

THE ADDED-VALUE OF ONLINE WORD-OF-MOUTH (eWOM) TO
ADVERTISING IN NEW PRODUCT ADOPTION: AN EMPIRICAL ANALYSIS
OF THE MOVIE INDUSTRY

by

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Abstract

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Fiona Sussan

Advisor: Professor Hirokazu Takada

This dissertation uses the Endogenous Growth Theory to describe the value that consumer online word-of-mouth (eWOM) adds to the sales of a new product (a movie) in its multiple versions (released in the theater and then on DVD). The Endogenous Growth Theory posits that human capital growth adds value to an economy. This dissertation views consumer eWOM as human capital that adds value to advertising and new product sales. Users' votes, users' grade and users' messages on a movie website are the measurements of eWOM that represent human capital. These three measurements of eWOM are hypothesized to have positive, increasing and sustained long-term effect on movie box office sales and DVD rentals. Other movie-specific variables of production costs, screens, MPAA ratings, critics' evaluation, time lag, Oscar award and sequel were included measuring movie sales. Empirical results support the hypotheses that users' votes, users' grades, and users' messages add value to advertising in movie box office sales. Results also support the hypotheses that eWOM of users' messages have an increasing effect on movie box office sales.

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Chapter 1: Introduction

“Just because no one pays for word-of-mouth or the Internet or Web doesn’t make them any less effective. Just because some giant conglomerate doesn’t have electronic systems asking people about their word-of-mouth usage or because legions of analysts aren’t trying to break down the incoming data from panels, doesn’t mean the value of these communication forms is less relevant.”

Don Schultz, *Marketing News*, April 2005

This dissertation is about the empowerment of consumers in the market place expressed through the Internet-enabled online word-of-mouth communications among consumers (eWOM).¹ Consumers in the digital information age have been described as living in an “information democracy” in which abundant information is “tilted” in favor of the consumers (Sawhney and Kotler 2001). In addition to the abundance of consumer-generated information, ordinary consumers’ interactive and spontaneous exchange of information cannot be controlled even by powerful corporations, government and special interest groups. Unlike such traditional media of information transmission as mailing, telephone campaigns and mass advertisings, the incremental cost of Internet-based eWOM limitlessly approaches zero. This equalizes the information transmission power between otherwise hapless consumers and powerful corporations, government and special interest groups.

This dissertation is not about investigating why, what and when consumers engage in eWOM (these issues are already addressed in Hennig-Thurau et al. 2004). It is about the *power* of the already existing eWOM in the marketing systems. It is not about the comparison of traditional word-of-mouth and eWOM (this is already addressed in

¹ eWOM is used by Hennig-Thurau et al. (2004). Other authors use word-of-mouse (Kiecker and Cowles 2001) or word-on-line (Granitz and Ward 1996).

Dellarocas et al. 2004). It is about the *measurement* of the already existing eWOM in the marketing systems. This dissertation is not about how firms should manipulate or participate in the eWOM process (this is already discussed in Dellarocas 2004, Mayzlin forthcoming). It is about how *firms should include* the newly available eWOM data in evaluating and augmenting the effectiveness of their own marketing communications, namely advertising, in the new product adoption process.

Many firms at home and abroad are still unable to recognize the power of eWOM. In the early days of the world-wide-web, the famous Nike Boycott case against Nike for using child labor in Vietnam and Indonesia was the result of an unexpected rapid Internet-based “grass-root” movement. In Japan in 1999, Toshiba shocked the corporate world when it made a public apology to a customer after the customer released the tape on a website that contained a Toshiba customer service employee’s insulting remarks to him (Tsurumi 1999). There were 1.6 million hits on that website in two days. Before the Internet, consumer-to-consumer or consumer-to-business conversations were less noticeable to the general public because they were widely dispersed and mostly untracked. But in the Internet age, firms need to realize that the new medium has transformed traditional limited private untraceable oral word-of-mouth to one of unlimited publicly traceable printed consumer-to-consumer interactions in cyberspace.

eWOM is now made up of speedy and continuous exchanges of billions of consumers’ opinions expressed in one-to-many broadcasts or many-to-many spontaneous discussions organized in multiple online consumers’ feedback systems. In 2003, 33 million or 26% of all adult Americans posted a comment or a rating of a product or a service online; and online rating has become a national pastime (Hitlin and Rainie 2004).

These eWOM activities are evidenced in online feedback systems such as www.ePinions.com, www.cNet.com, www.TiVocommunity.com and many more (for a detailed discussion, see Dellarocas 2003). eWOM is a digital library of printed testimonies or transcripts that are available and accessible at any time and at any place and can possibly have a long, sustained influence.

It is alarming that many firms are still unwilling to *accept* the fact that the power of eWOM can be as effective as or more effective than that of traditional marketing communications. For example, the first *Blair Witch Project* movie which became an overnight box office success spread almost solely by eWOM (Bickart and Schindler 2002). For its sequel, however, the studio decided to engage in a large-scale conventional advertising campaign to launch *Blair Witch Project 2* and ended up with a dismal failure at the box office. This episode points out the important fact that consumers appear reacting differently to eWOM than to conventional advertising.

There are two ways to tackle firms' inability to recognize their unwillingness to accept the power of eWOM. One is to fall back on the conservative side and argue that since eWOM is made up of anonymous consumers whose activities cannot be controlled by the firms, marketers should continue to assume word-of-mouth automatically follows after advertising and ignore the need to include eWOM in the measurement of advertising effectiveness. Such an argument, however, is rather tenuous when we consider the botanists who even include the measurement of sunshine in their forecasts of the effect of seed grade on plant height although the sunshine variable cannot be controlled *per se*. An alternative approach is to treat eWOM as usable data that actually *measure* interpersonal communications and at the same time could enhance advertising.

The research reported in this dissertation supports the latter approach: it shows that consumers' eWOM can be *counted* as a value-adding component of advertising in the marketing systems. While much of the marketing communication and new product literature has in the past speculated that the effect of word-of-mouth in general increases over time and the advertising effect decreases over time, it has yet to be empirically demonstrated that consumer word-of-mouth actually sustains over the long term when compared to advertising. This dissertation makes a first attempt to equate the sustainability of the word-of-mouth effect (or eWOM effect) to a *new value* which consumers are adding to the marketing systems and especially to advertising.

The sustainability of eWOM over time will have a long-term effect on a firm's future. It is therefore imperative for firms to measure eWOM and *anticipate* its effects on their brands and their businesses. Disgruntled customers are creating perennial corporate hate web sites (Wolrich 2005). Concerned customers are creating online brand-boycott movements that carry social messages of anti-globalization, consumer-rights activities and much more (e.g., boycotttesco.com for RFID chips). Such consumer-directed feedback goes beyond simple venting of dissatisfaction, rather it is indicative that consumers want *changes* in these corporations' behavior and want these corporations to be more socially or environmentally responsible. It is foreseeable in the near future that the power of eWOM will lead toward the redefinition of marketing from a *firm-initiated process to find out what a customer needs and wants* to a *customer-initiated process to dictate to firms what they must do before customers will agree to buy the firms' products*. Some firms have already begun to listen to their customers first before they produce. For example, the manufacturer Ducati is famous for its product design, led by a community

of their customers (Sawhney 2001). LEGO recently produced the “Santa Fe Super Chief” locomotive set solely designed and promoted by its adult LEGO train-set enthusiasts (Hof 2005). These firms however remain the exceptions rather than the norm.

The sustainability of eWOM over time, which I call *added-value*, shows that when it is included in the measurement of advertising effectiveness, it explains more about a new product’s sales than when it is not included. The results of this dissertation also show that this *added-value* has a longer sustainable impact on new product sales than an advertising effect alone.

This dissertation helps managers and academics in advertising and marketing to understand and to forecast the increasing impact of eWOM on new product sales. Given that goal, eWOM, as used in this dissertation means the enquiries, the evaluations, the opinion and the discussions that consumers engage in within an *aggregate* environment or in an *interactive* platform in cyberspace. By *aggregate* I mean a consumer who adds his or her own opinion to the community of other consumers to be expressed as part of the total evaluation in the form of a grade, the number of stars, or the number of thumbs up and so on. For example, after I view the movie *The Pirates of the Caribbean*, I go to the Yahoo movie website and rate the movie “B”, where this grade is added to the already existing aggregate “A-” grade given by 95,623 other fellow consumers. By *interactive* platform I mean a virtual space that facilitates social and informational connection among consumers other than just simply listing monologues to which no one responds. There are non-interactive platform websites. They only publish individual consumers’ reviews but do not seek other consumers’ evaluations or responses to these

reviews in terms of rating their “helpfulness” or linking them into a conversation thread, or using these reviews in an algorithm-based recommendation system.

1.1 Added-value

To establish the conceptual depth and breadth of eWOM as an *added-value* in this dissertation, I introduce the Endogenous Growth Theory (Romer 1986; Hulten 2000) from the discipline of economics to explain how technology-enabled consumer interactions in cyberspace empower consumers and at the same time generate *new value* in the market. Past research has measured the *real economic value* brought forth by Internet-enabled technologies that connect many people to many others to exchange information and share knowledge. For example, the Amazon peer book review system was found to increase consumers’ welfare by increasing the awareness of obscure books otherwise not promoted or sold in brick-and-mortar stores (Bryjolfsson et al. 2003). Information economists have confirmed that in the digital economy, information is transformed from a scarce commodity to an abundant one, and this transformation has lowered the costs of information to near zero and possibly increased real economic value in the market (Shapiro and Varian 1999).

However, these economic values generated by the Internet medium are often viewed as a *technology-driven value*; they are seldom viewed as a *consumer-driven value* created by consumers’ proactive, continuous and interactive participation in the network of consumer-to-consumer online communication. This dissertation views Internet technologies as the vehicles, and consumers as the passengers, who interact with each other in the virtual space in a radically new way. In the interactive process, consumers (1)

increase their own product awareness and knowledge, (2) share their experiential knowledge with fellow consumers and (3) build and increase their total social network. As a result, these consumers' interactions add value to the market systems.

The consumer-driven values of eWOM manifested in increased knowledge, knowledge exchange and social networking, are synonymous with the Endogenous Growth Theory (Romer 1986; Hulten 2000). It posits that technology enables the increase of human capital in the form of (1) individual capital, (2) instructional capital and (3) social capital to benefit the economy. In this thesis, Internet technologies evidenced in virtual communities, online reputation systems, online chat rooms, message boards and many other venues are platforms that facilitate consumer-to-consumer communications, fostering human capital growth. Subsequently, this increased human capital empowers consumers and adds value to the market systems.

1.1.1 Building an eWOM added-value framework

To illustrate the added-value and the sustainability of eWOM in this dissertation, I chose an industry that has a continuous supply of new products with a relatively short life cycle—the movie industry. The prolific eWOM activities surrounding movies in recent years serve as an ideal backdrop to investigate consumer-to-consumer interactions over time. Chapter 2 describes the characteristics of the domestic U.S. movie market and the marketing activities surrounding it. Chapter 3 surveys the recent literature of movie-specific and relevant eWOM research. Chapter 4 describes the relationship of advertising and eWOM in relation to the U.S. domestic movie market and shows that there exist

positive and decreasing relationships between advertising and movie sales but positive and increasing relationships between eWOM and movie sales.

1.2 Testing the added-value of eWOM

This dissertation defines the value of eWOM and describes how eWOM can be measured alongside advertising in their effect on new product sales. In a new product context, eWOM is interpersonal communication that takes place after marketing communications have begun. This dissertation reports three main separate measurements that empirically test the added value of eWOM. The first measurement is to compare new product total sales within one product version (the primary market of movie box office gross) when there is only advertising versus when there is both advertising and eWOM. The second measurement is to compare the advertising and eWOM effects over time on weekly new product sales (weekly box office sales). The third measurement is to compare advertising and eWOM effects over time across versions (weekly box office sales and weekly DVD rental revenues). Chapters 5 through 7 describe the data used, the research design and the results reported. These three chapters present strong empirical evidence of eWOM added-value to advertising over time and across the versions of a new product.

1.3 Harnessing the added-value of eWOM

When I first proposed the need to include consumer-to-consumer word-of-mouth in the measurement of the effectiveness of business-to-consumer communications in new product adoption, my proposal received an award that funded my subsequent dissertation

research.² When I presented the use of the Endogenous Growth Theory to describe the *value* consumers are bringing to the table in the digital environment, I received divided feedback from academics. Some recommended that I discard the Endogenous Growth Theory and simply measure consumer-to-consumer word-of-mouth. Some lauded the introduction of the Endogenous Growth Theory into marketing for its value in analyzing such phenomena as “co-creation”, “collaborative marketing”, and “listening in on consumers” in the digital economy. For example, Prahalad (2004) describes the experience-centric co-creation of value by consumers. Sawhney (2001) describes collaborative marketing where firms need to rethink how they interact with customers. Urban and Hauser (2004) used the web environment to listen in to find and explore customers’ needs in the trucking industry. Some who are familiar with organization studies commented on this dissertation’s ingenious way to apply the theory within the context of a consumer market.

When I used the Endogenous Growth Theory to explain eWOM when it is added to the traditional advertising effectiveness framework, the feedback from my colleagues was unanimously positive. When the new conceptual framework is presented with movie industry empirical results, the audience finds the results interesting. The results of this dissertation confirm two main principles: (1) eWOM adds value to new product sales, and (2) eWOM influences early sales of a new product.

² An open doctoral proposal competition of US\$10,000 entitled the John Funk Award was awarded in December 2003 by the Center for Research in Technology and Innovation, Kellogg School of Management, Northwestern University.

1.3.1 Principle 1: eWOM adds value to new product sales

Internet technology-enabled online consumer-to-consumer word-of-mouth adds value to advertising in total new product sales. The empirical results of this dissertation in Chapter 7 show that eWOM, measured in the form of consumers' participation in the rating of new movies, consumers' aggregate grade given to new movies, and the interactive messages consumers exchange in discussing new movies, explains more of the movie sales than when these eWOM measurements are not included. These three dimensions of eWOM results support the three types of human capital values of the Endogenous Growth Theory discussed in Chapter 3. They are individual capital, instructional (knowledge sharing) capital and social capital. Consumers' voting represents a democratic empowerment of each individual consumer—an increase in consumer participation and satisfaction that adds to the total value received by the consumers. A consumer adding his or her own evaluative grade of a new product to the aggregate grade already given by the community of fellow consumers represents knowledge sharing, that is, instructional capital that equates to the value of adding knowledge to benefit other consumers. The interactive message results in this dissertation represent the social interactions that foster trust and reciprocity to build social capital of consumers *in toto*.

The managerial implications of this principle are that (1) eWOM is much more than a continuation of traditional word-of-mouth; and (2) eWOM is about the empowerment of each individual consumer and also of all consumers as a group. Traditional word-of-mouth has been viewed as one of a hierarchical transmission of signals from the early adopters or opinion leaders to the less informed masses or to the

later adopters, and the signals transmitted are restricted within strong or weak structural ties. eWOM is much more complex than signaling within structural ties. eWOM is about horizontal two-way or more interactive *exchanges* of a consumer's thoughts, experiences, know-how and opinions to build knowledge to be *shared* by everyone within an open community.

The sense of community brings me to the second managerial implication of this principle in that eWOM is an empowerment of both the individual consumer and the consumer group as a whole. The recent popularity of the reality show "American Idol" is an example of one of the empowerment of the consumer and highlights the importance of voting. The show allows viewers to decide who the winner is via a phone-in voting system. However, other than a few firms mentioned earlier, most managers have not yet proactively included their customers in their marketing process. Although there have been discussions both for and against firm-sponsored manipulation of eWOM, this dissertation supports the view that manipulation of eWOM is not the proper response to silence the increasing voice of consumers. Mayzlin (forthcoming) discusses the benefits of firms manipulating eWOM. Dellarocas (2004) showed manipulation of eWOM is harmful to the firm when consumers' opinions are mostly honest. Rather, a manager's task is to learn to recognize and *listen to* the voice of the consumers and incorporate their opinions in the marketing process to harness the increasing power of eWOM.

1.3.2 Principle 2: eWOM influences early sales

Online consumer-to-consumer discussions of a new product before its launch increase the new product initial sales. While this sounds rather straightforward and

intuitive, marketing communications and advertising research have not recognized this in the past. Stemming from the traditional Two-step Flow Communication Model discussed in Chapter 3, marketing communications and advertising research have always viewed initial sales of a new product as a result of advertising effect; only later sales are seen as the result of interpersonal or consumer-to-consumer communications. However, the results of this dissertation in Chapter 7, which measure the eWOM impact on weekly movie box office sales, found that eWOM prior to the launch of a new product is important, and similar to that of advertising, in the new product's first week of sales.

The managerial implication of this principle is that since information distance and the incremental cost of information in the digital economy are both approaching zero, the paradigm of information asymmetry favoring firms has been shifted to the paradigm of information democracy favoring consumers instead. In the past, firms could manipulate public opinion to a certain extent because of the information advantage they had. In the digital economy, firms can no longer hide their own mistakes or flawed products at the time of a new product launch. Now, the first customer who notices a firm's mistakes will broadcast them online instantaneously to other consumers. Managers have to realize that eWOM takes place simultaneously with marketing communications or advertising without any intervening time lag, as previous marketing communication models have assumed. Creating firm-directed pre-launch buzz may not be enough. The task of the manager is to keep his ears very close to the ground listening to all eWOM prior to the new product launch.

Chapter 2: Overview of the U.S. Movie Market

When I began my search for an industry that primarily uses advertising to sell its new products, and at the same time has been subject to substantial online word-of-mouth activities, some researchers recommended that I look at the movie industry, which provides abundant data for both advertising and eWOM activities.³ This chapter will begin with the appropriateness of the choice of the movie industry to my research questions, an overview of the distribution and promotion of movies in the U.S. and ends with the description of traditional word-of-mouth to the recent eWOM activities surrounding movies.

This dissertation uses the U.S. movie industry to test the Internet empowerment of consumers and to demonstrate eWOM at work in new product sales for three reasons. First, the supply of new movies is continuous, averaging 400 new releases in theaters annually (MPAA 2004). This abundant supply of new movies coupled with well-documented advertising budgets and “printed” eWOM for each new movie is well suited for the rigorous examination of whether the spread of consumers’ unsolicited evaluations empower consumers vis-à-vis movie studios and distributors’ advertising. Second, a new movie typically has a relatively short life cycle when compared to other entertainment products such as a music CD or a book. The short life cycles of movies provide appropriate “fruit flies” for testing the central hypotheses of this thesis. Those who study genetics avoid studying humans because new generations come along only every thirty years or so. It takes a long time to understand the cause and effect of any changes. Instead, they study fruit flies. They are conceived, born, mature, and die all within two

³ Special thanks to Professor David Godes of Harvard University and Professor Dina Mayzlin of Yale University.

weeks. Third, the multiple versions of a movie from primary markets of domestic theater release and international theater release to the secondary market of DVDs, cable TV pay-per-views and so on are accompanied by continuous “perpetual” and printed eWOM. This enables the quantitative measurement of eWOM’s long-term effect on movie sales.

The movie market is characterized by an oligopolistic market structure. In the past, movie studios like MGM and 20th Century Fox employed their own directors, actors and screen play writers in addition to filming studios and production staff. Nowadays, domestically scattered independent productions make movies and the studios market them. This separation of movie making and marketing allows the studios to *create* blockbuster movies through aggressive advertising and screen distribution. In the process of the creation of a blockbuster, even movies that are subject to unfavorable word-of-mouth can maximize revenues through wide screen distribution and successful promotion for the opening week to avoid bad word-of-mouth. In the past, studios were able to buy large first-week audiences and ignore consumers’ feedback. However, in the Internet age, previously ignored consumer feedback can no longer be neglected in the movie industry since Internet-based communications transmit eWOM instantly through text-messaging on cell phones, Internet-based chat rooms and many more online venues (High-tech word of mouth 2003).

2.1 The domestic movie market in the U.S.

The U.S. domestic box office gross has increased by more than \$4 billion in the past decade, and at the same time the production costs of a movie increased from an average of \$29 million to \$63 million, and the marketing costs increased from \$14 million to \$39 million per movie (for the period 1993-2003, MPAA 2004). Domestic

U.S. box office gross sales in 2003 were \$9 billion, with 459 new films released in the same year. The industry defines box-office gross as the gross receipts collected by motion picture theaters, negative cost as the production cost of a movie, marketing cost as print and advertising costs, and blockbuster as films grossing above \$100 million (Moore 2000).⁴

The movie business is inherently risky with many movies not breaking even after taking into account production costs and marketing costs (Eliashberg et al. forthcoming). Since 1992, however, the international theatrical markets have been bringing in more revenue than the domestic theatrical markets. Domestic box office gross sales alone do not generate enough revenue to make Hollywood movies profitable (Menand 2005). Given the increasing production costs and astronomical marketing costs, the revenue streams of Hollywood movies depend more on multiple versions or ancillary (secondary) markets of a movie such as international release, DVDs, video games, licensing and others after the domestic theatrical release in order to generate a profit. In 2003, movie sales and rentals in DVDs and VHSs in the U.S. totaled \$23 billion, more than double that of domestic box office gross (MPAA 2004).

Because of the importance of the ancillary markets, one way to view the domestic theater release is to see it as playing the role of a “commercial” for subsequent versions (Menand 2005). In fact, the breakdown of a typical studio’s total revenue is: 10% from domestic box office, 10% from international box office, 42% from home video and 38% from Pay TV, Cable TV and Broadcast TV (Verter and McGahan 1998). In the U.S., the population of “moviegoers” may well have peaked in the late 1940’s. But, the population

⁴ The “\$” sign represents United States Dollars.

of “movie viewers” has been steadily increasing since the 1980’s when VHS rental markets were created.

2.2 Movie distribution in the U.S.

Once a movie is made, its marketing hinges only on the “2Ps” of marketing variables—distribution (placement) and promotion, instead of the “4Ps” of marketing variables—price, product, placement and promotion. This is because the finished product, the movie, does not change during box office release, and the ticket price is fixed at movie theaters. Because of this, I will be discussing only the distribution and promotion of movies here within the context of advertising and eWOM relationships.

The studios that produce movies are often also the ones that physically distribute the prints or reels to the theaters and at the same time engage in making marketing decisions on the films (Eliashberg et al. forthcoming). In a sense, the market structure of the movie industry in the U.S. is essentially an oligopoly of seven companies controlling the production, distribution and even the rating of films (Menand 2005). The MPAA is made up of seven studios and distributors: Buena Vista Pictures Distribution (The Walt Disney Company), Sony Pictures Entertainment Inc., Metro-Goldwyn-Mayer Studios Inc., Paramount Pictures Corporation, Twentieth Century Fox Film Corporation, Universal City Studios LLLP, and Warner Bros. Entertainment Inc. In 2003, these seven studios and distributors together collected 84% of the total box office gross from the 194 films they released (MPAA 2004). The remaining 265 films released by other studios and distributors collected 16% of the total box office gross. The theaters or exhibitors are owned by hundreds of companies with the top 10 controlling about 50% of all screens (Verter and McGahan 1998).

An explanation of the mechanism of the financial arrangements between studios/distributors and theaters/exhibitors is important to the understanding of the motives behind the studios' marketing strategy in relation to the timing of advertising spending. The studio and the theater typically enter into a contract entitled a "film rental agreement" which has a sliding scale fee structure. Typically, the studio is compensated as high as 95% of the box office gross on opening week and then it will be compensated to as low as 30% after seven weeks of release (Lukk 1997; Verter and McGahan 1998). Because of the fee structures, studios are motivated to spend almost the entire movie's advertising budget prior to or during the first two weeks of theater release (Lukk 1997).

I have also included below a description of the distribution chain beyond the box office theater release as it is central to the understanding of the marketing strategies employed by the studios and the possible impact of eWOM on subsequent versions of a movie after theatrical release. Briefly, a U.S. film life cycle begins with the domestic U.S. release followed by the international theater release. Approximately 180 days after the U.S. domestic theater release, DVDs/VHSs are released with a 35-day window for exclusive distribution, and then pay-per-views on cable TV and the broadcast networks (Lukk 1997). A movie ticket at the theater averages \$6, and a new DVD title average sales price is \$20 (MPAA 2004). The rental of a DVD/VHS movie averages \$4.50 per movie at Blockbuster. Movies in DVDs can also be rented for \$3.80 through vending machines supplied by Movie Bank USA. By now, movies released in the DVD/VHS format account for 60% of Hollywood's revenues, and are becoming increasingly important in generating cash for studios (Crawford 2004).⁵ Although DVD sales are

⁵ The 60% revenue reported for DVDs in 2004 is a much larger number than that of the Verter and McGahan report in 1998 cited earlier in this chapter.

lucrative for studios, accurate prediction of their sales is rather difficult as evidenced in the recent DreamWorks misjudgment of *Shrek 2* DVD sales. The misjudgment resulted in DreamWorks' earnings forecasts to fall short by 25% and its stock price to tumble (Marr 2005).

2.3 Movie promotion in the U.S.

Because of the aforementioned sliding-scale fee agreement with theaters, the studios spent most of the advertising dollars before and during the first two weeks of the launching of a new movie to maximize their revenues during the first two weeks of opening (Lukk 1997). A MPAA member's typical media spending allocates 39% of its advertising budget on network and spot TV advertisement, followed by 22% on cable TV, radio, magazines and billboards, 14% on newspapers, 4% on trailers and 1% on the Internet; the remaining 20% is allocated to non-media related spending including production services, exhibitor services, publicity and market research (MPAA 2004).

In view of the studios' film rental fee arrangements with theaters and the oligopolistic market structure, it is not a surprise to recognize that the major studios have been using a single formula to flood mass-media based advertising before and during opening week coupled with the widest possible number of screen openings to market their movies. In other words, the studios create the "opening" effect with advertising and distribution strategies to maximize their own profits. Blockbuster movies therefore are mostly *created* through the successful manipulation of the advertising and distribution strategies. The top 20 movies that had the highest grossing opening weekends in 2003 are also the movies that became blockbusters (MPAA 2004).

The studios also use the strategy of flooding the market with mass-media based advertising before the theater release to avoid bad word-of-mouth, or to fill the theaters before the consumers realize they are being presented with a bad movie (Menand 2005). This is evidenced by the release of *The Matrix Revolution* (the third movie in the Matrix series), in which over 10,000 screens were opened simultaneously worldwide. The first-week release in the U.S. collected 60% of its total box office sales (MPAA 2004). On the other hand, one may argue that if a movie is expected to receive reasonably favorable word-of-mouth (e.g., *My Big Fat Greek Wedding*, *Mystic River*, *Million Dollar Baby*), the advertising budget should not be spent on flooding the market prior to or during the first week of theater release but instead the advertising dollars should be distributed evenly throughout the lifetime of the movie. The current movie industry practice is unclear as there were no available data to suggest whether decreasing weekly box office sales are simply a function of decreasing advertising efforts. Neither is it clear whether advertising and distribution create an *opening week freshness* effect for consumer demand to view the movie at the opening or consumers really view movies as being *staler* after the opening week.

It is however clear that without a substantial advertising budget and distribution power, movies cannot compete for audiences at the beginning of the theatrical release. In other words, sales of many reasonably good movies may suffer from current industry marketing practices, since the current advertising and distribution configuration creates awareness among consumers of only those movies that are promoted by the powerful studios/distributors.⁶ In turn, these powerful studios/distributors dictate the choices of

⁶ In 2003, the exception to this is *The Lord of the Rings* and *Freddy vs. Jason*, both blockbuster movies were distributed by New Line Cinema, which is not a member of the oligopoly.

movies given to the consumers. What is intriguing about movie consumption is that while consumers can spread negative word-of-mouth after they watch a movie they cannot or will not be compensated for having bought a bad product. This is unlike the case of conventional consumer goods, where a consumer who purchased a product he or she doesn't like can return the product for a refund. Or after a consumer has eaten bad food that causes food poisoning, he or she can get a refund or restitution through litigation.

2.4 Word-of-mouth in the U.S. movie industry

Central to this thesis is the growth of the empowerment of consumers' voices versus advertising in the process of new product adoption. What is unique in the adoption of a new movie is that there is a dominant role played by independent critics' word-of-mouth, in addition to advertising and consumer word-of-mouth. It is clear that professional film critics make a lot of noise before and during the opening weekend, but it is unclear if a film critic's evaluation had a measurable impact on box office sales. Recent events have also tarnished the image of film critics. For example, Sony was fined over inventing a fictitious film critic to write positive reviews of *A Knight's Tale* and *The Animal* (Sony fined over fake reviews 2002). A film critic's evaluation may in fact have no correlation to opening week sales, total box office gross, DVD sales or DVD rentals. A recent example from the Yahoo movie website is *Mr. and Mrs. Smith*, which received an aggregate "C-" grade from 14 critics and opened as number one in the weekend with \$51 million sales, while *Cinderella Man*, which received an aggregate "B+" grade from 15 critics and opened with a disappointing \$18 million first weekend gross. Professional critics appear to be rating the artistic and intellectual value of given movies while ignoring their mass appeal.

Traditional industry practice has measured consumer word-of-mouth in movies through exit polls at screenings. Because the nature of the finished product is not subject to improvement (at least not in the theater release), there seems to be little incentive for studios to attempt to handle post-consumption dissatisfaction expressed in bad word-of-mouth. Unsuccessful films like *Gigli* and *The Hulk* simply become available on DVD or network TV sooner rather than later. Essentially, there is little attention paid to relying on consumer word-of-mouth in films that have high production and marketing costs (Eliashberg et al. forthcoming).

2.5. eWOM in the U.S. movie industry

To date the most notable example of eWOM's potential power in marketing movies is *the Blair Witch Project*, whose promotion was almost entirely dependent on Internet-based word-of-mouth (Hennig-Thurau et al. 2001). The film was produced at a production cost of \$35,000 and the total box office gross was \$130 million. Similar eWOM influence is found in the Japanese film *Ringu*. Its box office success in 1998 was promoted mostly by cell-phone-based eWOM (High-tech word of mouth 2003). The most popular movie-related eWOM websites in the U.S. include Rottentomatoes, IMDb and Yahoo. These websites publish consumers' or users' reviews, host forums or message boards to allow consumers to interact by viewing or replying to each other's comments, and consolidate consumers' evaluations of movies in the form of grades. A few years ago, these websites began with movies released in theaters only, and recently they added movies released on DVDs. Nielsen Entertainment's research results found that movies that received poor reviews on the Rottentomatoes website can lose 20% of their weekend box office sales (Grover 2004).

A brief survey of these websites suggests that each website has a different niche in its approach to enable consumers to participate in the discussion and evaluation of movies. IMDb, owned by Amazon, primarily publishes detailed and long reviews from both critics and users. The Rottentomatoes website has the most interactive forum which is organized in threads of messages for consumers to view and to which they can contribute. It also has a very active and expansive page of critics' reviews. The Yahoo movie page gives a comprehensive report of both the quantitative and qualitative evaluations from critics and consumers. All of these websites provide each movie with its own page and many discussions of a movie are often found prior to the box office release.

There are other movie-related websites that are indirectly related to eWOM. The Hollywood Stock Exchange (www.hsx.com) is a popular website for consumers to speculate on the first-weekend box office revenue of a movie through online simulated stock trading. Other websites such as Boxofficemojo, The-numbers, Boxofficeguru, Boxofficeprophets are primarily sites that provide box-office statistics and predict box-office performances of movies. Another eWOM-related website is Netflix which is an online DVD rental company that uses a recommendation system to indirectly pass one customer's review or choice as a recommendation to another customer. This recommendation system is similar to that used by online book stores like Amazon.

What is perhaps surprising in the midst of the recent proliferation of eWOM on movies is the inability of Hollywood studios to recognize or attend to the increasing impact of consumer-led eWOM. There is yet a strategy to emerge from the studios to measure or tackle the empowerment of the consumers' voice in relation to the studios'

huge advertising expenses. It is unclear how the studios can make use of the 15,000 consumers' reviews on *The Passion of the Christ*, or the 120,000 consumers' votes for *The Pirates of the Caribbean* to augment their own advertising messages. It is even less clear how studios could handle the cell phone text message that began panning *The Hulk* the minute the consumer exited the theater on the opening day of the movie (High-tech word of mouth 2003).

It is foreseeable that the empowerment of consumers through eWOM may allow studios to spend less money on advertising for reasonably good movies that have "legs to run" or momentum after opening week based on favorable word-of-mouth to sustain a longer theater release. For example, *My Big Fat Greek Wedding* was in the theaters for over a year. On the contrary, the empowerment of consumers through eWOM may force studios to push movies that are subject to unfavorable word-of-mouth toward a shorter and shorter theater life cycle. For example, *Gigli* was in the theaters for only three weeks. In the long run, the empowerment of eWOM may call for the *democratization* of the oligopolistic market structure and push for the rewriting of the single formula of mega advertising budget and widest screen opening for those movies which are dictated by powerful studios to be released, to make room for good movies produced by smaller studios to become available for theater release.

Chapter 3: Literature Review

The previous chapter describes the overview of the movie industry and the distribution and promotion strategies practiced in the actual market place. It concluded that the most common current practice is for studios and distributors to flood the market place with overwhelming mass-media advertising at the beginning of the new movie launch and to open with as many screens as possible for their marketing of a new movie. The studios and distributors have not relied much on consumer word-of-mouth despite the proliferation and the popularity of consumers' participation in, and increasing reliance on, online movie reviews and ratings. Mirroring the industry practice, little academic research focuses on movie-specific word-of-mouth or eWOM.

Because this dissertation measures if and how the empowerment of consumers through eWOM adds value to advertising in new movie sales, this chapter will begin with reviewing academic research that directly measures advertising and/or word-of-mouth effect on movie sales. Second, since there are no published articles, to the best of my knowledge at the time of this dissertation, that directly measure advertising and eWOM effects on movie sales, this chapter widens the scope and reviews of empirical studies that address eWOM effects on sales of other comparable new products. Third, this chapter introduces the Endogenous Growth Theory to explain the essence of this dissertation. It is the *technology* that enables the real-time online consumers' interactions to become more powerful with respect to the size of the consumer group, the frequency, the quantity and the quality of consumer feedbacks, in contrast to the traditional consumer word-of-mouth that takes place within a fixed communication process and

structured social relationship. Finally, this chapter reviews how eWOM has changed the communication model in the new-product adoption process. A summary of constructs and related recent empirical movie studies as compared to this study are listed in Table 1 (see Table 1).

3.1 Advertising and word-of-mouth effects on movie sales

Central to this dissertation is the hypothesis that Internet-enabled online word-of-mouth has empowered consumers and at the same time adds value to movie sales above and beyond advertising. I will first review the literature of empirical research that measures advertising effects on movie sales.

3.1.1 Advertising effect on movie sales

As mentioned in Chapter 2, the common practice of movie studios is to invest the majority of their advertising dollars immediately before or during the opening week of a movie launch. Zufryden (1996) developed a comprehensive three-stage (awareness, intention and ticket) response model to measure advertising effects on box office performance. He first used 63 French films released in 1993 to estimate the advertising and word-of-mouth effects in the model. He, then, applied the model to forecasting ticket sales by varying advertising budgets and varying the magnitude of word-of-mouth. His empirical results are relevant in two areas to this dissertation in its investigation of advertising and eWOM effects on new movies sales. First, he concluded that while larger advertising budgets in the first week generate larger ticket response, the larger response quickly falls after the first week and eventually dissipates after three weeks of theater release (Zufryden 1996, Figure 3, p. 37). In other words, the phenomenon that the larger the advertising budget the larger the ticket sales is only in the opening week. After three

weeks of theater release of a given movie, the larger advertising budget spent in the first week does not increase ticket sales. Second, he inferred that when a high word-of-mouth level is expected for a film, a studio may reduce its advertising budget to achieve a given box office sales target and vice versa. However, he did not measure word-of-mouth and advertising effect together on ticket sales. This inference is important to this dissertation because the quantity of word-of-mouth is inversely related to the advertising budget, and word-of-mouth may substitute for advertising spending. Furthermore, Zufryden (2000) studied the relationship between a film's promotional website and box office sales for 21 films. He found that a film's promotional website activities can be used as a relevant predictor of the same film's box office performance.

3.1.2 Word-of-mouth effect on movie sales

In the movie industry, independent film critics' word-of-mouth plays a major interpersonal communicative role in influencing consumers' behavior in box office sales (Basuroy et al. 2003; Eliashberg and Shugan 1997). Eliashberg and Shugan (1997) measured box office sales in a parsimonious model of positive, negative or total number of critics' reviews, and concluded that critics are more like leading indicators who influence late adopters than as opinion leaders influencing early adopters in theater attendance. Basuroy et al. (2003) replicated the empirical results of Eliashberg and Shugan (1997) and also included the impacts of such other variables as production budgets and star power. They found that the impact of film critics' negative reviews, not positive reviews, diminishes over time and that critics are influencers for early adopters, contrary to the findings of Eliashberg and Shugan (1997). Neither of these studies

included advertising in their study of the effects of film critics' positive or negative reviews on box office sales.

In prior research, there were two approaches used to study the effect of consumer word-of-mouth on box office sales. The two approaches are one that uses actual exit poll evaluations from early movie screening to measure word-of-mouth and other using intentional word-of-mouth activities from subjects who watched a movie in an experiment. Two studies found that post-consumption word-of-mouth intentions given by subjects after their being exposed to different movie information stimuli can be used to predict the market share of a new movie (Eliashberg et al. 2000; Neelamegham and Jain 1999). Zufryden (2000) used Cinemascore audience exit poll evaluations as a covariant in his study, and found exit poll evaluations have positive impact on box office sales. However, Zufryden (1996 p.38) found that word-of-mouth has a positive but decreasing impact over time on ticket sales. This dissertation argues that eWOM has an increasing impact over time on weekly movie sales.

The relationship between film critics' word-of-mouth and consumer word-of-mouth has also been investigated (D'Astous and Touil 1999; West and Broniarczyk 1998). From laboratory experiments, these two studies concluded that consumers' evaluations of films are significantly related to critics' evaluations. However, they did not measure their impacts on box office sales or advertising budgets.

3.2 Advertising and eWOM effects on movie sales

There is one recent paper by Dellarocas et al. (2004) that links advertising, offline word-of-mouth and online word-of-mouth and compares their effects to predict movie box office sales. The results of their working paper are important to this dissertation.

First, they found that the content of the first week of Yahoo online movie reviews is similar to the actual word-of-mouth captured through the traditional approach of surveying, and that online ratings can be considered as a useful proxy for word-of-mouth of movies. Second, they included advertising budgets and the statistics of online reviews in a diffusion model to forecast movie sales. The only drawback of this approach (including advertising) is that the diffusion model has been empirically shown to be inappropriate to characterizing the adoption process of films (Eliashberg and Sawhney 1994).

3.2.1 eWOM effects on movie sales and other products

Zhang et al. (2004) compared the effects of online versus offline movie reviews on box office sales and preliminarily concluded that both online and offline reviews have positive impact on box office sales, with online reviews having a larger impact on box office sales than offline reviews. Awad et al. (2004) investigated the substitutability of movie eWOM for advertising and preliminarily reported that users who participate in eWOM as a source of information do not identify advertising as playing a significant role in their decisions to view a movie. Ansari et al. (2000) developed a model that includes eWOM in movies from critics and fellow consumers. He demonstrated that the model that includes the widest varieties of consumers' preferences and critics' evaluations results in making better and more accurate recommendations for consumers. Similar positive impacts of online product reviews on offline sales has also been investigated and empirically confirmed for products like new TV shows (Godes and Mayzlin 2004), books (Chevalier and Mayzlin 2003) and beer (Clemons et al. 2004). These research results are

important to this dissertation and support the view that eWOM is related positively to offline new product sales and can possibly be substituted for advertising.

3.3 eWOM and firm-sponsored manipulated eWOM

So far, the eWOM of this dissertation has been defined as consumer-to-consumer interactive and aggregate exchanges of evaluations, opinions and experience delivered through the Internet in an electronic format (Chapter 1, p. 5). At this point, I would like to clarify and exclude firm-initiated online word-of-mouth from this dissertation. In particular, I would like to separate viral marketing and firm-initiated manipulative chat in Internet forums from consumer-to-consumer-based eWOM. In practice, it is difficult to separate the fusion of firm-initiated versus consumer-initiated communications since the proliferation of tools or applications such as web blogs, emails, chat rooms, and firm-initiated communications can easily show up in consumer-to-consumer communications.

3.3.1 Viral marketing

Viral marketing begins with an email originating from a marketer and then being passed along to a friend and to a friend's friend (Kharif 2000; Welker 2002). Some researchers view this form of Internet-enabled marketing as "peer-to-peer referrals" or "knowledge-sharing" platforms (De Bruyn and Lilien 2004; Subramani and Rajagopalan forthcoming). De Bruyn and Lilien (2004) found that these unsolicited electronic referrals or online word-of-mouth generated different effects on the stages of awareness, interest in, and sales of a product. They found that the characteristics of social ties influence receivers' behavior differently. For the receiver of online word-of-mouth, they found that close social tie increases his or her awareness of a new product, perceived social affinity triggers his or her interest in a new product. Demographic similarity has a negative

influence on the receiver's awareness, interest and the sales in a new product. Subramani and Rajagopalan (forthcoming) categorized the effectiveness of viral marketing according to the role of the recommender within a social network. This dissertation, however, views viral marketing as *initiated* by marketers with the *intent to persuade*, and therefore does not adhere to the definition of eWOM described earlier on p.5 of Chapter 1.

3.3.2 Firm-manipulated word-of-mouth

Firm-manipulated word-of-mouth is created when either marketers themselves or someone hired by the marketers intentionally disguise themselves as consumers to promote products in *cyberspace* where the anonymity of the communicators is the norm. The theoretical benefits of such manipulation are unclear. Dellarocas (2004) concluded that theoretically firms' manipulation of online forums by posting positive reviews is harmful when there are a sufficiently large number of consumers posting honest opinions online. In the Internet market of opinions, firms' manipulated eWOM is likely to be exposed or cannot withstand severe weeding out processes. Mayzlin (forthcoming), however, used a game theory to show that Internet anonymity increases the substitutability between the actual consumer word-of-mouth and firms' promotional chat disguised as consumer word-of-mouth. Again, this dissertation does not view such manipulation by firms in the online environment as eWOM as defined earlier.

3.4 eWOM and the Endogenous Growth Theory

The central theme of this dissertation is that consumers are empowered in the digital world through their increasing interactions with each other in *cyberspace* powered by Internet technology. In other words, eWOM is enabled by Information

Communication Technology (ICT) such as email, Internet Forums, message boards, chat rooms, instant messaging and collaborative filtering algorithms. They transform limited private face-to-face untraceable oral communications that take place in dispersed geographic space to unlimited large-scale publicly traceable printed and perpetual word-of-mouth published in a centralized virtual cyberspace (e.g., Dellarocas 2003). This empowers consumers through individual and social actions (e.g., Bagozzi and Dholakia 2002). This technology-enabled empowerment is described as technology-driven human capital growth in the Endogenous Growth Theory. The Endogenous Growth Theory is described in section 3.4.3.

3.4.1 Internet technology transforms word-of-mouth to eWOM

First, Internet technology has changed the logistics of how consumers conduct word-of-mouth activities. Instead of transmitting opinions to one's pre-existing social circles with established tie-strength via face-to-face interactions, dialing a phone call or writing a letter, cyberspace allows consumers with no previous ties to "gather" online to express opinions and exchange product information and evaluation beyond the limitations of spatial distances, social class barriers, cultural differences and other prior inhibitors (Armstrong and Hagel 1996; Muniz and O'Guinn 2001; Rheingold 1993; Wellman 2001). Connecting to other consumers in cyberspace is much simpler logistically by being just a few mouse clicks away. Second, Internet technology has changed the nature of word-of-mouth activities. In the traditional word-of-mouth, one has to find someone to talk to about one's own opinion of a product and risk not being heard. Consumers can now easily initiate word-of-mouth activities by expressing themselves in a few mouse clicks through one-to-many broadcasts or many-to-many exchange formats offered in

multiple websites, newsgroup, and chat rooms and so on that can possibly reach millions of fellow consumers. The voice of the initiating consumer is heard. The incremental information cost is limitlessly approaching zero. Consumers who engage in finding out about other consumers' reviews or evaluations of a product can find information within a few clicks using search engines such as Google.

What is more striking is that eWOM is organized in the form of a reputation system (e.g., Yahoo's movie ratings) or a recommendation system (e.g., Amazon's book recommendations) that is constantly updated by many fellow consumers' evaluations, and has an increasing impact on consumers' decision processes (Ansari et al. 2000; Dellarocas 2003). Essentially, eWOM increases consumers' *information* about a product tremendously when compared with the traditional interpersonal word-of-mouth process in which information of a product only comes from one's friends or acquaintances. In a sense, the migration from traditional to online word-of-mouth has shifted the *information asymmetry* paradigm in which firms have more product information than consumers, to one of an *information democracy* paradigm in which consumers have as much information as the seller about the product and especially the experiential information about the product from other consumers (Sawhney and Kotler 2001).

3.4.2. *eWOM transforms social interactions among consumers*

Internet-enabled communication is found to be a double-edged sword amplifying the existing social network and simultaneously establishing weak ties among strangers that may become close and meaningful (Bargh and McKenna 2004; Wellman 2001). The expansion of a consumers' social network also expands his or her access to multiple sources of information about a product. The phenomenon of online virtual communities

has been described as following consumers to radically interact with one another (Deighton 1996). Recently, consumers have been found to participate voluntarily in virtual communities to conduct *intentional social action*. Such action would likely become the most influential in shaping the consumers' enduring opinions and behavior (Bagozzi and Dholakia 2002). To rephrase, the power of eWOM has increased to such an extent that American consumers are listening more to fellow consumers than to businesses when they make their purchase decisions (Berry and Keller 2003).

3.4.3 eWOM empowers consumers

It is, therefore, the technology-enabled social interactions among consumers that empower consumers at the individual level, group level and the societal level. This empowerment is described as human capital growth in instructional capital, individual capital and social capital within the Endogenous Growth Theory (EGT). Such capital is accumulated through cumulative human and information interactions and expands informational impacts.

The EGT is an economics theory developed in the 1980's as an extension of "dynamic economy of scales or learning by doing" of the 1950's. It has been recently introduced to the marketing discipline. It describes internal and cumulative growth in the market place (Bharadwaj et al. 2005). EGT has not been applied in marketing to describe the growth or added-value that consumers are contributing to the marketing systems through the empowerment of the consumers' voice enabled by the Internet. EGT (Romer 1986) emerged to introduce an alternative view to the neoclassical economic view of technology as an exogenous growth variable. EGT argues that the economic growth in the long run is driven by human capital growth assisted by technologies. Human capital

growth is defined as the composites of (1) individual capital in the form of democratic leadership, (2) instructional capital in the form of knowledge-sharing and (3) social capital in the form of people's mutual trust via reciprocal interactions (Hulten 2000).

First, applying this theory to the empowerment of consumers through eWOM in this dissertation, I am equating the popular online rating system of a product or a service with a democratic expression of individual capital at work. Not unlike political voting, consumers are now able to rate hotels, books, films and even the "American Idol" contestants online. For example, the 120,000 votes for *The Pirates of the Caribbean* represent approximately 120,000 consumers participating in the democratic voting process to express their individual opinions about the movie. Second, I am equating published product evaluations contributed by consumers with instructional capital that allows public knowledge sharing among consumers. For example, the 15,000 movie reviews on *The Passion of the Christ* is knowledge open to the public to be shared by anyone. Third, I am equating the virtual communities with a platform to nurture social capital growth. For example, the Rottentomatoes website has an interactive forum which creates the ability to pan a movie's opening (Grover 2004). Together, this human capital growth is described as *added-value* in this thesis.

The view that Internet technologies have enabled consumers to participate in adding value to the marketing systems is similar to that of workers using advanced technologies to participate in R&D of product or production process innovations in order to increase a firm's productivity. It is *endogenous* because the Internet medium has expanded each consumer's social exchanges, knowledge sharing and trust with each other *within* the marketing systems of new product sales. In a sense, this endogenous growth is

similar to concepts in collaborative marketing or co-creation with customers that add value to the firm (e.g., Sawhney and Prandelli 2000; Urban and Hauser 2004).

3.5 eWOM in new product adoption

This dissertation concentrates on the empowerment of eWOM within the context of new product adoption. In the past, researchers have confirmed that word-of-mouth interpersonal communications are central to the diffusion process (Rogers 1995). However, they have not been able to capture the actual word-of-mouth communications efficiently due to the privacy of interpersonal conversations dispersed in both time and space (Kiecker and Cowles 2001). The Internet medium *changed* this situation. I will also review the communication models related to word-of-mouth and the changes advocated in relation to eWOM. Modern marketing communications theory began with the Two-Step Flow Model (Katz and Lazarsfeld 1955). The Two-Step Flow Model is the foundation of a body of new product diffusion literature that uses sales, advertising budgets, and marketing mixes to measure or forecast a new product sales success (for a review please see Bass et al. 2000). Some of these models included an advertising variable, but none of them measured actual word-of-mouth activities.

3.5.1 Two-step flow communication model

The Two-Step Flow Model in new product adoption depicts a hierarchical flow of communication initiated by firms through advertising that first passes on to opinion leaders and then to the masses (Katz and Lazarsfeld 1955). Word-of-mouth activities pass from the consumers who *have-heard* about the new product to the consumers who *have-yet-to-hear* about the new product. This model was built in the 1950s when mass-media

penetration of TV was rather low (at less than 10% of total households). During that time, information asymmetry was prevalent among consumers and also between firms and consumers.

In the Internet age, after the commercialization of the Internet and the emergence of the World Wide Web technology in the 1990s, the information distance among mass consumers has become near zero and the time difference between the firm's new-product launch and a consumer's access to such information is near zero. The Internet has brought about an information democracy that puts consumers in a less hierarchical relationship with other consumers or with firms. This necessitates a reconfiguration of the Two-Step Flow Model, mainly to reflect the fact that consumer word-of-mouth activities on the Internet are far more ubiquitous and spontaneous than the passage of messages from the *have-heard* to the *have-yet-to-hear*.

3.5.2 *The interactive communication model*

Because of the changing face of the new medium, the Internet, and its increasing power to replace the old media, Sussan (2005) used an "interactive communication model" that incorporates consumer-to-consumer interactive communications within the Two-Step Flow Model to study new product diffusion. Sussan (2004) uses the Systems Theory to depict the interactive communications of firm-to-consumer, consumer-to-consumer, and consumer-to-firm within a continuous system. Both of her papers conclude that the inclusion of consumer word-of-mouth in the marketing communication model adds expansive value to the new production adoption processes in terms of total market value, users' likelihood of adopting the new product and the potential market size.

3.6 eWOM and versioning

In the Internet age, the marginal cost of the reproduction of the digital content of information goods is near zero and thus the offering of versions of digital goods makes economic sense (Shapiro and Varian 1999). Versioning is defined as the same product separated by sequential release, price and content. The later version is usually priced cheaper with lesser content (Shapiro and Varian 1999). An example of versioning is hard cover books and paperback books. Versioning is a term rarely used in the marketing discipline. This dissertation introduces versioning and puts forward the concept of the increasing possibility and profitability for firms to simultaneously release multiple versions of digital goods to various market sectors.

In the delivery of multiple versions of information goods, it is, however, unclear how the digitalization of consumer word-of-mouth is related to the multiple versions of digital goods in terms of new product communication. It is unclear (1) whether eWOM is continuous from earlier to later versions of a new product, or (2) whether eWOM combined with advertising has a longer impact than advertising alone, or (3) whether eWOM combined with advertising can possibly substitute for advertising on the adoption of multiple versions of a new product. To the best of my knowledge, there has been no published literature or working papers at the time of this dissertation addressing these questions. Therefore, I am proposing a conceptual framework in the next chapter to describe the relationships between eWOM and advertising in multiple versions of a new product.

Chapter 4: Conceptual Framework and Hypotheses Development

“We’ve learned consumers put formal media lower on their list of what influences their purchases’ than many other things. Leading the list is—you guessed it—‘asking other people’ or the inimitable word-of-mouth.”

Don Schultz, *Marketing News*, April 2005

Word of mouth has existed and dominated the transmission of information in society before the invention of printing technology, newspapers and other mass media. However, it has been difficult to eavesdrop on private word-of-mouth conversations that have been dispersed in time and space. The Internet changed that. It is the emergence of centralized cyberspace that brings us back to the possible dominance of online word-of-mouth over mass-media messages in influencing consumers. This chapter begins with a mass-media-based conceptual framework that depicts the relationships between advertising marketing communication and word-of-mouth interpersonal communication. It then introduces the new eWOM and advertising framework in movie sales. It proposes hypotheses related to the various dimensions of eWOM adding value to advertising and sales in two versions of movie sales.

4.1. Conceptual framework

A generic conceptual framework of advertising and word-of-mouth at work in multiple versions of the sale of a new product is depicted in Figure 1. Within this framework, advertising remains a mass-media-based message generated by businesses. Internet-based advertising is not depicted separately here because it only occupies approximately three percent of the total annual advertising budgets spent in recent years. Word-of-mouth in this framework is depicted as traditional word-of-mouth which is assumed to follow after advertising but is difficult to document because of word-of-

mouth being private conversations and dispersed in time and space. The furthest left component in Figure 1 represents advertising and word-of-mouth at work leading to the sales of a new product in its first version. The middle and the furthest right components in Figure 1 represent advertising and word-of-mouth at work leading to the sales of a new product in its second and third versions.

The three components in Figure 1 are connected by two large arrows. The arrows represent the total effect of the sales of the new product's previous version on the sales of the same new product in its subsequent version. Within the conceptualization in Figure 1, the effects of advertising and unrecorded word-of-mouth activities in the new product's first version is already accounted for within the sales of the new product's first version, and do not separately or independently have an impact on the advertising and word-of-mouth activities in the new product's second version. Similarly, the advertising and word-of-mouth activities in the second version also stop at the sales of the new product of the second version and so on.

4.2 Advertising and eWOM in new movie sales framework

The application of the above conceptual framework in the movie industry is illustrated in Figure 2 with two versions of a new movie and their related advertising and eWOM at work in each version. The framework in Figure 2 deviates from the conceptual framework in Figure 1 in two components. First, in Figure 2, the word-of-mouth component is "users' eWOM" instead of the traditional word-of-mouth in Figure 1. "Users' eWOM" is referred to as the online word-of-mouth perceived by consumers as genuine non-professional opinions, ratings or discussions contributed by fellow consumers. They are usually presented in movie-related websites as users' reviews,

users' ratings, users' grades and users' forums or communities. Again the difference between word-of-mouth and eWOM as described in Chapter 3 is mainly that the former is oral, unrecorded, untraceable, unorganized consumer interactions conducted within structured social ties, and the latter is print-based, recorded, traceable, organized consumer interactions among strangers centralized in cyberspace. Because of Internet technologies, eWOM now continues from box office sales in the left component to eWOM of DVD weekly rentals.

Second, the component of other control variables (the wide rectangle above the sales of the two versions) is added to Figure 2. These control variables of production costs, number of screens, critic's evaluations, MPAA ratings, sequel release, Oscar awards and time lag are used in previous movie research and are specific to the movie industry. Film critics' evaluation is included as a control variable in this eWOM framework because the definition of eWOM in this dissertation is restricted to consumers' interactive and aggregate evaluations. These consumers' evaluations are perceived as written by genuine consumers who have no commercial reasons to contribute to the aggregate evaluative system. Film critics, however, make their livelihoods critiquing films and therefore cannot be considered as having no commercial interests.

The left portion of Figure 2 depicts the advertising, users' eWOM and other control variables and their effects on movie box office sales. Advertising here refers to the industry definition of print and the advertising budget of each movie. Users' eWOM and the control variables are already described earlier. The right portion of Figure 2 depicts the advertising, users' eWOM and other control variables and their effects on

DVD rental sales. The arrows in Figure 2 represent the directional relationships of the variables, and the numbers correspond to the hypotheses. The details of these relationships and the hypotheses' formation will be discussed later in this chapter. In essence, the application of the conceptual framework of Figure 1 into new movie sales in Figure 2 adds to the current literature of advertising and word-of-mouth effects on new product sales the components of (1) eWOM, and (2) the continuation of eWOM from one new product version to another.

4.3 Hypothesis development

In the following section, I propose seven hypotheses that span three kinds of eWOM, advertising and their increasing and decreasing relationships within the two product versions of movie sales. The three kinds of eWOM are: (1) individual capital represented by a consumer's participation in voting for a movie at an individual level, (2) instructional capital represented by a consumers' participation in rating a movie by adding his or her opinion to a group level, and (3) social capital represented by a consumer's participation in discussing a movie in a virtual community. These types of eWOM are hypothesized to explain increases in total box office sales. eWOM is also hypothesized to increase and remain sustained over time. Parallel to eWOM, advertising impact on movie sales is expected to be positive but decreases over time in the first version of box office sales, and dissipates in the second product version of DVD rental.

4.3.1 Version 1- movie box office sales

4.3.1.1 eWOM adds value to advertising

As shown in Chapter 3, the Endogenous Growth Theory posits that technology facilitates human capital growth (Romer 1986; Hulten 2000). In this dissertation, Internet

technologies such as email, chat rooms, online rating systems, virtual communities and so on are technologies that enable a consumer's participation in the knowledge exchange process within the marketing systems and increase his or her interactions with other consumers. Together these activities empower a consumer to voice his or her own opinion, increasing his or her own knowledge, sharing his or her knowledge with others through the socialization process; the consumer, as part of a social group, becomes more powerful. These different forms of knowledge exchange are identified as growth of composite human capital that adds value to the marketing system.

In the movie industry, a consumer's participation in rating movies, sharing experiences, giving opinions and discussions in websites such as Yahoo, IMDb, Rottentomatoes and Moviefone in cyberspace are examples of the increase of human capital consisting of his or her individual capital, instructional capital through knowledge sharing with others and social capital through building trust within a larger group. Any form of knowledge creation has been identified as a vital component in the new product adoption process (Rogers, 1995).

First, as discussed in Chapter 3, in the form of individual capital, a moviegoer can and does freely *participate* in the voting, rating, review or discussion of a movie. This democratic self-expression is similar to that of a political election in which an individual participates to choose a political leader. Movie websites such as Yahoo, Rottentomatoes and IMDb invite anyone to participate in voting on a movie in order to grade the movie in various dimensions. These websites also allow anyone to express his or her own opinions about the movies. It is the open nature of these websites or platforms in cyberspace that empowers each individual and expands his or her own individual capital. The expansion

of each consumer's individual knowledge of and involvement with a product in the form of voting and suggesting best-buys could be said to have effects similar to advertising, which may create more awareness, add value to the marketing systems and lead to more new product sales. This added-value can be measured by the increase of new product sales and leads to the hypothesis of,⁷

H1. eWOM in the form of individual capital growth adds value to advertising and positively affects total box office sales.

Second, in the form of instructional capital, a moviegoer can and does add his or her own opinions or experiences to a larger body of consumers' aggregate opinions. This body of aggregate opinions or accumulated knowledge becomes an online reputation system that facilitates knowledge exchange among consumers (Dellarocas 2003). In movie-related websites such as Yahoo, Moviefone and IMDb, a moviegoer can add his own evaluation of a movie in the form of a grade, a review of what he or she likes, dislikes or a description of his or her own experience. These individual evaluations are added to a larger body of consumers' evaluations expressed in the form of an aggregate single grade (e.g., *Finding Nemo* was rated B+ by 46,321 users on the Yahoo website), or in a review within many other reviews (e.g., *Finding Nemo* had 2311 users' reviews on the Yahoo website). The accumulated knowledge is a form of knowledge exchange defined as instructional capital in the Endogenous Growth Theory. Instructional capital is like a knowledge bank shared by all consumers and in turn empowers consumers as a group.

⁷ The increase in the sales of a product can be used as a surrogate measure of an increase of human capital, similar to the increase of an employee's human capital increasing a firm's output.

The mere existence of such a knowledge bank provides product information and raises product knowledge and is likely to improve sales. In the context of movie consumers, the massive body of opinions and reviews equips them with more knowledge about the movie based on feedback from consumers who have seen the movie.

Consumers become more confident and assured of movie's quality, find that there are less risks to take as a result of benefiting from other consumers' prior experience and they are more likely to buy movie tickets. This empowerment supported by instructional capital gives consumers more confidence, similar to that of risk-reduction, to adopt new products, and therefore adds more value to new product sales and leads to the hypothesis of,

H2. eWOM in the form of instructional capital growth adds value to advertising and positively affects total box office sales.

Third, in the form of social capital, a moviegoer can join and participate in virtual communities or Internet forums to discuss and share opinions with other consumers. For example, Rottentomatoes has one of the most active forums in which consumers' opinions about an individual movie or movies in general are organized in threads of messages replied to and viewed by fellow consumers. For example, on the Yahoo website for the movie *Finding Nemo*, there are 825 individual messages posted on its community message board. Within this virtual community, consumers carry on a conversation with each other, or link each other's opinions together within a thread. This kind of interaction or reciprocity is the essence of trust building within a social environment (Wellman 2001). This social trust is the foundation of social capital as defined in the Endogenous

Growth Theory. The consumers in the virtual community are empowered by this social capital growth.

Also, the increase of social capital gives consumers or moviegoers more confidence in the discussions or evaluations by fellow consumers. Because of this trust, consumers have now become more dependent on fellow consumers in their own purchase decisions. Belonging to a virtual community also means that there may be peer pressure or a need to feel a sense of belonging by participating in discussions and forums. In order to be able to contribute to the interactive activities on the net, consumers often feel that there is a need for first-hand experience in using a product or seeing a movie. This should also have a positive effect on sales. As a community, consumers will be able to speak with a louder voice in any of their efforts in asserting and protecting their rights as consumers. This social capital further encourages and gives confidence to consumers when making their purchase decisions. This leads to the hypothesis,

H3. eWOM in the form of social capital growth adds value to advertising and positively affects total box office sales.

4.3.1.2 Advertising's diminishing effect

Prior movie research has not investigated the longitudinal advertising effect on weekly box office sales when word-of-mouth is present. Zufryden (1996) confirmed that the advertising effect decreases over successive weekly box office sales, but did not measure the advertising effect when consumer word-of-mouth is present. In the digital environment with eWOM, I hypothesize the advertising effect continues to decrease over successive weekly box office sales and leads to,

H4. Advertising has a positive effect on weekly box office sales but the advertising effect will significantly diminish over time when eWOM is present.

4.3.1.3 eWOM's increasing effect

Zufryden (1996) studied word-of-mouth effects and found them to decline over time for movie ticket sales, but reported the effect is sustained for consumers' awareness of a movie and consumers' intention to watch a movie over time. Since this dissertation focuses on movie ticket sales, therefore in here I am only discussing Zufryden (1996) finding that the word-of-mouth effects on ticket sales decrease over time. His finding is contrary to marketing textbook conceptualization and speculation that word-of-mouth effect on new-product sales increases over time. This discrepancy could be due to the fact that the word-of-mouth in Zufryden (1996) was estimated with a pre-determined relationship with ticket sales based on previous mathematical models and was not based on actual data. In the digital economy when word-of-mouth is recorded and easily accessible and retrievable, the effect of eWOM should have an increasing power of influence over a consumer's purchase decision and leads to the hypothesis of,

H5. eWOM has a positive effect on weekly box office sales and eWOM's effect will significantly increase over time when advertising is present.

4.3.2 Version 2 - movie DVD rentals

In this dissertation, the second version of a new movie is DVD rental. Although immediately after the first version of box office sales a new movie is rented to airlines for in-flight entertainment, this dissertation chooses DVD rental as the second version instead because the size of DVD rental market is large and the weekly revenues represent

consumers' choice similar to that of box office sales. Movies chosen for in-flight entertainment are pre-determined by airlines instead. DVD weekly rental revenues are used here to parallel the first version of a new movie, which is weekly box office sales. DVD sales, although a large market, are not included in this dissertation because it is not possible to obtain a finite sales figure of DVD to compare to box office gross. DVD sales are continuous in stores while box office sales in theaters finish at a fixed release date.

There exist complex relationships among advertising, eWOM, box office sales and other variables on DVD rentals. The two versions are entangled with many questions. For example, are the two populations consuming the two versions distinct from each other? It is unclear why, when and which consumers choose to watch which movies in the theater and which movies at home on DVDs. Theater showings are within a restricted time frame at a dark cinema space, whereas watching a DVD allows viewers to adopt an "any time, any place" format. Viewers can view the DVD at their own speed (pausing, taking a snack break or using the restroom) within the rental period for multiple days and multiple times (no more late fees at Blockbuster as of 2005) at home, in the car, or at work on their personal computers. Viewers can also multi-task while watching DVDs. In other words, the consumption behavior of the DVD differs from that of going to the theater. Because of these differences, the decision process leading toward why, when and which DVD to rent may differ drastically from that of theater going and from other products that have multiple versions (e.g., hardcover vs. paperback books).

While these are important questions that need further exploration, immediate questions relevant to this dissertation are: (1) given the time lag between box office release and DVD release, when a consumer rents a movie on DVD, how much of the

advertising from box office release does he or she recall? To rephrase, how much does the advertising effect from the first version of theater release continue into the second version of DVD release? And (2) when a consumer rents a movie on DVD, how much does he or she rely on online word-of-mouth that is retrievable and easily accessible? To rephrase, how much does the eWOM from the first version of theater release continue or sustain through the second version of DVD release?

So far, we know for sure that advertising effect always diminishes over time, and it will not be surprising if, by the time a movie is released on DVD, a consumer will not be able to recall the advertising of the movie. After all, the time lag between the opening of a movie in a theater and the same movie release on a DVD is averaging approximately 167 days. This leads to the hypothesis of,

H6. Advertising from the first version of box office sales has no effect on the weekly DVD rental sales when eWOM is present.

We also know that in the digital environment, by the time a movie on DVD is released, there is much more eWOM available to consumers than when it was first released in the theaters. Thus far there is no literature, to my knowledge, which attempts to measure the effect of the advertising and eWOM, or the effect of the advertising and word-of-mouth from the first version of theater release to the second version of DVD release. The accumulated quantitative and qualitative online ratings and evaluations for movies by fellow consumers can be viewed as increased information to help reduce risks for late adopters. In this view, the DVD renters are late adopters when compared to the early adopters, the theatergoers. The view that late adopters are less risk-tolerant than early adopters is found in the traditional innovation adoption literature (Rogers 1995).

Since experiential products (here, movies) are analogous to risky consumption (Hales and Shams 1991), the more eWOM information available will have more beneficial influence on the DVD renters' ability to alleviate their risk perceptions of the new product.

Therefore I hypothesize,

H7. eWOM accumulated from box office sales adds value to weekly DVD rental sales.

Chapter 5: Data⁸

The data in this dissertation are based on blockbuster movies in the U.S. in 2003. Although blockbuster movies have been defined by the industry as movies that generated more than \$100 million in box office gross, MPAA (2004) has recently reported blockbuster movies as movies grossing \$50 million or above in total box office sales. Therefore, this dissertation will use MPAA's (2004) recent report and include movies grossing \$50 million (to be exact, \$49 million) and above. For 2003, the \$50 million and above movies coincide with the top 50 grossing movies. The size of the data set in this dissertation is similar to that of Eliashberg and Shugan (1997), who used a database of 56 movies to measure film critics' effect on box office sales.

Blockbuster movies are selected in this dissertation in order to emphasize the effect of eWOM. This is because the sales of blockbuster movies have mostly been related to large advertising budgets but not to favorable word-of-mouth. A few examples of those movies that had clever marketing but unfavorable word-of-mouth are *The Hulk*, *The Matrix Revolution*, and *Dr. Seuss' the Cat in the Hat* (Menand 2005). In other words, the successful box office gross on these movies relied on advertising but did not rely on word-of-mouth. Therefore it is more robust to choose blockbuster movies to test the effect of eWOM than to choose movies that generated smaller box office gross with less advertising budget but relied on consumer word-of-mouth.

Movie-related business data have become widely available through multiple websites such as www.IMDb.com, www.boxofficemojo.com, www.thenumbers.com, and www.leesmovieinfo.com. Details of each movie's domestic U.S. box office weekly sales,

⁸ The style of this chapter follows that of the *Journal of Marketing* (e.g., Eliashberg and Shugan 1997).

total sales, advertising budgets, costs (negative costs or production costs), dates of theater releases, dates of DVD releases, DVD weekly rental sales, MPAA ratings, and weekly screens (theaters showing the featured films) were collected and cross-referenced from the above-mentioned publicly accessible websites.

Parallel to these business data, eWOM data that matched these top fifty box-office grossing films in 2003 were also collected from the Yahoo Movie website. Although there are multiple websites such as www.IMDb.com and www.Rottentomatoes.com where moviegoers gather to rate and either write or read reviews of a movie, many of them are either related to DVD sales (www.IMDb.com is owned by DVD retailer www.Amazon.com) or are built on intentional biased evaluations or opinions. For example, www.Rottentomatoes.com is particularly influential in panning movies (Grover 2004). The Yahoo website is ranked as the Web's most popular movie site by Nielsen/NetRatings in 2003 with 8.5 million unique visitors (Yahoo! Movies and Entertainment 2004).

Data for two versions for these 50 movies are collected: total box office gross, weekly box office sales and weekly DVD rental sales. Corresponding online word-of-mouth weekly data for each movie in each version were collected. For the box office version, data for the entire period during theater release were collected. For the DVD rental version, weekly rental revenues were collected for the period up to the week that the DVDs rentals were taken off the list. It is a common practice of a movie data website to report DVD weekly rental data up to a certain period when the movies lose their popularity, a concept similar to that of a music Billboard top seller chart.

This dissertation only uses ten weeks' sales and eWOM data from each version, an approach similar to the eight weeks in Eliashberg and Shugan (1997). In total, the data points include 50 movies with two versions of box office sales and DVD rentals, each ten weeks in length, two sets of eWOM (users' messages) corresponding to the ten weeks of each version, users' grades, users' votes, advertising budgets and other control variables such as production costs, screens, critics' evaluations, MPAA ratings, sequel and time lag between the two versions.

5.1 Dependent variables

Three dependent variables within two versions of a movie are measured: weekly box office sales, total box office gross and weekly DVD sales. A summary of the variables, description, measurement and source is listed in Table 2.

BOXTOTAL.⁹ This is the box office gross per movie collected in the domestic U.S. market. This is used to measure the hypothesized "endogenous growth" effect of users' word-of-mouth or eWOM that cumulatively adds value to total box office gross. This dependent variable has been used in Eliashberg and Shugan (1997).

BOXW₁₋₁₀. Ten weekly box office sales for 50 movies are collected. This is used to measure the incremental value of users' word-of-mouth or eWOM in time.

DVDW₁₋₁₀. Ten weekly DVD rental revenues for 50 movies are collected. These 50 movies correspond to the same movies collected for box office sales. At the time of this dissertation and to the best of my knowledge, there is no publication that investigates

⁹ This subheading follows the style of reporting for variables used in the *Journal of Marketing* and the *Journal of Marketing Research*. The rest of the paper will continue using this uppercase format for this and other variables. An example of such usage can be found in these two marketing journals.

DVD rental income within the context of advertising and of word-of-mouth or eWOM effect.

5.2 Independent variables

AD. Print and advertising or marketing costs for each movie were collected from multiple websites. The terminology in the film industry is print and advertising. It is defined as the cost of film prints and advertising expenditures (Moore 2000). One prior movie paper has used advertising budget as the most important independent variable affecting box office sales (Zufryden 1996). Other papers use advertising budgets as a control variable (e.g., Ravid and Basuroy 2004).

USERS_VOTES. This is the number of votes given to each movie by users on the Yahoo website. In the Yahoo website, each movie has its own webpage. This voting participation represents the empowerment of a consumer's own individual capital. The number of votes is a surrogate measurement of the value of individual capital.

USERS_GRADE. This is an aggregate grade given by many users to a movie on the Yahoo website. Typically, a user signs in with an email address to rate a movie and give grades for the story, acting, direction and visuals. In turn, Yahoo reports an aggregate grade of all consumers' ratings in each movie's main page. This grade is a surrogate measure of the value of instructional capital. The grades are translated to a numerical scale from 1,000 (C-) to 7,000 (A-), similar to Dellarocas et al. (2004).

MSGBFBOX. Users' messages are the messages posted in the area described as "Community: Message Board" of each movie in the Yahoo movie website. This is used to measure consumer-to-consumer interactive word-of-mouth activities or eWOM in this dissertation. The first measurement, message before box office (*MSGBFBOX*), represents

the number of messages up to the opening day of the movie in theaters. This is used to measure the influence of users' messages on the first week of box office sales.

MSGTOTAL. The second measurement of eWOM activities is the total number of messages generated up to the end of the theatrical release. This number encompasses all the messages before and during the box office release. This is used to measure the impact of users' messages on total box office gross sales.

MSGBOXW₁₋₉. The third measurement of eWOM activities is the number of weekly messages contributed by users during box office release. This is in fact the incremental number of messages from the previous week that affects the sales of the current week. The incremental approach is consistent with prior movie research (Elberse and Eliashberg 2003).

MSGDVDW₁₋₉. The fourth measurement of eWOM activities is the number of messages during the weekly DVD release (*MSGDVDW₁₋₉*). This is a cumulative number of messages carried over from the box office time period. The reason for choosing cumulative instead of incremental messages is because the conceptual framework of this dissertation is intended to measure the effect of eWOM continuously from one version to the next. For the first week of DVD release, *MSGTOTAL* is used. The timing of the release of DVDs coincides with theater closing. All the above users' messages captured in the virtual community are a surrogate measure of social capital.

5.3 Control variables¹⁰

Prior research has used MPAA ratings, sequel, production costs, Oscar and screens as control variables for movie box office sales (Basuroy et al. 2003; Elberse and

¹⁰ I follow the *Journal of Marketing* (Basuroy et al. 2003) and report the simple statistics for dummy variables here instead of reporting them in Chapter 7.

Eliashberg 2003; Ravid and Basuroy 2004; Zufryden 1996, 2000). This dissertation follows this tradition and collected these data for the 50 top grossing movies in 2003. Film critics' evaluations and time lag are also included as control variable.

COSTS. The production costs or negative costs of each movie are collected from various websites previously mentioned. Negative Cost is the cost of producing a motion picture which includes financing costs (Moore 2000). The average costs of making a movie were \$63.8 million in 2003 (MPAA 2004). The production costs are separate from the marketing costs or advertising budgets previously collected.

SCREENSW₁₋₁₀ / SCREENS_MAX. Two levels of the number of theaters are collected for this dissertation. First, *SCREENSW₁₋₁₀*, the weekly number of theaters per movie is collected. This is to synchronize with the dependent variable of weekly box office sales. Second, *SCREENS_MAX*, the maximum number of theaters per movie during its box office release time period is collected. This is for total box office sales measurement.

CRITICS. An aggregate grade provided by multiple critics on a movie is used. The Yahoo movie website collects multiple dimensions of grading from various critics and provides a single critics' grade. The grades are translated to a numerical scale from 1,000 (C-) to 7,000 (A-), similar to Dellarocas et al. (2004).

MPAA ratings - G, PG, PG13, RRATED, and NR.¹¹ The MPAA ratings are put in as dummy variables in the data set. NR (not rated) is set as the default. The current sample size includes 2 G-rated movies, 7 PG-rated movies, 24 PG13-rated movies, 15 R-rated movies and 2 unrated (NR) movies.

¹¹ The use and the descriptions of dummy variables for MPAA ratings in this paragraph follow the style of Ravid and Basuroy (2004) in *the Journal of Business*.

SEQUEL. The control variable of sequel has been used in previous studies and a successful sequel was found to increase profitability of a movie (Ravid 1999). Two remakes are included in the sequel. Remakes are new versions of successful movies that were made quite a while ago. They are *Cheaper by the Dozen* which was previously released in the 1950s, and *The Texas Chainsaw Massacre* previously made in the 1980s. Together, there are 14 films classified as a “sequel” in the sample of this dissertation. Sequels are given the value of one and non-sequels the value of zero.¹²

OSCAR. This dissertation measures only the actual winning of an Oscar award. Previous research has included both nomination and actual award for the film (e.g., Basuroy and Ravid 2003; Ravid and Basuroy 2004). This independent variable is used to measure its effect on total box office sales and DVD rental sales. This independent variable is not included in the weekly box office regressions because the timing of the Oscar nomination or award was rarely announced when the film first opened or within the first ten weeks of the film’s release. Also, Oscar awards were given through a polling system by both Hollywood and regular consumers, which almost make it impossible time-wise to have a film nominated during its first ten weeks of release. There simply were not enough consumers who could have seen the films to poll for an Oscar. In this current data set, there are 7 films that were awarded an Oscar and they were coded as one; and the non-winners were coded as zero.

TIMELAG. This variable describes the difference in the number of days between a movie’s first release at the box office and its subsequent release in DVD format. This time lag variable is used in the DVD weekly rental revenue regression.

¹² This and subsequent coding for dummy variables follow the style used in Ravid and Basuroy (2004).

Chapter 6: Research Design

This chapter explains how the hypothesized relationship of eWOM to advertising and new product sales is going to be measured in this dissertation. The hypotheses in Chapter 4 were developed around the theme of the effect of eWOM on (1) its added value on advertising on movie sales, and (2) its increasing and sustained relationship with movie sales over time. First, the added value of eWOM on advertising can be measured by comparing sales with and without eWOM in total box office sales. Second, the eWOM relationship with advertising and sales over time can be measured via a longitudinal eWOM effect over ten weeks of sales across two versions of box office sales and DVD rental revenues.

Since there are three kinds of eWOM (individual capital, instructional capital and social capital) identified with the Endogenous Growth Theory in this dissertation, and two versions (box office sales and DVD rentals) of the new product, the design of this research is a matrix of models with 2 versions x 3 eWOM measurements as depicted in Table 3 (see Table 3). The matrix of models becomes 3 (dependent variables) x 4 (independent variables) because the first version box office (dependent variable) is split into two levels – one is total box office gross and one is weekly box office sales, in order to measure both the total and the time-related eWOM effects. For the independent variables, the advertising variable is added to the three eWOM as a base model in order to compare the added value of eWOM above advertising alone. Model A is a base model that includes only advertising without eWOM in measuring the advertising effect on movie sales. Model B includes both advertising and users' votes (individual capital) in measuring their effects on movie sales. Model C includes both advertising and users'

grades (instructional capital) in measuring their effects on movie sales. Model D includes both advertising and messages (social capital) in measuring their effects on movie sales.

For total box office sales, multiple regressions are used with a separate regression for each model. Three types of eWOM are measured in Models B, C and D. For box office weekly sales, multiple regressions are used with a separate regression for each week. Model D is used. Ideally all three types of eWOM are measured. However, the data of users' votes and users' grade are cross-sectional data that cannot be captured weekly, and therefore they do not synchronize with the dependent variable of box office weekly sales. For DVD rental sales, multiple regressions are used with a separate regression for each week. Again, only Model D is used. This is because the cross-sectional data of users' votes and users' grade do not synchronize with the dependent variable of DVD weekly rental sales. In the multiple regressions, other than the major independent variables depicted in Table 3, control variables previously mentioned in detail in Chapter 5 are also included. The multiple regressions used here to measure box office sales are consistent with the approach used by prior research conducted by Eliashberg and Shugan (1997) and Basuroy et al. (2003).

The hypotheses and their expected cause-effect directional relationship between dependent and independent variables are categorized in Table 3. Hypotheses 1 to 3 are about the effects of three dimensions of eWOM, namely individual capital, instructional capital and social capital, and each of their added values to advertising in total movie box office sales. The measurement of these added values of eWOM is to find out if the variables *USERS_VOTES* in Model B, *USERS_GRADE* in Model C, and *MSGTOTAL* in Model D become statistically significant when they are added to the multiple regressions

with advertising only (Model A).¹³ Hypothesis 4 is about the diminishing long-term advertising effect on weekly box office sales when eWOM is present. The decreasing long-term effect is measured by regressing the weekly advertising coefficients over 10 weeks in order to statistically test its decreasing effect over time. Hypothesis 5 is about the positive and increasing long-term effects of eWOM of users' messages and their added value to advertising over weekly box office sales. The increasing long-term effect is measured by regressing the weekly eWOM coefficients over 10 weeks in order to statistically test its increasing effect over time. Hypothesis 6 is about advertising from the box office release period having no effect on DVD rental revenues. Hypothesis 7 is about the positive long-term effects of eWOM and its added value to advertising over weekly DVD rental revenues.

This dissertation makes the first attempt to measure the diminishing advertising effect and the increasing eWOM's effect over multiple weeks of box office sales and DVD rental sales in movie research. Zufryden (1996; 2000) did not measure the effects of advertising and word-of-mouth over time when they coexist in the same time frame. Basuroy et al. (2003) and Eliashberg and Shugan (1997) measured film critics' influence on box office sales over eight weeks of box office sales, but they did not measure the increasing or decreasing effect of film critics on box office sales over time.

¹³ Dissertation committee member Professor El Barmi has suggested the use of the partial F-test in this dissertation instead of reporting the t-value of each added variable reported in an earlier version of this dissertation. However, in the current measurement, the t-value of the added variable is the square root of the F-value in the partial F-test. Thanks to Professor Jimmy Ye of Baruch College and Professor Francis Yue of City University of Hong Kong clarifying that the use of the partial F-test is identical as the t-test in this measurement. For further clarification, I have calculated the partial F-test by hand, and also used the SAS "test hypotheses" command to obtain the F-values. The F-values obtained from both hand calculation and the SAS "test hypotheses" command are the squares of the t-value obtained for each variable added in the multiple regressions reported earlier. The *p*-values obtained are identical for the partial F-test, the SAS "test hypotheses", and from the t-value generated by adding each variable in the multiple regressions. Therefore in Chapter 7, I will only be reporting t-value, an approach consistent with previous multiple regression-based movie-related papers in *the Journal of Marketing* (e.g., Eliashberg and Shugan 1997) and *the Journal of Advertising Research* (e.g., Zufryden 1996).

This dissertation included the results of the double log models in an earlier version but does not include them here.¹⁴ This is because a multiplicative double-log model is not appropriate for the theoretical argument of this dissertation. The goal of this dissertation has been to find out how each dimension of eWOM representing the three types of capital within the Endogenous Growth Theory will add different values to movie sales. Therefore, it is not within the scope of this dissertation to measure the interactive effects of variables offered by a multiplicative double-log method.

This dissertation also reported, in an earlier version, other results from the measurements of advertising and eWOM effects on movie sales when the movies are separated by (1) sequel vs. non-sequel, (2) R-rated vs. non-R-rated, (3) extreme vs. mediocre users' grade, and (4) extreme vs. mediocre critics' grade. Also a comparison of the results of advertising and users' grade model vs. advertising and critics' grade model was reported. These results, however, derived from control variables are peripheral. They are not central to the main purpose of this dissertation to measure the impact of the empowerment of consumer eWOM to movie sales. Therefore, the results are not reported here.¹⁵

¹⁴ In an earlier draft of this dissertation, the results of double log models were included. The results were included during the final defense of this dissertation. These results are not included in here because they do not have any added-value to the results of the non-log models except to show that I have actually performed these tests which in this case were already demonstrated in earlier drafts and during the final defense.

¹⁵ The removal of these results are recommended and approved by the dissertation committee.

Chapter 7: Summary Statistics and Results¹⁶

This chapter begins with the report of summary statistics and the correlations of variables in Tables 4 to 7. Regression results of total box office sales are reported in Table 8. Regression results of weekly box office sales and weekly DVD rental sales are reported in Table 9. The results of the increasing effect of eWOM over time are reported in Table 10 and depicted in Figure 3, and the results of the diminishing effect of advertising over time are reported in Table 11.

7.1 Summary statistics

The movie data I have collected for this dissertation included the entire length of box office release until the movies are no longer showing in theaters. For the DVD version, I have also collected data until the DVD rental revenues have dropped off the top rental chart. In this dissertation, however, I present only one set of analyses for movies that lasted in theaters at least ten weeks and lasted in DVD rental ten weeks. Table 4 reports the summary statistics for box office total sales. Table 5 reports summary statistics for weekly box office sales and Table 6 reports summary statistics for DVD rental.

7.1.1. Summary statistics for total and weekly box office sales

Table 4 describes the summary statistics for the top-grossing 50 movies released in 2003 (see Table 4). The film with the highest box office total sales (*BOXTOTAL*) in

¹⁶ The reporting style of this chapter includes the sequence of reporting, the use of subtitles, the report of numbers, summary statistics, regression results, significance level, t-statistics, p-value, coefficients and standardized coefficient follows that of movie studies published in *the Journal of Marketing* (e.g., Basuroy et al. 2003), *Marketing Science* (e.g., Elberse and Elaishberg 2003) and *the Journal of Business* (e.g., Ravid and Basuroy 2004).

this sample is *Lord of the Rings – Return of the King* (\$377.02 million). The film that has the smallest box office total sales in the current data set was *Big Fish* (\$49 million).

There are three films that spent the highest advertising budgets (*AD*) of \$50 million (*Lord of the Rings*, *The Matrix Reloaded*, and *X2*), and one film with the lowest advertising budget of \$15 million (*Mystic River*). The production costs (*COSTS*) were highest for *Terminator 3* (\$170 million) and the lowest for *Texas Chainsaw Massacre* (\$9.5 million). *X2* commanded the highest maximum screen (*SCREENS_MAX*) with an exposure of 3,749 theaters and *Mystic River* the lowest maximum screen exposure of 1,581 theaters.

Critics gave five films an aggregate grade (*CRITICS*) of “A-” (the grade is translated into a scale of 1,000 to 7,000 with “C-” as 1,000 and “A-” as 7,000) and four films an aggregate grade of “C”. Users graded (*USERS_GRADE*) four films “A-” and one film “C-”. *Lord of the Rings* took in the most number of votes (*USERS_VOTES*) of 102,341 to evaluate the movie, and *Kangaroo Jack* took in the least number of votes of 868. *Lord of the Rings* generated the most consumers’ discussions (*MSGTOTAL*), with 18,250 messages, and *Daddy Day Care* generated the least with 76 messages during the entire period prior to box office release until the end of theater showing.

The time lag (*TIMELAG*) between box office release and the DVD release averages at 167 days, with *Elf* having the longest time lag between the two product versions at 375 days and *Mona Lisa Smile* the shortest time lag of 81 days. The summary statistics of the dummy variables have been described previously in Chapter 5.¹⁷

¹⁷ This dissertation follows the *Journal of Marketing* (e.g. Basuroy et al. 2003) to report summary statistics of dummy variables in the data section, and therefore will not be repeated in this chapter.

Table 5 describes the first ten weeks of box office release (see Table 5).¹⁸ Four films together dominated the highest weekly box office sales ($BOXW_{1-10}$). *The Matrix Reloaded* (the highest 1st week at \$134.28 million), *Lord of the Rings* (the highest 2nd week at \$98.16 million and the highest 3rd week at \$68.15 million), *Finding Nemo* (the highest 4th, 5th, 6th, 7th, 8th and the 10th weeks), and *The Pirates of the Caribbean* (the highest 9th week). While most box office sales show the highest revenue in the first few weeks of release and much less revenue in later weeks, some movies such as *Big Fish* and *Mystic River* have a bell-shaped curve with the peak sales appearing only many weeks after opening and soon after Oscar nominations.

Table 5 also describes the corresponding number of screens ($SCREENSW_{1-10}$) during the first ten weeks of box office release. For the weekly screens, *X2* opened with the highest number of screens in the 1st and 2nd week (3,741 and 3,749 screens separately). *Lord of the Rings* ranked highest in the number of screens in the 3rd and 4th week of opening (3,703 and 3,532 screens). *Finding Nemo* took over the 5th through the 8th week (3,333, 2,902, 2,643, 2,480), and *The Pirates of the Caribbean* for the 9th and 10th week (2,203, 2,029).

Lastly, Table 5 describes the weekly number of messages ($MSGBFBOX$, $MSGBOXW_{1-9}$) from the Yahoo message board during theater release. Weekly messages of previous week are to affect the box office sales of the following week. For the opening week, the messages accumulated up to the week before opening or the messages before box office ($MSGBFBOX$) are measured. *Lord of the Rings* generated the most messages

¹⁸ Data for the entire length of box office release for each movie were collected but only the first ten weeks were used for analysis. Some movies have more weeks of release than others. In the collected data set, the longest box office release was 31 weeks (*Kill Bill No. 1*).

before opening. Three movies together generated the most users' messages during the weekly theater release in this data set. *The Matrix Reloaded* generated the most messages in the 1st (3,189), 2nd (2,473), 5th (663), 9th (313) and 10th (289) week. *Lord of the Rings* had the highest number of messages in the 3rd (1,079), 4th (1951) and 8th (292) week. *The Pirates of the Caribbean* had the most messages in the 6th (681) and 7th (711) week during theater release.

7.1.2 Summary statistics for weekly DVD rental

Table 6 describes the DVD rental revenues ($DVDW_{1-10}$) and their corresponding number of messages from the Yahoo message board during those weeks (see Table 6). DVD weekly sales and related message board activities, however, paint a rather different picture than the data for box office weekly sales. There is no one particular film that dominates the DVD rental revenues over these weeks. The highest DVD rental revenue for the 1st week went to *S.W.A.T.* (\$13.58 million); the same film grossed \$37 million in the 1st week of its theater release. The highest DVD rental revenue for the 2nd and 6th week went to *Elf* (\$11.11 million and \$3.75 million), the 3rd week to *The League of Extraordinary Gentlemen* (\$7.04 million) which was one of the movies voted with the lowest grade by critics (C- or 1,000). The 4th and 5th week went to *The Pirates of the Caribbean*. The 7th week went to *Mystic River*, the 8th was *The Italian Job*, the 9th *Anger Management*, and the 10th *Daddy Day Care*, again a movie rated one of the lowest by critics (C- or 1,000). Other than *The Pirates of the Caribbean*, this list of movies does not include the most popular movies such as *Finding Nemo*, *Lord of the Rings* and *The Matrix Reloaded* as seen in the box office total or weekly data.

For users' messages ($MSGDVDW_{1-9}$) in DVD rental, *Lord of the Rings* remains the movie with the highest number of messages for all the weeks during DVD rental. *Daddy Day Care* has the smallest number of messages for all the weeks during DVD rental. For the first week of DVD rental, the corresponding users' messages affecting the week are the messages accumulated before DVD release ($MSGTOTAL$).

7.2. Variables and correlations

Table 7 reports the correlation matrix for the key variables (see Table 7). The bold-faced numbers in parentheses in Table 7 represent statistically significant coefficients whose values are larger than 0.50 with p -value $< .0001$. Advertising (AD) is significantly and positively correlated ($r = .62, p < .0001$) with production costs ($COSTS$). This reflects movie studios' spending large advertising amounts to turn a high cost movie into a blockbuster. Advertising (AD) is also significantly and positively correlated ($r = .79, p < .0001$) with the maximum number of screens during theater release ($SCREENS_MAX$). This reflects movie studios blanketing as many movie theaters as possible with their blockbuster candidates. Because of production costs ($COSTS$) and the maximum number of screens ($SCREENS_MAX$) are correlated statistically significantly to advertising (AD), it has been recommended by researchers that these three variables should not be loaded together in the same multiple regression. This view is supported by Ravid and Basuroy (2004, S177) that advertising and production costs are mutually and positively correlated and cannot be treated as separate independent variables in a multiple regression. Eliashberg and Shugan (1997, p.74) did not load independent variables with statistically significant correlations in the same regression in order to avoid severe multicollinearity problems. Because of the reasons explained above, the variables of

production costs (*COSTS*) and the variable of the number of maximum screens (*SCREENS_MAX*) will not be included in the models.¹⁹

Table 7 also reports the correlation, statistically significant ($r = .58, p < .0001$), between film critics' grade (*CRITICS*) and users' grade (*USERS_GRADE*). To avoid multicollinearity problem, critics' grade (*CRITICS*) will not be included in the total box office sales. This is because one of the models (Model C) in total box office sales includes Users' Grade (*USERS_GRADE*) as a major independent variable. However, film critics' grade (*CRITICS*) will be included in the box office weekly and DVD weekly regressions because users' grade (*USERS_GRADE*) is not included in these weekly regressions as a major independent variable.

Table 7 reports that users' word-of-mouth in the form of messages (*MSGTOTAL*) is correlated statistically significantly ($r = .66, p < .0001$) to the number of voters who evaluated the movies (*USERS_VOTES*). This does not create a problem in this dissertation since these two variables were intended to be loaded into separate regressions in total box office sales as discussed in Chapter 6 and has been described in Table 3.²⁰

7.3 Box office regression results

The success of a Hollywood movie in domestic U.S. box office sales is often regarded as a benchmark for its subsequent success in the international theater release and secondary markets. Although domestic U.S. box office sales do not necessarily

¹⁹ I have discussed the removal of the *COSTS* and *SCREENS* variables in detail with the dissertation Chair Professor Hirokazu Takada on numerous occasions including email correspondence prior to the dissertation defense. He fully concurred. I am also thankful to Professor Bharat Sarath of Baruch College for the discussion of "taking the con out of econometrics" and how many variables should be included in my model, and he concluded that it is the contribution of my dissertation to address the mis-specification of prior research.

²⁰ A report of a summary of statistical procedures has been moved to Appendix A.

generate the largest portion of the income of a movie's entire product life, they nevertheless have received much attention from marketers, mass media coverage and academic research. In particular, first-week or opening box office sales have been a *de facto* indicator for a movie's having "legs to run" for subsequent weeks' sales.

The importance of total sales of theater release in the U.S. leads this dissertation to begin measuring the results of eWOM impact on the entire box office version. At the same time, this dissertation measures the impact of eWOM on weekly box office sales in order to report the increasing impact of eWOM over time. The weekly measurement and results in a sense address the effect of eWOM on early versus late adopters in the first version of a movie's release in theaters.

7.3.1. eWOM in total sales

H₁-H₃ address the value that consumers' online word-of-mouth or eWOM adds to advertising during the entire period of theater release expressed in the total box office gross sales. These values were represented in three types of eWOM activities to include online users' votes, users' aggregate grade and users' messages in movie websites. To test these hypotheses, I ran four separate multiple regressions coded as Model A to Model D described previously in Chapter 6 (see Table 3). The dependent variable for all regressions is total box office sales (*BOXTOTAL*). The major independent variable for Model A is advertising (*AD*). The major independent variable for Model B is advertising (*AD*) and users' votes (*USERS_VOTES*). The major independent variable for Model C is advertising (*AD*) and users' grade (*USERS_GRADE*). The major independent variable for Model D is advertising (*AD*) and users' messages (*MSGTOTAL*). The control variables shared by all regressions are Oscar award (*OSCAR*), sequel (*SEQUEL*), and MPAA

ratings (*G*, *PG*, *PG13*, *RRATED*). Model A is a base model to compare the added value of each of the eWOM variables in Models B to D.

The results of the four separate multiple regressions are reported in Tables 8 (see Table 8). The coefficient of advertising (*AD*) in Model A is statistically significant (at the .01 level). The Adjusted R^2 of Model A is .65. In Model B, the coefficient of advertising (*AD*) is significant (at the .01 level). In Model C, the coefficient of advertising (*AD*) is significant (at the .01 level). In Model D, the coefficient of advertising (*AD*) is significant (at the .01 level). Advertising is statistically significant in all models with or without eWOM.

In Model B to D, the coefficients of the users' votes (*USERS_VOTES*), users' grade (*USERS_GRADE*) and users' messages (*MSGTOTAL*) are all statistically significant (at the .01 level). H_1 , H_2 , and H_3 are supported. Each eWOM variable has statistically significant impact on total box office sales. The Adjusted R^2 of Models B to D are larger than the Adjusted R^2 of .65 of Model A, suggesting an enhanced explanatory power of each of the eWOM variables added to advertising. The Adjusted R^2 of Model B is .76. The Adjusted R^2 of Model C is .74. The Adjusted R^2 of Model D is .74. eWOM in the form of users' votes (*USERS_VOTES*), users' grade (*USERS_GRADE*) and users' messages (*MSGTOTAL*) add 9% to 11% more explanation to total box office sales than advertising alone.

7.3.2 eWOM in weekly sales

The theoretical foundation of communications theory in new product adoption discussed in Chapter 3 coupled with the movie industry background described in Chapter 2 have converged to the opinion that word-of-mouth takes place and is effective in the

later part but not at the beginning of a new product's life. In other words, advertising is to affect the sales at the beginning of a new product's life and word-of-mouth is to affect the sales at a later stage of a new product's life. This dissertation argues for the power of eWOM and tests its effect on the earlier and the later stage of a new product's life.

H₅ predicts that eWOM's effect is positive and will significantly increase over time in weekly box office sales. To test this hypothesis, I first follow the Basuroy et al. (2003) model by running separate weekly box office regressions for each of the ten weeks.²¹ Once the coefficients, messages before box office (*MSGBFBOX*) for the 1st week and weekly messages (*MSGBOX₁₋₉*) for the 2nd through the 10th week, for each week's box office sales were estimated, the coefficient estimates of eWOM were regressed over time.

7.3.2.1 eWOM's positive impact

The results of the impact of users' messages before box office (*MSGBFBOX*) and users' weekly messages (*MSGBOXW₁₋₉*) on weekly box office sales (*BOXW₁₋₁₀*) are reported in Table 9. The coefficient estimates of users' messages are positive nine out of the ten weeks. H₅ of eWOM's positive effect on weekly box office sales is supported. Users' messages are statistically significant in the 1st week (at the .01 level), 5th and 6th week (at the .05 level), and 7th to 10th week (at the .01 level). The first week of users' messages being statistically significant is contrary to previous belief that word-of-mouth only affects the later stage of a new product's life. The standardized coefficient estimates of eWOM are plotted over ten weeks in Figure 3. Figure 3 clearly shows the positive impact of eWOM on weekly box office sales.

²¹ The variable weekly screens (*SCREENSW₁₋₁₀*) is not included because of its chicken-and-egg relationship with box office sales compounded by a complicated managerial decision (Krider et al. forthcoming).

7.3.2.2 eWOM's increasing impact over time

In the Internet age, this dissertation has conceptualized that technology-enabled word-of-mouth or eWOM facilitates human capital growth that empowers consumers to add value to the marketing system. As such, H₅ predicts that eWOM will have an increasing effect over weekly box office sales. To test such effect, the coefficient estimates of users' weekly messages are regressed over time. The results reported in Table 10 support H₅. Weekly messages (*MSGBFBOX*, *MSGBOXW₁₋₉*) increase statistically significantly (at the .01 level) over time with the positive coefficient of time at .04. The increase of eWOM effect over time means that the later the week of box office sales the larger the impact of eWOM. In other words, the later the moviegoers, the more dependent they are on the human capital generated by eWOM that influence their choices of movies.

7.3.3 Advertising in weekly sales

This dissertation shows that eWOM adds value to advertising in new movie sales. The value that eWOM adds to advertising expressed in the empowerment of consumer human capital may affect the long-term effect of advertising. H₄ predicts that the advertising effect is positive but diminishes over weekly box office sales in the presence of eWOM. In the following I will first report the results of advertising positive impact, and then the results of advertising diminishing effect over time.

Within the first ten weeks of box office release, H₄ predicts advertising has positive impact on sales. The coefficients of advertising (*AD*) are found to be positive in all the ten weeks. The positive impact is depicted in Figure 3. The coefficients of advertising (*AD*) are statistically significant (at the .01 level) for the 1st to the 4th week.

H₄ also predicts advertising has diminishing impact on box office sales over time when eWOM is present. To test the diminishing effect, the coefficient estimates of advertising are regressed over time. The results reported in Table 11 support H₄ (see Table 11). The advertising effect diminishes statistically significantly (at the .01 level) over time with the negative coefficient of time at -.20.

7.4. DVD regression results

The findings of DVD rental sales in this dissertation are important because (1) the secondary market of Hollywood movies released in DVDs have been expanding, and (2) the studios have not been able to understand the demand of DVDs (Marr 2005). This dissertation predicts that eWOM generated during theater release will have a long-term sustained influence over DVD rental sales. But advertising promoted during theater release will have no effect on DVD rental sales. To test these hypotheses, the major independent variables for the multiple regressions are advertising (*AD*) and users' weekly messages (*MSGTOTAL*, *MSGDVDW₁₋₉*). The control variables shared by all regressions are Oscar (*OSCAR*), sequel (*SEQUEL*), MPAA ratings (*G*, *PG*, *PG13*, *RRATED*) and time lag (*TIMELAG*). Time lag (*TIMELAG*) and Oscar (*OSCAR*) are variables only included in DVD rental sales but not in box office sales.

7.4.1 Advertising effect

H₆ predicts that advertising budgets spent during box office release will have no effect on DVD rental revenues. Table 9 reports the coefficient of advertising (*AD*) is statistically significant in the 1st week (at the .01 level), 2nd week (at the .01 level), and the 4th week (at the .05 level). The coefficient estimates of these weeks are positive. H₆ is

therefore not supported. In other words, advertising generated during box office period has some remaining effects, three out of ten weeks, on DVD rental sales.

7.4.2 eWOM added-value

As eWOM has added value to movie sales in their first version in theater release, this dissertation expects the widely available and easily accessible eWOM to have a sustained influence on movies in their second version, DVD rental sales. H_7 predicts that eWOM from box office sales will continue to have a positive impact on DVD rental sales. The results are reported in Tables 9 (see Table 9). The coefficients of users' message (MSG_{TOTAL} and $MSG_{DVDW_{1-9}}$) are statistically significant in the 2nd week (at the .01 level), 3rd week (at the .01 level), 4th week (at the .05 level), 6th week (at the .01 level) and the 9th week (at the .05 level) of DVD rental sales. However, the coefficients are negative. H_{11} is therefore not supported.

It is puzzling that the eWOM in the form of users' messages having a negative statistically significant impact on DVD rental sales. This means that the movies that are most discussed in a virtual community during theater release will have an opposite effect on DVD rental sales. For example, the movies that have the most messages such as *The Lord of the Rings*, *The Matrix* and *Freddy vs. Jason* will have lower DVD rental sales when compared to movies that have few messages such as *Anger Management* or *The Italian Job*. One reason that this could happen is because the most discussed movies from box office are also the same movies that most consumers have already seen in theaters. It is unlikely then for consumers to rent them when these movies become available in DVDs.

Chapter 8: Discussion

This dissertation has demonstrated the utility of online consumer-to-consumer word-of-mouth and the value it adds to advertising of a new product. A conceptual framework that includes advertising and consumers' online word-of-mouth or eWOM has been proposed and tested for their impacts on total box-office sales, weekly box office sales and DVD rental revenues. A summary of the hypotheses and empirical results are listed in Table 12 (see Table 12). I will first summarize the results of eWOM and then the results of advertising on new product adoption. The hypotheses (H₁-H₃ and H₅) for eWOM adding value to box office sales with increasing impact found unanimous support. The hypotheses (H₇) for eWOM adding value to DVD rental sales did not find support. The hypothesis (H₄) for advertising to have positive but decreasing effect in weekly box office sales was supported. The hypothesis (H₆) for advertising to have no effect on DVD rental sales was not supported.

Three kinds of human capital growth are tested for their impact on the sales of a new product in different versions. All of them are shown to add value beyond advertising to the total sales of a new product. Individual capital in the form of users' votes has a positive impact on total box office sales. Instructional capital in the form of users' grade adds value to total box office sales. Social capital expressed in users' messages is sustained in the first version of movie sales and has an increasing impact over time on box office sales. It, however, has less influence on DVD rental sales. This seems to suggest that the two versions of a new product could be separated by two different social groups.

In the following, I will begin discussing the results as to how each of the three human capitals adds value to movie sales. I then discuss each capital generated by eWOM and its relationship to advertising.

8.1 Individual capital

Individual capital suggests that the democratic voting process will empower consumers and add value to marketing systems. The number of users' votes was found to add value to advertising in total box office sales. H_1 is statistically supported. The inclusion of consumers' individual capital adds 11% more explanation to total box office sales than when it is not included. The inclusion of users' votes to advertising explains more of the total theater sales than when only the advertising effect is measured. Users' votes represent a democratic process which empowers each individual and therefore the higher the number of votes for a movie, the larger the representation of individual capital in that movie.

Consumers voting on movies are similar to that of the democratic political voting process. Applying political analogy to the understanding of marketing is not new given the fact that marketing communications and related persuasion theories were born out of political communication (Katz and Lazarsfeld 1955). The individual capital captured in this dissertation is not far from what Sawhney and Kotler (2001) are labeling the new era of consumer power in the Internet age as "information democracy".

Consumers' individual capital growth in the digital age implies consumers are voluntarily voicing their own opinions and at the same time they expect to be heard. This empowerment of consumers has the potential of a large-scale democratic movement similar to that of a political movement. Consumers empowered and connected through

Internet technologies can participate and join together *en masse* to possibly overthrow firms who are dictatorial and are not listening to consumers. Online ratings being one of the Americans' favorite past time is indicative of the fact that consumers are looking to participate within the marketing process and be a part of the marketing communication system. Consumers in the digital economy are no longer willing to be passively influenced by one-way mass-media based advertising messages.

8.2 Instructional capital

Instructional capital suggests that a knowledge exchange in the form of a knowledge bank that accumulates evaluations deposited by a large group of consumers adds value to the market system. The empirical findings show that the aggregate users' grade given to a particular movie adds value to total box office sales. H₂ is supported. The inclusion of eWOM in the form of instructional capital adds 9% more explanation to the total box office sales than when it is not included. This instructional capital expression enabled by Internet-based online reputation systems adds a new dimension to movie evaluation which traditionally was believed to be dominated by positive and negative reviews by film critics (e.g. Eliashberg and Shugan 1997; Basuroy et al. 2003). The information valence of positive and negative comments by a handful of film critics is now replaced by a large scale consumer feedback system that measures multi-dimensional evaluations voluntarily provided by moviegoers. This large scale feedback system represents the knowledge power of the consumers *in toto*.

Consumers' instructional capital growth implies the individual consumer no longer has to depend on any single source of information. Consumers can access multiple opinions from various sources stored in the knowledge bank. At the same time,

consumers can use the knowledge bank to check on the accuracies of information and opinions sent by firms. The empowerment of this instructional capital growth means that the knowledge accumulated by consumers may exceed that of the firms' own knowledge. This capital growth should be included as part of the co-creation marketing process (Prahalad 2004).

It will be interesting to deepen understanding of how instructional capital may sustain and affect product versions. The sustainability of instructional capital is likely to extend the total life of a product given that the nature of the Internet-based knowledge bank is perpetual and makes peer-consumers' evaluations accessible without any time constraints. However, bad evaluations kept in the knowledge bank may shorten the total life of a product. The remedy in such case is to reinvent the product and give it a new version. One possibility is that the proliferation of consumers' knowledge of a new product at the beginning of its first version may propel new product diffusion faster than before and in turn shorten the life of a new product. Furthermore, the cumulative consumer knowledge may push for the simultaneous launch of multiple versions of a new product with different versions of a new product overlapping and possibly cannibalizing each other in the digital economy.

8.3 Social capital

Social capital suggests that frequent reciprocities or interactions among people will increase social trust, empower consumers and add value to the market systems. The number of users' messages was found to add value to advertising in total box office sales. H_3 is statistically supported. The addition of consumers' social capital adds 9% more explanation to the total box office sales than when it is not included. The number of

users' messages was also found to have a positive and an increasing impact on weekly box office sales. H₅ is statistically supported. This impact, however, does not sustain to the second product version in DVD rental sales. H₇ was not supported. Social capital empowers consumers as a group. This group, however, might not be as inclusive as previously thought. In other words, the group that discusses about theater releases of movies may not be representative of the group that discusses or watches DVDs. The finding that users' messages before a new movie launch statistically significantly affect the first week of box office sales is a rather interesting result. This may indicate a new concept that eWOM can be used as a predictor of first-week box office sales similar to that of advertising. In other words, word-of-mouth is not restricted to affect only a later stage of a new products' life as previously thought.

8.4 Advertising effect

Conventional wisdom suggests that advertising effect diminishes over time. Advertising was found to statistically significantly impact the first four weeks of box office sales. H₄ is supported. However, advertising budget spent during box office version is also found to statistically significantly affect the 1st, 2nd and 4th week of DVD rental sales. This finding was contrary to H₆ that hypothesized advertising from box office version will have no effect on the DVD version. H₆ is therefore not supported. It is surprising to find a sustained effect of advertising promoted during box office sales on DVD rental sales. This could be because DVD rental stores are spending a similarly proportional amount of advertising dollars on new releases of DVDs as studios did on theater release.

Chapter 9: Conclusion

This dissertation is the first to measure human capital expressed in three kinds of consumers' online feedback as the *value* consumers are adding to multiple versions of new product sales. In measuring the composite human capital, I show the empowerment of consumers through their individual capital growth, instructional capital growth and social capital growth measured in their participation in the online voting, ratings and generating messages of movies, which contributes to the explanation of movie sales. This final chapter is organized as follows. I will begin with the theoretical and empirical contributions of this dissertation, the relevance of the findings and their implications to managers, and then close the chapter with the limitations of this pioneer work and with future research opportunities.

9.1 Contributions

This dissertation offers several contributions. First, it introduces the Endogenous Growth Theory from economics to view consumer online interactions as human capital growth that adds *value* to the marketing system. Human capital or intellectual capital has been used in organizational studies to evaluate workers' productivity, but in marketing, consumers have rarely been seen as the ones who generate intangible intellectual capital to add value to the marketing systems. The empirical results of this dissertation show that technology-enabled interactive consumers' evaluations can be counted as human capital contributing to the marketing system, similar to how technology has enabled workers to increase human capital and efficiency in an organization (Brynjolfsson and Hitt forthcoming).

Second, the advertising and eWOM conceptual framework extends and expands previous marketing and interpersonal communications literature of new product adoption by incorporating *measurable* consumer word-of-mouth with advertising across multiple versions of new product sales. There is an urgent need for movie research to address the recent relationship between advertising and online word-of-mouth (Elberse et al. forthcoming). Third, the empirical results of this dissertation add new findings to word-of-mouth literature to demonstrate increasing and sustained effects of eWOM that were not tested in prior research studies. These results not only solidify prior theoretical assumptions about word-of-mouth but also clarify how online eWOM can possibly have more effect in the earlier stages of the first version of a new product than previously thought.

Fourth, this dissertation is the first research in marketing that separates the online consumer-to-consumer communications into three formats that represent three separate forms of human capital: individual capital, instructional capital and social capital. Separate measurements for these different kinds of intellectual or human capital are important in order to understand the reality of the many facets of consumer-to-consumer online communications.

Fifth, this dissertation demonstrates an effective use of widely available web-based data. The accessibility of web-based data that reflect consumers' opinions is so easy that market researchers have been advocating their use in order to understand consumers better (e.g. Kozinets 2002).

9.2 Managerial implications

This study has extended previous advertising research by adding consumer word-of-mouth explicitly to the analysis of new movie sales. Given that the new Internet medium cannibalizes consumer attention in the conversion of consumer behavior from passively watching TV to, for example, proactively voting for the “American Idol” contestants or posting opinions online, marketers need to convert their advertising dollars from the traditional one-way 30 second TV spot to a two-way interactive “conversation” with their customers (Elliott 2005).

This dissertation implies the importance for marketers to recognize consumers as co-creators within the marketing communication process, and to use online reputation systems to measure the impact or additive effect of consumer aggregate word-of-mouth. This dissertation did not suggest that advertising is failing or dead, as advocated by Ries and Ries (2002) or Zyman (2002), they do suggest that the incorporation of consumer word-of-mouth data to the advertising formula can explain new product sales more definitively. Large firms such as General Electric have already strategically included online consumers’ eWOM to supplement traditional mass-media based advertising (Elliott 2005).

The voice of the consumer is undeniably important since we know by now that poor reviews from a consumer website such as www.rottentomatoes.com will result in a major damaging effect to opening week sales. Perhaps, the most interesting results of this study concerns practical questions: How should marketers include eWOM in their communications to consumers? Should marketers put the consumers’ eWOM on their own websites? Sussan (2004) in an experiment found that consumer eWOM published on

a firm's website is statistically significantly less effective in persuading new product adopters than consumer eWOM published on an independent third-party website.

Because of the proliferation of eWOM in which a consumer's opinions are published and broadcast immediately after a movie's opening day, one possibility is that knowledge of a new movie will be diffused very quickly and lead to a shorter life of the theater version. Should marketers then launch multiple versions of a movie at the same time given that digital technology is allowing duplication and production at negligible incremental costs (Shapiro and Varian 1999)? The simultaneous delivery of box office and DVD movies has already arrived with the company "2929" scheduled to release the film *Bubble*, a murder mystery set in Ohio, simultaneously on DVD, in theaters and on cable television (Carr, 2005). The question then is how to convince the major studios and the distribution chains to simultaneously release all versions of a movie when domestic box office in the U.S. is just one version or a portion of the value chain that includes overseas releases, video games, licensing merchandise, DVDs, cable pay-per-view and sequels. Finally, the empirical results of this dissertation have shown that eWOM has a larger impact than advertising over time in box office sales. Managers should consider the possibility of substituting advertising dollars with free published eWOM.

9.3 Limitations and future research

The results of this dissertation are subject to several limitations. First, although the Endogenous Growth Theory found support in consumers adding value to advertising in the movie industry, future research should expand this theory to other industries and consider using data from virtual communities such as www.tivocomunity.com and www.ipodlounge.com etc. which have more intensive consumer interactions in terms of

contributing to individual capital, instructional capital and social capital in the new product adoption process. Second, this dissertation showed that consumers' messages changed from a positive to a negative effect from box office to DVDs. Future research should investigate theoretical explanations leading to negative consumer word-of-mouth effect from the first to the second version. Alternatively, future research should consider using online data for the DVD version from DVD rental websites such as www.blockbuster.com or www.netflix.com.

Third, this dissertation has not explicitly addressed the issue of whether the two versions of the same new product are consumed by one or two distinct populations of consumers. Future research should consider making bolder assumptions about populations or segment movies or segment audiences by demographics. Fourth, the DVD weekly rental revenue sales have a lower fit indicated by lower values of the Adjusted R^2 when compared to the box office gross and the box office weekly revenues. The low fit statistics in the DVD version in a way reflect the reality that the industry has yet to know how to forecast the DVD market (Marr 2005). Therefore, future research should include the measurement of marketing communications during the second version from sources like movie rental companies. Finally, eWOM data of votes, grades and messages used in this dissertation do not necessarily reflect the fact that consumers who are yet to view the movie are actually reading them or that they are being influenced by eWOM in deciding to watch movies. Future research may well consider conducting laboratory or field experiments to establish a *cause and effect* relationship between consumer word-of-mouth and actual movie ticket sales.

Table 1

Constructs and Related Recent Empirical Movie Studies

Authors	Dependent Variable		Independent Variables			
			Advertising	Word-of-Mouth		
	Movie Sales	DVD		Critics	Consumers	
	Box Office				WOM	eWOM
This Study	X	X	X	X		X
Dellarocas et al. (2004)	X		X	X	X	X
Awad et al. (2004) ^a	X		X			X
Zhang et al. (2004) ^a	X				X	X
Zufryden (1996)	X		X		X	
Zufryden (2000)	X		X		X	
Eliashberg et al. (2000)	X		X		X	
Neelamegham and Jain (1999)	X			X	X	
Eliashberg and Sawhney (1994)	X			X		
Basuroy et al. (2003)	X			X		
Eliashberg and Shugan (1997)	X			X		
Elberse and Eliashberg (2003)	X		X	X		
D'Astous and Touil (1999)				X	X	
West and Broniarczyk (1998)				X	X	
Ansari et al. (2000)				X		X

^a These are MIT working papers added after my meeting with the author at INFOMRS Marketing Science Conference June 2005 at Atlanta. These two papers were not included in the earlier version of this dissertation.

Table 2

Variables, Description, Measurement and Sources

Variable	Description	Measurement	Source
<i>BOXTOTAL</i>	Box office total sales	Total revenue per movie during theater release (in millions, U.S. dollars), the industry term is Box Office Gross.	<i>www.boxofficemojo.com</i> <i>www.thenumbers.com</i> <i>www.IMDb.com</i> <i>www.leesmovieinfo.com</i>
<i>BOXW₁₋₁₀</i>	Box office weekly sales	Weekly revenue ending Sunday (in millions, U.S. dollars). First weekend or opening weekend revenue includes revenues since the day of release. Most movies open on Friday.	<i>www.boxofficemojo.com</i> <i>www.thenumbers.com</i> <i>www.imbd.com</i> <i>www.leesmovieinfo.com</i>
<i>DVDW₁₋₁₀</i>	DVD rental weekly revenues	Weekly revenue ending Sunday (in millions, U.S. dollars). These numbers do not include online rental according to the source.	<i>www.leesmovieinfo.com</i>
<i>AD</i>	Advertising expenditures	Print and advertising expenditures (in millions, U.S. dollars).	<i>www.boxofficemojo.com</i> <i>www.thenumbers.com</i>
<i>USERS_VOTES</i>	Users' votes	The number of users who voted on a movie by giving grades to a movie.	<i>Yahoo movie site: main page of each individual movie</i>
<i>USERS_GRADE</i>	Users' grade	Users' evaluation of a movie: an aggregate grade of A to D given by users after they evaluate a movie on multiple dimensions, converted to a 1,000 to 7,000 scale.	<i>Yahoo movie site: main page of each individual movie</i>
<i>MSGBFBOX</i>	Messages before box office	The total number of messages among users per movie before the day of box office release. For example, there are 6,181 users' messages for <i>Freddy and Jason</i> before box office release.	<i>Yahoo movie site: message board of each individual movie</i>

Table 2 (cont.)

Variables, Description, Measurement and Sources

Variable	Description	Measurement	Source
<i>MSGTOTAL</i>	Total message	The total number of messages among users per movie up to the end of box office release. For example, there are 10,317 users' messages for <i>Freddy and Jason</i> by the end of box office release.	<i>Yahoo movie site: message board of each individual movie</i>
<i>MSGBOXW₁₋₉</i>	Weekly incremental messages during box office period	The number of messages during the week prior to a particular box office week. For example, there are 1,053 users' messages for <i>Freddy vs. Jason</i> during its first week of box office release. This number is used in the equation to measure box office second week sales.	<i>Yahoo movie site: message board of each individual movie</i>
<i>MSGDVDW₁₋₉</i>	Cumulative messages up to a certain week during DVD period	The number of messages generated by users up to a particular DVD rental week. This number includes the messages generated in the prior version during box office release. For example, there are 10,439 users' messages for <i>Freddy vs. Jason</i> by the end of the first week of its DVD release. This number is used in the equation to measure its DVD second week rental sales.	<i>Yahoo movie site: message board of each individual movie</i>
<i>COSTS</i>	Production costs	Production budget (in millions, U.S. Dollars)	<i>www.boxofficemojo.com</i> <i>www.thenumbers.com</i>

Table 2 (cont.)

Variables, Description, Measurement and Sources

Variable	Description	Measurement	Source
<i>SCREENS</i> <i>W₁₋₁₀</i>	Screens per week	The number of theaters in which the film was shown during a particular box office week.	<i>www.boxofficemojo.com</i> <i>www.thenumbers.com</i>
<i>SCREENS</i> <i>MAX</i>	Maximum Screens	The largest number of theaters in which the film was shown during box office release.	<i>www.boxofficemojo.com</i> <i>www.thenumbers.com</i>
<i>CRITICS</i>	Critics grade	Critics' evaluation of a movie: an aggregate grade of A to D given by critics after they evaluate a movie on multiple dimensions, converted to a numerical scale of 1,000 to 7,000.	<i>Yahoo movie site main page of each individual movie</i>
<i>G</i>	MPAA rating G	Dummy variable that represents the MPAA rating of G.	<i>www.yahoo.com</i>
<i>PG</i>	MPAA rating PG	Dummy variable that represents the MPAA rating of PG.	<i>www.yahoo.com</i>
<i>PG13</i>	MPAA rating PG13	Dummy variable that represents the MPAA rating of PG13.	<i>www.yahoo.com</i>
<i>RRATED</i>	MPAA rating R	Dummy variable that represents the MPAA rating of R.	<i>www.yahoo.com</i>
<i>SEQUEL</i>	Sequel	Dummy variable that indicates a movie that is either a sequel or a remake.	<i>www.yahoo.com</i>
<i>OSCAR</i>	Oscar award given	Dummy variable that indicates whether an Oscar award has been given.	<i>www.yahoo.com</i> <i>www.IMDb.com</i>
<i>TIMELAG</i>	Time lag between box office and DVD release	Time lag between box office and DVD release.	<i>www.yahoo.com</i> <i>www.IMDb.com</i> <i>www.leesmovieinfo.com</i>

Table 3

Research Design

Model with Major Independent Variables*					
	A	**	B	C	D
Dependent Variables	Advertising (AD when there is no eWOM)	Advertising (AD when there is eWOM)	Individual Capital (<i>USERS_VOTES</i>)	Instructional Capital (<i>USERS_GRADE</i>)	Social Capital (Users' Message: <i>MSGBFBOX</i> , <i>MSGBOXW₁₋₉</i> , <i>MSGTOTAL</i> , <i>MSGDVDW₁₋₉</i>)
Total Box Office Sales (H ₁ -H ₃)			+ (H ₁)	+ (H ₂)	+ (H ₃)
Weekly Box Office Sales (H ₄ -H ₅)		+, decrease (H ₄)			+ increase (H ₅)
Weekly DVD Rental (H ₆ -H ₇)		No effect (H ₆)			+ (H ₇)

* Control variables of *COSTS*, *SCREENS_MAX*, *SCREENSW₁₋₁₀*, *CRITICS*, *G*, *PG*, *PG13*, *RRATED*, *SEQUEL*, *OSCAR* and *TIMELAG* are not included here because these variables are not the focus of this dissertation.

** The measurement of advertising effect when eWOM is present, and is therefore measured within each corresponding model with eWOM.

+ denotes positive relationship.

Table 4

Summary Statistics of the Nondummy Variables

Variable	N	Mean	Std. Dev	Minimum	Maximum
<i>BOXTOTAL</i>	50	121.96	72.23	49.00	377.02
<i>AD</i>	46	31.73	8.47	15.00	50.00
<i>COSTS</i>	49	72.25	39.94	9.50	170.00
<i>SCREENS_MAX</i>	50	3,074.76	473.18	1,581.00	3,749.00
<i>CRITICS</i>	48	3,666.67	1,814.05	1,000.00	7,000.00
<i>USERS_GRADE</i>	50	4,900.00	1,281.74	1,000.00	7,000.00
<i>USERS_VOTES</i>	50	17,094.62	18,362.60	868.00	102,341.00
<i>MSGTOTAL</i>	50	1,893.06	3,649.44	76.00	18,250.00
<i>TIMELAG</i>	50	167.14	62.26	81.00	375.00

Source: Data from www.boxofficemojo.com, www.thenumbers.com, www.IMDb.com, and www.leesmovieinfo.com

Note: *BOXTOTAL*, *AD* and *COSTS* are in millions of dollars.

Note: See Table 2 for the definitions of variables.

Table 5

Summary Statistics of the Weekly Box Office Variables

Variable	N	Mean	Std. Dev	Minimum	Maximum
<i>BOXW</i> ₁	50	37.05	28.35	0.28	134.28
<i>BOXW</i> ₂	50	30.69	18.10	0.28	98.16
<i>BOXW</i> ₃	50	18.02	10.98	2.94	68.15
<i>BOXW</i> ₄	50	11.88	7.56	4.39	37.06
<i>BOXW</i> ₅	50	7.52	5.02	2.16	25.44
<i>BOXW</i> ₆	50	5.14	4.08	0.78	20.94
<i>BOXW</i> ₇	50	3.25	3.14	0.30	16.13
<i>BOXW</i> ₈	49	2.37	2.77	0.13	12.72
<i>BOXW</i> ₉	49	1.59	2.13	0.06	9.66
<i>BOXW</i> ₁₀	49	0.99	1.46	0.06	6.90
<i>SCREENSW</i> ₁	50	2,909.50	815.36	6.00	3,741.00
<i>SCREENSW</i> ₂	50	2,975.72	684.05	6.00	3,749.00
<i>SCREENSW</i> ₃	50	2,903.00	614.83	124.00	3,703.00
<i>SCREENSW</i> ₄	50	2,596.64	608.73	125.00	3,532.00
<i>SCREENSW</i> ₅	50	2,166.56	629.83	1,050.00	3,333.00
<i>SCREENSW</i> ₆	50	1,693.26	722.29	406.00	2,902.00
<i>SCREENSW</i> ₇	50	1,233.38	695.20	272.00	2,643.00
<i>SCREENSW</i> ₈	50	902.06	648.07	55.00	2,480.00
<i>SCREENSW</i> ₉	50	646.90	531.86	114.00	2,203.00
<i>SCREENSW</i> ₁₀	49	462.71	438.90	71.00	2,029.00
<i>MSGBBOX</i>	50	721.60	1,806.76	23.00	11,084.00
<i>MSGBOXW</i> ₁	50	283.46	602.64	1.00	3,189.00
<i>MSGBOXW</i> ₂	50	248.42	465.86	5.00	2,473.00
<i>MSGBOXW</i> ₃	50	130.40	218.48	1.00	1,079.00
<i>MSGBOXW</i> ₄	50	116.38	296.89	4.00	1,951.00
<i>MSGBOXW</i> ₅	50	69.48	137.08	1.00	663.00
<i>MSGBOXW</i> ₆	50	55.34	130.90	0.00	681.00
<i>MSGBOXW</i> ₇	50	47.64	120.75	0.00	711.00
<i>MSGBOXW</i> ₈	50	27.90	65.07	0.00	292.00
<i>MSGBOXW</i> ₉	50	26.28	66.79	0.00	313.00

Source: Data from www.thenumbers.com and www.leesmovieinfo.com.

Note: *BOXW*₁₋₁₀ are in millions of dollars.

Note: See Table 2 for the definitions of variables.

Table 6

Summary Statistics of the Weekly DVD Variables

Variable	Mean	Std. Dev	N	Minimum	Maximum
<i>DVDW</i> ₁	6.35	1.99	50	2.23	13.58
<i>DVDW</i> ₂	4.97	1.64	50	1.29	11.11
<i>DVDW</i> ₃	3.53	1.37	50	0.97	7.04
<i>DVDW</i> ₄	1.90	1.02	50	0.72	5.72
<i>DVDW</i> ₅	1.48	0.86	50	0.50	5.25
<i>DVDW</i> ₆	1.15	0.72	50	0.39	3.75
<i>DVDW</i> ₇	0.94	0.43	50	0.31	2.22
<i>DVDW</i> ₈	0.80	0.40	49	0.31	1.99
<i>DVDW</i> ₉	0.72	0.31	47	0.33	1.40
<i>DVDW</i> ₁₀	11.20	0.25	44	0.30	1.32
<i>MSGDVDW</i> ₁	1,904.30	3,666.78	50	78.00	18,330.00
<i>MSGDVDW</i> ₂	1,918.48	3,689.49	50	78.00	18,399.00
<i>MSGDVDW</i> ₃	1,927.34	3,701.36	50	79.00	18,443.00
<i>MSGDVDW</i> ₄	1,932.72	3,709.18	50	79.00	18,493.00
<i>MSGDVDW</i> ₅	1,938.72	3,717.70	50	80.00	18,554.00
<i>MSGDVDW</i> ₆	1,943.40	3,725.92	50	80.00	18,614.00
<i>MSGDVDW</i> ₇	1,948.58	3,731.04	50	80.00	18,646.00
<i>MSGDVDW</i> ₈	1,952.52	3,734.11	50	81.00	18,661.00
<i>MSGDVDW</i> ₉	1,957.74	3,738.75	50	81.00	18,686.00

Source: Data from www.thenumbers.com and www.leesmovieinfo.com.

Note: *DVDW*₁₋₁₀ are in millions of dollars.

Note: See Table 2 for the definitions of variables.

Table 7

Variables and Correlations^a

	<i>AD</i>	<i>COSTS</i>	<i>SCREENS_ MAX</i>	<i>CRITICS</i>	<i>USERS_ GRADE</i>	<i>MSG TOTAL</i>	<i>USERS_ VOTES</i>
<i>AD</i>	1.00						
<i>COSTS</i>	0.62 (.00)	1.00					
<i>SCREENS_ MAX</i>	0.79 (.00)	0.44 (.00)	1.00				
<i>CRITICS</i>	0.0002 (.98)	0.12 (.41)	-0.17 (.23)	1.00			
<i>USERS_ GRADE</i>	0.01 (.92)	-0.11 (.42)	-0.18 (-.19)	0.58 (.00)	1.00		
<i>MSG TOTAL</i>	0.46 (.00)	0.33 (.02)	0.33 (.01)	0.19 (.18)	0.24 (.08)	1.00	
<i>USERS_ VOTES</i>	0.39 (.00)	0.28 (.04)	0.29 (.03)	0.23 (.10)	0.43 (.00)	0.66 (.00)	1.00

^aPearson Correlations

Number of observations = 46

() The number in parenthesis indicates significance level

() The number in bold indicates significance level of $p < .0001$

Note: See Table 2 for the definitions of variables.

Table 8

Movie Total Box Office Sales Regression Results

	Model A (Ad without eWOM)		Model B (AD with eWOM of <i>USERS_VOTES</i>)	
	Coefficient (s.c.)	t-statistic (p-value)	Coefficient (s.c.)	t-statistic (p-value)
<i>AD</i>	5.43 (.61)	6.08 (.00)	<i>AD</i>	4.27 (.48) (.00)
<i>eWOM</i>			<i>eWOM^a</i>	0.001 (.40) (.00)
<i>OSCAR</i>	70.87 (.34)	3.57 (.00)	<i>OSCAR</i>	26.56 (.12) 1.35 (.18)
<i>SEQUEL</i>	11.83 (.07)	0.75 (.45)	<i>SEQUEL</i>	-0.71 (-.00) -0.05 (.95)
<i>G</i>	120.47 (.23)	2.06 (.04)	<i>G</i>	150.47 (.29) 3.05 (.00)
<i>PG</i>	1.09 (.00)	0.03 (.97)	<i>PG</i>	12.17 (.05) 0.41 (.68)
<i>PG13</i>	4.38 (.02)	0.13 (.89)	<i>PG13</i>	11.68 (.07) 0.42 (.67)
<i>RRATED</i>	4.56 (.02)	0.13 (.89)	<i>RRATED</i>	6.61 (.04) 0.23 (.81)
	$R^2 = .70$ Adj. $R^2 = .65$		$R^2 = .80$ Adj. $R^2 = .76$	
	Model C (AD with eWOM of <i>USERS_GRADE</i>)		Model D (AD with eWOM of <i>MSGTOTAL</i>)	
	Coefficient (s.c.)	t-statistic (p-value)	Coefficient (s.c.)	t-statistic (p-value)
<i>AD</i>	5.21 (.59)	6.69 (.00)	<i>AD</i>	3.83 (.43) 4.40 (.00)
<i>eWOM^b</i>	0.01 (.33)	3.64 (.00)	<i>eWOM^c</i>	0.007 (.38) 3.85 (.00)
<i>OSCAR</i>	50.26 (.24)	2.77 (.00)	<i>OSCAR</i>	47.48 (.23) 2.63 (.01)
<i>SEQUEL</i>	18.92 (.12)	1.37 (.18)	<i>SEQUEL</i>	0.10 (.00) 0.01 (.99)
<i>G</i>	107.22 (.21)	2.11 (.04)	<i>G</i>	179.94 (.35) 3.44 (.00)
<i>PG</i>	24.55 (.11)	0.78 (.44)	<i>PG</i>	32.72 (.15) 1.04 (.30)
<i>PG13</i>	9.43 (.06)	0.33 (.74)	<i>PG13</i>	28.97 (.19) 0.99 (.32)
<i>RRATED</i>	1.43 (.00)	0.05 (.96)	<i>RRATED</i>	14.35 (.08) 0.49 (.62)
	$R^2 = .78$ Adj. $R^2 = .74$		$R^2 = .79$ Adj. $R^2 = .74$	

Number of observations for Models A through D = 46

(s.c.) standardized coefficient

() the number in bold indicates significance level of p -value $< .05$.

^a eWOM of *USERS_VOTES*, ^b eWOM of *USERS_GRADE*, ^c eWOM of *MSGTOTAL*

Table 9

Movie Weekly Regression Results – Box Office and DVD

Week	R^2 (Adj. R^2)	AD (s.c.)	t-statistic (p -value)	$eWOM^a$ (s.c.)	t-statistic (p -value)	$CRITICS$ (s.c.)	t-statistic (p -value)
$BOXW_1$	.78 (.74)	2.26 (.66)	6.95 (.00)	0.003 (.25)	2.82 (.00)	0.00 (.08)	0.99 (.32)
$BOXW_2$	.70 (.63)	1.30 (.59)	4.81 (.00)	0.003 (.12)	0.98 (.33)	0.00 (.21)	2.10 (.04)
$BOXW_3$	.53 (.42)	0.69 (.51)	3.34 (.00)	-0.0005 (-.02)	-0.17 (.86)	0.00 (.27)	2.18 (.03)
$BOXW_4$	.59 (.50)	0.39 (.44)	2.89 (.00)	0.002 (.08)	0.53 (.60)	0.00 (.28)	2.24 (.03)
$BOXW_5$	.56 (.46)	0.10 (.17)	1.18 (.24)	0.005 (.30)	2.08 (.04)	0.00 (.16)	1.23 (.22)
$BOXW_6$	.60 (.50)	0.00 (.01)	0.08 (.93)	0.01 (.34)	2.27 (.02)	0.00 (.19)	1.57 (.12)
$BOXW_7$	.71 (.65)	0.02 (.06)	0.53 (.60)	0.009 (.38)	3.50 (.00)	0.00 (.26)	2.58 (.01)
$BOXW_8$	.73 (.67)	0.06 (.18)	1.61 (.11)	0.009 (.40)	3.94 (.00)	0.00 (.28)	2.87 (.00)
$BOXW_9$	.69 (.62)	0.04 (.17)	1.35 (.18)	0.01 (.44)	3.73 (.00)	0.00 (.20)	1.89 (.06)
$BOXW_{10}$	.72 (.66)	0.01 (.11)	0.93 (.36)	0.009 (.44)	4.08 (.00)	0.00 (.17)	1.09 (.69)
$DVDW_1$	.30 (.09)	0.11 (.49)	2.52 (.01)	-0.05×10^{-3} (-.11)	-.57 (.56)	-0.00 (-.10)	-.52 (.60)
$DVDW_2$	.43 (.26)	0.09 (.50)	2.86 (.00)	-0.01×10^{-2} (-.45)	-2.52 (.01)	-0.00 (-.15)	0.86 (.39)
$DVDW_3$	.45 (.29)	0.05 (.32)	1.88 (.06)	-0.01×10^{-2} (-.56)	-3.19 (.00)	-0.00 (-.15)	0.09 (.93)
$DVDW_4$	.38 (.20)	0.04 (.39)	2.14 (.04)	-0.05×10^{-3} (-.43)	-2.31 (.02)	-0.00 (-.19)	-1.00 (.32)
$DVDW_5$	.39 (.21)	0.02 (.24)	1.34 (.18)	-0.08×10^{-3} (-.23)	-1.26 (.21)	-0.00 (-.11)	-0.62 (.53)
$DVDW_6$	.46 (.30)	0.02 (.31)	1.83 (.07)	-0.03×10^{-3} (-.45)	-2.62 (.01)	-0.00 (-.13)	0.74 (.46)
$DVDW_7$	.52 (.38)	0.00 (.11)	0.69 (.49)	-0.03×10^{-3} (-.31)	-1.94 (.06)	-0.00 (-.04)	0.25 (.80)
$DVDW_8$	.42 (.24)	-0.00 (-.10)	-0.57 (.56)	-0.03×10^{-3} (-.30)	-1.68 (.10)	-0.00 (-.00)	-0.00 (.99)
$DVDW_9$	.48 (.32)	-0.00 (-.01)	-0.07 (.94)	-0.02×10^{-3} (-.37)	-2.11 (.04)	-0.00 (-.08)	-0.47 (.64)
$DVDW_{10}$	.35 (.13)	0.00 (.15)	0.77 (.44)	-0.02×10^{-3} (-.35)	-1.71 (.09)	-0.00 (-.01)	-0.07 (.94)

(s.c.) standardized coefficient

() the number in bold indicates significance level of p -value $<.05$.

^a eWOM is users' messages. For box office regressions, I use *MSGBFBOX* for the 1st week and *MSGBOXW₁₋₉* for the 2nd to the 10th week. For DVDs regressions, I use *MSGTOTAL* for the 1st week and *MSGDVDW₁₋₉* for 2nd to the 10th week.

Table 9 continued

Movie Weekly Regression Results – Box Office and DVD

Week	<i>SEQUEL</i> (s.c.)	t-statistic (p-value)	<i>G</i> (s.c.)	t-statistic (p-value)	<i>PG</i> (s.c.)	t-statistic (p-value)	<i>PG13</i> (s.c.)	<i>t-statistic</i> (p-value)
<i>BOXW</i> ₁	10.28	1.86	11.89	0.60	-7.04	-0.55	-3.32	-0.29
N = 45	(.17)	(.07)	(.06)	(.55)	(-.07)	(.58)	(-.05)	(.77)
<i>BOXW</i> ₂	6.92	1.59	25.55	1.65	-0.18	-0.02	-1.96	0.22
N = 45	(.17)	(.12)	(.20)	(.10)	(-.00)	(.98)	(-.05)	(.82)
<i>BOXW</i> ₃	0.47	0.15	19.63	1.67	1.61	0.21	3.04	0.45
N = 45	(.01)	(.88)	(.25)	(.10)	(.04)	(.83)	(.13)	(.65)
<i>BOXW</i> ₄	-3.22	-1.55	19.98	2.63	6.38	1.29	2.08	0.48
N = 45	(-.20)	(.12)	(.39)	(.01)	(.26)	(.20)	(.13)	(.63)
<i>BOXW</i> ₅	-3.69	-2.52	18.53	3.45	4.60	1.34	4.12	1.36
N = 45	(-.33)	(.01)	(.53)	(.00)	(.28)	(.18)	(.39)	(.18)
<i>BOXW</i> ₆	-2.72	-2.42	16.89	3.97	4.51	1.65	3.30	1.36
N = 45	(-.30)	(.02)	(.59)	(.00)	(.34)	(.10)	(.39)	(.18)
<i>BOXW</i> ₇	-1.73	-2.40	12.59	4.74	2.70	1.64	1.94	1.28
N = 45	(-.25)	(.02)	(.57)	(.00)	(.26)	(.11)	(.29)	(.20)
<i>BOXW</i> ₈	-1.59	2.48	9.14	4.20	2.93	2.01	0.92	0.71
N = 44	(-.25)	(.01)	(.47)	(.00)	(.32)	(.05)	(.16)	(.48)
<i>BOXW</i> ₉	-1.11	2.09	7.83	4.00	2.34	1.88	1.23	1.11
N = 44	(-.23)	(.04)	(.53)	(.00)	(.33)	(.06)	(.27)	(.27)
<i>BOXW</i> ₁₀	-0.40	-1.20	5.98	4.91	0.48	0.62	0.75	1.09
N = 44	(-.12)	(.23)	(.60)	(.00)	(.10)	(.53)	(.25)	(.28)
<i>DVDW</i> ₁	-1.43	-2.05	0.32	0.13	1.53	0.95	2.02	1.41
N = 45	(-.36)	(.04)	(.02)	(.90)	(.25)	(.35)	(.53)	(.16)
<i>DVDW</i> ₂	-1.40	-2.67	-2.95	-1.51	0.41	0.34	-0.03	-0.03
N = 45	(-.42)	(.01)	(.27)	(.14)	(.08)	(.73)	(-.01)	(.97)
<i>DVDW</i> ₃	-0.82	-1.88	-4.81	-2.95	-1.41	-1.39	-1.47	-1.63
N = 45	(-.29)	(.06)	(-.53)	(.00)	(-.33)	(.17)	(-.55)	(.11)
<i>DVDW</i> ₄	-0.73	-2.11	-1.42	-1.10	0.14	0.18	-0.12	-0.18
N = 45	(-.34)	(.04)	(-.21)	(.28)	(.04)	(.86)	(-.06)	(.86)
<i>DVDW</i> ₅	-0.83	-2.83	-1.81	-1.65	0.30	0.45	0.26	0.43
N = 45	(-.46)	(.00)	(-.31)	(.10)	(.11)	(.65)	(.15)	(.66)
<i>DVDW</i> ₆	-0.63	-2.67	-1.75	-1.99	0.36	0.65	-0.09	-0.20
N = 45	(-.41)	(.01)	(-.35)	(.06)	(.15)	(.51)	(-.06)	(.84)
<i>DVDW</i> ₇	-0.45	-3.43	-0.68	-1.37	0.20	0.66	-0.06	-0.25
N = 45	(-.49)	(.00)	(-.23)	(.17)	(.14)	(.51)	(-.07)	(.80)
<i>DVDW</i> ₈	-0.24	-1.67	-0.79	-1.56	0.26	0.81	-0.00	-0.02
N = 44	(-.28)	(.10)	(-.29)	(.12)	(.19)	(.42)	(-.00)	(.98)
<i>DVDW</i> ₉	-0.22	-2.13	-0.76	-2.07	0.12	0.52	-0.06	-0.30
N = 43	(-.33)	(.04)	(-.38)	(.04)	(.11)	(.60)	(-.10)	(.76)
<i>DVDW</i> ₁₀	-0.12	-1.17	-0.64	-1.83	0.23	1.04	-0.03	-0.20
N = 40	(-.22)	(.25)	(-.39)	(.07)	(.27)	(.30)	(-.07)	(.84)

Table 9 continued

Movie Weekly Regression Results – Box Office and DVD

Week	<i>RRATED</i> (s.c.)	t-statistic (<i>p</i> -value)	<i>OSCAR</i> ^b (s.c.)	t-statistic (<i>p</i> -value)	<i>TIMELAG</i> ^c (s.c.)	t-statistic (<i>p</i> -value)	F-Ratio (<i>p</i> -value)
<i>BOXW</i> ₁	1.96	0.17					16.30
N = 45	(.03)	(.86)					(.00)
<i>BOXW</i> ₂	-3.45	-0.39					10.35
N = 45	(-.08)	(.69)					(.00)
<i>BOXW</i> ₃	-0.84	-0.84					5.04
N = 45	(-.03)	(.90)					(.00)
<i>BOXW</i> ₄	1.49	0.35					6.43
N = 45	(.09)	(.72)					(.00)
<i>BOXW</i> ₅	3.12	1.02					5.67
N = 45	(.27)	(.31)					(.00)
<i>BOXW</i> ₆	1.78	0.75					6.59
N = 45	(.19)	(.45)					(.00)
<i>BOXW</i> ₇	0.79	0.52					11.12
N = 45	(.11)	(.60)					(.00)
<i>BOXW</i> ₈	0.58	0.45					11.68
N = 44	(.09)	(.65)					(.00)
<i>BOXW</i> ₉	0.67	0.61					9.64
N = 44	(.14)	(.54)					(.00)
<i>BOXW</i> ₁₀	0.09	0.14					11.22
N = 44	(.02)	(.89)					(.00)
<i>DVDW</i> ₁	3.00	2.10	0.75	0.75	0.00	0.83	1.43
N = 45	(.74)	(.04)	(.14)	(.45)	(.13)	(.41)	(.21)
<i>DVDW</i> ₂	1.02	0.95	0.90	1.19	0.00	1.07	2.55
N = 45	(.30)	(.34)	(.21)	(.24)	(.15)	(.29)	(.02)
<i>DVDW</i> ₃	-0.58	-0.65	1.58	2.49	-0.00	-0.43	2.79
N = 45	(-.20)	(.51)	(.43)	(.01)	(-.05)	(.67)	(.01)
<i>DVDW</i> ₄	0.71	1.01	1.27	2.53	0.00	0.73	2.09
N = 45	(.33)	(.32)	(.46)	(.01)	(.10)	(.46)	(.05)
<i>DVDW</i> ₅	0.59	0.99	1.00	2.35	0.00	0.34	2.16
N = 45	(.32)	(.32)	(.43)	(.02)	(.05)	(.73)	(.04)
<i>DVDW</i> ₆	0.30	0.62	0.42	1.25	0.00	0.88	2.89
N = 45	(.19)	(.53)	(.21)	(.22)	(.12)	(.38)	(.01)
<i>DVDW</i> ₇	0.17	0.63	0.43	2.23	0.00	1.11	3.65
N = 45	(.18)	(.53)	(.36)	(.03)	(.14)	(.27)	(.00)
<i>DVDW</i> ₈	0.02	0.11	0.29	1.49	-0.00	-1.08	2.38
N = 44	(.03)	(.91)	(.26)	(.14)	(-.15)	(.28)	(.03)
<i>DVDW</i> ₉	-0.00	-0.04	0.33	2.29	-0.00	-0.83	2.94
N = 43	(-.01)	(.96)	(.40)	(.02)	(-.11)	(.41)	(.01)
<i>DVDW</i> ₁₀	0.09	0.47	0.21	1.56	-0.00	-0.81	1.61
N = 40	(.16)	(.64)	(.32)	(.12)	(-.13)	(.42)	(.13)

^b the variable *OSCAR* is not included in box office weekly regressions.

^c the variable *TIMELAG* is not included in box office weekly regressions.

Table 10

Regression Results: eWOM's Increasing Effect over Time

	<i>MSGBFBOX,</i> <i>MSGBOXW₁₋₉</i>
Time	0.04
t-value	3.68
Pr > |t|	.00
Adjusted R^2	.58

Table 11

Regression Results: Advertising's Diminishing Effect over Time

	<i>MSGBFBOX,</i> <i>MSGBOXW₁₋₉</i>
Time	-0.20
t-value	-4.02
Pr > |t|	.00
Adjusted R^2	.62

Table 12

Hypotheses and Empirical Results

Hypotheses	Empirical Results
H1. eWOM in the form of individual capital growth adds value to advertising and positively affects total box office sales.	Supported
H2. eWOM in the form of instructional capital growth adds value to advertising and positively affects total box office sales.	Supported
H3. eWOM in the form of social capital growth adds value to advertising and positively affects total box office sales.	Supported
H4. Advertising has a positive effect on weekly box office sales but the advertising effect will significantly diminish over time when eWOM is present.	Supported
H5. eWOM has a positive effect on weekly box office sales and eWOM's effect will significantly increase over time when advertising is present.	Supported
H6. Advertising from the first version of box office sales has no effect on the weekly DVD rental sales when eWOM is present.	Not Supported
H7. eWOM accumulated from box office sales adds value to weekly DVD rental sales.	Not Supported

Figure Captions

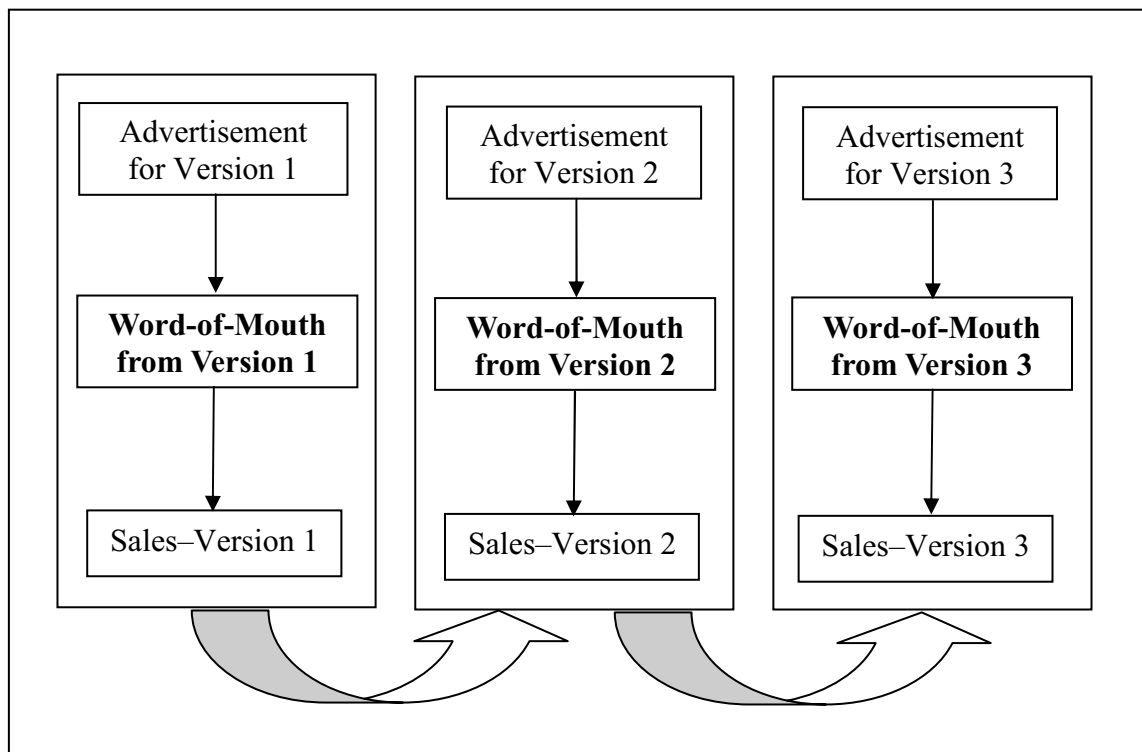
Figure 1. Advertising and word-of-mouth in multiple versions of a new product

Figure Captions

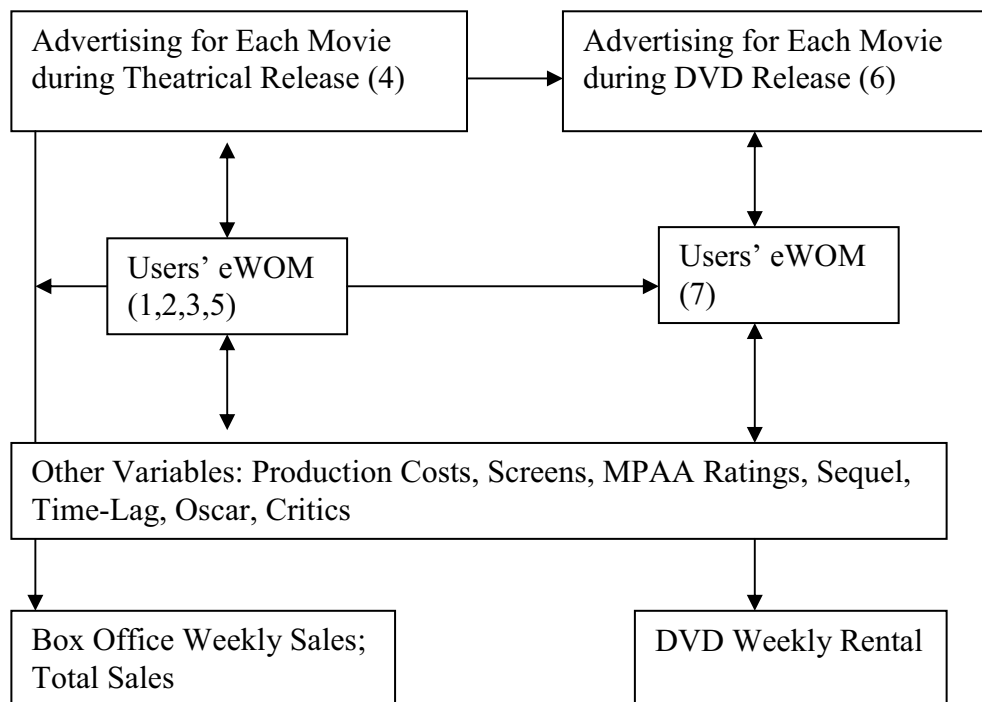
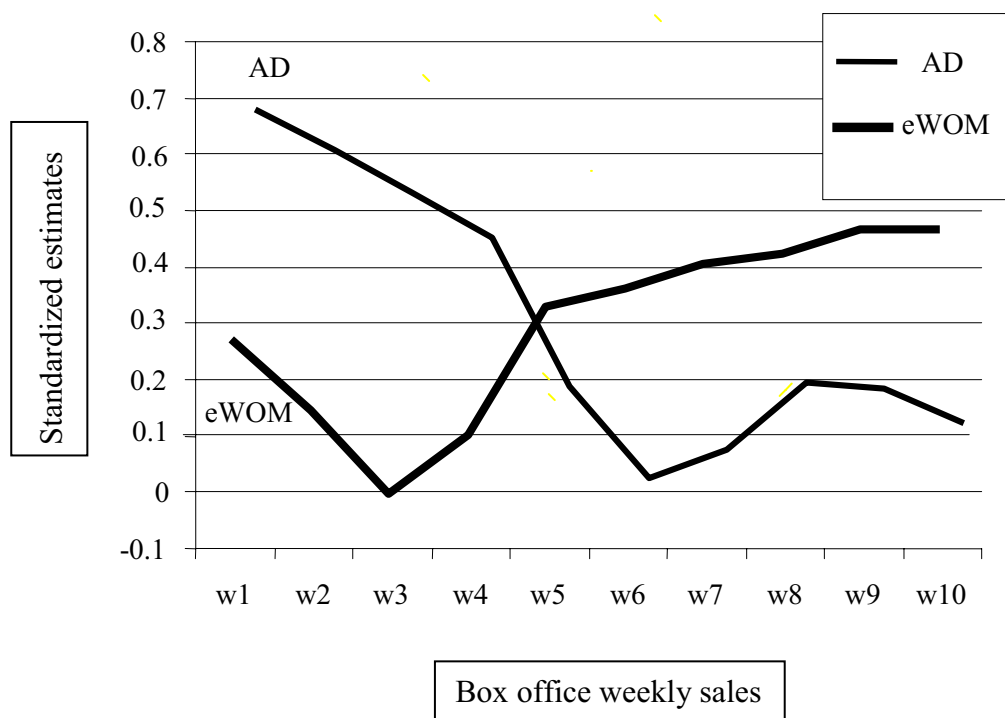
Figure 2. Advertising and eWOM in new movie adoption

Figure Captions

Figure 3. Increasing eWOM over weekly box office sales

Appendix A

A summary of statistical procedures

I began plotting each independent variable against the dependent variables to visualize the relationships among them. The purpose of this step was to have a preliminary understanding of the behavior of the data. A few movies were spotted as possible outliers. I then started to examine the impact of extreme and influential observations outliers. I followed the Belsey et al. (1980) criteria and computed COOK'S D, RSTUDENT, COV-RATIO, DFFITS, DFBETA, and the h metrics. Four movies have exceeded the cutout limits of two or more of the six tests. I then deleted these observations from the sample and reestimated the equations. This method did not lead to a qualitative change to the total box office regression.

The deletion of these four movies however changed the regression results of some of the weekly box office sales. Since these four movies are the ones with the most users' messages, deleting them defeats the purpose of this research on eWOM. Instead of deleting them, I coded them as four separate dummy variables and reestimated all the weekly equations. The reestimation results did not lead to any changes in interpretation.

The next step I took was to test for possible multicollinearity, the condition index and variance inflation factor in all the regressions results are below cutoffs suggested by Belsey et al. (1980), suggesting no multicollinearity problem.

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