

Decision Making under Asymmetric Information in Markets for Experience Goods: Empirical Evidence of Signaling Effects on Consumer Perceptions

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Dipl.-Kfm. Daniel Kaimann

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Erstgutachter

Prof. Dr. Bernd Frick

Fakultät für Wirtschaftswissenschaften

Universität Paderborn

Zweitgutachter

Prof. Dr. Claus-Jochen Haake

Fakultät für Wirtschaftswissenschaften

Universität Paderborn

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1 Introduction

"The consumer has a simple alternative to search; he can use experience (...)."

Philip Nelson 1970

Experience goods represent an example *par excellence* for the presence of information asymmetry among consumers and producers, as they are characterized by the consumer's *a priori* lack of information about a product's quality before consumption (Nelson 1970: 1). An effective way of reducing information asymmetries is the transmission of a credible signal by the producer. Usually, signaling will have a strategic effect, which means that the receivers, or consumers, will purchase goods and services that are associated with a reliable quality signal (Spence 1973). Michael Spence introduced signaling theory in his 1973 seminal article about the reduction of asymmetric information in the selection of potential job candidates. In Spence's model, the candidates' education levels serve as a signal of the quality as future employees. Potential employers interpret the education signal and adjust their selection behavior in response to the education levels.

A significant number of management, marketing and economic studies have analyzed signaling effects under asymmetric information (Spence 1973, Banerjee 1992, Stiglitz 2002, Gao *et al.* 2008, Kirmani and Rao 2000, Hochwater *et al.* 2007, Kang 2008, Ndofor and Levitas 2004, Rao *et al.* 1999). Specifically, a number of studies on signaling effects examine entertainment markets (Eliashberg and Shugan 1997, Nelson *et al.* 2001, Nelson and Glotfelty 2012, Hennig-Thurau *et al.* 2012, Liu 2006). The entertainment industry is especially suitable for the analysis of asymmetric information for several reasons. First, products related to the media industry represent classic experience goods. Second, entertainment markets present various signals of quality, such as word-of-mouth, professional critics, and brand reputation measures. Third, the sales and different signal figures are tracked and garnered by a number of service providers and thus easily available. Fourth, entertainment markets, such as the video game industry or the movie industry, assure comparability according to technology requirements, product characteristics and industrial and market structures.

In the specific context of entertainment markets, most studies frequently analyze the

relationship between sales performance and expressed opinions of professional critics and especially consumer word-of-mouth (Basuroy *et al.* 2003, Boatwright *et al.* 2007, Eliashberg and Shugan 1997, Holbrook and Addis 2007, Gemser *et al.* 2006, Archak *et al.* 2011, Chen and Xie 2008, Chevalier and Mayzlin 2006, Chintagunta *et al.* 2010, Decker and Trusov 2010, Dellarocas *et al.* 2007, Duan *et al.* 2008, Hu *et al.* 2008, Moldovan *et al.* 2011, Shao 2012, Sun 2012). Additional emphasis is placed on the analysis of sales prices, product ratings according to age and genre classification, market share of producers and distributors, award presentations, sequel titles, and marketing expenditures (Park *et al.* 2011, Schlereth and Skiera 2012, De Vany and Walls 1999, Leenders and Eliashberg 2011, Moon 2010, Ravid 1999, Alden *et al.* 2006, Pham *et al.* 2013, Rao *et al.* 2013, Van Horen and Pieters 2012, Basuroy and Chatterjee 2008, Gierl and Huettl 2011, Sattler *et al.* 2010).

I apply signaling theory to describe rational choice behavior on markets for experience goods under asymmetric information. Specifically, I study two entertainment markets that meet the necessary requirements for the analysis of signaling effects. The two markets are the film industry and the video game industry. Figure 1 describes the primary elements of the signaling environment in the entertainment industry in form of a timeline. The timeline presents three main elements: *the signaler*, *the signal*, and *the receiver*.

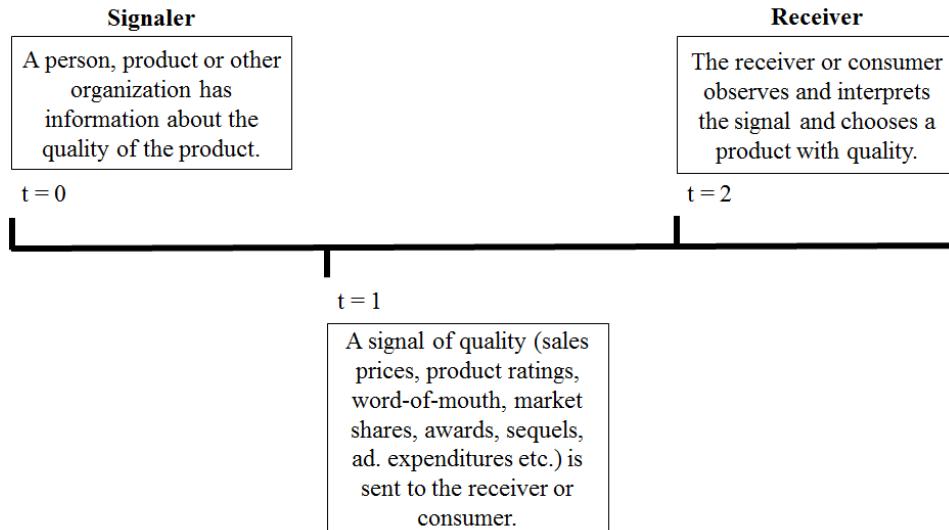
The signaler is a person, product or organization that obtains information about the quality of the product that is not accessible to outsiders and consequently possesses a privileged position (Spence, 1973, Kirmani and Rao 2000). This information may include specifications about the product that outsiders would find useful. A classical signaler in the entertainment industry is represented by professional critics who normally receive a new product before its release and thus obtain positive and negative private product information that is not available to consumers.

The signal is a positive or negative information intentionally communicated by the signaler to the receiver or consumer. Effective signals have two main characteristics: the observability of the signal and the signal costs (Myers and Majluf 1984, Bird and Smith 2005). The signal observability refers to the possibilities to which receivers are able to notice the signal. The signal costs point out the credibility of the signal. The signaler may

communicate dishonest signals if the costs and benefits of signaling false signals outweigh the costs and benefits of signaling true signals. Classical signals in the entertainment industry present sales prices, market shares, awards, sequels, marketing expenditures or critical reviews from professionals and word-of-mouth.

The receiver or consumer is an outsider who does not obtain the information about the underlying quality of the product but would like to receive this information to improve his decision-making process (Basuroy *et al.* 2006, Rao *et al.* 1999). Additionally, signaling should involve a strategic effect, meaning that the signaler should benefit from the receiver in some way if the receiver selects the signal of the signaler in favor of other alternatives. Classical receivers in the entertainment market are presented by cinemagoers or video game players. In the case of critical reviews, consumers would observe and interpret the reviews from professionals and choose a product according to the recommendation of the critic.

Figure 1: Signaling Effects on Consumer Perceptions under Asymmetric Information



In this context, I address a number of key research questions concerning the identification of the signaler, the signals, and the receiver: (1) How do signals of quality from professional critics influence buyer behavior compared to signals originating from other consumers? (2) How do product characteristics moderate the influence of

professional critics and word-of-mouth on commercial success? (3) How does brand extension induce spillover effects that positively affect market performance? (4) How do other signals of quality such as sales prices, market shares, awards, or marketing expenditures affect revenues? (5) How do different signals of quality interact with one another? (6) How does the interaction of different signals of quality affect total sales?

In four different chapters, I describe how the aforementioned signals affect consumer perceptions and derive managerial implications and suggestions for future research. However, I focus on the analysis and the comparison of expressed opinions of professional critics and word-of-mouth and on the study of the commercial success of brand extension products and franchise titles. Additionally, I place further emphasis on the causal interrelationships of signals and on the question how these interactions of signals affect market performance.

The four analyses of the entertainment market do not only differ in terms of the film and video game industry but also by the econometric approaches combining classical variable-oriented analyses and novel qualitative comparative analyses of signals.

Variable-oriented analysis focuses on the empirical identification of the net effects of independent variables on one or more dependent variables. In variable-oriented analyses, linear, additive models test causality and are primarily based on correlation relationships. However, the estimation quality depends on a representative sample and a proper model specification.

In contrast, qualitative comparative analysis studies causation with set-theoretic relationships. Different membership score thresholds indicate whether a variable is completely in or completely out of a specific set of cases. Additionally, the set of cases and their thresholds can vary according to different problem sets and research questions. Whereas variable-oriented analysis is based on linear, additive models and thus on single paths that lead to the outcome of interest, qualitative comparative analysis is able to model multiple distinct causal paths to the outcome.

In summary, variable-oriented analysis seeks to explain the influence of moderating effects on one (or more) dependent variable(s) and qualitative comparative analysis seeks to find configurations of complex interactions of variables across cases that lead to the outcome of interest. Consequently, both methodologies represent complementary approaches.

In what follows, I describe the two parts and four chapters of the thesis in greater

detail. The first part includes the variable-oriented analyses; the second part presents the qualitative comparative analysis methodology. Each part features two entertainment market studies, one for the film industry and one for the video gaming industry. The segmentation into two specific methodologies and industries supports the identification of moderating signals. In this way, I can derive precise implications for both academic scholars and the entertainment industry.

1.1 Part 1: Variable-Oriented Analysis of Signals

The first chapter of the variable-oriented analysis asks the question whether professional critics outweigh word-of-mouth as a signaling effect on consumer's perceptions. To answer the question, I study the video game industry which is characterized by experience goods and a lack of *ex ante* knowledge of product quality, such that reliable external signals of product quality are likely to be highly valued. Two potentially credible sources of information are reviews by professional critics with expert reputations, as well as word-of-mouth reviews from other consumers. By default, reviews from professional critics are published before the product's release whereas word-of-mouth opinions are communicated after the commercial launch of a product. Following Eliashberg and Shugan (1997), professional critics appear to adopt the role of influencers due to their expertise and reputation whereas word-of-mouth opinions are more likely to predict sales figures because they reflect the existing preferences of consumers.

This study makes a direct comparison between the relative influence of both critic and user reviews on the sales of video games software. To empirically estimate and separate the effects of the two signals, I analyze a sample of 1,480 video games and their sales figures between 2004 and 2010. The dataset consists of the five mainstream console and handheld devices available during the time period: Nintendo DS, Nintendo Wii, Sony PlayStation 3, Sony PSP and Xbox 360. The reviews from both professionals and users are gathered from the Internet portal Metacritic, a website that reviews entertainment products and especially video games according to a weighted average score of mainstream critical responses.

I find evidence to suggest that reviews from professional critics have a significantly positive influence on sales that outweighs word-of-mouth reviews. Consequently, the findings support the hypothesis that professional critics adopt the role of an influencer whereas word-of-mouth opinion acts merely as a predictor of sales. Additionally, the Metacritic score appears to be a reliable measure of valence and should therefore be

considered by game developers and publishers and be part of success-oriented development agreements. From an economic part of view it is important to understand which signals and specifically which critical statements drive commercial success and strengthen competitive advantage. Thus, product sales can be predicted accurately. This is even more crucial during the early product life cycle stages.

The second part of the variable-oriented analysis section focuses on the analysis of movie success mechanisms in a genre-specific context. Movies represent classical experience goods and a prime example of the occurrence of information asymmetries. Consequently, consumers have latent information about the characteristics of movies before consumption. To counter information asymmetries, consumers may rely on their prior knowledge of movies, and match their purchase decision with their movie genre preferences (Austin and Gordon 1987, De Silva 1998). Thus, movie genre categories can induce reputation effects that helps consumers to assess the quality of a product or a movie before consumption.

In contrast to other movie genres, computer animated and comic book based films show an increase in production and new cinema releases in the last decade. Whereas the total American film market faced a decline in production by 12 percent in 2009 compared to 2008, computer animated movies and comic book adaptations increased production and box office releases and thus accounted for 12.5 percent of the total American box office revenues in 2009. In addition, eight computer animated movies were released in cinemas and accounted for nearly \$1.5 billion in 2010, an increase of 16 percent to 2009. Following the success of computer animated movies, the major film studios also released eight comic book based films with titles such as *Thor* or *Captain America: The First Avenger* that earned \$449 million and \$368 million, respectively at the box office worldwide.

I present an explorative genre-specific film analysis of the two genres of computer animated and comic book based films to identify movie success mechanisms. By introducing the concept of the motion-picture marketing mix, which represents a set of tactical marketing tools in order to strengthen a company's strategic customer orientation, I am able to systematically identify key movie success factors and consequently the relevant set of movie success mechanisms that may affect customer's perceptions. By focusing the empirical analysis exclusively on the two genres computer animation and comic book adaptation, I conduct a cross-sectional empirical analysis of all computer

animated and comic book adaptation movies that had a US cinema premiere, resulting in a total of 211 observations from 1978 to 2012. Additionally, I consider regional and cultural differences and the sales figures from both the domestic and the foreign market.

I derive multiple managerial and research implications. First, research in the field of movie business thoroughly analyzes and quantifies the key success drivers of American feature films (Smith and Smith 1986, Litman and Kohl 1989, Wallace, Steigermann and Holbrook 1993, Sawhney and Eliashberg 1996, Eliashberg and Shugan 1997, Krider and Weinberg 1998, Ravid 1999, Nelson *et al.* 2001, De Vany 2004, Walls 2005). However, a genre-specific differentiation and specifically a separate consideration of computer animated and comic book adaptation movies has not yet been conducted. Second, the introduction of the motion-picture marketing mix helps both researchers and movie managers to systematically structure and analyze the complexity of the dynamic movie market. As a result, both interest groups can develop a set of marketing tools that efficiently meets customers' perceptions and strengthen a company's competitive position. Third, I find empirical evidence that actors with *ex ante* popularity, award nominations, and the production budget represent key movie success mechanisms and significantly influence a movie's commercial appeal. Following Rosen's (1981) superstar theory, I conclude that certain characters appear to attract a bigger audience at the box office. Consequently, star actors as well as the size of the production budget and award nominations play an important part in promoting new releases and should be considered by film studios and distributors in the planning of new projects. Finally, word-of-mouth appears to create reputation effects that significantly affects revenues. Thus, I confirm studies by Dellarocas (2003) and Liu (2006) showing the influence and correlation between word-of-mouth mechanisms and product sales in their analyses. Additionally, practitioners should be aware of the long-term impact of word-of-mouth and should therefore consider a social communication strategy in their marketing activities.

1.2 Part 2: Qualitative Comparative Analysis of Signals

In the first chapter of the qualitative comparative analysis section, I study complex causal interrelationships in dynamic markets using qualitative comparative analysis and Shapley value decomposition. Linear algebra and linear regression models are based on linear combinations of variables and focus on the study of moderating effects. Cause-effect relationships are measured by statistical significance levels and the partial effects of independent variables are aggregated to a total effect. Apparently, linear regression

models are able to capture the net effects of individual variables, but they are not appropriate to account for and analyze complex causal structures. Accordingly, to answer the question how signals of quality interact with each other, an additional method of analysis is needed. Boolean algebra, qualitative comparative analysis (QCA) and the game theoretical solution developed by Shapley and Shubik (1954) appear to be more suitable for covering complex causal relationships and for helping us to understand what interactions of different signals significantly affect revenues.

Using proprietary data from the motion-picture industry, I study a sample of the 500 all-time box office champions and the relationship of revenues and financial effects (production budget), seasonality and time effects (release before or during a federal holiday), reputation effects (movie reviews from professionals and consumers, star popularity effects of actors, sequels, prequels or book adaptations and award wins), and discrimination effects (Motion Picture Association of America ratings). Whereas QCA accounts for the multiple interaction terms of the signals, the Shapley value decomposition determines the marginal contribution of the different signals to market performance.

I show that a segmentation and brand extension strategy is sufficient for achieving high market performance and that certain conditions (e.g., production budget, critic reviews and brand extension products) appear particularly appropriate for gaining a competitive advantage in the film market. Additionally, the introduction of QCA for analyzing markets provides both academics and practitioners with a novel approach to structure and understand complex causality of markets, such as the motion-picture industry. The Shapley value power allocation appears particularly appropriate for the study of net effects, thus giving managers the opportunity to identify key drivers of product sales and giving academics the option to study both the identification of market structures and the determination of marginal effects of factors. In summary, I introduce novel methodological approaches to analyze relationships in markets and show that specifically the production budget, professional critic reviews and brand extension products appear to drive the performance in entertainment markets.

In the second part of the qualitative comparative analysis section, I study the interaction of signals with the help of a fuzzy set qualitative comparative analysis (fsQCA) and a dataset from the video game industry.

In the context of the entertainment industry, previous studies have analyzed the

influence of a range of individual and separate signals such as reviews from professional critics, word-of-mouth, and marketing expenditures on sales performance (Eliashberg and Shugan 1997, Liu 2006, Nelson and Glotfelty 2012). However and most likely, consumers continuously evaluate the credibility and reliability of a range of signals both separately and jointly, although existing econometric studies pay insufficient attention to the interactions and complex combinations of signals. For this reason, I develop a novel theoretical and empirical approach to address these issues and study the interactions of different signaling effects (i.e., word-of-mouth, brand reputation, and distribution strategy) on customer perceptions.

Using a sample of 1,208 console and handheld video game titles, I consider the signaling effects of word-of-mouth, professional critics, and sequels, but also extend beyond this to test for interactions between re-releases, prices, product ratings, and the market share of publishers. Consequently, I not only study two or three-dimensional interactions but also multiple and complex combinations of different signaling effects. To account for multiple interactions of cause-effect relationships, I apply a fuzzy set qualitative comparative analysis. Fuzzy sets are variables that have a degree of membership score between the range of 0 and 1. Consequently, fuzzy sets represent qualitative and quantitative data characteristics.

The results of the study address a number of key managerial and research issues in the economics and management literature. First, I support the contention that reviews from professional critics act as a signal of product quality and therefore positively influence unit sales. Specifically, positive reviews from professional critics represent a more important determinant of success and are a far more influential and trusted signal of product quality than the opinions of other users. Second, I find evidence to support the use of brand extension strategies as marketing tools that create spillover effects and support the launch of new products. This result is consistent with findings from other studies such as Erdem and Swait (2004) and Völckner and Sattler (2006), who found the quality of the parent product, as well as the fit with the parent, to be important factors for successful brand extension strategies. Specifically in the video game market, success clearly breeds success; video games distributors and developers should bear this in mind in the development of new products and their strategies for brand extension and new product releases. Third, while I do not by any means suggest that the demand curve for video games software is upward sloping, I do find evidence that a high price serves as a

signal of quality, as do the discriminatory effects of restrictive age ratings. Consequently, it appears that video game consumers are not particularly sensitive to price. Accordingly, the demand for video games software can be described as being relatively price inelastic.

In summary, it can be assumed that the interrelation of a cross-platform distribution strategy, high product quality, and reviews from professional critics appear to be of crucial importance in establishing a successful franchise and consequently a successful brand extension strategy. Additionally, the introduction of qualitative comparative analysis and the set-theoretic approach allows for the study of causal asymmetry for the first time. Causal asymmetry indicates that the combinations of independent variables leading to high market performance differ from the combinations of independent variables leading to low market performance. Accordingly, qualitative comparative analysis is not only able to analyze complex cause-effect relationships and multiple interactions but also to identify sufficient combinations of independent variables and their relationship with the outcome.

1.3 List of Presentations and Scientific Dissemination of Studies Submitted as Parts of this Dissertation

<i>Publication</i>	<i>Cox, Joe and Kaimann, Daniel 2013: "The Signaling Effect of Critics: Do Professionals outweigh Word-of-Mouth? Evidence from the Video Game Industry". Center for International Economics. Working Paper No. 2013-11. University of Paderborn.</i>
Chapter in the Dissertation	Second.
Contribution to joint work with co-authors	The work on this study was equally shared by both authors with a percentage share of 50 percent, meaning that the writing, estimation and analysis was a complete joint project.
Conferences/ Workshops/ Seminars	<p>The paper was presented by Daniel Kaimann at the following conference and seminars:</p> <ul style="list-style-type: none"> ▪ Suffolk Economics Seminar Series, Suffolk University, Boston, MA, September 2013 ▪ UCF Marketing Research Seminar, Orlando, USA, September 2013 ▪ 35th ISMS Marketing Science Conference, Istanbul, Turkey, July 2013 (together with Joe Cox)
Scientific Dissemination	The work on this study started in January 2013. A first draft was finished in July 2013 and a working paper was released in September 2013. The current version is of January 2014.

<i>Publication</i>	<i>Kaimann, Daniel 2011: “"To Infinity and Beyond!" A Genre-Specific Film Analysis of Movie Success Mechanisms”. Center for International Economics. Working Paper No. 2011-05. University of Paderborn.</i>
Chapter in the Dissertation	Third.
Contribution to joint work with co-authors	Single authored paper.
Conferences/ Workshops/ Seminars	The paper was presented by Daniel Kaimann at the following conference and seminars: <ul style="list-style-type: none"> ▪ International Conference of Cultural Economics of ACEI, Doshisha University, Kyoto, Japan, June 2012 ▪ Department of Business Administration and Economics Research Workshop, University of Paderborn, Waldeck am Edersee, September 2010
Scientific Dissemination	The work on this study started in January 2009 and a first draft was finished in June 2010. A working paper was published in the CIE working paper series in May 2011. After several internal revisions and comments by Bernd Frick and Darlene Chisholm, a revised working paper was published in September 2013. The current version is also from that point of time. The study has been submitted to the Journal of Media Economics in August 2013 and received a “revise and resubmit” in April 2014.

<i>Publication</i>	<i>Kaimann, Daniel 2014: "Combining Qualitative Comparative Analysis and Shapley Value Decomposition: A Novel Approach for Modeling Complex Causal Structures in Dynamic Markets".</i>
Chapter in the Dissertation	Fourth.
Contribution to joint work with co-authors	Single authored paper.
Conferences/ Workshops/ Seminars	<p>The paper was presented by Daniel Kaimann at the following conference and seminars:</p> <ul style="list-style-type: none"> ▪ Portsmouth Business School Research Seminar, University of Portsmouth, Portsmouth, UK, January 2013 ▪ YU/Bruce Mallen Workshop for Scholars and Practitioners in Motion Picture Industry Studies, sponsored by The Syms School of Business at Yeshiva University New York, Los Angeles, CA, November 2012 ▪ Suffolk Economics Seminar Series, Suffolk University, Boston, MA, March 2012 ▪ NBER Productivity Lunch Seminar, National Bureau of Economic Research, Cambridge, MA, March 2012
Scientific Dissemination	The work on this study started in late 2011 and a first draft was finished in February 2012. Thanks to comments by Darlene Chisholm and seminar and conference participants, the study could be submitted to the Journal of Cultural Economics in February 2014.

<i>Publication</i>	<i>Kaimann, Daniel and Cox, Joe 2014: "The Interaction of Signals: A Fuzzy set Analysis of the Video Game Industry". Center for International Economics. Working Paper No. 2014-11. University of Paderborn.</i>
Chapter in the Dissertation	Fifth.
Contribution to joint work with co-authors	Daniel Kaimann contributed 70 percent and Joe Cox 30 percent to the work of this study. Joe Cox was mainly responsible for the literature review, conceptual framework, and managerial implications. The sections data and methodology, estimation results and conclusion was conducted by Daniel Kaimann. The introduction was equally written by both authors. Joe Cox also provided the data. Daniel Kaimann was responsible for the preparation and transformation of the data.
Conferences/ Workshops/ Seminars	The paper was presented by Daniel Kaimann at the following conference and seminars: <ul style="list-style-type: none"> ▪ International Conference of Cultural Economics of ACEI, UQAM, Montreal, Canada, June 2014 (together with Joe Cox)
Scientific Dissemination	The work on the study started in December 2013. The first and final version was finished in May 2014 and directly submitted to the International Journal of Research in Marketing (Special Issue on Entertainment Industry).

6 Outlook

To forecast product sales efficiently and to understand what signals influence the purchase decisions of customers under asymmetric information, we study the entertainment industry and specifically the movie and video game industry. The regression results provide empirical evidence that the expertise of professional critics serves as a credible signal that helps consumers to minimize uncertainties and consequently influences sales performance. Nevertheless, reviews from customers, the so-called word-of-mouth, also have significant effects on revenues. Additionally, we find that star actors, award nominations, and the production budget lead to high revenues in the movie market.

In terms of limitations, our approaches focus on the one hand on computer animated and comic book based films, on the other hand on video games. We do not address additional movie genres like comedy, action or horror or other entertainment markets, such as the music or book industry. Thus, further research should extend the model for ancillary genres and entertainment industries. Nevertheless, that may imply a new level of complexity, but it will also improve the explanatory value of the model.

The studies by Walls (2005) and McKenzie (2010) represent two approaches that introduce new methods of analysis to capture the dynamics and complexity of the entertainment industry. While Walls (2005) used a conditional stable-distribution regression analysis to study movies success mechanisms in the American film market, McKenzie (2010) applied Pareto distribution models in his study of the Australian DVD industry. However, both studies still suffer from multicollinearity and endogeneity.

To counter the dynamics of the entertainment industry and the issues of multicollinearity and endogeneity, we present two studies and introduce a new method of analysis to capture cause-effect relationships and measuring outcome performance in dynamic markets. Qualitative comparative analysis (QCA) appears to present a complementary method of analysis to existing regression analyses. QCA helps to understand the interrelationships of complementary and substitutable conditions and the outcome of interest. Consequently, QCA appears to be appropriate to analyze complex cause-effect relationships and multiple interactions. QCA is based on set-theoretic relationships, whereas standard analysis approaches are usually based on correlational relationships. The set-theoretic approach allows for the analysis of causal asymmetry, meaning that the solutions that lead to high market performance may differ from the

solutions that lead to low market performance.

The QCA results provide empirical evidence that for motion pictures, a segmentation and brand extension strategy is sufficient for achieving high market performance. Additionally, the production budget and critical reviews appear to lead to high performance. For video games, a brand extension strategy and reviews from professional critics also seem to lead to high market performance. In addition, it could be assumed that discriminatory effects of prices and restricted age ratings represent signals of quality and consequently have a positive influence on unit sales.

In terms of limitations, the QCA approach suffer from limited diversity. Limited diversity occurs when logically possible configurations of independent variables are not empirically observable. For a set of eight independent variables, 256 (2^8) combination of independent variables are possible. Consequently, at least 256 different configurations should appear in reality. However, this high number of combinations is hard to observe and thus limited diversity will be the rule rather than the exception (Ragin 2000). Furthermore, QCA is inappropriate to identify the net effects of causal conditions. We introduce a novel method of analysis to specify marginal contributions of causal conditions to the outcome of interest. The Shapley value evaluates the distribution of power among conditions and consequently appears particularly useful for the identification of marginal effects of individual conditions. Finally, QCA only considers time-invariant data and is not able to analyze any type of time-variant data. Thus, we acknowledge the implementation of time series analysis in QCA.

The approaches we have used in this study have consistently shown the substantial impact of critical statements about the quality of a product or service on commercial success. Due to the greater credibility, it is usually assumed that social online communication does not only have the capability to affect product sales, but also to influence business sales strategies (Chen and Xie 2008, Liu 2006). Customers are now able to voice their opinion and share their experience after a transaction in various discussion forums, assessment portals or online blogs. Thus, it is possible for them to enter into a dialogue and to share beliefs and positions. However, as has been shown in this dissertation, professional critics appear to have a credible and reliable expertise that outweighs online word-of-mouth.

So far, most studies have examined the impact of word-of-mouth on sales portals such as eBay or Amazon and have shown a correlation of online customer reviews and product

sales (Dellarocas 2003, Chen und Xie 2008). However, these studies mostly considered the average ratings of the sellers or the products. Consequently, only quantitative indicators were included as exogenous variables. Liu (2006) is one of the first studies covering and analyzing emotional expressions of user reviews with the help of lexicographic computer software. He collected five main factors in order to measure the text and sentiments of online word-of-mouth: the number of messages, the valence, the subjectivity, the number of sentences, and the number of valence words. In particular, the number of messages and the average number of sentences have been identified as a signal of quality.

Future research projects should extend the quantitative and qualitative analysis of online word-of-mouth and professional reviews of Liu (2006) with the help of corpus-linguistic methods of analysis. Accordingly, reviews from both professional critics and consumers would not only serve as an aggregate, absolute measure in empirical studies on the economic success of entertainment goods but also as a basis for the development of different “review-corpora”.

Corpora are a collection of authentic spoken or written language data. It is advisable to compose different corpora with regards to specific research questions and hypotheses. After the implementation of “review-corpora”, concordance analyses test the co-occurrence of certain words and constructions and identify frequencies in relation to other parameters and generate initial findings of their ways of use.

The estimation results of the concordance studies can be further refined through the analysis of key words, meaning words that appear with a high frequency in the text (Wynne 2008). Additional language parts can be analyzed and categorized in terms of grammatical structures and functions. Additionally, expressed sensory experiences in reviews can be conveyed linguistically.

In the end, corpus-linguistic methods and econometric analysis should be combined to study the relationship of reviews from both consumers and professionals and economic performance. The findings would lead to a better understanding of consumer needs and consequently developers and distributors could integrate these needs into the product development process.

Specifically for products that are at the introductory stages of their product life cycle, it is strategically important to forecast product sales efficiently to optimize the value chain and business perspective. Thus, it is decisive to control and analyze how the information

contained in online posts can be measured and evaluated to optimize managerial decisions and to strengthen competitive advantages. As a result, companies could enhance their competitive advantage and consumers could increase their personal benefits through the development of consumer-oriented products.

In conclusion, this research introduces two different approaches for quantifying signaling effects that influence the purchase decisions of customers under asymmetric information. Using proprietary data from the motion-picture and video game industry, we specifically show that brand extension strategies and critical reviews from both professional critics and word-of-mouth may lead to high market performance. Although the operationalization and empirical evidence are specific to the context of motion pictures and video games, we believe that our conceptual and estimation approaches can be used to study other industries in which the impact of signals on consumer perceptions is of similar importance.

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