Predicting Success Factors of Video Game Titles and Companies

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Abstract. What strategies, company organisations, and design decisions render video game titles successful and secure the survivability of a game development studio? These are important questions, subject to situational and contextual variation. Nevertheless, different approaches clearly make a major impact on the public reception or economical outcome of a video game project, thereby making the identification of these factors a critical inquiry for both academia, cultural institutions, and the games industry. This work aggregated 137 (ontology-, theory- and experience-driven) variables about 144 games from 76 companies located in the European game industries, and deployed machine learning to predict success criteria on a feasible level. The most important features from these models were extracted, presented, and validated using the expertise of three long-time industry professionals, highlighting the soundness and actuality of these factors. Among others, genre, game engines, business models and protagonist characteristics can highly impact a game's reception and/or economic accomplishments.

Keywords: Video game success · Expert interviews · Industrial survey

1 Introduction

What is the secret sauce that guarantees success for startup game companies? This Gordian Knot has puzzled investors as well as founders and entrepreneurs since the game development became commercialized and industrialized. Researchers from business schools around the world have been wrestling with the broader topic of successful startups for a while, building a decent corpus of knowledge [3,10,23,24,26]. Most of the work is justifiably focused on tech startups, but the game industry, with its many idiosyncrasies and hit-driven economy has not been especially covered as extensively. To research this topic further, we set out to uncover what makes some teams so effective while others turn into fruitless failures. At the core of our investigation are the design methods and creative processes that set the games industry apart form other

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tech startups. To clarify our approach and aim of the paper, we formulated the following research questions:

- RQ1: **Can we predict factors for success and survivability of video game titles and companies using supervised learning?**
- RQ2: **Do these predicted factors and statements align with the opinions of industry experts?**

Tackling this enterprise, we drew inspiration from related work and theoretical literature for the design of the established key features and aggregated a dataset of 43 companies about 144 video games in total, gathering 137 particular variables that might or might not impact a game's or company's success (c.f. Sect. 3.1). As soon as this was populated, we trained predictive machine learning models (i.e. random forest classification and regression, c.f. Sect. 3.2) to identify the most contributing factors for and their correlation with the success criteria of company survivability, player reception (score) and return on investment, among others. As results of these predictions turned out to be promising, we collected the most important factors and validated these in qualitative interviews with long-standing industrial professionals (c.f. Sect. 4). Eventually, we derive general implications from our results and interpret these with respect to the business and experts' opinions.

2 Related Work

Even if some approaches tackle the aggregation of key factors for video game and company success, this field is largely under-represented, especially from an academic perspective, and industrial reports have only produced linear correlations so far. Bornemark investigated seven properties of video games towards success, using six major e-sport games, but did not confirm any theoretical derivations [5]. Cha found higher-level factors for success and funding capital in the specific case of crowdfunded games, which turn out to be particularly risky [6]. Especially with the respect to the qualitative presentation and a company's prior success, Koch et al. support these insights [16]. Aleem et al. observe the impact of team configuration, management, testing, programming practices and other detailed factors on game success from the respective developer's perspective [2]. Marketing decisions and practices for the Turkish game industry were also studied from Scengun et al. [25]. While they deliver descriptive measures about the local market, yet the impact of these metrics onto the (global) success was not discussed. Song et al. used Bass Diffusion Models and Cluster Analyses to identify success factors of Steam games, mainly considering genre, price and minimum system requirements, as they constrain themselves to publicly accessible Steam data [28]. While certain genres were predictive for the reception of games, the price level did not contribute significantly to the prediction. In the endeavor of establishing a framework for the success of video games, Ahmad et al. discuss factors such as concept design, development budget, game engines, marketing, mutiplayer, and downloadable content [1]. Although their approach encompasses

an arguably feasible set of key factors, they only evaluated it on a single game, which lacks evidence of scalability and representativeness. Koch and Bierbamer focused on the smaller subset of player contributions and its effect onto video game success [17]. Apart from that, there is plenty of literature on predicting churn or retention to facilitate the longevity of particular games, highlighting game-related and general factors [4,19].

The most ambitious and closely related endeavor considerably was the industry-driven *Game Outcomes project*[1] from 2014, that sought to uncover which features define successful game development teams. The project collected information from 273 teams regarding teamwork, leadership, and culture and correlated this with five measures of success (outcomes): return on investment (profits or losses), critical acclaim (Metacritic score), internal satisfaction (is the team happy with the product), and project delays (from perfectly on schedule to canceled). The team created a survey with 116 questions derived from literature [12,20,30], collecting responses from 273 projects. The analysis consisted of correlating the 116 variables collected with the four outcomes. Some of the results show expected correlations, for example team experience is very positively correlated with success; other results are particularly surprising, for example crunch imposed on the team from management is negatively correlated with successful outcomes, while voluntary crunch is positively correlated with successful outcomes. The Game Outcomes project was a key inspiration for our work, which we strive to extend by investigating potential non-linear relations employing machine learning algorithms as well as expanding the pool of collected variables. We also pursuit to explore the sustainability of development teams as well as the success in terms of revenue and critical acclaim. Therefore, we set out to investigate whether we could predict different types of success metrics (5-year survival rate, players scores and return on investment) based on the variables collected.

3 Approach

In order to predict success criteria of video game companies or their particular products (RQ1), we aggregated a data set including a major sample of Scandinavian video game studios that incorporates a multitude of factors for success, company history, demographic distribution and metadata (delineated in detail in Sect. 3.1). Based on these, we explicitly aimed to predict measures for a company's survivability (as tiered into *"active since more than five years"*, *"active since less than five years"*, *"defunct and lived more than five years"* and *"defunct and lived less than five years"*), return on investment (calculated by the Sharpe ratio [27]), success rating (according to expert assessments) and an individual game title's user perception (based on their percentage of positive Steam reviews or star ratings on the app/play store, respectively). Joining the advantages of high predictive power and intuitive means of explainability, we chose Random

[1] http://intelligenceengine.blogspot.com/2014/12/the-game-outcomes-project-part-1-best.html.

Forests to predict the previously listed criteria and identify the most important features that lead to this prediction. Random Forests ensemble large collections of binary decision trees to solve classification or regression problems, suiting the discrete as well as continuous input and target variables of our data set. The decision trees used all operate on slightly different variable decisions along their pathways, which leads, if considering votes from a large number of those, to decently accurate predictions while training in reasonable calculation time and, most importantly, expressing insights and reports about why which factors were chosen, enabling the desired explainability of the approach. The following sections will give an overview about the composition and magnitude of the data set and the prediction accuracy, before validating these outcomes with the help of industry experts (RQ2).

3.1 Dataset and Processing

The dataset is based on interviews that were conducted with companies contacted through a European industry cluster. The list of companies provided was checked against and complemented with a national registry of companies by type. 76 companies were contacted and 43 companies responded. Semi-structured interviews were conducted via online meetings. The interviews covered the broader areas of "Company Information", "Business Metrics", "Success Assessment", "Production", and "Open Remarks". All interviews were conducted by the same researchers, who followed an agreed upon structure, developed by the project's team of four researchers in advance. Due to the semi-structured nature, the interviews lasted between 45 and 90 min. Notes were taken during the interview, and recordings of the interviews were transcribed in the following weeks. Transcriptions were analyzed by two of the researchers with a grounded theory approach, identifying themes and clusters (dimensions), and responses (variables) while cross checking coding regularly. The extracted data was gathered in a shared spreadsheet. This data was then complemented by (1) additional research in public repositories, including revenue and employee numbers, released titles, public funding received, and others, and (2) the analysis of 144 games of the interviewed companies. The game analysis was based on already established game ontologies, classifications, and related research [7–9,14,15]. The dimensions of analysis were chosen based on a mapping onto Jørgensen and Boger's categories [13]. In a survey of Reddit posts where users collaborate to help remember particular games from the past, Jørgensen and Boger identified categories at hand of which games were described and thereby identified. Choosing these categories for the present project is based on the assumption that, as these are the categories that players use to describe forgotten games they want to rediscover, they must be of some importance to the user. As the current project aims to measure game company success criteria, using categories that have importance to consumers was logical. The analysis included - but was not limited to - structural, graphical, and narrative elements of the games, release dates, age ratings, platforms, monetization schemes, as well as public and user reception. For the latter, major game related news websites were targeted with a google

search including the game's name. If articles existed they were gathered and analyzed via "review analysis" - a method based on grounded theory - with "focus questions" [21]: 'Does the article mention anything innovative or unique about the game?' - 'Does the article indicate a reason for 'newsworthiness' in the categories of Sensation, Conflict, Identification, Current Interest, or Significance?' The former focus question was also employed on the analysis of user reviews. For this, ten user reviews for each game were collected, using the standard sorting method of each platform (Steam, Google Play Store, the App Store).

Due to the diversity of the selected games, their genres, elements [9], and platforms, and instances of unavailable data, some variables were sparsely populated. In these cases it was necessary to establish comparable values across games. For example,"User Scores" are different between distribution platforms. With an underlying binary system of "Recommended" or "Not Recommended" ratings, Steam rates games according to the amount of positive reviews they received. The App Store and Google Play Store, on the other hand, rate games on a decimal system from 0–5. A sample of games that were rated on both Steam *and* at least one mobile platform showed that transforming percentage of positive Steam reviews into the decimal 0–5 system is viable, with only small deviations of +–0.2.

The final data set contains 137 variables covering the topics "Developer Experience", "Organization Culture", "Diversity Metrics", "Business Metrics", "Success Metrics", "Production" and "Product" of those 144 projects. Due to the general data protection regulation (GDPR) conform agreements between research institution and participating companies, the dataset itself cannot be made available, but we report on the outcomes and most impactful features in Results and Appendix.

Table 1. Most important factors for predicting success criteria (indicating Random Forest feature importance in brackets and top positive/negative values below).

Survivability	Player score	Success rating	Sharpe ratio
Genre (0.23)	Business Model (0.09)	Dependencies (0.06)	Genre (0.11)
↑ Adventure Games	↑ Paid	↑ Unreal Engine 4	↑ Action Games
↓ Party Games	↓ Advertisements	↓ Unity	↓ Puzzle Games
Dependencies (0.11)	Realism (0.04)	Genre (0.05)	Retention Metrics (0.06)
↑ Unreal Engine	↑ Abstract	↑ Sport	↑ 7-Day retention
↓ Flash	↓ Realistic	↓ Party Game	↓ Not in development
Play Setting (0.05)	Genre (0.03)	Acquisition metric (0.04)	Protagonist Gender (0.06)
↑ Solo	↑ Adventure	↑ Only for marketing	↑ Female
↓ Social	↓ Idle Game	↓ None	↓ Neutral

3.2 Prediction Outcomes

We chose Random Forest configurations of 1,000 estimators, assessed split quality via Gini impurity, and settled on the square root of the feature size for

the number of variables at each split (mtry), based on suggestions by Kuhn and Johnson [18] and own experiments with the data set. Using 5-fold cross-validation (as the established standard measure for the power of machine learning models [29]), 5-year survivability was correctly predicted with a 92.02% accuracy. For the remaining continuous variables, the Random Forest regression predicted Player Score with a mean absolute error (MAE) of 0.48 (with respect to 0 to 5-star ratings), Success rating with a MAE of 0.37 (with respect to 5-point ratings) and Sharpe ratio (commonly ranging from 0 to 3) with a MAE of 0.22. The most important features that lead to these predictions are summarized in Table 1 and are used to compile a set of statements for the following expert validation of the system.

In essence, companies that mainly develop adventure games will have a higher survivability, especially when compared to developers of party games; players rate games higher when they do not display any advertisements even if they have to pay for them; Companies that draw on Unreal Engine are rated as more successful than Unity studios; and female protagonists turn out to produce higher returns on investment than male or neutral ones.

4 Validation

After compiling statements about the (positive or negative) impact that important factors of game companies or titles might have (produced by the proposed system, for a subset see Table 1), we recruited a concise set of experts ($n = 3$) to validate whether these factors are truly important and whether the predictions stand to reason. For that, we implemented a survey that asked 26 questions regarding the direction of impact a factor might have on a target success variable, e.g. *"If a company develops mainly Free to Play games, its 5-Year Survivability will be..."*, so that experts' answers could be compared with the system's outputs. To ensure objectivity, participants were in no way affiliated with the companies approached for establishing the dataset. In a subsequent semi-structured interview, we further evaluated their responses by confronting participants with their answers in contrast to the system's predictions. If these matched, they were asked to briefly explicate their reasoning behind the answer. If these contradicted each other however, we followed up by assessing why the system output might not be the case; or if it still could make sense under some circumstances. Eventually, they were presented their overall agreement percentage and commented on that, listed additional factors that might have been important to predict the mentioned success criteria and expressed their opinion on the factors brought up by our approach.

4.1 Measures

In total, the pre-survey consisted of 26 binary questions (abstaining possible) targeting survivability, player score, success rating and return on investment. Each of those categories presented two to three factors that might impact these

criteria and listed two to five sample values each, for which participants indicated if they are positively or negatively impacting the target variable. We computed the agreement between participants and the system as well as an inter-rater reliability between them. For the following interview, we recorded mainly qualitative responses about the match or mismatch between their own and the system's answers and classified them afterwards using structuring content analysis [22].

4.2 Procedure

After recruitment, subjects of the validation were sent online informed consent forms together with the aforementioned pre-survey. Once completed, they scheduled an appointment for the subsequent interview, either via an online video conference tool or in person.

4.3 Participants

Participants were approached based on their expertise in the video games industry. All of them spent considerable amounts of years (10 to 30) within leading game companies (such as Electronic Arts, Sony Interactive Entertainment or SEGA) in the roles of producers, designers, coordinators, consultants, creative directors and/or sole proprietors. In total, one female and two male subjects took part in this validation.

5 Results and Discussion

When asked about their estimation in how far certain factors of game companies and titles influence success outcomes (c.f. Table 1), participants tended to come up with the same answers as our prediction. Following the chance-adjusted Fleiss' Kappa [11], we found moderate ($\kappa_{P1} = 0.54$) to very good ($\kappa_{P2} = 0.87, \kappa_{P3} = 0.84$) agreement. Among themselves, they reached a good inter-rater reliability of ($\kappa_P = 0.61$), leading to a moderate agreement ($\kappa_{all} = 0.55$) when calculating between all participants and the prediction.

5.1 General Findings

In most cases (54%), all experts agreed in accordance to the system, as in the opinion that *"if a game's business model is mainly through advertisements, the player rating will be lower"* (especially as *"people react to the annoyance. [...] Ads have gotten very pushy."* (P2)) or *"if you can choose from multiple protagonists, a game's return on investment will turn out higher"*. Apart from that, for 23% of the statements, the majority of experts agreed with the prediction and only shared some concerns (e.g., two participants confirmed the statement that *"if a company mainly develops Party Games, its 5-year survivability will be lower"*, whereas only one judged the commonly low-risk, low-budget business of Party Games as a robust venture). Only for some (12%) factors, all experts disagreed

with our data-driven estimation, such as *"if a company develops mainly education games, its 5-year survivability will be higher"* or *"if a game's protagonist is male, its return on investment will be lower"*.

When confronted with mismatches between their individual answers and the system's predictions, experts commonly expressed that they did not know better and would rather trust data and/or came up with reasons why their initial instinct might be incorrect or only conditionally true. Referring to the previously mentioned example, experts were convinced that education games do not produce higher market values than conventional video games for leisure, yet the higher availability of governmental and research funds for educational games in the European Union (where the data set was collected) might make these studios more likely to survive, which was reported to differ from the North American business (where the validation was carried out). On the other hand, game companies that focus on educational games *"are rather niche [...] and those who exist have low overhead"* (P2).

Only on rare occasions, participants uttered strong opinions against the computed predictions. One of these results states that *"if a company uses Unreal Engine as their main game engine, its 5-year survivability will be higher, whereas using the Unity Engine decreases survivability"*. P3 claimed that *"It is not necessarily the game engine that is important for the company, but it is what they are able to produce. If you go for [First-person shooters] with high-fidelity graphics then you are more likely to use Unreal Engine, but if you are doing something smaller, then its probably going to be Unity. [...] Companies that develop Unity mobile games are more likely to go bankrupt versus high-fidelity games. But not because they make mobile games, but because if you are developing high-fidelity games, you are already an established group, have funding and everything else you need."* This reflects the common misconception of correlation being causation, as this approach can obviously not comprehend causes, but relations between variables always have to be interpreted with context. On another note, P2 added that *"Unity is definitely superior to Unreal for mobile.[...] Apart from that, it might make sense. [...] At the high end of the game market, Unreal has more adoption than Unity. [...] So there is the perception that anyone can do Unity, but Unreal is hard. It makes you more valuable if your skill set is Unreal"*.

With respect to the used data set, the proposed approach produced viable predictions with high classification accuracies and rather low regression errors (c.f. Sect. 3.2). Validating factors with the highest random forest feature importance through an expert assessment, the agreement between industry professionals and the prediction turned out to be reasonably above chance and feasible, especially when compared to the baseline agreement between the participants themselves. A perfect consensus is unlikely to expect, neither between data-driven results and individual opinions, nor between multiple opinions of experts - but as our subsequent qualitative interview suggests, the larger part of disagreements stem from lack of knowledge, personal opinions and preferences, regional differences, and the manifolds of circumstances that a production of a game can entail.

Eventually, participants agreed that the factors highlighted by the system can be critical for the success or survivability of a game or company. Above that, they mentioned further factors that they deemed important for company or game outcome, such as *"having experienced people in the top positions"*, *"management practices"*, the *"competitive landscape"* against similar games that are already out there, the *"platform"* and further economic and quality factors. As the most important factor however, it was stressed that *"having the potential to construct a franchise [...] or sequel"* is a distinctive predictor for success.

5.2 Survivability

For the impact of Party Games on a company's survivability, only one participant mentioned that *"the social aspect is more important than the quality of the game, [...] so they can be developed with lower costs"* (P1), whereas another expert explicitly refuted this, as *"there is an oversaturation of party games on the market. [...] People put out party games without making them good. They expect the* "party aspect" *to carry it and rely on social factors"* (P3), which is in line with our prediction.

Even though P3 argued against the estimation of Unreal resulting in higher survivability than the Unity Engine, they admitted that when it comes to correlation, these results can definitely make sense - it is just not the engine that causes better or worse survivability.

5.3 Player Ratings

All participants agreed that if a game is financed through advertisements, player ratings will definitely be lower than for paid or premium games. As a reason, they stated that *"when people pay for things, they assign value to it. They naturally think its worth more because they paid money for it"* (P3). On the other hand, they don't see this trivially true as *"at the same time, expectations of the demographics changed. Older people don't like ads, younger people even value websites more if they have ads"* (P3). As many games are tailored for and/or targeted at younger populations, the temporal dimension and current zeitgeist are arguably critical for the development of video games - and for the prediction of their success.

5.4 Return on Investment

Overall, experts agreed that game projects with low cost and budget lead to less risky endeavors and thus tend to increase Return on Investment, as with the case of Casual Games and/or Idle Games, yet not for Puzzle Games (as the *"market might be very crowded"* (P2). The impact of a protagonist's gender raised more controversial discussions though. Despite the fact that one participant (P3) admitted that his answer to that was rather subjective, as they prefer to play male characters, they expressed that, when compared to playing a game with

a female protagonist, *"males are still the dominant target group for most video games"* (P3) and playing as a female includes *"fantasy fulfillment and suggestive content"* (P3) for the male audience. P2 contested this position as *"the most successful video games of all time are based on male characters"* but acknowledged that there are definitely fewer games with exclusively female main characters and *"companies that create these are also likely to make better games"*. When it comes to neutrally gendered or objects as protagonists, experts agreed that it impacts financial success in a rather negative way, as *"there is little identity in that and players want to feel connected to the protagonist"* (P1). For the contemporary prominent category of games where players can choose from multiple protagonists or create a custom one, predictions and expert opinions all point into a positive influence on ROI.

6 Implications

Returning to the initially posed research questions, we follow from the previously outlined predictions, quantitative and qualitative results that:

- (RQ1) The genre of games typically developed, used engines and software dependencies, as well as the social setting of play are important factors that can facilitate or inhibit the survivability of a game company; the business model, realism and genre are critical for the public reception of the player base; and genre, the type of used retention metrics and the gender of protagonists can highly influence the financial outcome of a video game.

We do not limit the expressiveness of our approach onto these listed factors, but focused on these during the interviews and this paper for the sake of brevity. In order to not neglect the importance of other critical factors, we are going to publish this approach via a web-based interface that produces the same predictions and offers interactive visualizations and analysis of all related variables.

Regarding the second research question, we argue that:

- (RQ2) considerably high agreements between statements produced by the approach of this work and opinions of long-standing industry experts indicate that outcomes of this approach are sound and notably substantial factors for the success of video game titles.

Combining these considerations, we contribute to the fields of games user research and industrial video games market research by developing and publishing an artifact capable of predicting valid critical success criteria. As this is highly dependent on the magnitude, actuality and representativeness of the underlying data set, it will be continuously extended to incorporate appropriate and global information. Powerful data-driven predictions should always be interpreted with respect to temporal, spatial and contextual factors, and cannot replace professional interpretations alone, but uniting expert industrial knowledge and data backed up by sound and expressive approaches can arguably lead to improved predictions and explanations that are essential for both industry and academia.

7 Limitations and Future Work

Although we sought to make the data as representative as possible, the magnitude of the data set used for the prediction and validation of this approach can be seen as a limitation, as it can only reflect a part of the industrial landscape. This becomes even more noticeable with the focus on European game companies, whereas the validation was executed with experts from North America, as some differences in the businesses showed up within the study. Nevertheless, we investigated a set of fundamental factors that are not limited to regional occurrences and arguably transfer to the international market, and the approach proposed in this work is generally independent from the used sample. Thus, we strive to extend the data set to a larger global scope and repeat the experiments to end up with probably similar, but ideally even more factors critical for video game success.

With a limited sample size of three, the variance of opinions is certainly higher than from a larger population. Yet, during our recruitment, we focused on quality before quantity and excluded participants without the necessary in-depth knowledge and experience about industrial processes, decisions and the business. To account for this smaller sample, we deployed subsequent qualitative interviews that gave reason to the expert's decisions, determined how convinced they are on a specific topic and discussed each of the particular factors in detail. This helped explain the majority of mismatches between the data-driven and individual statements and consolidated our findings on the respective factors.

The majority of factors that experts claimed to be of highest importance for predicting success were actually covered in the utilized data set, yet did not turn out as most predictive for the target criteria. This might be due to how the deployed random forest models work, as a limited set of distinctive factors is often enough to classify data and not all critical factors turn reach high feature importance, or due to the difference between the markets, and/or due to the fact that perceived importance might deviate from actual factor contribution in the end. To not lose the insights from either perspective, we recommend to not rely on only a single source of information, but to ascertain expert opinions on a topic and consolidate these with data-driven results when speaking about success factors for video games.

Eventually, participants stated that they would have liked to express their opinion on continuous scales rather than binarily, which adds a measurement of confidence to their estimations and will definitely be considered in the next iteration of this work.

8 Conclusion

The economic success and failure of video games, as well as the survivability of their respective developer companies, are multifarious variables dependent on a high number of qualitative, temporal, societal and strategic factors. In order to derive the importance of particular detailed factors on these outcomes, we aggregated a larger data set from various game companies, describing a host of game

projects through myriad qualitative and quantitative measures. These variables were trained on a machine learning approach to estimate survivability, player reception and economical success, which produced decently accurate predictions that were validated from selected experts with long-term industrial knowledge. This work presents a set of important factors that contribute to video game success or failure and illustrates a feasible approach for extracting these.

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A Appendix

In the following, we list the set of important features for predicting the respective success variable, as used for the pre-survey (in a randomized manner). Participants were asked to estimate in which direction a factor and its value might impact survivability, player rating or Sharpe ratio (or abstain). Answers that correspond to the underlying data set used in this approach are **highlighted**, but not presented to the experts before the following interview. This is not meant as an exclusive list of factors, as many parameters from Sect. 3.1) are significantly correlated with the outcomes, but these turned out as most predictive.

A.1 Survivability

If a company has Phaser in their dependencies, its 5-Year Survivability will be... (lower/**higher**).
If a company has Unreal Engine in their dependencies, its 5-Year Survivability will be... (lower/**higher**).
If a company has Unity in their dependencies, its 5-Year Survivability will be ... (**lower**/higher).
If a company has Java in their dependencies, its 5-Year Survivability will be ... (**lower**/higher).
If a company has Flash in their dependencies, its 5-Year Survivability will be ... (**lower**/higher).
If a company develops mainly Free to Play games, its 5-Year Survivability will be ... (lower/**higher**).
If a company develops mainly Action games, its 5-Year Survivability will be ... (lower/**higher**).
If a company develops mainly Education games, its 5-Year Survivability will be ... (lower/**higher**).
If a company develops mainly Party games, its 5-Year Survivability will be ... (**lower**/higher).
If a company develops mainly Endless Runner games, its 5-Year Survivability will be ... (**lower**/higher).
If a company develops mainly MMORPGs, its 5-Year Survivability will be ... (**lower**/higher).

A.2 Player Rating

If a game's business model is Advertisements, the User Ratings will be ... (**lower**/higher)
If a game's business model is Free To Play (with In-App purchases), the User Ratings will be ... (lower/**higher**)
If a game's business model is Paid/Premium, the User Ratings will be ... (lower/**higher**)
If a game's realism is abstract, the User Ratings will be ... (lower/**higher**)
If a game's realism is realistic, the User Ratings will be ... (**lower**/higher)
If a game is not particularly designed to be newsworthy, the User Ratings will be ... (**lower**/higher)
If a game is particularly designed to be newsworthy, the User Ratings will be ... (lower/**higher**)

A.3 Sharpe Ratio (ROI)

If a game's genre is Puzzle Games, its ROI will be ... (**lower**/higher)
If a game's genre is Idle Games, its ROI will be ... (lower/**higher**)
If a game's genre is Casual Games, its ROI will be ... (lower/**higher**)
If a game features a female protagonist, its ROI will be ... (lower/**higher**)
If a game features a male protagonist, its ROI will be ... (**lower**/higher)
If a game features a neutrally gendered protagonist, its ROI will be ... (**lower**/higher)
If a game features multiple protagonists, its ROI will be ... (lower/**higher**)

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