A Comparative Analysis of Consumption: Evidence from a Cultural Goods Market

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Abstract: This study uniquely employs a fuzzy-set qualitative comparative analysis (fsQCA) technique to account for complex relationships in consumption. The fsQCA technique assumes that relationships are based on a set–subset relationship. This assumption is fundamental when decision-makers are affected by information asymmetry and are, thus, required to jointly evaluate the credibility and reliability of a range of external signals. This issue also affects consumers in markets for cultural goods, where the quality of products is not known with certainty in advance of the purchase decision. Our study uses fsQCA to establish the effect of different quality signals on consumption in the US market for video game software. Our results show that reviews from professional critics alongside brand extension and multi-platform release strategies act as signals of product quality and, therefore, lead to high sales performance.

Keywords: fuzzy sets; qualitative comparative analysis; cultural goods

1. Introduction

The entertainment industry represents a significant component of global economic activity and generated worldwide revenues of more than $1.9 trillion in 2017 [1]. However, consumer preferences and decision-making in markets for cultural goods can be notoriously unpredictable given the heterogeneous characteristics of buyers and their subjective responses to the consumption experience [2]. Such unpredictability also poses challenges for the sustainability of production and consumption in these markets [3]. Despite these challenges, several prior studies have attempted to model the determinants of consumption in entertainment markets using conventional statistical techniques [4–6]. However, complex interrelationships between key variables can lead to problems in modeling and interpreting links with commercial performance using techniques such as multiple regression. For example, the examination of three-way or even four-way interaction effects assumes well-formulated hypotheses and strong support from both theory and the underlying data, conditions which are seldom present in the context of entertainment markets.

In this study, we address these deficiencies in the literature through the use of fuzzy-set Qualitative Comparative Analysis (fsQCA) to analyze the determinants of commercial performance in a market for entertainment goods. The QCA technique assumes equifinality, meaning that the determinants leading to the presence of an outcome may differ from the determinants leading to its absence. Additionally, QCA assumes that relationships are based on a set–subset relationship. Using logical reduction algorithms, the technique minimizes the set of combinations of cases to a reduced subset of configurations that lead to an outcome of interest [7–10].

fsQCA has been used to find complex relations and resulting pathways to sustainable consumption [11,12]. Halme et al. [13] have used fsQCA methodology to identify pathways
to sustainability performance improvements. Florea et al. [3] have used fsQCA to evaluate the complex conditions of sustainable production of agricultural cooperatives. As a result of these qualities, fsQCA represents a valuable tool in contexts in which it can combine idiosyncratic qualitative and quantitative evidence into a coherent and comparable framework [14] and allows researchers to combine theoretical discourse with evidence-based analysis in cases involving complex chains of causality [15]. Therefore, the approach is particularly well-suited to analyzing consumer decision-making and behavior in commercial contexts such as entertainment markets.

Our study is unique in the use of fsQCA as a means by which to analyze consumption and, thus, sales performance in the market for video games software, which has grown to represent a sizeable share of the global market for entertainment products. In 2018, worldwide sales revenues from the video games market exceeded $138 bn, of which around $30 bn was recorded in the US [16]. Video games sales have exceeded total movie box office receipts for several years, and successful entertainment software products outperform blockbuster movies in opening week sales [17]. However, far less attention has been paid to understanding determinants of commercial performance in the video games market than other mainstream forms of entertainment such as movies. This study, therefore, also partly addresses this knowledge and research gap.

The objectives of our research are twofold. First, we seek to understand how the interrelationships between product characteristics and signals of quality affect sales performance. We undertake this analysis in the context of a market for cultural goods, where these interrelationships are particularly complex and uncertain. Our study, therefore, contributes to the literature on sustainability by making scientific predictions and assessments of the changing patterns of consumption in a cultural goods market.

Second, we seek to highlight the usefulness of the fsQCA technique in analyzing and identifying complex configurations of determinants [11]. To our knowledge, the insights made possible using fsQCA have never previously been deployed in the context of cultural goods. Therefore, our unique use of the fsQCA methodology makes a broader contribution towards demonstrating and applying the tools that social scientists can use to research the areas of consumption and many other areas of significant importance to sustainability [3].

2. The fsQCA Methodology

QCA has the advantage of considering complex configurations of determinants and assumes equifinality, the idea that a system can reach the same outcome from several distinct paths and combinations of initial determinants [18]. Consequently, qualitative comparative analysis allows for the interpretation of logical interconnections between all possible configurations of distinct determinants [7,8,19,20]. The theoretical perspective on complex configurations is based on the twin ideas of necessity and sufficiency. Accordingly, set-theoretic analyses strive to identify the configurations of determinants that are necessary and/or sufficient for the occurrence of an outcome [9,10,21,22]. A configuration is defined as necessary if it is required for a specific outcome to occur. By contrast, it is defined as sufficient if by itself it leads to a specific outcome [23].

QCA can be further divided into two types of analyses: crisp and fuzzy set analysis. A crisp set is dichotomous, meaning that an attribute is either in or out of a set. Consequently, crisp sets can be compared with binary determinants taking a value of 1 for in (e.g., female) and 0 for out (e.g., male). Fuzzy sets retain the dichotomous properties of the crisp sets but, in contrast, also allow set membership in the interval between 0 and 1. Thus, a fuzzy set could include individual cases that are fully in (i.e., fuzzy membership = 1), cases that are more in than out (i.e., fuzzy membership = 0.75), some who are neither in nor out (i.e., crossover fuzzy membership = 0.5), more out than in (i.e., fuzzy membership = 0.25), and some that are fully out of the set (i.e., fuzzy membership = 0).

The following subsections present background information on fsQCA. The subsections present the steps required to perform the analysis in proper sequence: the selection and calibration of the fuzzy sets, the construction of the QCA truth table, and finally, the output
of the QCA solution formula. The final subsection describes the QCA characteristic of equifinality in greater detail.

2.1. Fuzzy Sets

In this study, fuzzy sets are used to model the degree of set-theoretic memberships of determinants. Whereas interval-scale determinants are categorized according to sample means and standard deviations, fuzzy sets are classified according to theoretical and substantive knowledge. Unlike conventional interval-scale determinants, fuzzy sets of cases can vary according to a specific research question and represent continuous membership scores in the interval between 0 and 1. Consequently, fuzzy sets simultaneously represent qualitative and quantitative data characteristics. The two extreme qualitative thresholds, 1 and 0, indicate full membership and non-membership in the fuzzy set. After membership thresholds are established, interval-scale determinants are transformed to fuzzy set scores according to the log odds of full membership. Therefore, a finely grained calibration of fuzzy set determinants is obtained, with membership scores ranging from 0 to 1.

2.2. The Truth Table Algorithm

Following the calibration of the degree of fuzzy set memberships of determinants and outcomes of interest, fsQCA identifies minimal configurations of these determinants. The minimization process is structured on a hierarchical composition. It applies a logical reduction algorithm that reduces the number of determinants to a minimized subset of configurations leading to the outcome of interest. The final truth table shows all logical combinations of determinants in one matrix.

After constructing a truth table, the total number of rows \( r \) is minimized according to the minimum frequency number and consistency level required for a solution. The minimum frequency refers to the greatest number of cases that must be considered for a solution. The minimum consistency level refers to the percentage of cases correctly described by the solution; consistency indicates how well the phenomenon is explained. Consistency reflects the proportion of cases \( N \) that reflect all determinants \( X \) and the outcome \( Y \) in relation to cases \( N \) that reflect all determinants \( X \) but do not reflect the outcome \( Y \). Accordingly, for any outcome \( Y \) and \( N \) number of cases, the consistency of a determinant or a combination of determinants \( X \) is defined as:

\[
\text{Consistency} = \frac{\sum_{i=1}^{N} \min(X_i, Y_i)}{\sum_{i=1}^{N} X_i}
\]  

(1)

While the appropriate consistency threshold is research-specific and of no general fit, Ragin [10] recommends a consistency level of no lower than 0.75.

Finally, a logical minimization algorithm, known as the truth table algorithm, reduces the remaining information contained in the truth table. The truth table algorithm primarily compares pairs of configurations that do not distinguish significantly in their determinants but match in their outcome. Subsequently, the algorithm deletes redundant information and proceeds with the minimization process until all remaining logical true combinations of determinants can no longer be reduced. All simplified configurations are summarized in solution formulas.

In addition to the consistency statistic, the coverage measure can also assess the solutions generated by fsQCA. Measures of consistency and coverage can be considered similar to the significance level and \( R^2 \) in a variable-oriented analysis, although a direct conceptual comparison should be avoided [24]. Coverage represents the ratio of cases explained by the solution formula; that is, coverage indicates how much of the phenomenon is explained. More specifically, coverage reflects the proportion of cases \( N \) that reflect all determinants \( X \) and the outcome \( Y \) in relation to cases \( N \) that reflect the outcome \( Y \) but do
not reflect the determinants $X$. Accordingly, for any outcome $Y$ and $N$ number of cases, the coverage of a determinant or a combination of determinants $X$ is defined as:

$$Coverage = \sum_{i=1}^{N} \min(X_i, Y_i) / \sum_{i=1}^{N} Y_i$$

(2)

2.3. The Solution Formula

In a solution formula, all minimized sets of configurations are supplemented by the three logical Boolean operators OR (equated with a “+”), and AND (identified as “∗”), as well as the negation of determinants NOT. These three basic operators express any given relationship between the configurations and the outcome of interest. For instance, given an outcome set $Y$ and the prime expressions of determinants $A$, $B$, and $C$, the configuration $A \ast B + C \rightarrow Y$ indicates that the determinants $A$ and $B$ or the negated determinant of $C$ lead to the outcome $Y$.

Following the notation of solution tables introduced by Ragin and Fiss [10], different types of circles are used when reporting these solutions to indicate the occurrence of determinants, whereby black circles (●) indicate the presence of a determinant and white circles (○) indicate the absence of a determinant. The absence of any circle indicates that the determinant could be either absent or present and, hence, does not influence the outcome in question. Consequently, final configurations are categorized by their affirmed and negated core determinants. Additionally, the solution tables only show configurations of determinants that pass the required frequency and consistency threshold and, thus, consistently lead to the outcome of interest.

2.4. The Presence of Equifinality

The understanding of necessary and sufficient determinants implies equifinality, meaning that the configurations of determinants leading to the presence of the outcome are frequently different from the configurations of determinants leading to its absence [10,25]. For example, although the presence of a particular combination of attributes might lead to high commercial performance, the absence of this combination may not necessarily result in low performance. In contrast to this, the presence of a completely different configuration of determinants may instead lead to low performance. Thus, the idea of equifinality allows for the simultaneous identification of different sets of determinants; one set may lead to very low performance, whereas another set may lead to average performance, and a third one may lead to high performance [25].

3. The Conceptual Framework for Analysis

The conceptual framework that underpins our empirical analysis is based around key components of the consumer decision-making process, as outlined in well-established models of consumer purchasing intent (for example, [26]). We assume that the consumer is exposed to several sources of information that might influence their perception of the product and thereby shape their purchasing intent. The first of these are credible signals of product quality. The importance of signals to address information asymmetry problems has been widely studied in other contexts, such as food labeling [27,28] and political consumerism [29]. Product reviews (R) have been established as signals with significant potential to shape consumer perceptions in entertainment goods. Several prior studies have focused on the extent to which product demand is influenced by the opinions and experiences of professional critics [30,31]. Additionally, online reviews from other consumers are also likely to represent valued product quality signals in entertainment goods markets [32–35].

Entertainment markets have been argued to have become more commercialized, with branding representing an essential means by which to shape consumer preferences [36]. Established brand reputation (B) is also likely to act as a powerful signal of quality. Consumers may believe that subsequent products released within the same series of software
products are imbued with similar underlying quality characteristics to the original [37]. This phenomenon is well-known in the movie industry, where sequels to successful film franchises typically attract audiences based on positive associations with earlier consumption experiences [38]. In video games software, consumer perception may be influenced positively if a given software title is a sequel forming part of a successful franchise or is released by a market-leading publisher with an established reputation [39]. Finally, the effect of price (P) may influence sales performance in several different ways. In the traditional economic sense, price is expected to lower unit sales ceteris paribus, although it may be perceived as an indicator of quality [40]. This is a particular issue affecting products of this nature, given that consumers may be likely to associate low prices for unfamiliar products with higher levels of risk [41].

Consumer perceptions are also likely to be influenced directly by a set of innate and directly observable product characteristics. In the specific context of video games, this would include determinants such as genre (G) and age ratings (A), which have also been shown to affect commercial performance in the movie industry [42–44]. Additionally, video gaming is an example of a two-sided market where consumers access products or services via an intermediary platform; in this case, the incompatible hardware models produced by each of the three major manufacturers Sony, Microsoft, and Nintendo. Consumers in these ‘two-sided’ markets benefit from network and cross-side network effects, whereby utility is dependent on the volume of platform use among the volume of other users and the variety of user types, such as software developers [45]. In the case of video gaming, it is, therefore, likely to be essential to account for the hardware platform of release (H), which may affect demand due to both the size of the user base and the product release strategies adopted by product developers [46]. Together, these innate product characteristics combine and potentially interact with credible signals of quality to form the perceptions that influence a consumer’s purchase decision, which in aggregate determine the commercial performance of individual products, measured in terms of unit sales.

A visual summary of this conceptual framework and how each signal and characteristic fits together can be found below in Figure 1. Given that these signals and characteristics are unlikely to appear in isolation, significant and complex interrelationships may exist between each of these elements. These are reflected in the Venn diagrams relating to both signals of quality and product characteristics, which demonstrate the inter-relatedness of these determinants. The qualitative comparative analysis technique is considered to be highly appropriate in this context as a means by which to establish the interactions and complex interrelationships between an identified range of signals and characteristics identified above and the commercial sales performance of video game software titles.

Figure 1. Conceptual framework.
4. Data

To empirically identify the configurations of determinants that are necessary and sufficient for the occurrence of the outcome of interest, we construct a sample consisting of 1208 individual video game software titles and their commercial performance for console and handheld devices, including Nintendo DS, Nintendo Wii, Sony PlayStation 3, Sony PSP, and Xbox 360. All titles were released in the US during the period between 2006 and 2010. Data were collected using the video game sales tracking website VGChartz, the video game catalog website MobyGames, and the price-tracking website CamelCamelCamel.

The data represent the range of determinants outlined in the conceptual framework appearing in the previous section, mainly relating to signals of product quality and product characteristics. The signals of product quality represent a set of determinants that directly affect consumer perceptions, namely product reviews from professional critics and consumers (i.e., the Metacritic scores), brand reputation (i.e., prior franchise sales and publisher market size), and unit prices (i.e., the deviation of individual game launch prices from the average market price). Product characteristics represent a set of determinants reflecting age rating (i.e., age rating set by the ESRB), genre (i.e., number of genre tag(s), e.g., action, adventure, and sports, reflecting the content of the gameplay experience), and the hardware platform (i.e., the distribution strategy and the cumulative number of installed user base). This set reproduces inherent and directly observable software characteristics that may shape consumers’ perceptions and, thus, affect their purchase decisions. The primary outcome of interest is a measure of commercial sales performance, which captures the lifetime unit sales of each software title. Regarding the idea of equifinality, the sales performance set reflects four levels of sales performance (i.e., very high, high, low, and very low). Thus, it is possible to test whether the configurations of determinants leading to high performance are frequently different from those leading to low performance.

In fsQCA, cases are matched degrees of set memberships reflecting the outcomes of interest and determinants with the help of a calibration process [22]. We calibrate fuzzy sets by applying the recommended direct method of calibration by Ragin [10]. First, three membership thresholds are specified for all outcomes and determinants based on theoretical considerations and empirical findings: the breakpoint for full membership (fs = 1), full non-membership (fs = 0), and the crossover point (fs = 0.5). These three thresholds are used to transform the interval-scale determinants to fuzzy set scores according to the log odds of full membership. The result is a detailed calibration of fuzzy membership scores ranging from 0 to 1. Apart from interval-scale determinants, fuzzy membership scores may vary according to the specific research question and assignment. Therefore, fuzzy set calibration must be transparent to guarantee the study’s accuracy and ensure its replication and evaluation [10,22]. We describe our calibration of fuzzy sets and the setting of breakpoints in detail in Table 1. We base our criteria for fuzzy set memberships on empirical and theoretical knowledge. However, we also implement several alternative calibrations of set memberships to test the robustness and consistency of findings (see Section 5.3 for a detailed description of these robustness checks). In a few cases, the characteristic can only be expressed in dichotomous terms, resulting in the absence of a crossover point and the creation of crisp sets. However, as fuzzy sets retain the dichotomous properties of the crisp sets, and, therefore, crisp sets present a special case of fuzzy sets, our calibration process remains consistent. In addition to the determinants’ description and fuzzy set calibrations, we show descriptive statistics for all determinants and outcome measures in Table 1.
Table 1. Model determinants and fuzzy-set membership threshold.

| Determinant | Description | Criteria for Full Membership (fs = 1) | Crossover Point (fs = 0.5) | Criteria for Full Non-Membership (fs = 0) | Mean | Std. Dev. |
|-------------|-------------|--------------------------------------|---------------------------|-------------------------------------------|------|-----------|
| Sales Performance | Lifetime unit sales (US) | \(\geq 90\text{th percentile}\) | 75th percentile | \(\leq 50\text{th percentile}\) | 0.26 | 0.35 |
| High Sales Performance | \(\geq 99\text{th percentile}\) | 90th percentile | \(\leq 75\text{th percentile}\) | 0.11 | 0.21 |
| Very High Sales Performance | \(\leq 10\text{th percentile}\) | 25th percentile | \(\geq 50\text{th percentile}\) | 0.74 | 0.35 |
| Low Sales Performance | \(\leq 1\text{st percentile}\) | 10th percentile | \(\geq 25\text{th percentile}\) | 0.89 | 0.21 |
| Very Low Sales Performance | \(\geq 1\text{st percentile}\) | 10th percentile | \(\geq 25\text{th percentile}\) | 0.89 | 0.21 |

Signals of Product Quality

| Determinant | Description | Criteria for Full Membership (fs = 1) | Crossover Point (fs = 0.5) | Criteria for Full Non-Membership (fs = 0) | Mean | Std. Dev. |
|-------------|-------------|--------------------------------------|---------------------------|-------------------------------------------|------|-----------|
| Product Reviews (Professional Critics) | Metacritic score; an aggregate (weighted) summary of reviews from professional critics | \(\geq 90\) ('Universal Acclaim') | 75—89 ('Generally Favorable') | \(\leq 74\) ('Average' or 'Mixed') | 0.42 | 0.34 |
| Product Reviews (Users) | Metacritic score; an aggregate (weighted) summary of reviews posted by other consumers | \(\geq 90\) ('Universal Acclaim') | 75—89 ('Generally Favorable') | \(\leq 74\) ('Average' or 'Mixed') | 0.42 | 0.34 |
| Brand Reputation (Prior Franchise Sales) | Unit sales achieved by the previous title appearing in the same series (if applicable) | \(\geq 90\text{th percentile}\) | 75th percentile | \(\leq 50\text{th percentile}\) | 0.27 | 0.34 |
| Brand Reputation (Publisher) | Size of a publisher in relation to its market and its competitors | Top-20 Publisher | NA (Crisp Set) | Non-Top-20 Publisher | 0.55 | 0.50 |
| Price | Deviation of individual game launch prices from the average price observed for the relevant hardware platform | \(\geq 90\text{th percentile}\) | 75th percentile | \(\leq 50\text{th percentile}\) | 0.31 | 0.37 |

Product Characteristics

| Determinant | Description | Criteria for Full Membership (fs = 1) | Crossover Point (fs = 0.5) | Criteria for Full Non-Membership (fs = 0) | Mean | Std. Dev. |
|-------------|-------------|--------------------------------------|---------------------------|-------------------------------------------|------|-----------|
| Age Rating | Age-appropriateness rating set by the ESRB | M Rating ('Mature') | NA (Crisp Set) | Non-M Rating | 0.21 | 0.24 |
| Genre(s) | The number of genre tag(s) (e.g., action, adventure, strategy, sports) reflecting the content of the gameplay experience | \(\geq 4\) | 2 | \(\leq 1\) | 0.19 | 0.39 |
| Hardware Platform (Distribution Strategy) | The number of hardware platforms on which the software title is released | \(\geq 4\) | 2 | \(\leq 1\) | 0.32 | 0.30 |
| Hardware Platform (Installed User Base) | Market share of each hardware platform in cumulative unit sales up to and including the year of release | \(\geq 90\text{th percentile}\) | 75th percentile | \(\leq 50\text{th percentile}\) | 0.26 | 0.36 |

5. Analysis

After the independent and dependent measures have been transformed to fuzzy sets as described above, we use the set memberships to construct a data matrix known as a truth table with \(2^k\) rows, where \(k\) is the number of determinants. Each row of this table is associated with a specific combination of determinants. The final truth table, therefore, lists all possible combinations of determinants. Following this, empirical cases are sorted into the truth table rows with some rows containing many cases, some rows a few, and some rows containing no cases if there is no empirical sample of this combination of determinants reflecting the given row [25].

In Table 2, we present an example of the truth table of determinants for achieving high sales performance, reflecting the relationships between our cases, determinants, and outcome of interest. Each row of the truth table represents one of the \(2^k\) logically possible combinations of the \(k\) determinants. Each column presents one of the nine determinants. The column HSP indicates the value of the outcome, showing 0 as we choose a frequency
cutoff of two cases. Additionally, the truth table reveals the presence of limited diversity, meaning that not all logically possible combinations between the nine determinants (i.e., $2^9 = 512$ logically possible combinations) are observed empirically. We have 386 combinations of cases in our data set for which we find no observations and, thus, illustrate the phenomenon of limited diversity [47,48].

Table 2. The truth table of determinants for achieving high sales performance (Excerpt).

| Row | HSP | PC | UC | PFS | P | Pr | AG | G | DS | IUB | Frequency |
|-----|-----|----|----|-----|---|----|----|---|----|-----|------------|
| 1   | 1   | 0  | 0  | 0   | 1 | 0  | 0  | 0 | 0  | 0   | 30         |
| 2   | 1   | 0  | 0  | 0   | 0 | 0  | 0  | 0 | 0  | 1   | 20         |
| 3   | 1   | 0  | 0  | 0   | 1 | 0  | 0  | 0 | 0  | 0   | 19         |
| 4   | 1   | 1  | 1  | 0   | 1 | 0  | 0  | 0 | 0  | 0   | 18         |
| 5   | 1   | 0  | 0  | 0   | 0 | 0  | 0  | 0 | 0  | 1   | 15         |
| 6   | 1   | 0  | 1  | 0   | 1 | 0  | 0  | 0 | 0  | 0   | 14         |
| 7   | 1   | 0  | 1  | 0   | 0 | 0  | 0  | 0 | 0  | 1   | 12         |
| 8   | 1   | 0  | 0  | 1   | 1 | 0  | 0  | 0 | 1  | 0   | 12         |
| 9   | 1   | 0  | 0  | 0   | 0 | 0  | 0  | 0 | 0  | 1   | 11         |
| 10  | 1   | 0  | 1  | 0   | 0 | 0  | 0  | 0 | 0  | 1   | 10         |
| 11  | 1   | 1  | 1  | 0   | 0 | 0  | 0  | 0 | 0  | 1   | 9          |
| 12  | 1   | 1  | 1  | 1   | 1 | 1  | 0  | 0 | 0  | 1   | 10         |
| 13  | 1   | 1  | 1  | 0   | 1 | 0  | 0  | 0 | 0  | 0   | 9          |
| 14  | 1   | 1  | 0  | 0   | 0 | 0  | 0  | 0 | 0  | 0   | 8          |
| 15  | 1   | 0  | 0  | 0   | 0 | 1  | 0  | 0 | 1  | 0   | 8          |
| 16  | 1   | 0  | 1  | 0   | 1 | 0  | 0  | 0 | 0  | 0   | 7          |
| 17  | 1   | 0  | 0  | 0   | 1 | 0  | 0  | 0 | 0  | 1   | 7          |
| 18  | 1   | 0  | 0  | 0   | 0 | 1  | 0  | 0 | 0  | 0   | 6          |
| 19  | 1   | 0  | 0  | 0   | 0 | 0  | 0  | 1 | 0  | 0   | 5          |
| 20  | 1   | 1  | 0  | 1   | 1 | 1  | 0  | 0 | 1  | 0   | 6          |
| 21  | 1   | 1  | 1  | 1   | 1 | 1  | 0  | 0 | 0  | 0   | 5          |
| 22  | 1   | 1  | 1  | 1   | 0 | 0  | 0  | 0 | 0  | 1   | 5          |
| 23  | 1   | 1  | 1  | 1   | 0 | 1  | 0  | 0 | 0  | 0   | 5          |
| 24  | 1   | 1  | 1  | 0   | 1 | 0  | 0  | 0 | 0  | 0   | 5          |
| 25  | 1   | 1  | 0  | 0   | 1 | 0  | 0  | 0 | 0  | 0   | 5          |
| 26  | 1   | 0  | 1  | 1   | 1 | 0  | 0  | 0 | 0  | 1   | 5          |
| 27  | 1   | 0  | 0  | 1   | 0 | 0  | 0  | 0 | 1  | 0   | 5          |
| 28  | 1   | 1  | 1  | 1   | 1 | 0  | 0  | 0 | 0  | 0   | 4          |
| 29  | 1   | 1  | 1  | 1   | 0 | 1  | 0  | 0 | 0  | 1   | 4          |
| 30  | 1   | 1  | 1  | 0   | 1 | 0  | 0  | 0 | 0  | 1   | 4          |
| 31  | 1   | 1  | 0  | 1   | 0 | 1  | 0  | 0 | 0  | 0   | 4          |
| 32  | 1   | 1  | 0  | 0   | 0 | 0  | 0  | 0 | 0  | 1   | 4          |
| 33  | 1   | 1  | 0  | 0   | 0 | 1  | 0  | 0 | 0  | 0   | 4          |
| 34  | 1   | 0  | 1  | 1   | 1 | 1  | 0  | 0 | 0  | 0   | 4          |
| 35  | 1   | 0  | 1  | 1   | 0 | 0  | 0  | 0 | 0  | 0   | 4          |
| 36  | 1   | 0  | 0  | 1   | 1 | 1  | 0  | 0 | 0  | 1   | 4          |
| 37  | 1   | 1  | 1  | 0   | 1 | 0  | 0  | 0 | 0  | 1   | 4          |
| 38  | 1   | 0  | 1  | 0   | 1 | 0  | 0  | 0 | 0  | 1   | 3          |
| 39  | 1   | 0  | 1  | 0   | 0 | 1  | 0  | 0 | 0  | 0   | 3          |
| 40  | 1   | 0  | 1  | 0   | 0 | 1  | 0  | 0 | 0  | 0   | 3          |
| 41  | 1   | 0  | 1  | 0   | 0 | 0  | 0  | 0 | 0  | 1   | 3          |
| 42  | 1   | 0  | 0  | 0   | 0 | 0  | 0  | 1 | 0  | 0   | 3          |
| 43  | 0   | 1  | 1  | 1   | 0 | 1  | 0  | 0 | 0  | 0   | 2          |
| 44  | 0   | 1  | 1  | 0   | 0 | 0  | 0  | 1 | 0  | 0   | 2          |
| 45  | 0   | 1  | 1  | 0   | 0 | 0  | 0  | 0 | 1  | 0   | 2          |
| 46  | 0   | 1  | 0  | 1   | 0 | 0  | 0  | 0 | 1  | 0   | 2          |
| 47  | 0   | 1  | 1  | 0   | 0 | 0  | 0  | 1 | 0  | 0   | 2          |
| 48  | 0   | 1  | 0  | 1   | 1 | 1  | 0  | 0 | 0  | 0   | 2          |
| 49  | 0   | 1  | 0  | 1   | 1 | 0  | 0  | 0 | 1  | 0   | 2          |
| 50  | 0   | 0  | 1  | 1   | 1 | 0  | 0  | 0 | 1  | 0   | 2          |
Table 2. Cont.

| Row | HSP | PC | UC | PFS | P | Pr | AG | G | DS | IUB | Frequency |
|-----|-----|----|----|-----|---|----|----|---|----|-----|-----------|
| 51  | 0   | 0  | 1  | 0   | 0 | 0  | 1  | 0 | 0  | 1   | 2         |
| 52  | 0   | 0  | 1  | 0   | 0 | 0  | 1  | 0 | 0  | 0   | 2         |
| 53  | 0   | 0  | 1  | 0   | 0 | 0  | 1  | 0 | 0  | 1   | 2         |
| 54  | 0   | 0  | 1  | 0   | 0 | 0  | 1  | 0 | 0  | 1   | 2         |
| 55  | 0   | 0  | 0  | 1   | 0 | 0  | 0  | 1 | 0  | 0   | 2         |
| 56  | 0   | 0  | 0  | 0   | 1 | 0  | 0  | 0 | 0  | 1   | 2         |
| 57  | 0   | 0  | 1  | 0   | 0 | 0  | 0  | 0 | 0  | 0   | 2         |
| 58  | 0   | 0  | 0  | 1   | 0 | 0  | 0  | 0 | 0  | 1   | 2         |
| 59  | 0   | 0  | 0  | 1   | 1 | 0  | 0  | 0 | 0  | 0   | 2         |
| 60  | 0   | 0  | 1  | 1   | 0 | 0  | 0  | 0 | 0  | 0   | 2         |
| 61  | 0   | 0  | 0  | 1   | 1 | 1  | 0  | 0 | 0  | 0   | 2         |
| 62  | 0   | 0  | 0  | 0   | 1 | 0  | 0  | 0 | 0  | 1   | 2         |
| 63  | 0   | 0  | 0  | 0   | 0 | 1  | 0  | 0 | 0  | 0   | 2         |
| 64  | 0   | 0  | 0  | 0   | 0 | 0  | 1  | 0 | 0  | 0   | 2         |

Note: HSP = High Sales Performance; PC = Professional Critics; UC = User Critics; PFS = Prior Franchise Sales; P = Publisher; Pr = Price; AG = Age Rating; G = Genre(s); DS = Distribution Strategy; IUB = Installed User Base.

In what follows, we show the results and solution tables of configurations for achieving the outcome of interest after applying the truth table algorithm. The findings once again underline the equifinality characteristics of QCA. We present the configurations that lead to high and very high sales performance and those that lead to low and very low sales performance. We, therefore, emphasize the idea that the determinants leading to the presence of an outcome may be quite different from those leading to the absence of the outcome of interest [25].

5.1. Analysis of Configurations for Achieving High and Very High Sales Performance

Table 3 presents the results of the fuzzy set qualitative comparative analysis for high sales performance. The solution tables show four core configurations that meet the necessary consistency threshold of 0.75 and a minimum acceptable frequency threshold of 2. This outcome emphasizes the presence of equifinality; that is, different paths and combinations of determinants can lead to the outcome of interest.

Solutions 1a and 1b indicate two essential paths to high sales performance. Both solutions combine product reviews and brand reputation effects for sequels as core determinants for achieving high sales performance. Solution 1a suggests that above-average selling prices are necessary when combined with the two common determinants to achieve the outcome in question. At the same time, Solution 1b indicates that a multi-platform distribution strategy to be the essential complementary determinant. Both solutions show a relatively high raw coverage score of approximately 0.30 and an average unique consistency rate of 0.76. Figure 2 shows the XY plot of solution 1a. Each dot in the XY plot represents one or more cases (i.e., video game software titles). Thus, some titles have identical scores. Twenty-three titles with a high score for solution 1a have high sales performance membership scores above 0.65, and 10 titles with high scores for this solution...
have membership scores below 0.65. Consequently, 2.3 times more titles with high scores on this solution have high versus low sales performance.

Table 3. Solution table of core configurations for achieving high and very high sales performance.

| Configuration                        | Solution 1a | Solution 1b | Solution 2a | Solution 2b | Solution 3 |
|--------------------------------------|-------------|-------------|-------------|-------------|------------|
| **Signals of Product Quality**       |             |             |             |             |            |
| Product Reviews (Professional Critics) |    ●       |    ●       |    ●       |    ●       |            |
| Product Reviews (Users)              |             |             | ●          | ●          |            |
| Brand Reputation (Prior Franchise Sales) | ●     | ●          | ●          | ●          |            |
| Brand Reputation (Publisher)        | ●          | ●          | ●          | ●          |            |
| Price                                | ●          | ●          | ●          | ●          |            |
| **Product Characteristics**          |             |             | ●          | ●          |            |
| Age Rating                           |             |             | ●          | ●          |            |
| Genre(s)                             |             |             | ●          | ●          |            |
| Hardware Platform (Distribution Strategy) | ●     | ●          | ●          | ●          |            |
| Hardware Platform (Installed User Base) |  ●       | ○          | ○          | ○          |            |
| Unique Consistency                   | 0.78        | 0.74        | 0.72        | 0.61        | 0.53       |
| Raw Coverage                         | 0.32        | 0.29        | 0.30        | 0.31        | 0.15       |
| Overall Solution Consistency         | 0.52        |             |             |             | 0.53       |
| Overall Solution Coverage            | 0.65        |             |             |             | 0.15       |

Note: Black circles indicate the presence of a determinant, and white circles indicate its absence. Blank spaces indicate that the determinant could be either absent or present and hence does not influence the occurrence of the outcome in question.

Solutions 2a and 2b emphasize the importance of simultaneous reviews from professional critics and other consumers to achieve high sales performance. However, both solutions indicate the presence of professional critics and the absence of positive reviews from consumers to be prime paths to the outcome of interest. Nevertheless, Solutions 2a and 2b differ in their complementary determinants; specifically, Solution 2a indicates brand reputation while Solution 2b indicates a comprehensive distribution strategy. The diagnostic measures of both solutions are similar to 1a and 1b, with raw coverage of approximately 0.30. However, solution 2a shows a unique consistency of 0.61 and, thus, reveals a slight deviation from the recommended threshold of 0.75. Figure 3 is an XY plot showing solution 2b. Twelve titles with a high score for this solution have high sales performance membership scores above 0.65, and nine titles with high scores for this solution have membership scores below 0.65. Thus, 1.3 times more titles with high scores on this solution have high versus low sales performance.

For all solutions relating to high sales performance, the solution paths show an overall coverage of 0.65, indicating that the combined model accounts for 65 percent of membership for achieving high sales performance. Consequently, the overall solution coverage is affected by considerable degrees of randomness and idiosyncrasy within the configurations. Furthermore, the overall solution consistency of these results is 0.52, which, although high, is still some way below the recommended consistency threshold.
Table 3. Solution table of core configurations for achieving high and very high sales performance.

![Figure 2. XY plot for solution 1a (High sales performance). Note. (Presence (Professional Critics) * Presence (Prior Franchise Sales) * Presence (Price) → High Sales Performance). Twenty-three titles with a high score for this algorithm have high sales performance membership scores above 0.65, and 10 titles with high scores for this algorithm have membership scores below 0.65; thus, 2.3 times more titles with high scores on this algorithm have high versus low sales performance.](image)

![Figure 3. XY plot for solution 2b (High sales performance). Note. (Presence (Professional Critics) * Absence (User Critics) * Presence (Distribution Strategy) → High Sales Performance). Twelve titles with a high score for this algorithm have high sales performance membership scores above 0.65, and nine titles with high scores for this algorithm have membership scores below 0.65; thus, 1.3 times more titles with high scores on this algorithm have high versus low sales performance.](image)

Table 3 also presents the results of the fuzzy set analysis of very high sales performance. The results show the existence of only one distinct path to the outcome in question. Regarding core determinants, Solution 3 indicates that being a sequel in a successful franchise, combined with a mature age classification and above average sales price is sufficient for achieving very high sales performance. The consistency threshold is set at 0.60 in this instance since no sufficient configurations meet the recommended threshold of 0.75. In combination with the unique consistency of 0.53, the solution should be assessed with some degree of caution.
Nevertheless, Solution 3 still has a raw coverage of 15 percent, indicating that the paths present a substantive degree of importance. Although only one sufficient configuration is found for very high sales performance, the analysis suggests that other configurations may lead to the outcome in question that will pass the minimum threshold criterion if applied to a more extensive data set. Figure 4 is an XY plot of solution 3 showing that 1.6 times more titles with high scores on this solution have very high versus very low sales performance.

5.2. Analysis of Configurations for Achieving Low and Very Low Sales Performance

The differences in high and very high sales-performance analysis demonstrate the equifinality understanding in qualitative comparative analysis. Consequently, it is essential to study the necessary determinants that lead to the presence of the outcome and those that lead to its absence. Accordingly, Table 4 presents the results of the fuzzy set analysis of low and very low sales performance, two outcome measures that represent the negated form of the outcome sets of high and very high sales performance. Following previous analysis, the necessary consistency threshold is again set at 0.75 and the minimum acceptable frequency threshold at 2.

Solutions 1, 2, and 3 presented in Table 4 indicate that either the absence of a major publisher, negative reviews from professional critics, or a narrow platform release strategy is sufficient for achieving low sales performance. Additionally, Solutions 4a, 4b, and 4c indicate that non-sequels explain low sales performance in successful franchises and non-M-rated game titles, low sales prices, and a small installed user-base of the relevant hardware platform or positive reviews from other consumers. Regarding very low sales performance, Solutions 5, 6, 7, and 8 suggest that either the absence of product reviews from professional critics, prior franchise success, restricted age ratings, or the presence of positive consumer reviews lead to very low sales performance. Furthermore, the overall solution consistency and coverage rate and the unique consistency and raw coverage scores of the solutions presented in Table 4 are incredibly high. Consequently, since the solutions cover almost all possible paths to achieving low and very low sales performance, the results indicate that the determinants for achieving the outcome are both sufficient and necessary.
Table 4. Solution table of core configurations for achieving low and very low sales performance.

| Configuration | Low Sales Performance | Solution | Solution | Very Low Sales Performance |
|---------------|-----------------------|----------|----------|-----------------------------|
|               | Frequency Cutoff = 2; Consistency Cutoff = 0.75 |          |          | Frequency Cutoff = 2; Consistency Cutoff = 0.75 |
| Solution      | 1 | 2 | 3 | 4a | 4b | 4c | 5 | 6 | 7 | 8 |
| Signals of Product Quality |         |          |          |          |          |          |          |          |          |
| Product Reviews (Professional Critics) |          |          |          |          |          |          |          |          |          |
| Product Reviews (Users) |          |          |          |          |          |          |          |          |          |
| Brand Reputation (Prior Franchise Sales) |          |          |          |          |          |          |          |          |          |
| Brand Reputation (Publisher) |          |          |          |          |          |          |          |          |          |
| Price |          |          |          |          |          |          |          |          |          |
| Product Characteristics |         |          |          |          |          |          |          |          |          |
| Age Rating |          |          |          |          |          |          |          |          |          |
| Genre(s) |          |          |          |          |          |          |          |          |          |
| Hardware Platform (Distribution Strategy) |          |          |          |          |          |          |          |          |          |
| Hardware Platform (Installed User Base) |          |          |          |          |          |          |          |          |          |
| Unique Consistency | 0.82 | 0.89 | 0.79 | 0.87 | 0.84 | 0.84 | 0.98 | 0.92 | 0.96 | 0.91 |
| Raw Coverage | 0.49 | 0.70 | 0.35 | 0.71 | 0.46 | 0.47 | 0.63 | 0.50 | 0.79 | 0.82 |
| Overall Solution Consistency |          |          |          |          |          |          |          |          |          |
| Overall Solution Coverage |          |          |          |          |          |          |          |          |          |

Note: Black circles indicate the presence of a determinant, and white circles indicate its absence. Blank spaces indicate that the determinant could be either absent or present and hence does not influence the occurrence of the outcome in question.

Comparing the solutions that lead to the absence of the outcome of interest with those that lead to its presence highlights two significant advantages of fsQCA. First, the findings allow for the construction of a highly detailed picture of equifinality. Second, the results of high and very high sales performance and low and very low sales performance reveal consistent interrelationships between determinants and the robust outcome against substantive modifications.

5.3. Robustness Checks

Although results are not reported, several sensitivity checks are undertaken to test the robustness of findings and implement alternative coding of the determinants. The fsQCA analyses presented above are compared with alternative approaches for coding product reviews, brand reputation, product characteristics, and publisher effects. Specifically, the degrees of memberships of professional critics and word-of-mouth are varied such that titles are fully included with a Metascore of ≥75, fully excluded with a Metascore of ≤49, and a crossover point set at 62. Additionally, sequels are classified using the same thresholds applied for very high sales performance instead of the high sales-performance threshold used in the previous analysis. Both the number of genre classifications and platforms of release (distribution strategy) are also coded more conservatively, with full membership set at a threshold of 2, full non-membership at a threshold of 0, and a crossover point at 1. The sensitivity analysis results indicate only minor differences in the number of solutions and specific unique consistency and raw coverage scores. However, the frequency and consistency cutoffs remain unchanged, and, thus, the general conclusions and interpretations of the results are consistent.

Gigerenzer and Brighton [49] support the focus of accuracy via predictive validity and cross-validation testing as a reliable model selection criterion. Predictive validation is a standard approach for assessing models’ relative performance and, thus, theory advancement (for example, [50]). The sample was randomized and split into two subsamples—a modeling sample and a holdout sample to test for predictive validity. Table 5 includes a predictive validation of Solution 1 and 2 for high sales performance, while Table 6 includes a predictive validation of Solution 2 for low sales performance. The findings indicate highly consistent models with high coverage (solution 1—high sales performance: consistency: 0.77, coverage: 0.28; solution 2—high sales performance: consistency: 0.73, coverage: 0.42; solution 2—low sales performance: consistency: 0.86, coverage: 0.70). Additional predictive test findings are
shown in Figures 5 and 6, which are XY plots showing tests of solutions 1 and 2 respectively in Subsample 1 using data from Subsample 2. Figure 7 is an XY plot showing a test of Solution 2 in Subsample 1 using data from Subsample 2. These figures support the conclusion that the highly consistent solutions for Subsample 1 have high predictive abilities for Subsample 2 and vice versa.

**Table 5. Test for predictive validity for high sales performance.**

| Configuration                     | 1     | 2     |
|-----------------------------------|-------|-------|
| **Signals of Product Quality**    |       |       |
| Product Reviews (Professional Critics) | •     |       |
| Product Reviews (Users)           |       |       |
| Brand Reputation (Prior Franchise Sales) | •     |       |
| Brand Reputation (Publisher)     |       |       |
| Price                             |       |       |
| **Product Characteristics**       |       |       |
| Age Rating                        |       |       |
| Genre(s)                          |       |       |
| Hardware Platform (Distribution Strategy) |       | •     |
| Hardware Platform (Installed User Base) |       | ○     |
| Unique Consistency                | 0.05  | 0.15  |
| Raw Coverage                      | 0.35  | 0.46  |
| Overall Solution Consistency      |       | 0.74  |
| Overall Solution Coverage         |       | 0.51  |

Note: Black circles indicate the presence of a determinant, and white circles indicate its absence. Blank spaces indicate that the determinant could be either absent or present and hence does not influence the occurrence of the outcome in question.

**Table 6. Test for predictive validity for low sales performance.**

| Configuration                     | 1     | 2     | 3     |
|-----------------------------------|-------|-------|-------|
| **Signals of Product Quality**    |       |       |       |
| Product Reviews (Professional Critics) | ○     |       |       |
| Product Reviews (Users)           |       |       |       |
| Brand Reputation (Prior Franchise Sales) |       | ○     |       |
| Brand Reputation (Publisher)     |       |       |       |
| Price                             |       |       |       |
| **Product Characteristics**       |       |       |       |
| Age Rating                        |       |       |       |
| Genre(s)                          |       |       |       |
| Hardware Platform (Distribution Strategy) |       |       | ○     |
| Hardware Platform (Installed User Base) |       |       | ○     |
| Unique Consistency                | 0.90  | 0.88  | 0.83  |
| Raw Coverage                      | 0.70  | 0.72  | 0.46  |
| Overall Solution Consistency      |       |       | 0.84  |
| Overall Solution Coverage         |       |       | 0.92  |

Note: Black circles indicate the presence of a determinant, and white circles indicate its absence. Blank spaces indicate that the determinant could be either absent or present and hence does not influence the occurrence of the outcome in question.
Figure 5. Test of solution 1 in subsample 1 using data from subsample 2. Note. Consistency: 0.77, Coverage: 0.28.

Figure 6. Test of solution 2 in subsample 1 using data from subsample 2. Note. Consistency: 0.73, Coverage: 0.42.

Figure 7. Test of solution 2 in subsample 1 using data from subsample 2. Note. Consistency: 0.86, Coverage: 0.70.
Additionally, and for comparative reasons, Table 7 presents the findings of the multiple regression analyses representing symmetric tests of how well the independent variables predict high and very high sales performance. In contrast, Table 8 presents the findings concerning low and very low sales performance. We limit our regression models to include only significant terms [51] and perform predictive validation by performing k-fold cross-validation tests. The results of the regression estimations confirm the results of the fsQCA analyses. Specifically, product reviews from professionals and brand reputation effects from prior franchise sales significantly positively impact sales performance.

Table 7. Summary of regression estimations of main effects for achieving high and very high sales performance.

| Variables                              | High Commercial Success | Very High Commercial Success |
|----------------------------------------|-------------------------|------------------------------|
|                                        | 1a' †                    | 1b'                          | 2a'                          | 2b'                          | Solution 3* †  |
| **Signals of Product Quality**         |                         |                              |                              |                              |                |
| Product Reviews (Professional Critics) | 0.326 ***               | 0.349 ***                   | 0.349 ***                   | 0.476 ***                   | 0.261 ***      |
|                                        | (0.027)                 | (0.027)                     | (0.027)                     | (0.027)                     | (0.023)        |
| Product Reviews (Users)                |                         |                              |                              |                              |                |
| Brand Reputation (Prior Franchise Sales)| 0.404 ***               | 0.413 ***                   | 0.419 ***                   | 0.261 ***                   | 0.086 ***      |
|                                        | (0.029)                 | (0.030)                     | (0.029)                     | (0.023)                     | (0.016)        |
| Brand Reputation (Publisher)          |                         |                              |                              |                              |                |
| Price                                 | 0.085 ***               | 0.086 ***                   |                              |                              | 0.047 ***      |
|                                        | (0.024)                 | (0.028)                     |                              |                              | (0.015)        |
| **Product Characteristics**            |                         |                              |                              |                              |                |
| Age Rating                             | 0.052 *                 | 0.100 ***                   |                              |                              |                |
|                                        | (0.028)                 | (0.030)                     |                              |                              |                |
| **Genre(s)**                           |                         |                              |                              |                              |                |
| Hardware Platform (Distribution Strategy)| −0.008                  | −0.011                      | 0.005                       | 0.031 **                    | 0.000          |
|                                        | (0.011)                 | (0.014)                     | (0.011)                     | (0.015)                     | (0.007)        |
| Observations                           | 1208                    | 1208                        | 1208                        | 1208                        | 1208           |
| R-squared                              | 0.375                   | 0.370                       | 0.368                       | 0.224                       | 0.242          |
| Adjusted R-squared                     | 0.373                   | 0.368                       | 0.367                       | 0.223                       | 0.240          |
| F-Test                                 | 259.3 ***               | 254.9 ***                   | 383.5 ***                   | 159.6 ***                   | 54.79 ***      |
| Highest VIF                             | 1.175                   | 1.119                       | 1.106                       | 1.001                       | 1.065          |
| **AIC**                                | 349.4                   | 359.2                       | 361.1                       | 608.3                       | −644.6         |
| **BIC**                                | 369.8                   | 379.6                       | 376.4                       | 623.6                       | −624.2         |
| **RMSE (Est1)**                        | 0.302                   | 0.300                       | 0.287                       | 0.301                       | 0.180          |
| **RMSE (Est2)**                        | 0.283                   | 0.287                       | 0.263                       | 0.337                       | 0.193          |
| **RMSE (Est3)**                        | 0.299                   | 0.280                       | 0.256                       | 0.299                       | 0.204          |
| **RMSE (Est4)**                        | 0.284                   | 0.262                       | 0.302                       | 0.315                       | 0.179          |
| **RMSE (Est5)**                        | 0.226                   | 0.275                       | 0.294                       | 0.303                       | 0.167          |
| **Mean (RMSE)**                        | 0.279                   | 0.281                       | 0.280                       | 0.311                       | 0.185          |

Note: Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. † Denotes the preferred model specifications according to the AIC/BIC and k-fold cross-validation criteria.

Additionally, the estimations demonstrate the influence of above-average selling prices and mature age classification on market success. All regression models show a reasonable fit validity (average $R^2$ of approximately 0.27) and predictive validity. Thus, fsQCA and regression analyses provide complementary methods and valuable innovations to theory construction and testing [8].

In summary, our analysis shows that a combination of positive reviews from professional critics alongside the use of brand extension strategies (i.e., sequels) and multi-platform releases act as signals of product quality and, therefore, lead to high sales performance. Conversely, we show that the absence of a major publisher, negative or absent
reviews from professional critics, and narrow brand extension and platform release strategies are associated with low sales performance. These results address the overall aims of our study by demonstrating how the interrelationships between product characteristics and signals of quality affect sales performance in a market for cultural goods. We also address our aim of demonstrating the methodological value of the fsQCA technique in analyzing and identifying complex configurations of determinants. We, therefore, believe our study highlights a powerful tool that can be used in social science research to investigate numerous issues relating to sustainability, such as the production and consumption of cultural goods.

Table 8. Summary of regression estimations of main effects for achieving low and very low sales performance.

| Variables                  | Low Sales Performance | Very Low Sales Performance |
|----------------------------|-----------------------|----------------------------|
| Signals of Product Quality |                       |                            |
| Product Reviews (Professional Critics) | † 3'            | −0.095 *** (0.018)        |
| Product Reviews (Users)     |                       |                            |
| Brand Reputation (Prior Franchise Sales) |               |                            |
| Brand Reputation (Publisher) |                     |                            |
| Price                      |                       |                            |
| Product Characteristics     |                       |                            |
| Age Rating                 |                       |                            |
| Genre(s)                   |                       |                            |
| Hardware Platform (Distribution Strategy) | −0.115 *** (0.033) |                      |
| Hardware Platform (Installed User Base) |             |                            |
| Constant                   | 0.772 *** (0.015)    | 0.941 *** (0.009)         |
| Observations               | 1208                  | 1208                       |
| R-squared                  | 0.010                 | 0.022                      |
| Adjusted R-squared         | 0.00902               | 0.0215                     |
| F-Test                     | 11.90 ***             | 29.11 ***                  |
| Highest VIF                | 1                     | 1                          |
| AIC                        | 900.9                 | −340.7                     |
| BIC                        | 911.1                 | −330.5                     |
| RMSE (Est1)                | 0.356                 | 0.235                      |
| RMSE (Est2)                | 0.341                 | 0.187                      |
| RMSE (Est3)                | 0.345                 | 0.204                      |
| RMSE (Est4)                | 0.366                 | 0.224                      |
| RMSE (Est5)                | 0.348                 | 0.196                      |
| Mean (RMSE)                | 0.351                 | 0.209                      |

Note: Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. † Denotes the preferred model specifications according to the AIC/BIC and k-fold cross-validation criteria.

6. Discussion

The conceptual framework underpinning our analysis suggests that consumer perception and purchase intention for video game software are influenced by combinations of both product characteristics and signals of quality. Referring back to Figure 1 in our conceptual framework, it broadly seems that signals of product quality (P·B·R) are more prevalent in determining sales performance than combinations involving product characteristics (H·A·G). However, combinations involving both elements are always necessary given that our results show that high and very-high sales success is determined by interactions between elements of the factors (P·B·R·H·A).

In more straightforward terms, we show that high sales performance for video game software can be achieved through two broad configurations of signals and characteristics.
The first involves a combination of positive reviews from professional critics and a strong brand reputation (sequels), which relate to the presence of either a higher price or a more comprehensive distribution strategy to achieve high sales performance. The second solution involves relationships between positive reviews from professional critics and the absence of positive reviews from users, which correlate with either brand reputation (sequel) or comprehensive distribution strategy to achieve high sales performance. We also demonstrate the critical interactions of characteristics and signals associated with very high sales performance, showing that only the combination of solid brand reputation, high price, and mature age rating lead to this particular outcome. Overall, our use of qualitative comparative analysis shows that sales performance in video games is predominantly determined by a combination of the signals from solid brand reputation and positive reviews from critics together with the characteristics of a multi-platform distribution strategy, a high price, and targeting a mature audience.

These findings have several important managerial implications for video game publishers. Primarily, we show that sales success cannot typically be achieved by pursuing a strategy focusing on any one of the signals mentioned above or characteristics in isolation. Instead, we demonstrate that sales success is only achievable through achieving specific combinations of signals and characteristics. All configurations estimated by the qualitative comparative analysis procedure are based on inter-relationships between brand reputation and combinations of other signals and characteristics. Therefore, while it is of strategic importance to aim to establish successful gaming franchises by releasing sequels to successful titles, this approach alone is not enough to ensure positive sales performance. Instead, success appears only to be achieved by ensuring that the quality of the product is sufficiently high to achieve positive reviews from professional critics and release the title across multiple platforms, charging a high price point and targeting the game at a mature audience. Therefore, a multi-faceted product development strategy is likely to represent an essential way publishers can maximize the likelihood of achieving sales success. It should also be noted that none of the configurations for sales performance involve combinations of publisher reputation, genre, or hardware platform. This implies that solid sales performance for video game software is achievable for any publisher releasing any type of game on any hardware platform, so long as it can achieve the specific combinations of signals and characteristics outlined above.

By way of comparison with the existing literature, our headline findings are consistent with other studies investigating the sales performance of video game software, which shows how reviews from professional critics [52], price [53], sequels, and age ratings [54] tend to associate positively with sales performance. In the broader context of entertainment markets, several other studies have also pointed to the importance of similar determinants of commercial performance at the movie box office—including reviews from professional critics [30,31], sequels [55,56], and age ratings [57]. However, it should be noted that even this group of studies that explore interaction effects between finite subsets of independent variables cannot demonstrate the extent to which varying combinations of factors lead to a high commercial performance in the market for entertainment goods. Therefore, our study makes a unique contribution to the body of literature that models the commercial performance of entertainment products by demonstrating how the market responds to the combined presence of various signals product characteristics and signals of quality.

7. Conclusions

This study contributes to the literature on sustainability by making scientific predictions and assessments of the changing patterns of consumption in a cultural goods market. Our research highlights the importance of developing a holistic picture of the mechanisms by which different signals of product quality affect consumption and decision-making in entertainment markets, considering simultaneous exposure to a range of market signals instead of considering different factors independently. The use of fsQCA helps to understand the interrelationships between core determinants, their configurations, and the outcome
of interest. As a result, this study improves the understanding of the essential drivers in markets for entertainment goods, an issue of significant importance to both academics and practitioners.

Specifically, the solutions of core configurations found for the sample of high-performance titles have shown the existence of several equifinal configurations. As such, the set-theoretic methods used in this study allow for a detailed analysis of the necessary and sufficient determinants of high-performance configurations. In combining a theoretical framework with a novel methodology and existing analysis methods, the current study, thus, represents a step toward better understanding decision-making processes under asymmetric information.

Additionally, fsQCA allows for the analysis of equifinality, i.e., configurations leading to very high performance are frequently different from configurations leading to high or low performance. Heretofore, equifinality has been chiefly neglected in decision-making and industrial-organizational research more broadly. Nevertheless, equifinality is not only existent in these domains but pervasive in everyday business decisions. Contemporary studies consistently show that the omission of the consideration of this structure is likely to lead to incomplete or inconsistent implications. By considering equifinality, we find that video game software titles with positive reviews from professional critics, combined with a strong brand reputation and high price, can achieve high sales performance. By contrast, the sole configuration that leads to very high sales performance involves attracting a mature consumer group and not necessarily relying on positive reviews from professional critics.

In terms of this study, fsQCA is especially useful for analyzing consumers’ decision-making process in a market for entertainment goods characterized by asymmetric information and the inability of consumers to assess all elements of product quality in advance of the purchase decision. The comparative analysis approach is particularly suitable for identifying the highly complex elements of the decision-making processes involved in the consumption and production of cultural goods and a range of other vital issues related to the sustainability of market behaviors.

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