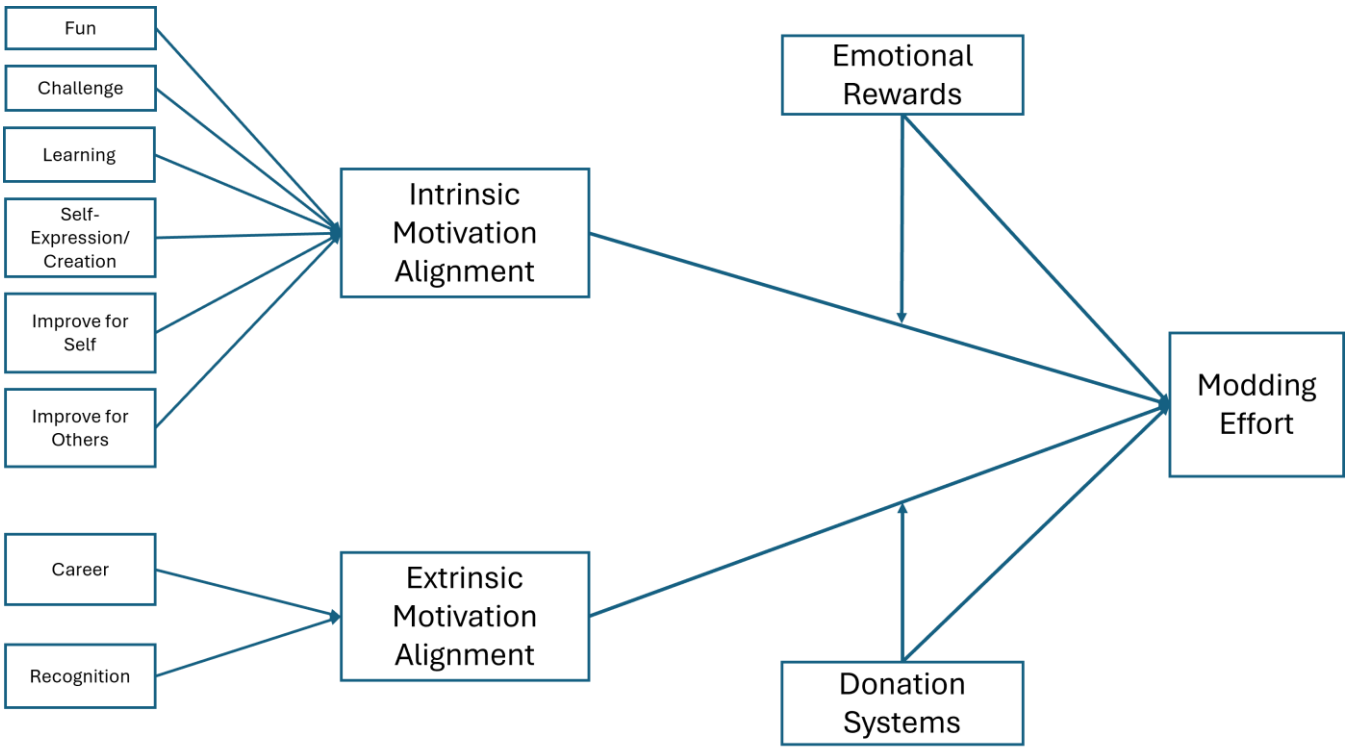

Figure 1 – Conceptual Model

3. Survey Methodology

3.1 Survey Design

In order to assess the intrinsic and extrinsic motivation factors importance and effect on modders' behaviour, a survey was designed based on the motivational factors identified in prior literature. Intrinsic motivation is measured by using the six main factors identified in the literature: fun/enjoyment of modding itself, solving the challenges presented by modding, learning new skills/curiosity about how games work, self-expression/experience of creation, making the game better for others, and making the game better for themselves. Each aspect of intrinsic motivation is measured by two items, using 5 points Likert scales to indicate how much each statement applies to the respondent. Extrinsic motivation is measured similarly to intrinsic motivation, using the factors identified in the literature: career prospects, and recognition/popularity. The items for career prospects and financial gain have been merged to create a four-item scale, while recognition/popularity is a two-item scale. Similarly to intrinsic motivation, extrinsic motivation scales are measured using 5 points Likert scales to indicate how much each statement applies to the respondent. While using only two items per factor is fewer than in much research that assess motivation, there are studies where two item scales have been used successfully to measure motivation or other constructs, such as Robinson et al. (2014), Poor (2014), and Peterson et al. (2008). The main reason for using two item scales in this study is to keep the time needed to complete the survey under 10 minutes, thus limiting respondent burnout. Items for intrinsic and extrinsic motivation have been crafted by modifying those from previous studies on modders' motivation, such as Poor (2014), Sotamaa (2010), and Postigo (2007). Additionally, items from motivation-measuring tools such as the Work Preference Inventory by Amabile et al. (1994; 1995) have been adapted.

In addition to intrinsic and extrinsic motivation, the direct, and moderating effect of emotional rewards and donation systems is measured by the survey. Emotional rewards are assessed by 6 items, each item asking modders about their experiences with interactions within the community, and their feelings regarding the support and affection they get from the community. The moderating effect of donation systems is measured by 5 items, asking respondents about their experiences with donations systems such as Patreon, reward systems

such as the Nexus Mods Donation Points System, and whether they are satisfied with the amount of financial support they receive from those sources.

Lastly, the dependent variable, modding effort, is measured by three items. First, respondents are asked about how many hours they spend working per week when working on a mod. Next, they are asked how many mods they had worked on by themselves, and in collaboration with others. While it would be greatly beneficial to know the total number of hours spent modding, prior research by Poor (2014) has showed that modders find it difficult to determine such number, as many have been modding for years, and they do not know when they should start counting the hours, from the inception of the idea, or from starting to model, script etc. Likewise, the quality of mods is nearly impossible to determine in a survey context, as modders are not reliable to ask how high quality they think their mods are. Modders could be asked to provide the number of downloads of their mods, however, as modders usually make more than one mod, asking for the number of downloads would be difficult to calculate. Furthermore, it could be argued that the number of downloads alone does not adequately gauge quality, given that games vary in player count. Consequently, a mod with 1000 downloads in a game with a limited player base might be seen as a top-performing mod, whereas the same number of downloads in a game with a large player base might indicate lower performance. Therefore, assessing the number of mods created, and the weekly hours dedicated to work, though not directly indicative of mod quality, enables the measuring of individuals' effort put into modding.

Lastly, some questions are included at the beginning of the survey to gather some demographic information such as age, gender, field of employment, amount of modding experience in terms of years, and the types of modding activities the respondents participate in. At the end of the survey, participants are asked if they want to participate in a prize draw, and whether they would be open to some follow-up questions in the form of an interview.

3.2 Running the Survey

The survey was designed and run through Qualtrics; a web-based software used for surveys. The survey was distributed over various channels in order to reach modders. The forums of ModDB, and Nexus Mods were the first channels to be utilized, as they are the two leading platforms hosting mods. In addition, the survey was shared on the forums of popular video game developer, Larian Studios, where modding specific forums were featured, and shared in game specific Discord servers where modders are active such as the Da Modding Den server, which is specific to the Total War games of Creative Assembly. The time to complete the survey was between 5 and 10 minutes aiming to reduce the probability of respondents leaving mid-survey. Furthermore, respondents were offered the chance to win 1 of 5 Steam Gift Cards, worth 25 Euros, upon indicating their wish to enter the prize draw and submit an email address which could be used for contacting the winners. The responses were collected over a period of two weeks in April.

3.3 Survey Analysis

To analyse the results of the survey, several statistical analyses are performed in the IBM SPSS environment. First the demographic information of the respondents such as Gender, Age, and Employment Status are analysed by assessing the distribution of answers per question in terms of percentages. In a similar manner, modders' Years of Experience and Weekly Modding Hours spent on modding are presented in terms of distribution in the sample. Next, the number of mods each modder has worked on are analysed by descriptive statistics, gaining insight into the minimum, maximum and mean number of mods worked on, in the sample. Moreover, once obtained, the number of mods is transformed into categories (titled Total Mod Ranges) in order to allow for better use in further analyses. Next the individual factors of intrinsic and extrinsic motivation are analysed. For intrinsic motivation, the constructs are Fun, Challenge, Learning, Self-Expression/Creation, Improve for Self, Improve for Others, and for extrinsic motivation the constructs are Career, and Recognition. First, the constructs for the individual factors are created by taking the mean of the scores of the questions belonging to each factor in the survey as it is common practice in most survey scale scoring such as the BPNSS, IMI, and others (Deci & Ryan, 2000; Deci et al., 1994). Then, the constructs' reliability is tested using Cronbach's Alpha which allows for deciding whether the constructs can be used

reliably in further analysis (Tavakol & Dennick, 2011). After verifying the constructs' reliability, they are analysed using descriptive statistics. Next, the composite constructs Intrinsic Motivation Alignment, and Extrinsic Motivation Alignment are created taking the mean of the scores of all intrinsic and extrinsic motivation factors respectively. The resulting constructs are analysed using descriptive statistics, and a Paired-Sample T-Test in order to determine the relative importance of intrinsic and extrinsic motivation, and test Hypothesis 3 (Zimmerman, 1997). Next, the items belonging to the Emotional Rewards construct are analysed by providing insight into the response distribution per item. In addition, some items belonging to Emotional Rewards were binarily coded while the other items used a five-point Likert scale, therefore, the binary values were recoded to serve as proxies for the options "Disagree" and "Agree", thus allowing analysis with the Likert scale items. Afterwards, the construct for Emotional Rewards is formed and tested using Cronbach's Alpha to determine the reliability of the construct. Then further analysis is performed using descriptive statistics. Next, the items belonging to Donation Systems are analysed in a similar manner to Emotional Rewards. The construct for Donation Systems is created in a similar manner as well and analysed using descriptive statistics. The last construct to be created is Modding Effort, which is created by adding the values from the Weekly Modding Hours to Total Mods Ranges, resulting in a variable with values between 2 and 10. The two variables making up the construct carry equal weight, which is justified by the logic that whether someone spends a lot of time on a few mods, or little time on many mods, should be considered relatively same in terms of effort. The two items were both measured on a 5-point scale, making it easier to combine them into the Modding Effort construct. Next, the values were recoded into five categories ranging from "Low Effort" to "Very High Effort" by using value ranges "1-2", "3-4" and so forth, for determining the categories. The resulting categories are then presented by their distribution in the sample in percentages.

Once all the constructs are created, the hypotheses are tested using a series of ordinal regressions. Ordinal regression is chosen for this research because the outcome variable, Modding Effort, is measured on an ordinal scale. This modelling approach enables testing the impact of each predictor variable on Modding Effort. Ordinal regression's coefficients represent the change in the log odds of being in a higher category of the outcome variable for a one-unit change in the predictor variable, making it suitable for examining the influence of

each variable on Modding Effort's ordinal scale (Liu, 2009). First the direct effects of Intrinsic Motivation Alignment and Extrinsic Motivation Alignment are tested to determine their influence on Modding Effort, and answer Hypothesis 1 and Hypothesis 2. Next, the direct effect of Emotional Rewards on Modding effort is tested in order to answer Hypothesis 4. Following that, the moderating effect of Emotional Rewards on the relationship between Intrinsic Motivation Alignment and Modding Effort is tested by including the interaction term of Emotional Rewards and Intrinsic Motivation Alignment in the regression for testing Hypothesis 5. Next, the direct effect of Donation Systems on Modding Effort is tested for answering Hypothesis 6. Then, the moderating effect of Donation Systems on the relationship between Extrinsic Motivation Alignment and Modding Effort is tested by the inclusion of the interaction term of Extrinsic Motivation Alignment and Donation Systems for answering Hypothesis 7. Lastly, all the independent and moderating variables are included along with the interaction terms in a final regression model, to gain insight into the relationships among variables and their combined effects.

4. Empirical Findings

4.1. Survey Findings

After cleaning the data by deleting incomplete and fraudulent responses, the survey had 73 respondents. Then, the results were analysed using IBM SPSS to gain insights into the data.

4.1.1 Demographics

First, some information about the respondents is presented. Table 1, presents the distribution of individuals within the sample based on gender identity. The findings reveal a predominant representation of males within the sample, constituting 90.4% of the total. In contrast, females account for a smaller proportion, comprising 8.2% of the sample. Additionally, there is a minor presence of individuals identifying as non-binary or third gender, representing 1.4% of the sample. Notably, no respondents indicated a preference to withhold their gender identity (0.0%).

Table 1 – Gender distribution of respondents

Gender	Male	Female	Non-binary / third gender	Prefer not to say
Percent	90.40%	8.20%	1.40%	0.00%

Table 2 displays the distribution of individuals within the sample according to age groups. The results indicate a diverse distribution of age groups within the sample. The largest proportion of individuals falls within the 25-34 age range, comprising 50.7% of the total. This age group represents a significant portion of the sample, suggesting a predominant presence of individuals in their late twenties to early thirties. Additionally, individuals aged 18-24 constitute 17.8% of the sample, indicating a substantial representation of young adults.

Table 2 – Age distribution of respondents

Age	Under 18	18 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 or older
Percent	4.10%	17.80%	50.70%	20.50%	6.80%	0.00%	0.00%

Table 3 illustrates the distribution of individuals within the sample based on their employment status. The table reveals a diverse distribution of employment statuses among the sample population. The largest proportion of individuals are employed in non-tech related industries, constituting 23.3% of the total. Additionally, a substantial portion of the sample consists of individuals working in other tech-related industries, comprising 21.9%. Moreover, approximately one-fifth of the sample consists of full-time students (19.2%), indicating a substantial proportion of individuals pursuing education alongside or in preparation for their careers. Interestingly, a notable proportion of respondents chose not to disclose their employment status (17.8%), indicating a level of privacy or preference for confidentiality.

Table 3 – Employment status of respondents

Employment Status	Percent
Currently unemployed	9.60%
Full-time student	19.20%
Working in the video game industry	8.20%
Working in other tech related industry	21.90%
Working in a non-tech related industry	23.30%
Retired	0.00%
Prefer not to say	17.80%

4.1.2 Modding Activity

Table 4 illustrates the distribution of individuals engaged in modding activities, categorized by their years of experience. The findings reveal a diverse distribution of experience levels among modders. Notably, a significant portion of individuals falls within the 2-3 years of experience category, comprising 30.1% of the total. Additionally, there is a considerable presence of individuals with 5 or more years of experience, accounting for 26.0% of the sample. Conversely, the proportions decline for individuals with fewer years of experience, with 0-1 and 3-4 years representing 4.1% and 12.3% respectively. This distribution suggests a varied landscape of expertise within the modding community, with both seasoned veterans and newcomers contributing to the field.

Table 4 – Experience level of respondents

Years of modding experience	0-1	1-2	2-3	3-4	4-5	5+
Percent	4.10%	15.10%	30.10%	12.30%	12.30%	26.00%

Table 5 presents the distribution of individuals within the sample based on the number of hours spent modding per week when working on a mod. The findings highlight varying levels of time allocation for modding activities among individuals working on mods. The largest proportion of individuals, accounting for 42.5% of the sample, dedicate 9 to 16 hours per week to modding. Furthermore, approximately one-fifth of the sample (19.2%) spends 17 to 24 hours per week on modding activities, indicating a notable investment of time in mod development and enhancement. Similarly, 16.4% of individuals allocate 25 to 30 hours per week to modding, reflecting a significant level of engagement and dedication to modding projects. Conversely, smaller proportions of the sample spend fewer hours per week on modding activities. Approximately 17.8% of individuals dedicate 0 to 8 hours per week to modding, indicating a more casual or intermittent involvement in modding endeavours. Additionally, a minority of individuals (4.1%) allocate 30 or more hours per week to modding, suggesting a highly intensive level of engagement and commitment to modding projects.

Table 5 – Modding hours of respondents

Weekly modding hours	0-8	9-16	17-24	25-30	30+
Percent	17.80%	42.50%	19.20%	16.40%	4.10%

Next, respondents were asked to provide an estimate of the number of mods they had worked on individually, and in collaboration with others. Table 6 summarises the results, showing that on average, modders had worked on 24-25 mods in total. Notable, that there are modders who have exclusively pursued modding projects independently, whilst there are also modders who have only worked in collaboration with others. In addition, the standard deviation of 24.232 suggests a considerable level of variability in the total number of mods worked on by participants. Given this wide-ranging disparity in modding experiences, the cumulative mod counts were categorized into five distinct brackets to provide a better understanding of the distribution of observations. Table 7 provides an overview of the resulting categories, and the

distribution of the sample. Interestingly, over one-third of the participants have contributed to fewer than 10 mods in total, representing the most prevalent category among the five. Conversely, a significant proportion of modders, accounting for 21.9% of the sample, find themselves on the opposite end of the spectrum, having participated in over 40 mods throughout their modding journey.

Table 6 – Mod count descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Mods worked on by self	73	0	80	21.12	21.09
Mods worked on in collaboration	73	0	20	3.44	4.613
Total Mods	73	1	95	24.5616	24.232

Table 7 – Mod count distribution

Total Mods Ranges	Less than 10	Between 10-19	Between 20-29	Between 30-39	More than 40
Percent	34.20%	24.70%	12.30%	6.80%	21.90%

4.1.3 Intrinsic Motivation Factors

The next part of the survey explored the underlying intrinsic motivation constructs through a series of questions. The questions and their respective response distribution can be observed in Appendix 1. As mentioned previously in the survey design chapter, six constructs were designed based on literature to assess their importance in modders' motivations. The six constructs were: Fun, Challenge, Learning, Self-expression / Creation, Improve for Others, and Improve for Self. Each construct was measured by two items in the survey. Fun, for example, was measured by the items: "What matters most to me in modding is enjoying what I do", and "I believe modding is a fun thing to do". To assess the reliability of the constructs, they were tested using Cronbach's Alpha. An overview of the reliability of the constructs can be found in Appendix 3. Based on the reliability tests, most constructs have a relatively high Cronbach's Alpha score, meaning the items seems to measure the same underlying construct. One exception is the construct Self-Expression / Creation, which has a Cronbach's Alpha of 0.689

which falls under the traditional, 0.7, reliability threshold. Therefore, that construct could not be used reliably for subsequent analysis. Nevertheless, the items complying the construct of Self-Expression / Creation, could yield valuable insights, therefore they were be analysed separate of each other, forming Self-Expression, and creation as two, separate, single-item, constructs.

The scores for the constructs were calculated by taking the means of the items belonging to the given construct per response. For instance, if a response had a score of 5 for the item "What matters most to me in modding is enjoying what I do", and a score of 4 for "I believe modding is a fun thing to do", the score for "Fun" would be 4.5. To assess the significance of each construct, descriptive statistics was applied to the constructs, obtaining the minimum, maximum, mean, and standard deviation for each construct across the sample. The overview of the descriptive statistics is presented in Table 8. From the table, we can see that the construct Fun had the highest mean score, 4.51, across the sample, indicating its significance in modders' motivations. It also has a low standard deviation of 0.63, indicating a low variation in responses which could further imply that fun is an important concept for modders. The construct for Challenge had both the lowest mean, 2.92, and highest standard deviation,1.39, among the constructs, although standard deviation is still relatively low. This implies that in general Challenge is the least important for modders in terms of driving force for engaging in modding. among the intrinsic motivational factors. It is important to note that although Challenge appears to be the least emphasized among intrinsic motivation factors, over 30 percent of the sample expressed agreement or strong agreement with challenge-related items, indicating a substantial portion of modders are indeed motivated by the challenge aspect of modding. Another point worth mentioning is, that by separating Self-Expression, and Creation, the experience of creation has one of the highest means, 4.22, among the factors, with low standard deviation, 0.99, implying that it is an important factor for modders. Moreover, based on the descriptives, it seems it is more important for most modders to increase their own enjoyment of a video game by modding, than it is to improve the game for others.

Table 8 – Intrinsic motivation factors descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Fun	73	2.00	5.00	4.51	0.63
Challenge	73	1.00	5.00	2.92	1.39
Learning	73	1.00	5.00	3.18	1.06
Improve for Others	73	1.00	5.00	3.77	1.24
Improve for Self	73	2.00	5.00	4.26	0.92
Self-Expression	73	1.00	5.00	3.27	1.03
Creation	73	1.00	5.00	4.22	0.99

4.1.4 Extrinsic Motivation Factors

Similarly to intrinsic motivation, constructs were created to assess the extrinsic motivation factors. Appendix 2 presents the items used to measure the constructs for extrinsic motivation, with their respective response distributions. The first four items were grouped together to create the construct Career, intended to measure the degree that modders view modding as a part of their long-term career journey. The last two items were used to create Recognition as a construct that focuses on the possible egocentric behaviour of certain modders. Both constructs were tested for reliability using Cronbach's Alpha to determine whether the items measure the same underlying concept or not. The results for the reliability test can be found in Appendix 3, showing that both constructs passed the reliability threshold, and therefore can be used in subsequent analysis.

The scores for the constructs were calculated in a similar manner as they were for the intrinsic factors, by taking the mean of the items belonging to the given construct. The resulting scores were analysed using descriptive statistics to gain insight into the general importance of extrinsic motivation factors for modders. Table 9 presents the resulting descriptives. The table shows that both extrinsic motivation factors have a relatively low mean score, with Career having 2.39, and Recognition 2.65 respectively. The standard deviation for Career is quite low with a value of 0.76 which means implies low variation within the sample. Recognition has a slightly higher standard deviation, implying higher variation. These results suggest that, in general, extrinsic factors play a less significant role in most modders' motivation. However,

there are still some modders who are interested in pursuing a career in the game industry and seek recognition from their peers for their achievements.

Table 9 – Extrinsic motivation factors descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Career	73	1.00	4.75	2.39	0.76
Recognition	73	1.00	5.00	2.65	1.29

An interesting finding is that upon examining career prospects alongside respondents' age, it becomes apparent that younger generations tend to exhibit higher scores for Career compared to older respondents. This suggests that younger individuals hold a more optimistic outlook regarding potential career opportunities within the video game industry. This is illustrated in Figure 2 where the age group of respondents is presented on the X-axis, and the scores for Career on the Y-axis.

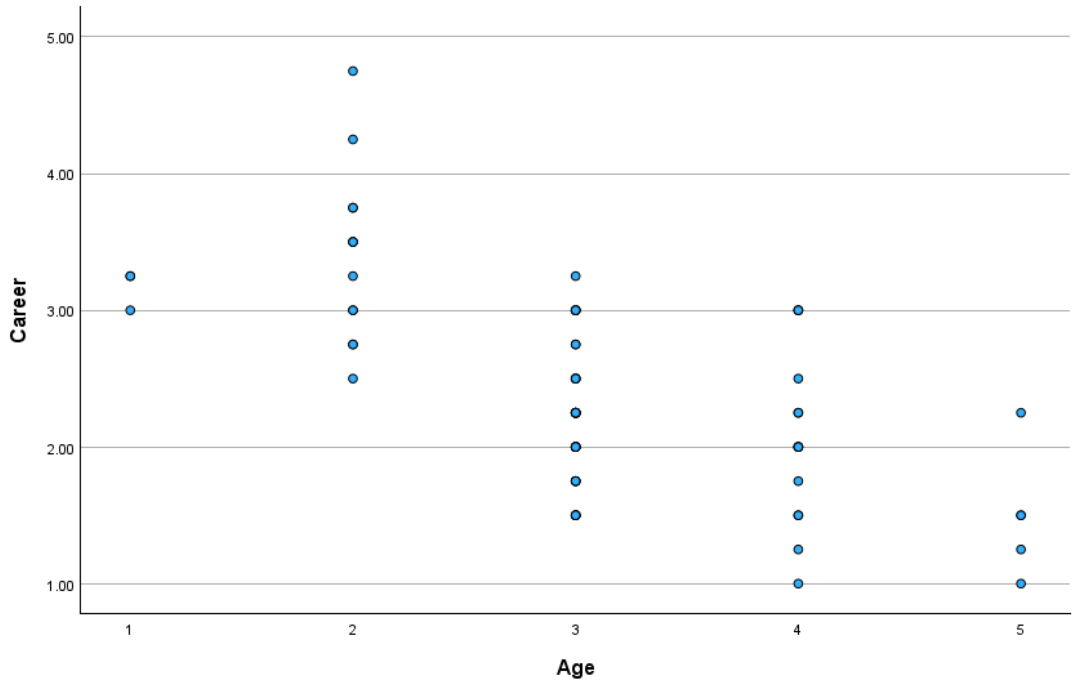

Figure 2 – Respondent Age and Career prospects scatter plot

4.1.5 Emotional Reward Construct

The next section of the survey contained questions related to participants' interaction with the community to assess the Emotional Reward construct. The distribution of responses for the individual items can be found in Appendix 5, with the main findings discussed below.

A majority of respondents (52.1%) have indicated that they have learned a lot about modding from others, indicating a significant level of knowledge acquisition through community interaction. In addition, the majority of respondents (43.8%) agree that they have formed good bonds with others in the modding community, indicating a sense of social connection. A substantial proportion (20.5%) strongly agreed with the statement regarding forming bonds with others, underscoring the importance of social relationships within the modding community. Furthermore, the majority of respondents (78.1%) reported that others in the community have expressed appreciation for their mods or thanked them for creating them, indicating a high level of positive feedback and recognition within the community. A substantial majority of respondents (75.3%) also reported receiving constructive comments from others to help them improve their mods, indicating a culture of constructive feedback and collaboration aimed at enhancing mod quality. The responses about others contributing elements to their mods, are more evenly distributed for this with slightly more than half of the respondents (52.1%) reporting that others have contributed various elements to their mods, such as code, scripting, or visual elements, indicating a significant level of collaboration and contribution from other community members. Lastly, a considerable majority of respondents either agreed (47.9%) or strongly agreed (27.4%) that it brings them joy when others show interest or affection towards their mods, indicating the positive emotional impact of appreciation and acknowledgment for modders. Overall, most respondents reported that they are satisfied with the amount of support they receive from the community, indicating a generally positive perception of community support. Once the construct has been made, its reliability was tested using Cronbach's Alpha, resulting in a score of 0.889 which suggests a reliable construct as can be found in Appendix 3. Furthermore, the descriptive statistics provided for the Emotional Rewards construct in Table 10 show a mean score of 3.58 and a standard deviation of 0.74 which suggest that a large proportion of respondents has experienced positive emotions as a result of positive sentiment from others in the community.

Table 10 – Emotional Rewards descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Emotional Rewards	73	2.17	4.50	3.58	0.74

4.1.6 Donation Systems Construct

Next, participants were asked about their experiences with donation systems such as Patreon, and their involvement in reward programs such as the Donation Points System by Nexus Mods. The distribution of answers for the items can be seen in Appendix 6.

From the results, we can observe that the overwhelming majority of modders in the sample do not have a Patreon account (83.6%) nor do they participate in reward programs (72.6%). For participants who indicated not having a Patreon, the questions related to receiving donations through Patreon were not presented and filled in automatically as "No", since without having a Patreon it did not make logical sense to ask whether they received donations through it. Reward programs had a higher participation rate in the sample, with notable proportion of respondents (27.4%) report participating in such programs, suggesting that a significant minority of mod creators actively engage in programs designed to financially reward their contributions. Participants were also asked to indicate their satisfaction with the financial support they receive, if they answered "Yes" to either having a Patreon or participating in reward programs. For participants who answered "No" to both types of donation sources, this question was not presented and filled in automatically as "Neither Agree nor Disagree." Comparing the satisfaction scores with having a source of financial support indicates that in most cases where someone has a source of financial support, they are generally satisfied with the amount received. The construct Donation Systems was created in a similar manner as the other constructs, by averaging the scores of the items belonging to the construct. The construct was tested for reliability, resulting in a Cronbach's Alpha of 0.882 (see Appendix 3). Next, the descriptives (Table 11) provided insight into the overall importance of financial rewards for modders. Overall, the descriptive statistics suggest that participants, on average, reported a moderate level of engagement or satisfaction with donation systems within the modding community, as indicated by the mean score of 2.53. Furthermore, the relatively low standard deviation of 0.59 suggests that there is relatively little variability in

participants' responses, indicating a consistent level of engagement or satisfaction across the sample.

Table 11 – Donation Systems descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Donation Systems	73	2.20	4.20	2.53	0.59

4.1.7 Modding Effort Construct

Lastly, the construct for Modding Effort is analysed which was created from the Weekly Modding Hours and Total Mods Ranges as described in the 3.3 Survey Analysis chapter.

Table 12 presents the distribution of respondents based on their levels of modding effort. From the table, we can see that 13.7% of respondents were categorized into low level of modding effort. 28.8% of respondents are in the moderately low level of modding effort indicating engagement in modding activities to a somewhat limited extent, but more than those in the low category. The largest portion of respondents, accounting for 32.9%, were sorted into the medium level of modding effort suggesting respondents engaging in modding activities at a moderate level of time commitment and a notable amount mods worked on. 15.1% of respondents were categorized into high level of modding effort category indicating high engagement in modding activities and dedicating a significant amount of time to their projects. The remaining 9.6% of respondents belong in the very high level of modding effort bracket who are extremely committed to modding, investing a significant amount of time into their projects resulting in a high number of mods or fewer, but larger mods.

Important to note, however, that the scales for Effort were created using only the limited amount of information that could be obtained using a survey, and therefore do not necessarily represent the actual reality of individuals' effort put into their work.

Table 12 – Modding Effort distribution

Modding Effort	Low	Moderately Low	Medium	High	Very High
Percent	13.70%	28.80%	32.90%	15.10%	9.60%

4.2 Hypotheses Tests

4.2.1 Hypotheses 1 & 2 – Intrinsic & Extrinsic Alignment Effects

The first regression performed was to test the effect of Intrinsic Motivation Alignment and Extrinsic Motivation Alignment on Modding Effort The output tables of the performed regression can be observed in Appendix 7.

By interpreting the resulting tables, several insights can be gained. Firstly, by looking at the Model Fitting Information, we can observe a significant decrease in the -2 Log Likelihood from the Intercept Only model to the model with the predictor variables, which suggests that adding the independent variables (Intrinsic and Extrinsic Motivation Alignment) improves the model's fit significantly. Moreover, the chi-square test indicates that the model fits the data significantly better than the Intercept Only model. Regarding the Goodness-of-Fit, the non-significant Pearson Chi-Square and Deviance Chi-Square values suggest that the model adequately fits the data, indicating that the observed and expected values do not significantly differ. This suggests that the model captures the variability in the dependent variable (Modding Effort) reasonably well. The Pseudo R-Square table, however, sheds light on the weakness of the model, as the Cox and Snell and Nagelkerke pseudo-R-Square values (0.123 and 0.129, respectively) indicate that the model explains only around 12-13% of the variance in the dependent variable. The McFadden pseudo-R-Square value (0.043) suggests an even weaker explanatory power. The most notable table for testing the relationship between the independent and dependent variables is the Parameter Estimates table (Table 13). From the table, we can observe a significant positive coefficient for Extrinsic Motivation Alignment (0.800, $p = 0.005$) suggesting that an increase in Extrinsic Motivation Alignment is associated with higher levels of Modding Effort. Therefore, Hypothesis 2 is supported by the regression analysis. In contrast, the coefficient for Intrinsic Motivation Alignment (0.403, $p = 0.463$) is not statistically significant, indicating that its effect on Modding Effort may not be reliably different from zero, therefore, Hypothesis 1 is not supported by the analysis. Lastly, the non-significant result in the Test of Parallel Lines suggests that the assumption of parallel lines across response categories is not violated, indicating that the effect of the independent variables on Modding Effort does not vary significantly across different levels of Modding Effort.

Table 13 – Intrinsic and Extrinsic Alignment Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[Effort = 1]	1.523	2.003	0.578	1	0.447	-2.402	5.448
	[Effort = 2]	3.23	2.028	2.536	1	0.111	-0.745	7.206
	[Effort = 3]	4.792	2.069	5.368	1	0.021	0.738	8.847
	[Effort = 4]	5.963	2.103	8.043	1	0.005	1.842	10.085
Location	Intrinsic	0.403	0.549	0.539	1	0.463	-0.673	1.479
	Extrinsic	0.8	0.285	7.872	1	0.005	0.241	1.359

4.2.2 Hypothesis 3 – Intrinsic & Extrinsic Alignment Comparison

Moving on from the individual aspects of intrinsic and extrinsic motivation, the two primary constructs Intrinsic Motivation Alignment and Extrinsic Motivation Alignment are analysed. Firstly, from the descriptive statistics in Table 14. we can infer some information about the distribution of the data. Intrinsic Motivation Alignment has a narrower range (from 2.58 to 4.58) compared to the Extrinsic Motivation Alignment variable (from 1.00 to 4.63). Moreover, a disparity in variability becomes apparent, with the Extrinsic Motivation Alignment variable presenting a notably higher standard deviation of 0.812 compared to the Intrinsic Motivation Alignment variable's 0.403. This discrepancy suggests a greater diversity in responses pertaining to Extrinsic Motivation Alignment factors. Subsequently, employing a Paired-Samples T Test (see Appendix 4), a statistically significant difference between Intrinsic Motivation Alignment and Extrinsic Motivation Alignment scores among the participants is revealed ($t(72) = 12.801$, $p < .001$). Furthermore, the effect size, quantified through Cohen's d, underscores a substantial distinction between the two variables ($d = 0.81$, 95% CI [1.161, 1.831]), indicative of a large effect. These findings substantiate the prominence of intrinsic motivational factors over their extrinsic counterparts within the modding scene, thereby providing empirical support for Hypothesis 3.

Table 14 – Motivation Alignment Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Intrinsic Motivation Alignment	73	2.58	4.58	3.732	0.403
Extrinsic Motivation Alignment	73	1.00	4.63	2.522	0.812

4.2.3 Hypothesis 4 – Emotional Rewards Direct Effect

The next regression tested the direct effect of Emotional Rewards on Modding Effort yielding valuable insights. The regression output tables can be found in Appendix 8.

Firstly, in terms of model fitting, the model has a significantly lower -2 Log Likelihood (78.531) compared to the Intercept Only model (119.338). Moreover, the Chi-Square value of 40.806 with 1 degree of freedom indicates a significant improvement in model fit ($p < .001$) upon adding the independent variable. The Goodness-of-Fit aspect of the model shows that both the Pearson and Deviance Chi-Square tests have non-significant p-values ($p = .988$ and $p = .953$, respectively), indicating a good fit of the model to the data. The Pseudo R-Square table's values indicate that the model explains a moderate proportion (42-45%) of the variance in the dependent variable as The Cox and Snell and Nagelkerke pseudo-R-Square values are 0.428 and 0.450, respectively. Moreover, the McFadden pseudo-R-Square value (0.186) which suggests a low to moderate level of explanatory power. The Parameter Estimates in Table 15 show that the coefficient for Emotional Rewards is 2.202 with a standard error of 0.397, indicating a statistically significant positive effect on Effort ($p < .001$). suggesting that higher levels of Emotional Rewards are associated with higher levels of Modding Effort. Furthermore, the 95% confidence interval for Emotional Rewards does not include zero, further indicating its significant effect on Modding Effort. In summary, the model provides a good fit to the data and explains a substantial proportion of the variance in Modding Effort, suggesting that Emotional Rewards is an important factor in understanding individual modders' efforts, therefore supporting Hypothesis 4.

Table 15 – Emotional Rewards direct effect Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[Effort = 1]	5.076	1.232	16.979	1	<.001	2.662	7.491
	[Effort = 2]	7.469	1.449	26.575	1	<.001	4.63	10.309
	[Effort = 3]	9.567	1.59	36.191	1	<.001	6.45	12.684
	[Effort = 4]	10.927	1.661	43.256	1	<.001	7.671	14.184
Location	Emotional Rewards	2.202	0.397	30.715	1	<.001	1.423	2.98

4.2.4 Hypothesis 5 – Emotional Rewards Moderation Effect

Regarding the moderating effect of Emotional Rewards on the relationship between Intrinsic Motivation Alignment and Modding Effort, the regression has shown significant improvement in model fit ($p < .001$) upon adding the independent variable, moderating variable, and interaction term compared to the Intercept Only model based on the information in the Model Fitting Information table (see Appendix 9). In terms of Goodness-of-Fit, the model shows to fit the data adequately as both the Pearson Chi-Square test, and the Deviance Chi-Square test have a non-significant p-value ($p = .354$, and $p = 1.000$ respectively). The Pseudo R-Square values indicate that the model explains a moderate proportion (44-47%) of the variance in the dependent variable based the Cox and Snell and Nagelkerke pseudo-R-Square values (0.444 and 0.467, respectively). Looking at the Parameter Estimates in Table 16, we can see the coefficients for the independent variable, moderating variable, and interaction term are -1.789. 1.470, and 0.265 respectively, however, none of them are statistically significant. Overall, despite the model showing a good overall fit to the data, none of the individual variables or their interaction term emerge as significant predictors of Modding Effort, which undermines the theorized positive moderating effect of Emotional Rewards on the relationship between Intrinsic Motivation Alignment and Modding Effort. Therefore, Hypothesis 5 is not supported by the statistical analysis.

Table 16 – Emotional Rewards moderation effect Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[Effort = 1]	-0.737	11.157	0.004	1	0.947	-22.604	21.13
	[Effort = 2]	1.707	11.204	0.023	1	0.879	-20.253	23.666
	[Effort = 3]	3.856	11.194	0.119	1	0.73	-18.084	25.796
	[Effort = 4]	5.238	11.19	0.219	1	0.64	-16.694	27.169
Location	Intrinsic Motivation Alignment (IMA)	-1.789	3.097	0.334	1	0.563	-7.858	4.28
	Emotional Rewards (ER)	1.47	3.059	0.231	1	0.631	-4.525	7.465
	IMA * ER	0.265	0.831	0.102	1	0.75	-1.365	1.895

4.2.5 Hypothesis 6 – Donation Systems Direct Effect

Turning to testing the direct effect of Donation Systems on Modding Effort, the model which only has Donation Systems as the independent variable and Modding Effort as the dependent variable shows a significant improvement in model fit ($p < .001$) upon adding the predictor variable Donation Systems compared to the Intercept Only model as can be observed in the Model Fitting Information table in Appendix 10. In addition, both the Pearson and Deviance Chi-Square tests have non-significant p-values ($p = .607$ and $p = .726$, respectively), suggesting a good fit of the model to the data. The Cox and Snell and Nagelkerke pseudo-R-Square values (0.208 and 0.219, respectively) in The Pseudo R-Square table indicate that the model explains a moderate proportion (20-22%) of the variance in the dependent variable. The Parameter Estimates in Table 17show that Donation Systems has an estimate of 1.587 with a standard error of 0.409, indicating a statistically significant positive effect on Modding Effort ($p < .001$). Also, as the 95% confidence interval does not include zero, which further indicates a significant effect on Modding Effort. Therefore, the statistically significant positive direct effect of Donation Systems supports Hypothesis 6.

Table 17 – Donation Systems direct effect Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[Effort = 1]	1.948	1.023	3.622	1	0.057	-0.058	3.954
	[Effort = 2]	3.624	1.025	12.515	1	<.001	1.616	5.632
	[Effort = 3]	5.293	1.131	21.900	1	<.001	3.076	7.510
	[Effort = 4]	6.633	1.275	27.082	1	<.001	4.135	9.132
Location	Donation Systems	1.587	0.409	15.031	1	<.001	0.785	2.390

4.2.6 Hypothesis 7 – Donation Systems Moderation Effect

Next, the moderation effect of Donation Systems on the relationship between Extrinsic Motivation Alignment and Modding Effort is analysed by including an interaction term in the regression. The model with the interaction term shows significant improvement in model fit compared to the Intercept Only model as evidenced by Model Fitting Information table in Appendix 11. In the model both the Pearson and Deviance Chi-Square tests have non-significant p-values (p = .286 and p = .873, respectively), suggesting a good fit of the model to the data. The Pseudo R-Square values of the model are indicating a moderate explanatory power in the variance as the Cox and Snell and Nagelkerke pseudo-R-Square values are 0.235 and 0.247, respectively. The Parameter Estimates show in Table 18that, in this model, Extrinsic Motivation Alignment is not statistically significant as a predictor with an estimate of 2.188 and, a p-value of 0.111. Donation Systems, on the other hand, has an estimate of 4.110 with a p-value of 0.035, indicating a statistically significant positive effect on Modding Effort suggesting that the presence of Donation Systems is associated with higher levels of Modding Effort. The interaction term of Extrinsic Motivation Alignment and Donation Systems has an estimate of -0.799 with a p-value of 0.149, which is not statistically significant. This suggests that the moderating effect of Donation Systems on the relationship between Extrinsic Motivation Alignment and Modding Effort is not significant, which means that Hypothesis 7 is not supported by the statistical analysis.

Table 18 –Donation Systems moderation effect Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[Effort = 1]	8.471	4.552	3.463	1	0.063	-0.451	17.394
	[Effort = 2]	10.216	4.576	4.985	1	0.026	1.248	19.184
	[Effort = 3]	11.923	4.63	6.631	1	0.01	2.848	20.997
	[Effort = 4]	13.257	4.695	7.974	1	0.005	4.056	22.458
Location	Extrinsic Motivation Alignment (EMA)	2.188	1.375	2.534	1	0.111	-0.506	4.883
	Donation Systems (DS)	4.11	1.953	4.43	1	0.035	0.283	7.937
	EMA * DS	-0.799	0.554	2.077	1	0.149	-1.886	0.288

4.2.7 Final Model

Finally, the regression of the final model, incorporating all the independent variables Intrinsic Motivation Alignment (IMA), Extrinsic Motivation Alignment (EMA), moderator variables Emotional Rewards (ER), Donation Systems (DS), as well as the interaction terms is analysed to gain insight into the relationships among variables and their combined effects on Modding Effort. The regression's output tables can be found in Appendix 12.

The Final model has a significantly lower -2 Log Likelihood (171.886) compared to the Intercept Only model (219.942). Moreover, the Chi-Square value of 48.056 with 6 degrees of freedom also indicates a significant improvement in model fit ($p < .001$) upon adding all the independent variables, moderator variables, and interaction terms. Both the Pearson and Deviance Chi-Square tests have non-significant p-values ($p = .756$ and $p = 1.000$, respectively), suggesting a good fit of the model to the data. These results indicate that the model adequately represents the relationship between the variables. The Pseudo R-Square values of Cox and Snell and Nagelkerke (0.482 and 0.507, respectively) indicate that the model explains a substantial proportion (48-51%) of the variance in the dependent variable. The Parameter Estimates in Table 19 show the various coefficients for the variables, however, none of them are statistically significant in the final model.

Overall, the model explains a substantial proportion of the variance in Modding Effort and adequately fits the data. However, none of the variables are statistically significant, which greatly hinders the overall usefulness of the model.

Table 19 – Final Model Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[Effort = 1]	0.603	12.176	0.002	1	0.961	-23.261	24.467
	[Effort = 2]	3.038	12.208	0.062	1	0.803	-20.889	26.965
	[Effort = 3]	5.29	12.203	0.188	1	0.665	-18.628	29.209
	[Effort = 4]	6.798	12.212	0.31	1	0.578	-17.138	30.734
Location	IMA	-2.414	3.113	0.601	1	0.438	-8.516	3.687
	EMA	0.713	1.439	0.246	1	0.62	-2.107	3.532
	ER	0.423	3.079	0.019	1	0.891	-5.613	6.458
	DS	1.9	2.022	0.883	1	0.347	-2.063	5.864
	IMA * ER	0.471	0.838	0.316	1	0.574	-1.171	2.112
	EMA * DS	-0.287	0.573	0.251	1	0.616	-1.411	0.836

4.2.8 Hypotheses Summary

Overall, all the hypotheses were tested using statistical methods resulting in the hypotheses either being supported by the analysis, or not supported by the analysis. An overview of the hypotheses test results is presented in Table 20.

Table 20 – Hypotheses Summary

Hypothesis	Test Result
H1: Intrinsic Motivation Alignment have a positive effect on Modding Effort.	Not Supported
H2: Extrinsic Motivation Alignment have a positive effect on Modding Effort.	Supported
H3: Intrinsic Motivation Alignment in more dominant than Extrinsic Motivation Alignment in the modding community.	Supported
H4: Emotional Rewards positively affect Modding Effort.	Supported
H5: Emotional Rewards have a positive moderating effect on the relationship between Intrinsic Motivation Alignment and Modding Effort.	Not Supported
H6: Donation Systems positively affect Modding Effort	Supported
H7: Donation Systems have a positive moderating effect on the relationship between Extrinsic Motivation Alignment and Modding Effort.	Not Supported

4.3 Modder Interviews

In addition to the survey, some interviews were conducted with modders who indicated being open to some follow-up questions. The interviews were semi structured, focusing mainly on the modding journey of the interviewees and their motivations. The interviewees were relatively distinct in their experiences, further proving the diverse nature of the modding scene. Some modders got into modding because they wanted to bring their personal stories and fantasies to life. As one such modder shared when asked about their motivation:

“For me, it's very simple - my modding is driven by the story that I write [...] The mods are setting the stage for the events in the story to take place. It's fan fiction, it uses characters and ideas from several existing games, and the setting is Oblivion. The choice of the game for the setting was largely down to the design of the game which allows for almost infinite modding. When I play the games in question, I pick up on the random things added by the workings of the game engine more than the story written by the designers of the game. These random events feed into my own story which I then want to play. To be able to do that, I make mods for Oblivion” (LenaWolfBravil, author of several mods for The Elder Scrolls IV: Oblivion, personal communication, 2024)

Other modders were missing content from their beloved games, therefore decided to fill in the gap as one interviewee said:

“There were things I wanted to play with in game that the faction I enjoyed most didn't have an official implementation of yet, so I decided I would try and make an equivalent yet.” (Neurotoxin, author of several mods for Total War: Warhammer III, personal communication, 2024)

In some cases, modding was the only way of playing something new, as one modder, who grew up during the communist regime said:

“Obviously, as a kid, I was only interested in playing games, but we only had one game on that computer (Alley Cat) and again, thanks to where we lived, it was very hard to get any other games. So, having no games, the only option was to make my own, which was an effort my father wholeheartedly supported and did all he could to teach me.” (T. Buzga, author of several mods for games such as Skyrim, Witcher, Fallout 4, X-Com, personal communication, 2024)

Moreover, the interviews have shown that even individuals' motivation can be multi-layered. T. Buzga shared the following regarding his source of motivation for having been engaged in modding for a long time:

"My motivation for modding comes from two places. First is often the need to improve or "fix" something, which is typically related to the GUI or HUD - usually to minimize the presence of HUD, sometimes to remove it completely, to help my immersion or making some "Quality of Life" changes. [...] Often, I also tweak/change sounds or visual effects, or I remove sounds or visuals I find annoying. […] Second is of course to create something new - a new item, new weapon, new character, new quest, or even a whole new game mode, it depends on what the game easily allows. […] basically, I make mods for nearly every single game I play, as long as it is even slightly possible or not too inconvenient. If for nothing else, I usually find something I don't like, and have to mod it before I can enjoy the game without getting constantly annoyed by whatever that thing was." (T. Buzga, author of several mods for games such as Skyrim, Witcher, Fallout 4, X-Com, personal communication, 2024)

The interviews also shed some light on the community aspect of the modding scene. One modder shared how the community was a great help for getting started with modding:

"I tried to add a handful of my own [mods] based off of a guide I found, but it was pretty out of date and there were some issues implementing it, which is what put me in the Modding Den. They gave me the necessary steps to get it all sorted." (Neurotoxin, author of several mods for Total War: Warhammer III, personal communication, 2024)

When asked about making their mods public for the wider audience, there were some notable differences between modders. Some modders have always planned to share their mods as one of the interviewees said:

"I had always intended to make it [mods] available to others. Generally speaking I take the view that the more people that have access to the mods, the better the mods will be. I get feedback I can utilise, other people might be inspired to make their own mods that might interest me or learn techniques I might later need knowledge on myself. It's an important cycle. I typically only keep private mods that use elements from other modders in combination, like when taking a bit from one graphical mod to slap onto another conflicting

graphical mod.” (Neurotoxin, author of several mods for Total War: Warhammer III, personal communication, 2024)

On the other hand, some modders primarily make mods for themselves and view sharing them only as an extra, as one modder shared:

“[...] this is all exclusively for my own purposes, I don't make mods for others. I started sharing my mods because someone asked. Many of them are sufficiently generic to be used in different settings and in other people's fantasy worlds, so I share some of them, but not all. […] what I do with the mods in terms of hosting them here, sharing them, etc., - that is subject to change as it depends on the feedback I get from others. When enough of it becomes unpleasant or starts bothering me, I'll stop sharing altogether.” (LenaWolfBravil, author of several mods for The Elder Scrolls IV: Oblivion, personal communication, 2024)

Lastly, modders shared their thoughts on donation systems, and how they view them in the modding scene:

“A Patreon, no. I don't really approve of "subscription" based donation models for modding, though I have no issue with one-time payment links. I was badgered for a long time by someone I know in real life about putting up a donation link of my own, [...] and eventually agreed to put one up upon the release of my most anticipated mod […] I did not get a single penny, which was fully expected on my part. Personally, I don't feel too bothered - money certainly shouldn't be a source of motivation for modding in my opinion. But I also don't scorn the idea of someone accepting money from someone who appreciates the work.” (Neurotoxin, author of several mods for Total War: Warhammer III, personal communication, 2024)

In summary, the interviews provided further insight into the minds of modders, showcasing the various motivations, attitudes, and journeys in the diverse landscape of modding.

5. Discussion

The video game industry is a dynamic environment where user innovation significantly enhances video games through modifications, or mods. Prior research has demonstrated the benefits of mods, showing that they increase game sales and player retention (Poretski & Arazy, 2017) and enrich the gameplay experience (Sotamaa, 2010). Mods also extend the lifespan of games, offering substantial business value to developers and publishers (Postigo, 2007). However, because user innovation is typically not funded by companies, understanding the motivations behind modding is an interesting area of research. This study aimed to explore the various intrinsic and extrinsic motivational forces driving modders, as well as the impact of specific factors like donation systems and emotional rewards.

The findings of this research contribute to the understanding of the driving forces for user innovation in the video game industry, and to the generalizability of prior studies. The survey resulted in intriguing insights into the modders' motivations. Firstly, the survey results indicated that intrinsic motivations, especially enjoyment, are paramount for modders. The construct of fun had the highest mean score (4.51) with low variation, underscoring its importance across the sample. This aligns with the prior research of Poor (2014) and Sotamaa (2010) suggesting that the inherent enjoyment of modding as an activity is a key driver user innovation in video games. Other significant intrinsic factors included improving the game experience for themselves (mean score 4.26) and the creative process (mean score 4.22). These findings align with Postigo (2007) and Sotamaa (2010), who noted that modding serves as a creative outlet and enhances enjoyment of games. Other intrinsic factors such as challenge, learning, and improving the game for others have also been found to be important for modders, however, the responses were more varied, showing the diversity of modders. Although intrinsic motivations dominated, extrinsic motivations also played a role, albeit to a lesser extent. The study found significant variability in extrinsic motivation alignment, indicating diverse responses among modders regarding recognition, and pursuing career prospects. Despite this variability, the lower mean score for extrinsic motivation alignment (2.52) compared to intrinsic motivation alignment (3.73) suggests that extrinsic factors are not the primary motivator for most modders. This finding is consistent with the existing literature as studies by Postigo (2007), Sotamaa (2010), and Poor (2014) have found that some modders

are motivated by career prospects and recognition, however, it is not a sentiment shared by the majority of modders.

Despite the dominance of intrinsic motivations, regression models did not consistently reflect this. Intrinsic Motivation Alignment was not statistically significant in any regression models, and Extrinsic Motivation Alignment was significant in only one model, raising concerns about the reliability of the dependent variables and models.

The survey also explored the role of community interaction, which emerged as an important component of the modding experience. The Emotional Rewards construct revealed that modders derive significant satisfaction from social connections and positive feedback within the community. The majority of respondents reported learning from others, receiving appreciation, and forming meaningful bonds, indicating that the social aspects of modding contribute substantially to their motivation. This implies that emotional support not only enhances the modding experience but also fosters a collaborative environment that encourages continuous innovation and improvement. This reinforces the findings of Poor (2014) who found that the community plays an important part in stimulating modders.

The impact of donation systems, such as Patreon and the Donation Point System by Nexus Mods, on modder motivations was also explored. While financial incentives were not the primary driver, the availability of donation systems provided an additional layer of support for modders. The survey revealed that around 20-30% of modders in the sample utilize donation systems and are generally content with the amount of financial support they receive. Therefore, this extrinsic reward mechanism, though not as influential as intrinsic motivations, still seems to play a supportive role in sustaining modding activities This partially reinforces the findings of Schopman (2023) who claimed that the Donation Points System increases modding activity. The survey suggests that donation systems hold value for some modders, making it plausible that systems like the one by Nexus Mods can attract modders. The regressions of both Emotional Rewards and Donation Systems suggest an increase in Modding Effort, however, the constructs were not statistically significant across all regressions further questioning the reliability of the models.

Lastly, the interviews confirmed the prominence of intrinsic motivation, as all interviewees primarily cited intrinsic factors as the drivers of their modding activities.

5.1 Limitations

While this study provides valuable insights into modder motivations, it also has limitations. Firstly, the sample size of 73, though sufficient for initial analysis, could be expanded for more generalizable results. Moreover, all data was collected in English, therefore useful information could be lost due to language limitations. An additional limitation of the literature review is that certain journal articles containing valuable information were not reachable through the employed search engines and databases without additional financial investment.

Furthermore, the survey, and the regression models suggest that the construct Modding Effort does not accurately represent a quantifiable measure of effort. Several reasons account for this issue. Firstly, the construct included the average weekly hours spent modding, but it would have been more informative to gather detailed data such as time spent per mod, in terms of weeks, months, and weekly hours. This approach would provide a more comprehensive overview of the time invested in each mod. However, in a survey setting, collecting such detailed information is nearly impossible because respondents are unlikely to recall the time spent on each mod, and asking for this data could deter them from completing the survey, especially if they have numerous mods. Another measure of effort was the number of mods, but this alone does not convey the size or quality of the mods. Determining the size of a mod is subjective, as it depends on the modder's interpretation of effort required for different types of mods, such as a weapon skin versus fixing a complex bug in the game. Similarly, assessing mod quality is challenging in a survey context. Modders are not reliable in self-assessing the quality of their mods, and even if they were, there is no definitive measure to reliably indicate quality. Previous research has attempted to gauge mod quality by the number of downloads, but asking modders to estimate downloads for each mod in a survey is impractical and time-consuming, likely leading to survey abandonment. Furthermore, the number of downloads does not necessarily reflect quality, as different games have varying player bases, complicating comparisons. Mod categories also pose a problem; a bugfix mod might have similar number of downloads to a game overhaul mod, even though the latter requires significantly more effort. One potential solution is to ask modders to list their mods for subsequent secondary data analysis. However, as Poor (2014) noted, not all modders publish their mods, with some preferring to keep them private, making download-based quality assessments futile for these cases.

Another limitation is that most modders in the sample were intrinsically aligned, with little variation in their scores. Consequently, two different modders could have identical intrinsic motivation alignment scores but vastly different modding effort scores, diminishing the usefulness of regression models that involved intrinsic and extrinsic motivation alignment as variables. A possible solution would be to expand upon the constructs for motivation alignment. This could be done by creating or using additional scales to measure intrinsic and extrinsic motivation alignment more sensitively, capturing subtle differences that might not be evident with the current scales.

5.2 Academic Implications

This study contributes to the academic knowledge about modding and user innovation in multiple ways. Firstly, this study strengthens the generalizability of prior research as modding still remains a relatively under-explored area of research.

By including various intrinsic and extrinsic motivation factors identified in previous studies (e.g., Sotamaa, 2010; Postigo, 2007; Poor, 2014), this research reinforces the applicability of these factors across different modding communities. Furthermore, while the number of respondents could have been higher, the survey reached multiple modding communities. The broader survey reach compared to earlier studies, which often focused on a limited number of games, enhances the generalizability of findings, making them more representative of the diverse modder population. Additionally, the study underscores the significant role that community plays in user innovation settings. It reveals that modding communities are not only platforms for creativity but also spaces where collaboration and support are important. This insight can be valuable in examining other user innovation environments to determine if similar community dynamics exist. Moreover, the study examined the role of donation systems in the modding scene, which is a relatively new phenomenon, therefore the findings of this paper can be utilized in future research regarding the economics of modding and the sustainability of modder communities. Furthermore, the study highlights the intricate nature of modding, demonstrating the challenges in reliably assessing modding activities and motivations. This calls for more refined and comprehensive research methods to capture the full scope of modder behaviour and contributions accurately.

5.3 Managerial Implications

The findings of this paper have important implications for game developers, publishers and platforms supporting modding activities as well. The findings show that in order to foster a vibrant modding community, it is essential to focus on enhancing intrinsic motivations. Developers can achieve this by creating tools and platforms that facilitate creativity and learning that could enhance user engagement and innovation. Additionally, incorporating features that enhance community interaction could further nurture an ecosystem of creative individuals who add value to game developers, publishers, and the players through their work. Additionally, donation systems, while secondary to intrinsic motivations, still play a valuable role in supporting modders. By providing avenues for financial support and recognition, developers can further enhance the engagement of modders. This dual approach of nurturing intrinsic motivations and providing extrinsic support through donation systems could create a more robust and sustainable modding ecosystem. Understanding these dynamics can help developers design more effective user-driven content strategies, leading to richer and more diverse game experiences.

5.4 Future Research

This study presents several avenues for future research. While this thesis has provided valuable insights into intrinsic and extrinsic motivational factors, emotional rewards, and the impact of donation systems, there remain several areas that warrant further exploration.

Future research could improve upon the measure of modding effort, and quantifying mod quality. As outlined in the limitations, mods and their authors are currently difficult to compare in a survey setting as the amount of information required exceeds the boundaries of a survey. Therefore, an interesting approach could be to build comprehensive profiles of individual modders. A smaller sample of modders and their mods could be analysed through personal communication which would make it be possible to gather more detailed information than in a survey setting. Initially, the sample could be limited to one video game, therefore making comparisons between mods a bit easier. Ideally, this method would provide a better understanding of the creation process of mods in terms of effort, and how modders themselves define mod size and quality.

Another research opportunity would be to study how modders' motivations change over time. Modders may begin creating mods for various reasons. However, for those who have been modding for years, certain factors might have altered their motivations over time. A longitudinal study could uncover these changes by focusing on a smaller number of modders and diving deep into their modding journey.

Lastly, it could be interesting to study modders of video games where the game developers provide mod toolkits and compare them to modders of video games where there are no such tools available. The effects of support from developers on modders' motivations and behaviour could yield interesting results. Such study could further show video game developers and publishers the potential benefits of actively supporting and nurturing a dedicated modding community.

These are just a few of the potential research avenues that future studies could explore. Given the relatively small amount of literature on modding, there are many opportunities for further investigating this dynamic and diverse field.

6. Conclusion

The landscape of video game modding is a complex and evolving field, its importance highlighted by researchers and the gaming industry alike. However, it still remains a relatively unexplored area. This thesis aimed to explore the motivations shaping modding in detail, examining the various intrinsic and extrinsic factors driving video game user innovation.

First, a literature review was conducted to explore the existing literature on video game user innovation and the motivations of modders. As a result, several intrinsic and extrinsic motivational factors were identified that shaped the theoretical framework of the study. In addition, community interactions and donations systems were identified as special factors influencing modders. Based on the theoretical framework, a conceptual model was developed to visualize the theorized relationship between the variables. In order to test the hypotheses and gather information about the strength of the various motivation factors, a survey was developed and distributed to modder communities. The survey had 73 responses, allowing to gain insight into various modders' motivations. The analysis of the survey responses revealed the prominence of intrinsic factors in modders' motivation. Although to a lesser extent, extrinsic factors, especially donation systems, were also found to play an important role in some modders' motivation. Moreover, the survey highlighted the importance of community engagement and support as many modders reported interacting with the community. Next, regression models were used to test the direct, and moderating effects of variables on the dependent variable modding effort. Unfortunately, the regression models suffered from the limitations of the dependent variable which are discussed in more detail in the limitations chapter. Despite the limitations, this study offers useful insights into the modding scene, specifically into how common and important the various intrinsic and extrinsic motivational factors are.

In conclusion, this thesis contributes to the understanding of what drives individuals to engage in video game modding, highlighting the interplay between intrinsic and extrinsic motivation. These insights can help create more supportive environments for modders, potentially leading to richer gaming experiences for many players. Moreover, by fostering a deeper understanding of modding motivations, this research opens the door for further studies to explore the dynamic and multifaceted modding community.

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Appendices

Appendix 1 – Intrinsic Motivation Survey Items

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
What matters most to me in modding is enjoying what I do.	0.00%	1.40%	5.50%	23.30%	69.90%
I believe modding is a fun thing to do.	0.00%	1.40%	6.80%	42.50%	49.30%
I like modding because it can present problems that are completely new to me.	21.90%	23.30%	20.50%	21.90%	12.30%
I mod because I enjoy trying to solve complex problems.	21.90%	20.50%	9.60%	26.00%	21.90%
I like modding because it provides me with opportunities for increasing my knowledge and skills.	5.50%	24.70%	34.20%	20.50%	15.10%
I mod because I am curious about how games work.	6.80%	23.30%	21.90%	37.00%	11.00%
It is important for me to have a way to express myself through my work.	4.10%	17.80%	37.00%	28.80%	12.30%
To me, the best thing in modding is the experience of creation.	1.40%	8.20%	6.80%	34.20%	49.30%
I mod to make the game better for other players.	15.10%	13.70%	6.80%	23.30%	41.10%
I like to contribute to the community by making mods.	4.10%	2.70%	26.00%	31.50%	35.60%
I mod to make the game better for myself.	1.40%	6.80%	8.20%	30.10%	53.40%
When I make a mod for a game, I like to play with the mod installed.	0.00%	6.80%	12.30%	30.10%	50.70%

Appendix 2 – Extrinsic Motivation Survey Items

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I mod because I hope to get a job in the game industry.	46.60%	20.50%	21.90%	4.10%	6.80%
I believe modding is a great way of supplementing my resume for potential future employment in the game industry.	16.40%	17.80%	45.20%	17.80%	2.70%
I believe I acquire skills from modding that can serve me well for future employment.	2.70%	15.10%	46.60%	30.10%	5.50%
I am strongly motivated by the money I can earn from modding.	58.90%	27.40%	8.20%	5.50%	0.00%
I am strongly motivated by the recognition I can earn from other people.	24.70%	19.20%	20.50%	27.40%	8.20%
To me, success means having more mod downloads than other mods do.	31.50%	20.50%	15.10%	27.40%	5.50%

Appendix 3 – Construct Reliability Tests

Construct	Reliability Statistics	
	Cronbach's Alpha	N of Items
Fun	0.874	2
Challenge	0.946	2
Learning	0.855	2
Self-expression / Creation	0.689	2
Improve game for Others	0.912	2
Improve game for Self	0.935	2
Career	0.751	4
Recognition	0.946	2
Emotional Rewards	0.889	6
Donation Systems	0.882	5

Appendix 4 – Intrinsic v Extrinsic Paired-Samples T-Test

Paired Samples Test

		Paired Differences					t	df	Significance	
					95% Confidence Interval of the Difference					
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			One-Sided p	Two-Sided p
Pair 1	Intrinsic - Extrinsic	1.20947	.80726	.09448	1.02113	1.39782	12.801	72	<.001	<.001

Paired Samples Effect Sizes

			Standardizer[a]	Point Estimate	95% Confidence Interval	
					Lower	Upper
Pair 1	Intrinsic - Extrinsic	Cohen's d	.80726	1.498	1.161	1.831
		Hedges' correction	.81579	1.483	1.148	1.812

a. The denominator used in estimating the effect sizes.
Cohen's d uses the sample standard deviation of the mean difference.
Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.

Appendix 5 – Emotional Rewards Survey Items

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I have learned a lot about modding from others.	8.20%	13.70%	8.20%	52.10%	17.80%
I have formed good bonds with others in the community	11.00%	9.60%	15.10%	43.80%	20.50%
It brings me joy when others show interest or affection towards my mods.	0.00%	0.00%	24.70%	47.90%	27.40%
In general, I am satisfied with the amount of support I get from the community.	0.00%	1.40%	34.20%	41.10%	23.30%

	No	Yes
Other gamers/modders have told me they liked my mod or thanked me for making it.	21.90%	78.10%
Other gamers/modders have made constructive comments to help me improve my mod.	24.70%	75.30%
Others have contributed code, scripting, voice, visual elements, or other content to my mod.	52.10%	47.90%

Appendix 6 – Donation Systems Survey Items

	No	Yes
I have an account on Patreon, or on a similar platform, with the purpose of allowing others to donate to me as a token of appreciation for my work.	83.60%	16.40%
I have received donations through platforms such as Patreon as a token of appreciation for my work in the past.	83.60%	16.40%
I regularly receive donations through platforms such as Patreon as a token of appreciation for my work.	87.70%	12.30%
I participate in programs that reward mod creators financially for their work (such as Nexus Mods Donation Points System)	72.60%	27.40%

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
In general, I am satisfied with the amount of financial support I receive through donations or rewards systems.	0.00%	1.40%	80.80%	16.40%	1.40%

Appendix 7 – Intrinsic & Extrinsic Regression Output

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	214.973			
Final	205.422	9.551	2	.008

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	282.109	262	.188
Deviance	201.027	262	.998

Link function: Logit.

Pseudo R-Square

Cox and Snell	.123
Nagelkerke	.129
McFadden	.043

Link function: Logit.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Threshold	[Effort = 1]	1.523	2.003	.578	1	.447	-2.402	5.448
	[Effort = 2]	3.230	2.028	2.536	1	.111	-.745	7.206
	[Effort = 3]	4.792	2.069	5.368	1	.021	.738	8.847
	[Effort = 4]	5.963	2.103	8.043	1	.005	1.842	10.085
Location	Intrinsic	.403	.549	.539	1	.463	-.673	1.479
	Extrinsic	.800	.285	7.872	1	.005	.241	1.359

Link function: Logit.

Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	205.422			
General	197.760[b]	7.662[c]	6	.264

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a. Link function: Logit.

b. The log-likelihood value cannot be further increased after maximum number of step-halving.

c. The Chi-Square statistic is computed based on the log-likelihood value of the last iteration of the general model. Validity of the test is uncertain.

Appendix 8 – ER Direct Effect Regression Output

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	119.338			
Final	78.531	40.806	1	<.001

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	30.952	51	.988
Deviance	35.384	51	.953

Link function: Logit.

Pseudo R-Square

Cox and Snell	.428
Nagelkerke	.450
McFadden	.186

Link function: Logit.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Threshold	[Effort = 1]	5.076	1.232	16.979	1	<.001	2.662	7.491
	[Effort = 2]	7.469	1.449	26.575	1	<.001	4.630	10.309
	[Effort = 3]	9.567	1.590	36.191	1	<.001	6.450	12.684
	[Effort = 4]	10.927	1.661	43.256	1	<.001	7.671	14.184
Location	Emotional_Rewards	2.202	.397	30.715	1	<.001	1.423	2.980

Link function: Logit.

Appendix 9 – ER Moderation Effect Regression Output

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	207.230			
Final	164.417	42.814	3	<.001

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	236.402	229	.354
Deviance	152.855	229	1.000

Link function: Logit.

Pseudo R-Square

Cox and Snell	.444
Nagelkerke	.467
McFadden	.195

Link function: Logit.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Threshold	[Effort = 1]	-.737	11.157	.004	1	.947	-22.604	21.130
	[Effort = 2]	1.707	11.204	.023	1	.879	-20.253	23.666
	[Effort = 3]	3.856	11.194	.119	1	.730	-18.084	25.796
	[Effort = 4]	5.238	11.190	.219	1	.640	-16.694	27.169
Location	Intrinsic	-1.789	3.097	.334	1	.563	-7.858	4.280
	Emotional_Rewards	1.470	3.059	.231	1	.631	-4.525	7.465
	Int_ER	.265	.831	.102	1	.750	-1.365	1.895

Link function: Logit.

Appendix 10 – DS Direct Effect Regression Output

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	72.559			
Final	55.497	17.062	1	<.001

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	32.132	35	.607
Deviance	29.613	35	.726

Link function: Logit.

Pseudo R-Square

Cox and Snell	.208
Nagelkerke	.219
McFadden	.078

Link function: Logit.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Threshold	[Effort = 1]	1.948	1.023	3.622	1	.057	-.058	3.954
	[Effort = 2]	3.624	1.025	12.515	1	<.001	1.616	5.632
	[Effort = 3]	5.293	1.131	21.900	1	<.001	3.076	7.510
	[Effort = 4]	6.633	1.275	27.082	1	<.001	4.135	9.132
Location	DonationSystems	1.587	.409	15.031	1	<.001	.785	2.390

Link function: Logit.

Appendix 11 – DS Moderation Effect Regression Output

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	186.905			
Final	167.318	19.587	3	<.001

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	174.805	165	.286
Deviance	144.537	165	.873

Link function: Logit.

Pseudo R-Square

Cox and Snell	.235
Nagelkerke	.247
McFadden	.089

Link function: Logit.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Threshold	[Effort = 1]	8.471	4.552	3.463	1	.063	-.451	17.394
	[Effort = 2]	10.216	4.576	4.985	1	.026	1.248	19.184
	[Effort = 3]	11.923	4.630	6.631	1	.010	2.848	20.997
	[Effort = 4]	13.257	4.695	7.974	1	.005	4.056	22.458
Location	Extrinsic	2.188	1.375	2.534	1	.111	-.506	4.883
	DonationSystems	4.110	1.953	4.430	1	.035	.283	7.937
	Ext_DS	-.799	.554	2.077	1	.149	-1.886	.288

Link function: Logit.

Appendix 12 – Final Model Regression Output

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	219.942			
Final	171.886	48.056	6	<.001

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	261.298	278	.756
Deviance	171.886	278	1.000

Link function: Logit.

Pseudo R-Square

Cox and Snell	.482
Nagelkerke	.507
McFadden	.218

Link function: Logit.

Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	171.886			
General	149.747[b]	22.140[c]	18	.226

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a. Link function: Logit.

b. The log-likelihood value cannot be further increased after maximum number of step-halving.

c. The Chi-Square statistic is computed based on the log-likelihood value of the last iteration of the general model. Validity of the test is uncertain.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[Effort = 1]	.603	12.176	.002	1	.961	-23.261	24.467
	[Effort = 2]	3.038	12.208	.062	1	.803	-20.889	26.965
	[Effort = 3]	5.290	12.203	.188	1	.665	-18.628	29.209
	[Effort = 4]	6.798	12.212	.310	1	.578	-17.138	30.734
Location	Intrinsic	-2.414	3.113	.601	1	.438	-8.516	3.687
	Extrinsic	.713	1.439	.246	1	.620	-2.107	3.532
	Emotional_Rewards	.423	3.079	.019	1	.891	-5.613	6.458
	DonationSystems	1.900	2.022	.883	1	.347	-2.063	5.864
	Int_ER	.471	.838	.316	1	.574	-1.171	2.112
	Ext_DS	-.287	.573	.251	1	.616	-1.411	.836

Link function: Logit.