

"Will They Merge?" – Financial Event-Related Information Processing in Social Media

Research-in-Progress

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ABSTRACT

A merger is a complex process and for investors it represents a situation of uncertainty on many levels. Investors may engage in online information exchange in order to reduce informational uncertainty. Social media can facilitate effective information exchange among investors. Drawing on the concepts of information processing and sense-making, I investigate information processing activities on blogs related to merger-related uncertainty. Furthermore, I investigate information generation, information depth, and the variety of information provided by blogs related to the completion likelihood of a merger. The analysis shows that financial event-related uncertainty can be related to information processing activities in social media.

Keywords

Social media, information processing, sense-making, merger, uncertainty, financial event

INTRODUCTION

Mergers are "business combination transactions involving the combination of two or more companies into a single entity" (SEC, 2008) and are highly relevant events for investors who are invested in one of the involved companies, likewise for potential future investors (Dodd, 1980). In the financial domain social media are heavily used, for example for the discussion of investment decisions and financial events such as merger announcements which forces investors to reassess their investment decisions (Das and Chen, 2007). Nowadays social media play a key role in the overwhelming exchange of information among users. Kaplan and Haenlein (2010) define social media as: "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content" (p. 61). This emphasizes two of the key reasons for the use of social media, namely the generation and exchange of information. In this sense, social media supports information processing activities of users by facilitating active discussions and information exchange among users.

Blogs, as one of the most prominent types of social media, can be described as "frequently updated websites where content (text, pictures, sound files, etc.) is posted on a regular basis and displayed in reverse chronological order" (Schmidt, 2007, p. 1409). In particular, in the financial domain blogs are frequently used as an information source and for information exchange, e.g. in the context of investment recommendations and further insights on markets events (Fotak, 2007). Previous literature on blogs was mainly concerned with the incentives to blog (Nardi et al., 2004), and with the impact of blog posts (Fotak, 2007).

Lu and Yang (2011) examined information exchange in online discussion forums after a natural disaster, whereby disaster-related uncertainties increase the need for information. I adopt this setting to the financial domain, where merger announcements cause uncertainties for investors concerning the evaluation of the announced merger and concerning the final execution of the deal (Muehlfeld et al., 2007). In my hypotheses development process I draw on the literature on information processing and sense-making. In order to obtain new insights concerning information processing in social media, this research captures data from financial blogs and empirically investigates the relationship between merger-related uncertainty and information processing activities on blogs, and is in this sense, to the best of my knowledge, the first of its kind.

The remainder of the paper is organized as follows. First, I describe the theoretical foundation and hypotheses development process. The following section is concerned with the empirical analyses, addressing the operationalization of variables, the data selection process, and the description of the applied methodology. Then I present the results and implications of the analysis, and the concluding section summarizes the findings and provides an outlook for further research.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

A merger represents a growth opportunity and a possibility for realizing synergistic gains, such as economies of scale and scope (Chakravorty, 2012). Because of the significant price effect subsequent to the announcement of a merger attempt, investors who are invested in at least of one of the involved parties have to analyze the event and its implications to their investment portfolio. Mergers are complex transactions, investors have to evaluate the target and acquiring company as well as the synergetic gains (Louis and Sun, 2010). In addition, a lot of mergers do not meet their proclaimed expectations and many are withdrawn before their completion or end in divestures (Muehlfeld et al., 2007). Therefore, a merger announcement represents a situation of uncertainty on many levels. In the event of a merger, the information provided by the involved companies is generally less standard and more difficult to process for investors compared to other financial events (Louis and Sun, 2010). Consequently, investors have to process more information compared to other financial events and experience higher information needs. Investors may engage in online information exchange and online communication in order to reduce informational uncertainty (Herrmann, 2007).

Uncertainty can be defined by the difference between information currently possessed by the individual and the information needed (Gailbraith, 1973). From an information uncertainty perspective, the primary source of uncertainty is the lack of information about situational, social and environmental factors (Lawrence and Lorsch, 1967). In addition, uncertainty represents “the inability to predict future outcomes or states of the world” (Gailbraith, 1978, p. 36). Therefore, in a merger transaction investors experience uncertainty concerning the final execution of a merger deal, because it is not certain that the merger will either get approved by shareholders or regulatory authorities. It is also possible that the management of one of the involved parties cancels the deal or that the management of the target company employs one of many defense tactics in the case of a hostile takeover. The remainder of this paper will be concerned with uncertainty concerning the completion likelihood of a merger.

On the individual level, information processing theory, which takes the perspective that people process received information, can serve as a mean to investigate human decision making (Slovic et al., 1977). The higher the uncertainty during the process of decision making the more information needs to be processed in order to achieve certain goals (Galbraith, 1973). In this sense, information behavior includes the identification of information needs, the search for the required information, as well as the provision and utilization of such information (Wilson, 1999). The described behavior includes also the provision or generation of information considered as being of value for other individuals (Wilson, 1999). Hence, merger-related uncertainty triggers information needs on the part of investors, meaning more amounts of information is required, therefore, I hypothesize:

1. Hypothesis (H1): The higher the uncertainty related to a financial event the more information is generated in social media.

Organization science as well as information science are familiar with the concept of sense-making (Dervin, 1983; Weick, 1995). Sense-making involves the above mentioned activities of information behavior in order to make sense out of a certain situation (Dervin, 1999). The term sense-making has been used in several scientific disciplines (Weick, 1995; Dervin, 1983; Russell et al., 1993). Sense-making addresses the process of understanding and the construction of meaning (Dervin, 1983). According to Dervin’s (1983) sense-making approach, individuals face information needs (e.g. because of uncertainty), called a ‘gap’, representing the difference between a given ‘situation’ and the desired situation, whereby a ‘bridge’ is considered as some mean of closing the ‘gap’. From Weick’s (1995) perspective sense-making can be viewed as the reduction of equivocality, the problem of too many meanings. Sense-making represents a cognitive activity, mostly investigated at the individual level (Russell et al., 1993). Nevertheless, people tend to share and communicate constructed meanings and their understanding to one another, creating a shared understanding. This is referred to as collective sense-making (Poltröck et al., 2003). In this context, social media can play a crucial role in the sense-making process on the individual and the collective level (Hermann, 2007). Social media can facilitate effective information generation and exchange among individuals who are dealing with ambiguous situations and informational uncertainties.

The concept of sense-making can also be applied to the event of a merger, when investors try to understand or make sense of huge amounts of complex information from several sources (Hermann, 2007). To create a shared understanding in the presence of uncertainty, the shared information has to be more comprehensive in order to reduce equivocality. In this perspective, information generation in social media can be viewed as a part of the collective sense-making process and one can expect a higher need for in-depth information by investors in the event of a merger:

2. Hypothesis (H2): The higher the uncertainty related to a financial event the more information depth is generated in social media.

The rationality of actors (individuals) can be bounded by incomplete information about alternatives (Simon, 1972). Furthermore, individuals face limitations in their information processing capabilities, leading to incomplete and simplified

representations of the world (Simon, 1957). Because uncertainty represents inability to predict future outcomes, one can expect that the higher the uncertainty the more interpretations of a given situation are possible by individuals who are limited by bounded rationality. Therefore, a larger variety of interpretations by investors concerning the outcome of an announced merger attempt is expected, which leads to my third hypothesis:

3. Hypothesis (H3): The higher the uncertainty related to a financial event the higher the variety of information that is generated in social media.

In the following these hypotheses will be tested with respect to the occurrence of blog postings in the event of a merger.

RESEARCH METHODOLOGY

Variables

In the following I describe the operationalization of the previously hypothesized constructs. Firstly, I describe three kinds of measures of uncertainty that are concerned with the completion likelihood of a merger and the reasoning behind those. Secondly, I describe the operationalized information processing variables (dependent variables).

Independent Variables - Uncertainty Measures

‘Method of Payment’ - Two major forms of financing a merger do exist. The acquirer can either choose cash or stock, where the payment is made with the acquiring company’s stock, as a form of payment. Payment made in cash has a positive signaling effect and is associated with post-merger performance (Yook, 2003). Cash payment is associated with raising debt and according to the free cash flow theory, cash financed deals are associated with a disciplining effect and larger benefits compared to mergers paid through the exchange of stock (Jensen, 1986). Stock financing is preferred by the management of the acquiring company if the acquiring firm is considered as being overvalued (Myers and Majluf, 1984). Empirical studies concerned with the post-announcement market reaction have shown that more negative abnormal returns are associated with transactions paid through the exchange of stock (e.g. Asquith and Mullins, 1983). In addition, studies show an empirical association between positive abnormal returns, as a post announcement performance measure, and cash acquisitions. This can be translated into a higher completion likelihood of cash-financed bids (Muehlfeld et al., 2007). Hence, deals that are paid in ‘cash’ can be considered as possessing less uncertainty concerning the completion of the deal compared to stock-financed deals. I consider a mixture of cash and stock financing as a ‘hybrid’ form of payment, representing a lower uncertainty with regard to the completion of a merger attempt than those that are paid through the exchange of stock, and representing a higher uncertainty compared to cash-financed deals.

‘Termination Agreement’ - “Termination fee clauses in merger agreements entail a contingent payment by one party to a counter party and are triggered when the former dissolves the agreement” (Bats and Lemmon, 2003, p. 470). The existence of a termination agreement is significantly positively associated with the likelihood of the deal being completed (Bats and Lemmon, 2003). In my analysis I consider mergers where at least one party was bound to pay a termination fee as being less likely to be withdrawn by one of the involved companies.

‘Not Mutual Agreed’ - Bids in merger transaction can be defined as being friendly or hostile. In hostile deals the management of the target company does not approve the takeover. Usually tender offers are hostile, where the acquirer purchases the necessary shares directly from the shareholders of the target (Chakravorty, 2012). In hostile deals the management can employ a variety defensive tactics to countervail a takeover attempt (e.g. poison pills, lock-ups, white knights, to name a few). Hence, friendly mergers attempts are expected to be more likely to be completed. I consider merger attempts that are considered as being hostile or where the target employed a defensive tactic as being ‘not mutual agreed’, and consequently less certain to be completed.

Table 1 provides an overview on the selected independent variables, their categories, and their conceptual level of uncertainty with respect to the completion likelihood of a merger attempt.

Name	Categories	Level of Uncertainty
<i>Method of Payment (MP)</i>	Cash	Low
	Hybrid	Medium
	Stock	High
<i>Termination Agreement (TA)</i>	Yes	Low
	No	High
<i>Not Mutual Agreed (NMA)</i>	Yes	High
	No	Low

Table 1. Independent Variables

Dependent Variables

‘Information Generation’ (H1): The amount of information that is generated can be measured by information quantity (Wasko & Faraj, 2005). Therefore, I measure the quantity of information by the number of occurring blog posts concerned with a merger between the date of announcement and the date of completion/abandonment of a merger attempt.

‘Information Depth’ (H2): As suggest by Mudambi & Schuff (2010), review depth of a provided messages in the context of online product reviews can be measured by the number of words of a message, representing a proxy for information diagnosticity. I adopt this approach to measure the depth of the provided information of blog postings that are concerned with a merger attempt by using the average word count of overall blog postings between the date of announcement and the date of completion/abandonment of the merger attempt.

‘Variety of Information’ (H3): My first approach to measure the variety of information is by looking at the number of unique blog sources that are concerned with a merger, which I will refer to as ‘Media Variety’ in the following. My second approach, in order to assess the different opinions and interpretations concerned with a merger, is to look at the overall ‘disagreement’ among blogs that cover a specific merger. I use the standard deviation of the sentiment polarity of blog posts that cover a merger as a proxy for disagreement among blogs (Antweiler and Frank, 2004). In so doing, I obtain sentiment scores (positive and negative) of individual words in each blog post by using a computer-assisted approach for content analyses of textual data (General Inquirer) (Stone et al., 1966). Then I calculate the polarity of each blog post according to the following formula (Zhang and Skiena, 2010):

$$\text{Polarity} = (\text{Number of positive words} - \text{Number of negative words}) / (\text{Sum of positive and negative words}) \quad (1)$$

Table 2 provides an overview on the selected dependent variables.

Name	Description
<i>Information Generation (IG)</i>	Number of blog posts
<i>Information Depth (ID)</i>	Average word count of blog posts
<i>Variety of Information (VI)</i>	Media Variety (M-VI): Number of unique blog sources
	Disagreement (D-VI): Standard deviation of the sentiment polarity of blog posts

Table 2. Dependent Variables

Dataset Description

All merger-related information has been retrieved form Thomson Reuters SDC Platinum database (SDC). My sampling objective was to build a sample of publicly traded firms where a merger is announced that is later either cancelled or completed. In July 2012, I identified 28,933 (U.S. only) M&A transactions on the SDC database that have been announced in the time period between 1/1/2008 - 12/31/2011. From the previous results 5,022 observations have been classified as mergers by the SDC. To ensure that the transaction would be of interest to private investors, I only took those mergers into my sample, where according to the database the acquirer and the target are public companies, leaving me with 640 observations. In addition, the deal value had to be greater or equal \$100 million, in order to ensure blog coverage of merger events, leaving me with 323 observations. The deal status of the merger has been restricted to be either ‘completed’ or ‘withdrawn’, because I want to focus only on those transactions where the outcome was already known, finally leaving me with 318 observations. Table 3 provides a descriptive statistic of the merger data sampling process.

No. of Observations after Query	Query Description
28,933	SDC M&A (US only) announced between 1/1/2008 and 12/31/2011
5,022	Merger transactions only
640	Public companies only
323	Deal value is \$100 million or higher
318	Deal status is either 'completed' or 'withdrawn'

Table 3. Merger Data

Lexis-Nexis, a database of legal and journalistic documents, was used for gathering the required blog data. This database provides access to blog postings via the blog content aggregator Newstex. Newstex's service 'Newstex Blogs On Demand' provides full-text blog content from a large amount of blogs covering a wide variety of topics, including, among others, economic and finance topics. Lexis-Nexis enables the use of search strings. To maximize the accuracy of search results for blog content that is related to a specific merger, I used the following Boolean search expression for each of the 318 identified mergers: 'name of the acquirer' AND 'name of the target company' AND 'merger'. The date range was set according to the merger's date of announcement and the date of either its completion or cancelation, which have been retrieved from the SDC database. The blog results provided me with the following information for each discovered blog post: source of the blog post, publication date of the blog post, and the full text of the content of the blog post (including the title). From the 318 previously identified mergers, 254 were covered by at least one blog during the above mentioned time period. Table 4 provides a descriptive statistic of the blog data sample.

Blog Database	Newstex
Identification of blog posts	Boolean search string: 'name of the acquiring company' AND 'name of the target company' AND 'merger'
Time period	From the announcement date to the date of merger completion/cancelation
Search results	Source of the blog, date of the blog post, and the full text of the blog content
Number of mergers covered by blogs	254
Average number of blog posts per merger	17.94
Average number of words per blog post	811.22
Average number of unique blog sources	7.64

Table 4. Blog Data

Analysis Method

For the following tests I compare independent samples of blog data representing different levels of uncertainty. As stated in a previous section, in the case of a merger event different factors do exist that can serve as an indicator for the likelihood of a merger being either completed or canceled. According to the previously presented measures of uncertainty I can deduce the uncertainty about the completion likelihood of a merger attempt being either 'high' or 'low' in the case of the variables TA and NMA, or 'high', 'medium', and 'low', in the case of the variable MP. In so doing, I test if different levels of uncertainty lead to different levels in the previously stated dependent variables. In the following *** indicates 1% level of significance.

The sampling distributions of the different data samples are not normally distributed (Kolmogorov-Smirnov test and Shapiro-Wilk test have been applied) and the sample sizes are not big enough in several cases in order to assume the sampling distributions to be approximately normal distributed. Therefore, I applied several nonparametric tests to test the previously stated hypotheses. In the case of nonparametric tests no assumptions about the shape of a population have to be made (Weiers et al., 2005).

Firstly, in order to compare two independent samples, with respect to the dependent variables TA and NMA, I applied the Mann-Whitney U-Test. Secondly, in order to compare more than two independent samples, with respect to the dependent variable MP, I applied the Kruskal-Wallis H-Test. The results of these tests are stated and discussed in the following section.

RESULTS

Table 5 states the results of the Mann-Whitney U-Test that compares merger deals where no ('No') termination agreement exists with those where at least one of the two involved parties agreed to a termination fee agreement ('Yes'). The Mann-Whitney U-Test in this case states that there is no significant difference between the ranks of the two types of merger deals. This means that deals with or without a termination agreement do not differ with respect to the different dependent variables, showing no support for the previously stated hypotheses.

Termination Agreement (TA)		N	Mean Rank	Mann-Whitney-U	Z	p
<i>Information Generation (IG)</i>	No	39	134.86	3905.5	-0.682	0.495
	Yes	215	126.17			
<i>Information Depth (ID)</i>	No	39	131.37	4041.5	-0.358	0.721
	Yes	215	126.8			
<i>Media Variety (M-VI)</i>	No	39	130.62	4071	-0.29	0.7
	Yes	215	126.93			
<i>Disagreement (D-VI)</i>	No	33	103.56	2856.5	-0.3	0.7
	Yes	179	107.04			

Table 5. Termination Agreement

Furthermore, table 6 states the results of the Mann-Whitney U-Test that compares merger deals that are mutual agreed by the two involved parties ('No') with those that are not mutual agreed ('Yes'). The Mann-Whitney U-Test in this case states, with respect to the different dependent variables (except in the case of 'Disagreement'), that there is a significant difference (on the 5% level of significance) between the ranks of the two types of merger deals. This means that deals that are mutual agreed or are not mutual agreed do differ significantly with respect to the different dependent variables. Furthermore, in the case of IG, ID, and M-VI the mean rank of the merger deals that represent a 'low' uncertainty concerning the likelihood of a merger being completed is lower than for mergers that are more uncertain concerning their completion. This shows strong support for the three previously stated hypotheses. Whether a merger is mutual agreed or not seems as a convincing and obvious measure to judge if a merger attempt is more likely to be completed or not, because if the management of the target company does not agree with the merger plans of the acquirer, the target company will most likely take actions against the merger attempt. In summary, higher uncertainty related to a merger attempt is related to more comprehensive information that is generated by a variety of blogs.

Not Mutual Agreed (NMA)		N	Mean Rank	Mann-Whitney-U	Z	p
<i>Information Generation (IG)</i>	No	236	124.12	1326.5	-2.664	0.08**
	Yes	18	171.81			
<i>Information Depth (ID)</i>	No	236	124.49	1414	-2.363	0.018**
	Yes	18	166.94			
<i>Media Variety (M-VI)</i>	No	236	124.91	1513.5	-2.048	0.041**
	Yes	18	161.42			
<i>Disagreement (D-VI)</i>	No	195	107.71	1421	-0.975	0.33
	Yes	17	92.59			

Table 6. Not Mutual Agreed

At last, table 7 states the results of the Kruskal-Wallis H-Test that compares three types of merger deals according to the method of payment ('Cash', 'Hybrid', and 'Stock') with respect to the different dependent variables. In contrast to previous results, the Kruskal-Wallis H-Test in this case states, with respect to the dependent variables IG, ID, and M-VI, that there is no significant difference between the ranks of the three types of merger deals. Hence, I find no support for the three

previously stated hypotheses. Nevertheless, in the case of 'Disagreement' the Null-Hypothesis can be rejected, but only at a 10% level of significance. Accordingly, I applied a post-hoc test to analyze if the different method of payments are significant different from one another in this case (table 8).

Method of Payment (PA)		N	Mean Rank	Chi-Square (H)	df	p
<i>Information Generation (IG)</i>	Cash	115	117.35	3.178	2	0.204
	Hybrid	84	135.49			
	Stock	49	122.45			
<i>Information Depth (ID)</i>	Cash	115	134.61	4.295	2	0.117
	Hybrid	84	116.63			
	Stock	49	114.27			
<i>Media Variety (M-VI)</i>	Cash	115	117.05	3.421	2	0.181
	Hybrid	84	135.82			
	Stock	49	122.57			
<i>Disagreement (D-VI)</i>	Cash	94	93.11	5.941	2	0.051*
	Hybrid	74	115.11			
	Stock	39	109.17			

Table 7. Method of Payment

Table 8 shows that only deals with the payment method 'Cash' and 'Hybrid' are significantly different from one another (on the 5% level of significance). Deals with 'Cash' (low uncertainty) as the method of payment show a lower standard deviation of blog sentiment, which is in favor of the third hypotheses. Nevertheless, 'Cash' and 'Stock deals are not significantly different from one another. Therefore, I cannot fully conclude that 'Method of Payment' is related to 'Disagreement'.

Method of Payment (PA)		Mean Rank	p
<i>Cash & Hybrid</i>	Cash	76.59	0.017**
	Hybrid	94.55	
<i>Hybrid & Stock</i>	Hybrid	58.05	0.638
	Stock	55	
<i>Cash & Stock</i>	Cash	64.03	0.167
	Stock	74.17	

Table 8. Post Hoc – Disagreement (D-VI)

SUMMARY AND CONCLUSION

In this paper I have explored information processing activities on blogs related to merger-related uncertainty. My analysis covers merger events and the respective blog posts that occurred between the date of announcement and final date of completion/cancellation of a respective merger transaction. From an information processing and sense-making perspective I generally hypothesized that higher levels of merger-related uncertainty relates to higher levels of information processing in social media. I investigated this with respect to the uncertainty concerning the completion likelihood of a merger and the corresponding blog posts. I hypothesized that the higher the uncertainty the more information is generated, and the higher the depth and the variety of generated information. This was strongly supported in the case of 'Not Mutual Agreed' as an uncertainty measure concerning the completion likelihood of a merger.

In a financial context, research on social media was mainly concerned with the impact of online communication and information exchange in order to make predictions about the market reaction (Antweiler and Frank, 2004). Hermann (2007)

already stated the relevance of the sense-making process of individuals in the financial context. My analysis provides first hints concerning information processing and sense-making in social media with respect to the financial domain in general, and in particular, with respect to merger events. Furthermore, my study provides additional insights on information processing in social media, because the results show that financial event-related uncertainty can be related to information processing activities in social media.

LIMITATIONS AND FURTHER RESEARCH

While my results provide empirical insights into information processing in social media, my research provides motivation for future research directions in this field. My research is based on basic measures that I aim to refine in future research in order to capture and explore more deeply information processing in social media. Because it is of highest practical relevance to examine information processing in social media in order to understand better how and why different types of social media are selected and used, a phenomenon that has increased exponentially over the last decade, I aim to combine different types of social media in one analysis.

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