

## HOW INVESTORS VALUE INDUSTRIAL POLICIES FOR E-BUSINESS FIRMS IN EMERGING MARKETS

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### ABSTRACT

E-business has created new industries that have added numerous new firms to world exchanges. Moreover, industry policies are important for e-business development in emerging markets. However, extant research on a linkage between e-business and financial performance has focused mostly on the influence of firms' behavior in developed markets, and understanding is limited regarding the effects of government administration on financial outcomes of firms in emerging markets. Therefore, we investigated the impact of e-business industrial policies in these markets by examining corresponding financial market responses. Our empirical investigation included an examination of financial market responses to e-business industrial policies released in China's emerging market. Specifically, we conducted an event study to investigate the impact of released policies on stock values of e-business firms. Our empirical analysis revealed the following. First, two types of industrial policies that facilitate e-business are associated with opposite abnormal returns on the release date. Specifically, concrete positive policies produce positive abnormal returns, while positive policies that are more general produce negative abnormal returns. Second, not all firms benefit equally from e-business policies. Specifically, policy value is strengthened or weakened by research and development and advertising expenditures. Therefore, managerial implications are applicable to investors, firms, and government.

Keywords: e-Business; Industrial policy; Financial value; Emerging market; Event study

### 1. Introduction

E-business plays an important role in the new economy [Jorgenson 2001]. With the corresponding creation of new industries, numerous firms have been introduced to the various world exchanges. Many new firms have become large enough to be listed on the S&P 500 and the Dow Jones Industrial Index [Singh et al. 2005]. E-business relies heavily on new products and technology, so the costs of research and development (R&D) can be substantial; furthermore, success based on such expenditures is far from certain [Srinivasan et al. 2009]. Investors who are motivated by cash flow expectations—in particular, the prospects of accelerating future cash flows and reducing associated risks [Srivastava, Shervani, and Fahey 1998]—must consider both the (expected) benefits and the downsides (technology complexity and benefit uncertainty). Therefore, e-business firms would be better off not only pursuing the traditional objective of increasing market share or corporate growth but also maximizing shareholder wealth within the overall framework of a country's industrial policy [Singh 1999, 2000]. Moreover, understanding the financial market response to e-business industrial policies is important because a firm's financial health is not

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only the ultimate measure for the success or failure of any strategic initiatives [Luo and Bhattacharya 2006] but also one of the most important measures of public policy effectiveness [Schwert 1981].

E-business in developed countries is growing continuously and it has grown in emerging markets as well. For example, as the Chinese government presented in its “Decision of the State Council on Accelerating the Fostering and Development of Strategic Emerging Industries,” e-business is one of the most important industries in China because of its contribution to the national economy [Chao et al 2012]. E-business firms are growing rapidly in China’s capital market; their average rate of growth in terms of total stock market value is over 100% per year [www.Sohu.com 2012]. However, emerging markets have certain characteristics that create a distinctive environment for e-businesses. First, the “visible hand” of the government is more powerful in emerging economies than in mature markets. In mature markets such as the U.S., the stock market and the venture capital market provide firms with cheaper external sources [Allen, Chui, and Maddaloni 2004]. In emerging markets, however, these high-growth and high-risk e-business firms are supported financially or non-financially by governments. For example, the Korean government has encouraged firms to introduce new products and industrial processes through an active and interventionist industrial policy [Singh 1998]. Further, the government of Israel has encouraged technological development through the creation of infrastructure and physical facilities for prospective entrepreneurs [United Nations 1999]. Finally, the Indian government has nurtured the growth, development, and maturing of industry through a variety of channels including financial resources, tools, professional guidance, and administrative assistance [Singh et al. 2005].

Second, unlike mature stock markets in developed countries, emerging stock markets are under-regulated and deficient in gathering information and disseminating it to private or public organizations [Singh 1998]. Investors in these markets are still not mature enough to make investment decisions based on complete evaluations of firms.

In emerging markets, e-business industries operate in immature environments with insufficient infrastructure, low acceptance of IT technology, and lack of trained manpower [Summers 1998; Gupta et al. 2010]. Therefore, firms operating in emerging markets face more uncertainty regarding future profits and market value than similar businesses in developed countries.

Despite the above, emerging markets have become increasingly more important in the global economy in recent decades. Economic crises in developed countries have fostered the realization that stakeholders (e.g., government, companies, and investors) must understand how investors in emerging markets value e-business industrial policies.

To our knowledge, however, the extant research in information-systems (IS) literature regarding the linkage between business and financial performance has mainly focused on the impact of firms’ behavior in developed markets. These studies have addressed initiatives regarding new products in the virtual world [Yang et al. 2012], an e-commerce launch [Dewan and Ren 2007; Subramani and Walden 2001], enterprise resource planning (ERP) investments [Ranganathan and Brown 2006], implementation [Hayes et al. 2001], and e-business infrastructure investments [Chatterjee, Pacini, and Sambamurthy 2002]. Moreover, these studies have revealed consistently that the market reacts quite favorably to announcements related to these initiatives [Dos Santos, Peffers, and Mauer 1993; Chatterjee, Pacini, and Sambamurthy 2002; Dehning, Richardson, and Zmud 2003; Anderson, Banker, Ravindran 2006]. IS literature indicates, however, that there is still a limited understanding of whether and how government administration at the industry level affects firms’ financial outcomes (e.g., market value). One possible reason is that most of the evidence is from developed economies (e.g., the U.S.), in which “market power” is dominant and governmental industrial policies are restricted. In certain emerging markets, the effect of government intervention is strong for industries (e.g., e-business) that are critical to the national economy and people’s livelihood [Ma, Delios and Lau 2013]. Yet, the impact of e-business industrial policies on stock markets has been underexplored.

There is a stream of literature on the impact of government policies on firms’ financial performance in other contexts. For example, regarding the food consumption sector, Ghani and Childs [1999] reported the adverse impact on shareholders’ wealth from the passage of the Nutritional Labeling and Education Act of 1990 (NLEA). Further, Mathios [2000] found that sales of high-fat dressings declined after nutritional disclosures required by the NLEA were introduced. Bollinger, Leslie, and Sorensen [2011] found that the law that requires mandatory posting of calories on menus in New York City, implemented in mid-2008, increased Starbucks’ revenue. For drug makers, legislation to subsidize prescription drug insurance for Medicare recipients sharply increased profitability of the drugs, as illustrated by the high Medicare market share in 2003 [Friedman 2009]. Konar and Cohen [1997] reported that mandatory disclosure of toxic chemical emissions caused related chemical firms to experience their largest decline in stock prices. Most of these studies have focused on regulations that usually impose constraints on industry; however, further research is needed to study resource policies that appear to support industry. Furthermore, these studies have not clarified whether different types of policies (i.e., general vs. concrete) cause a variance in the financial impact on firms within the same industry, even if the policies have the same incentives as motivation. Finally, these studies have not included analyses regarding firms’ efforts to enhance their financial market

performances supported by resource policies. An understanding of these issues provides important reference material for governments regarding the need to develop more effective industrial policies. Furthermore, understanding the differential effects of the interactions between e-business industrial policies and marketing investments allows firms to make determinations regarding allocating their limited resources to create the most impact. In other words, firms must identify the best strategies for creating profit and wealth for shareholders.

To fill the literature gaps, we investigated the impact of e-business industrial policies in emerging markets by examining financial market responses to these policies. We developed a conceptual framework concerning the impact of the release of such policies on firms' financial values. Specifically, we investigated whether listed e-business firms gained significant abnormal returns when e-business industrial policies were released, as this issue appears to be central to policy makers when locating resources for e-businesses in emerging markets. Additionally, we examined: (1) how investors in emerging economies respond to e-business industrial policies (i.e., whether the impact of general vs. concrete e-business industrial policies affects stock returns differently), and (2) how marketing strategies (i.e., advertising and R&D) complement or diminish the effects of industrial policies.

We empirically investigated these issues by examining the financial market responses to e-business industrial policies released in China's rapidly growing emerging market. Specifically, we conducted an event study to investigate whether and how e-business firms' stock values were affected by the release of industrial policies. Our empirical analysis revealed some interesting findings. First, two types of industrial policies that facilitate e-business were associated with opposite abnormal returns at the time of policy release. Specifically, concrete positive policies produced positive abnormal returns while positive policies lacking sufficient details produced negative abnormal returns. Second, we found that not all firms benefitted equally from e-business industrial policies. We learned that the financial value of such policies was strengthened or weakened by R&D and advertising expenditures.

We have organized the remainder of this article as follows. In the following section, we provide an overview of China's e-business industrial policies and develop our hypotheses concerning their impact on financial markets in emerging countries. We then describe our methodology for data and estimation and present empirical findings. Finally, we conclude with a summary, a discussion of managerial and policy implication, and suggestions for further research.

## 2. Background and Hypothesis Development

### 2.1 E-business Industry and Industrial Policy in China

E-business is defined as the application of information and communication technologies (ICT) in support of business activities. Commerce constitutes the exchange of products and services between businesses, groups, and individuals and can be seen as an essential activity of any business. Electronic commerce focuses on the use of ICT to facilitate the external activities and relationships of a business with individuals, groups, and other businesses [Beynon-Davies 2004]. The e-business industry includes applications of computer and communication industries and other Web application and information service providers (Chinese Industry Classification Standard). On the one hand, e-business is one of the most important industries of China's national economy; in fact, it is not only one of the strategic emerging industries but also one of the country's mainstay industries. On the other hand, e-business in China is still in an early stage, and government administration plays an important role in the industry's development. For example, the Twelfth Five-Year Plan of the e-business industry and other sub-industry plans such as the "Development Plan of Software and Information Service," the "Development Plan of Internet Service Providers," and the "Development Program of Internet of Things" provide guidance for the e-business industry at different levels.

### 2.2 Financial Impact of E-business Industrial Policies in Emerging Markets

In this study, we have focused on policies that result in the distribution of government assistance to industries. A change in these types of policies such as subsidies, research grants, low-interest loans, and tax exemptions alters the relative profitability and value of firms [Hartigan, Philip, and Sreenivas 1986]. Therefore, if future profits of an industry are expected to change because of alterations in industrial policies, the value of equities in that industry will be adjusted accordingly. Market investors have incentives to include all the idiosyncrasies that relate to a particular industry [Mahdavi and Amala 1994]. Thus, it seems that a new industrial policy designed to assist e-businesses may impact market values of e-business firms positively.

However, not all positive policies assisting industry lead to investors' positive responses in the stock market. The possible outcomes concerning financial market responses to launches of industrial policies are negative if the policy is too general and positive if the policy is concrete (specific). Generalizing from relevant literature concerning trade and industry policies [Mahdavi and Bhagwati 1994; Grossman and Levinsohn 1989; Lenway, Rehbein, and Starks 1986; Hartigan, Perry, and Kamra 1986], we concluded that concrete policies can clarify how governments

redistribute public assistance to industries through debt guarantees, low-interest loans, subsidies, etc. In contrast, general policies merely present the attitudes of a government or political party toward trade and industry. For example, such policies tend to be more protectionist or free-trade oriented but they do not clarify which instruments governments prefer to favor industries.

Investors may respond negatively to the launch of a positive but ambiguous industry policy; thus, e-business firms may experience negative abnormal returns at the time of a policy release. First, informed investors may have incorporated positive signals from policies into expectations of share price and “take profit” by pulling back the share price at the time of a policy launch. Efficient market theory suggests that as soon as a future change in profitability is anticipated, this information is incorporated immediately into the share price [Fama 1969]. Policymaking takes considerable time and involves research, consulting, proposals, hearings, and the attainment of enough votes to pass. During this process, a government can express its intentions through various media and networks including newspapers, journals, television, and academic/professional seminars [Wood 1985; Mahdavi and Amala 1994]. Before a policy is released, it is possible that recognition of governmental support is seized by sensitive investors who incorporate the positive signal into their expectations regarding share prices [Ghani and Childs 1999]. Furthermore, optimistic investors tend to expect more positive terms [Samuelson 1965]. Prospect theory suggests that under uncertain conditions, people value utility depending on the difference between results and prospects (i.e., expectations, assumptions) instead of just results [Kahneman and Tversky 1979]. According to the prospect theory, when a policy that is too general is officially released, informed investors who do not receive the expected news regarding its likely market impact will be disappointed and consequently may not respond positively to the official release. Moreover, without further encouragement regarding a potential positive impact on value, some investors who might be willing to convert the increase in an asset’s market value into cash could sell their shares in e-business firms when the asset has risen. Profit taking by a number of investors normally pushes share prices temporarily downward [Daniel, Hirshleifer, and Teoh 2002]. Therefore, these two trends could cause negative abnormal returns in the short term among investors.

Second, investors may respond negatively to positive policies that are too ambiguous because they do not reduce perceived industry risks. Farrell, Ferris, and Reichstein (1985) and Mitchell (1999) have suggested that perceived risk explains behaviors of investors who are typically motivated to avoid mistakes and monetary loss (i.e., risk aversion). Besides systematic risks (e.g., inflation, rising interest rates, and currency risk), perceived risk is also associated with certain idiosyncrasies [Hamilton 1994]. For e-business firms, industry-specific risks are technological, organizational, and benefit-related [Keil et al. 1998]. Technological complexity causes these firms to fail to deliver efficient implementation on time and on budget and thus contributes to delays in realizing revenue benefits [Davenport 1998; Rigby, Reichheld, and Schefter 2002]. As a result, technological risks often increase the costs and time of a project and decrease the overall return on investment (ROI). Organizational risks (e.g., a lack of top management commitment and user involvement) impact the effectiveness and efficiency of e-business, thereby influencing the ROI. Benefit risk refers to the failure of an e-business to achieve an estimated increase in sales or profits [Cheng and Lyu 2003]. Clearly, major risks regarding the ROI of e-businesses [Keil et al. 1998] may ultimately influence investors’ decisions.

As e-businesses are still immature in emerging markets, they are characterized by insufficient infrastructure, lack of required knowledge/skills by user support personnel, and inappropriate staffing [Summers 1998; Ye et al. 2013]. These businesses face more uncertainty regarding profits and future growth than in developed countries and thus aggravate investment risks. In developing countries, government policies affecting industry include financial assistance (e.g., subsidies, low-interest loans, and tax exemptions) and non-financial assistance (e.g., manpower training, promotion of exports, infrastructure, legal regulations, and marketing assistance); thus, risks regarding e-business development are reduced [Singh et al. 2005]. Not surprisingly, investors often search for guarantees from the government regarding policies or regulations [Daniel, Hirshleifer, and Teoh 2002]. Unfortunately, policies that are too general do not inspire enough confidence to cover the specific perceived risks of e-business investments. These risks may suggest a vulnerability to future uncertain cash flows, which would throw corporate capital budgeting into disarray and create conditions for higher capital-financing costs, thus damaging a firm’s stock value [Luo and Bhattacharya 2009]. As a new industrial policy is released, investors tend to be highly efficient at incorporating these perceived risks into their expectations about industry-share prices [Hughes, Lenway, and Rayburn 1997]. Thus, investors form lower expectations regarding future financial values because of the uncovered risks and may respond negatively to the announcement of a policy that is too general.

We hypothesize that the negative perception of a proposed policy and the anxiety associated with perceived investment risk leads investors to respond negatively to the release of policies that are too general, although such policies may seem positive for e-businesses.



*H1: The release of a positive e-business industrial policy that is too general (without details) creates negative abnormal stock returns for e-business firms in emerging markets.*

On the other hand, investors may respond positively to the launch of a concrete positive e-business policy, and related firms may experience positive abnormal returns at the time of policy release. Investors may react positively to a concrete policy because it may decrease their perceptions regarding idiosyncratic risks as mentioned above. Ang and colleagues [2006] have shown empirically that firm-idiosyncratic risk is priced by investors in financial markets. Concrete positive policies reduce investors' perceived risks by weakening their uncertainty about ROI, thereby decreasing the volatility of a firm's stock price.

As an example of a concrete positive policy, China's development plan to boost the Internet of Things includes detailed terms. In this plan, subsidies, low-interest loans, and tax exemptions can compensate for possible overspending on a project and an unexpected loss of benefits. Infrastructure supported by government can facilitate the implementation of IT technology in Internet of Things projects, and staff training can equip firms with skilled personnel to operate such projects; thus, these concrete details may reduce the technological and organizational risks for participating firms. We observed that on the effective date of a plan release, stocks for related sectors (e.g., Internet service providers, information facilities, and chip manufacturers) increased by more than 2% (<http://stock.stockstar.com/SS2012082200002181.shtml>). Therefore, a concrete positive policy helps a firm build a bulwark against a future loss of economic value, which likely reduces the vulnerability of future cash flows.

As an example of the realization of expected positive financial outcomes from a concrete policy, the French government in 1993 offered a rebate to consumers who were willing to trade in their old cars for new models that emitted fewer pollutants. The goal of the rebate was to promote environmental-friendly auto technology; specifically, the rebate was restricted to the purchase of French automobiles, as the government had offered subsidies to automakers agreeing to adopt cleaner technology. The concrete details of the rebate helped French automakers. One measure of the value of the government handout to Peugeot-Citroen is to estimate how much the rebate affected the company's sales in 1984. It is estimated that 7% of Peugeot's increased sales in 1984 were due to the rebate [*The Economist* 1995].

Overall, given the positive stimulus to investors and perceptions of reduced risk based on concrete policy announcements in emerging markets, the announcement of concrete e-business industry policy may also create positive abnormal returns for those firms.

*H2: The release of a positive e-business industrial policy that is concrete (specific) creates positive abnormal stock returns for e-businesses in emerging markets.*

### 2.3 Moderate Effects of R&D and Advertising

Industry policy may not yield universal performance impact for all e-businesses. We have presumed that industry policies have varying effects on firm value depending on two key strategic levers: R&D and advertising. R&D investment ensures a firm's innovative capability. Fichman (2004) explained that innovative capability improved by R&D is central to competitive positions or value propositions of e-businesses. Whereas R&D often increases a firm's stock returns [Mizik and Jacobson 2003], advertising is a value-appropriation strategic action that can foster brand and customer equity. Ultimately, advertising leads to future sales, profits, and shareholder wealth [Joshi and Hanssens 2009]. Further, some literatures have claimed the moderating role that R&D and advertising plays on a firm's market value. Luo and Bhattacharya [2009] reported that R&D and advertising leverage the impact of a firm's social performance on its idiosyncratic financial risk. Wiles, Morgan, and Rego [2012] found that marketing capability derived from R&D and advertising expenditures moderate abnormal stock returns due to brand acquisition and disposal. Therefore, we examined how investing in R&D and advertising affect the short-term financial market value of industry policy geared toward e-businesses.

Although some intangible resources including reputation, number of trademarks owned, and number of patents [Simon and Sullivan 1993] may impact a firm's value, the characteristics of the e-business industry in emerging markets limit these effects. First, e-business in emerging markets is still immature as many listed e-business firms do not have sufficient track records to establish reputations [Singh et al. 2005]; furthermore, there are few third parties with enough public trust to rank the reputations of e-business firms. Second, in emerging markets, much of the public appears to have weak brand consciousness [Sheth 2011] and consequently they are less aware of brand differentiation compared with the public in more developed markets ([Atsmon, Kuentz, and Seong 2012]. Finally, firms cannot benefit efficiently from their patents because of the lack of effective legal protection for patent rights in emerging markets [Lovas 2012]. Thus, reputation and the number of trademarks and patents that e-business firms owned seem to hardly influence the investor's decision.

#### 2.3.1 Research and Development (R&D)

We have presumed that R&D plays a contradictory role regarding the effects of e-business policies on abnormal returns by negating the undesirable effects of general policies and complementing the positive effects of concrete

policies. Regarding risk reduction, firms with a greater commitment to R&D enjoy less systematic risk [McAlister, Srinivasan, and Kim 2007]. Although a short-term risk may be apparent, R&D activities offer “the possibility of greater long-term financial gain given the possibility of their innovation” [Moorman and Miner 1997, p. 94].

By focusing on risk reduction, we examined the impact of R&D on the values of e-businesses following the release of general industry policies. Policies that are too general are not likely to reduce universal risks. Further, firm-idiosyncratic risks in organizations with higher R&D investments appear to be lower than those in firms with lower R&D investments. Specifically, R&D is a consistently important determinant of new product or technological success [Montoya-Weiss and Calantone 1994]. Firms engaging in R&D can advance their capabilities to adopt new technology and reduce risk resulting from failure to deliver e-business projects on time and on budget. Firms engaging in R&D can also generate incentive systems to encourage people who support and use the project, thus reducing organizational risk. In summary, R&D investments reduce firms’ vulnerabilities associated with cash flow by demonstrating innovativeness. Therefore, we expect that greater R&D expenditures will ensure less stock-price volatility that general positive can not cover.

*H3: For e-businesses, R&D expenditures weaken the negative impact on abnormal stock returns of a positive industrial policy that is too general.*

Regarding value creation, R&D’s superior strategic implications may improve competitive advantages, which could subsequently translate into increases in the expected values of net payoffs. Previous IS event studies have consistently revealed that the market reacts favorably to announcements related to new e-business investment [Dos Santos, Peffers, and Mauer 1993; Chatterjee, Pacini, and Sambamurthy 2002; Dehning, Richardson, and Zmud 2003; Anderson, Banker, and Ravindran 2006]. In addition to short-term effects on organizational performance, R&D creates intangible assets that can boost long-term cash flow while reducing volatility [Srivastava, Shervani, and Fahey 1998]. R&D is widely regarded as necessary for long-term survival and as an engine of growth, thus enhancing cash flow and future profitability [Sorescu, Shankar, and Kushwaha 2007]. Evidence regarding new product introductions in the personal computer market suggests that enhancement in cash flow occurs as a result of reduced selling and general administrative expenses [Bayus, Erickson, and Jacobson 2003].

With an understanding regarding value creation, we examined the impact of R&D on the values of e-businesses when concrete industry policies were released. These policies extend privileges to the entire e-business industry and greater R&D investments tend to enlarge benefits. Firms that devote more resources to R&D may strengthen their ability to innovate and develop new products [Mizik and Jacobson 2003], thus generating more business. As e-businesses demonstrate increased innovation, they become eligible for further subsidies and research grants that concrete policies offer. Moreover, new business that is generated by R&D enables firms to benefit from advanced infrastructure and additional labor resources that are associated with concrete policies. Finally, as e-businesses develop new products and services and show evidence of increased sales, they can enjoy more tax exemptions resulting from concrete policies. Overall, we postulate that firms with higher R&D expenditures benefit the most from the release of a concrete industry policy that fosters positive stock returns for the entire e-business industry.

*H4: For e-businesses, R&D expenditures strengthen the positive impact of concrete industrial policies on their abnormal stock returns.*

### 2.3.2 Advertising

Advertising has two important roles—to persuade (i.e., to signal quality and improve confidence) and to inform (i.e., to increase awareness and provide information)—as indicated by Akerberg [2001]; Bagwell [2007]; and Grossman and Shapiro [1984]. Regarding the persuasive role of advertising, research on signaling suggests that when uncertainty about product quality arises, a high-quality firm may utilize advertising spending to distinguish their product from low-quality competitors [Erdem and Keane 1996; Milgrom and Roberts 1986; Nelson 1974]. Advertising also goes “beyond the customer” in that its effects spill over to other stakeholder groups including suppliers, employees, and investors [Luo and Bhattacharya 2009]. Several studies have documented that a firm’s advertising affects stock returns [Grullon, Kanatas, and Weston 2004; Luo 2008]. In particular, stock markets in emerging markets are under-regulated and deficient in gathering information and disseminating it to private or public organizations. Additionally, listed e-business firms do not have sufficient track records to establish reputations [Singh et al. 2005]. Thus, investors in emerging markets are more likely to rely on certain signals such as advertising to infer firms’ future financial values.

Apart from persuasion, advertising also affects stock returns by promoting awareness. Servaes and Tamayo (2013) found that firms with higher levels of advertising generate greater market awareness, which moderates the relationship between corporate social responsibility (CSR) and firm value. There has been some evidence that advertising helps investors become more familiar with firms [Grullon, Kanatas, and Weston 2004; Barber and Odean 2008]. Advertisements are “communicators of identity” [Bhattacharya and Sen 2003, p. 78] that inform stakeholders about a firm’s operations and core values; through repetition, advertising helps keep a firm’s identity salient for

stakeholders. When investors retrieve “characters of e-business” for advertising firms from memory, it is more likely that they will associate the impact of related industry policies with these firms. Moreover, we argue that advertising ensures that the positive or negative impact of industry policy on stock returns will become more salient to investors. Chen, Liu, and Zhang [2012] have provided evidence that the awareness role of advertising has an interactive effect with other information in the stock market; specifically, advertising enhances the positive or negative effect of a third party’s review of a firm’s value. Similarly, greater awareness and knowledge of a firm and its products may attract greater investor attention to firm-specific news such as industry policy. Thus, the effects of industry policies on firm value may be amplified either positively or negatively by the persuasion and awareness roles of advertising depending on the nature of the policies. Thus, we propose the following:

*H5: For e-businesses, advertising expenditures strengthen the negative impact on abnormal stock returns of a positive industrial policy that is too general.*

*H6: For e-businesses, advertising expenditures strengthen the positive impact on abnormal stock returns of a concrete industrial policy.*

### 3. Methodology

#### 3.1 Data

We empirically examined the impact of e-business industrial policies on financial markets in emerging economies by using Chinese e-business industrial policies released in 2007, 2010, and 2012. On July 10, 2007, the State Council of China released the Eleventh Five-Year Plan for the technology industry; then, on September 18, 2010, the State Council of China passed the Twelfth Five-Year Plan for the IT industry. Thus, the Chinese government was presenting its decision to speed up the cultivation and development of the e-business industry as one of the country’s strategic emerging industries. Although documentation shows that the two policies promoted a positive attitude toward the e-business industry, the guidelines were too general and ambiguous. We have referred to their release as event type 1, and we combined the sample of 312 firms (110 firms on July 10, 2007, and 202 firms on September 18, 2010) belonging to the e-business industry, according to China’s Industry Classification Standard (GB/T 4754-2011). In contrast, a series of more specific sub-industrial plans was released in 2012 regarding the Internet of Things, Internet service providers, and software and information services. These plans provided detailed measures to support e-business firms in these sectors, such as financial assistance, infrastructure, etc. Targets for industry size were presented as well. For these policies released that we classified as event type 2, a sample of 443 firms belonging to three sectors according to professional stock analysis agencies (i.e., stock star (<http://www.stockstar.com/>), eastmoney (<http://www.eastmoney.com/>) and great wisdom (<http://www.gw.com.cn/>)) was selected. We did not find that e-business policies in China were normally released in the sequence of general information first and specific information later. In other words, there was not a precedent for concrete policies to be released following a related general policy release for e-business in China. We collected the daily returns and corresponding market returns from a commonly used financial database for the Chinese stock market—RESSET Financial Research Database [Guo and Fung 2011; Huang and Li 2012].

#### 3.2 Event Study Methodology

We adopted an event study methodology to examine the impact of e-business industrial plans released in emerging markets. The event study has been widely used for analyzing short-term stock market returns [Kothari and Warner 2007]. In recent years, it has been used for examining the impact of IT strategies on stock market returns from new e-business product announcements [Yang et al. 2012], e-commerce launches [Dewan and Ren 2007], enterprise resource planning (ERP) investments [Ranganathan and Brown 2006], and e-business infrastructure investments [Chatterjee, Pacini, and Sambamurthy 2002].

Given the market-efficiency theory [Fama 1969], perfect information, and the rationality of investors, the effect of a relevant event should be reflected immediately in stock prices [Srinivasan and Hanssens 2009]. Thus, any abnormal change in the price of a stock because of the arrival of new information reflects the present value of all expected current and future profits from the new information [Sood and Tellis 2009].

We estimated the abnormal return associated with the event (i.e., the e-business industrial plan release using the ex-post stock return during the course of the event window minus the normal expected return). Specifically, we estimated the normal expected return using the market model [(MacKinlay 1997):

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \quad (1)$$

where  $R_{it}$  and  $R_{mt}$  are the daily returns of the stock  $i$  ( $i$  = publicly traded e-business firms) and a standard market portfolio at day  $t$ . Following the relevant literature, we used  $t = \{-270, \dots, -21\}$  as the estimation window for predicting normal returns of stock  $i$ , and the market portfolio according to our estimations. We then applied the

estimated  $\hat{\alpha}_i$  and  $\hat{\beta}_i$  in the event window to calculate the abnormal returns and cumulative abnormal returns of stock  $i$  in the event window as:

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \text{ and } CAR_{it} = \sum_t AR_{it}, \quad (2)$$

where  $AR_{it}$  and  $CAR_{it}$  denote the abnormal returns and cumulative abnormal returns for event window  $t$ .

Haleblian and Finkelstein [1999] have suggested that small-event windows may miss early market reactions, whereas large-event windows may capture information unrelated to an event. To capture a possible information leakage prior to an official announcement and the possible delayed responses after an official announcement, we calculated the cumulative abnormal returns at different event windows over five days (e.g., from  $-2$  to  $2$ ). This method is consistent with those used in previous event studies cited in the IS literature [Tanriverdi and Uysal, 2011; Yang et al. 2012].

### 3.3 Regression Analysis

To verify the moderate effects of R&D and advertising, we conducted a comparison. First, we developed a regression model of cumulative abnormal returns (CAR) as the dependent variable to further examine the impact of the release of an e-business industrial plan on abnormal returns occurring for the listed firm  $i$  by incorporating *advertising* and *R&D expenditure* as moderate variables [Wiles, Morgan, and Rego 2012]. Additionally, we included three control variables to manage the possible effects of firm characteristics on outcomes, as shown in the following equation:

$$CAR_{it} = \alpha + \beta_1 RD_{it} + \beta_2 AD_{it} + \beta_3 SIZE_{it} + \beta_4 DET_{it} + \beta_5 OWNER_{it} + \zeta_{it}, \quad (3)$$

where *AD* and *RD* denote the moderators for two types of strategies—*advertising* and *R&D expenditure*, respectively. We collected data for these expenditures from firms' annual financial reports for 2006, 2009, and 2011. In line with the literature [e.g., Belderbos 2003; Zhang et al. 2007], we measured *AD* and *RD* as total expenditures divided by assets.

By reviewing previous event studies for firms' market values, we also incorporated three control variables—*SIZE*, *OWNER*, and *DET*—to capture the impact of firm size [Dehning, Richardson, and Zmud 2003, Cheng 2005], ownership [Tanriverdi and Uysal 2011], and debt rate [Wiles, Morgan, and Rego 2012] on abnormal stock returns. Data on these three variables were collected from firms' annual financial reports. Following the literature [Zhang et al. 2010], we used the logarithm of total income to measure firm size. We used the share rates that state owners hold to measure ownership, as these rates are indicative of government intervention in firm governance [Claessens, Djankov, and Lang. 2000]. Tables 1a & 1b summarize the variables incorporated in the regression model and their descriptive statistics.

Second, we ran an additional regression as the benchmark. This regression was generated based on the historical data set when there was no release of policies. Drawing on the method of Joshi and Hanssens [2010] and Vitorino [2014], we used the stock return for the period without the release of any policies as the dependent variable.

Table 1a: Descriptive Statistics of Variables of Event 1

Variables	Mean	Std.	Min.	Max.
R&D Expenditure (RD)	0.338	0.143	0.114	0.750
Advertising Spending (AD)	0.134	0.112	0.013	0.562
Debt (DET)	0.347	0.201	0.018	0.837
Firm Size (SIZE)	20.145	1.244	16.348	23.319
Ownership (OWNER)	0.160	0.164	0.0003	0.7006

Table 1b: Descriptive Statistics of Variables of Event 2

Variables	Mean	Std.	Min.	Max.
R&D Expenditure (RD)	0.311	0.146	0.085	0.708
Advertising Spending (AD)	0.330	0.223	0.022	0.993
Debt (DET)	0.118	0.106	0.007	0.500
Firm Size (SIZE)	20.640	1.388	15.700	26.097
Ownership (OWNER)	0.158	0.198	0.0005	0.985



#### 4. Results

To study the stock market responses to industrial plan releases, we first examined the cumulative abnormal returns for all e-business firms at various event windows (e.g.,  $[-1, +1]$  and  $[-2, +2]$ ). To isolate the impact of e-business industrial plan releases, we eliminated those firms with confounding events corresponding to the date of the release. We have presented significant cumulative abnormal returns at different event windows in Tables 2a & 2b. Significance was tested using t-test statistics.

Table 2a: Cumulative Abnormal Returns Associated with an E-business Industrial Plan Released in Event 1 (Using a Different Market Portfolio)

Event Window	MRET_TMV <sup>a</sup>	MRET_MC <sup>b</sup>	CSI 800 <sup>c</sup>	CSI 300 <sup>d</sup>
0	-0.012**	-0.012**	-0.025***	-0.02***
$[-1, 0]$	-0.013**	-0.013**	-0.029***	-0.020***
$[-2, 0]$	-0.012***	-0.011***	-0.017***	-0.016***
$[0, 2]$	-0.012**	-0.012**	-0.013**	-0.013**
$[-2, 2]$	-0.016**	-0.018**	-0.030***	-0.021***

Note: \*\*\*  $p < .01$ ; \*\*  $p < .05$ ; \*  $p < .1$ . The cumulative abnormal returns are consistently significant.

Table 2b: Cumulative Abnormal Returns Associated with an E-business Industrial Plan Released in Event 2 (Using a Different Market Portfolio)

Event Window	MRET_TMV <sup>a</sup>	MRET_MC <sup>b</sup>	CSI 800 <sup>c</sup>	CSI 300 <sup>d</sup>
0	0.010**	0.008**	0.018***	0.015***
$[0, 1]$	0.004*	0.004*	0.007***	0.006**
$[-1, 1]$	0.011**	0.009**	0.023***	0.019***

Note: \*\*\*  $p < .01$ ; \*\*  $p < .05$ ; \*  $p < .1$ .

a. MRET\_TMV: tradable market value weighted market return.

b. MRET\_MC: market capitalization weighted market return.

c. CSI 800: consists of CSI 300 and CSI 500, aiming to comprehensively reflect the price fluctuation and performance of large-, mid-, and small-cap companies in the Shanghai and Shenzhen securities markets, compiled by the China Securities Index Company, Ltd.

d. CSI300: a capitalization-weighted stock market index designed to replicate the performance of 300 stocks traded on the Shanghai and Shenzhen stock exchanges, compiled by the China Securities Index Company, Ltd.

As shown in Table 2a, the cumulative abnormal returns for e-business firms in event 1 were significantly negative at certain event windows (e.g., 0,  $[-1, 0]$ ,  $[-2, 0]$ ,  $[0, 2]$  and  $[-2, 2]$ ). For example, on the industrial plan release date, the average abnormal return ranged from  $-1.2\%$  to  $-2.5\%$ . If we focus on relatively wider windows, the average abnormal returns were also significantly negative (e.g., average cumulative abnormal return was  $-2.1\%$  at the event window of  $[-2, 2]$ ) and relatively higher than at the event date, indicating that the effect also held two days prior to and two days following the release date. These results support H<sub>1</sub>, suggesting that releases of e-business industrial policies that are too general create significantly negative abnormal returns for e-businesses.

As shown in Table 2b, the cumulative abnormal returns for e-businesses in event 2 were significantly positive at certain event windows (e.g., 0,  $[-1, 1]$  and  $[0, 1]$ ). For example, at the industrial plan release date, the average abnormal return ranged from  $0.8\%$  to  $1.8\%$ . If we focus on relatively wider windows, the average abnormal returns were also significantly positive (e.g., average cumulative abnormal return was  $2.3\%$  at the event window of  $[-1, 1]$ ) and relatively higher than at the event date, indicating that the effect also held one day prior to and one day after the release date. These results support H<sub>2</sub>, suggesting that the release of a concrete e-business industrial policy creates significantly positive abnormal returns for e-businesses.

Given the cumulative abnormal returns reported in Tables 2a and 2b, we estimated Eq. (3) to examine the effects of advertising and R&D proposed in hypotheses H<sub>3</sub>–H<sub>6</sub>. We have reported the regression model estimation for the two events in Tables 3a and 3b. As shown in these tables, the results concern advertising and R&D effects.

As shown in Tables 3a and 3b, the estimation provides a comparable model fit (adjusted  $R^2 = 0.204$  in Table 3a; adjusted  $R^2 = 0.325$  in Table 3b) with existing works using event study methodology (e.g., adjusted  $R^2 = .099$  in Yang et al. [2012], and adjusted  $R^2 = .065$  in Ranganathan and Brown [2006]). Regarding the effect of R&D

expenditures (*RD*) proposed in  $H_3$ , we found that the coefficient of R&D is significantly and positively associated with cumulative abnormal returns (*CAR*) in both event 1 ( $\beta_1 = 0.006$ ,  $p < .05$ ) and event 2 ( $\beta_1 = .087$ ,  $p < .05$ ). These results suggest that while R&D expenditures weaken the negative impact of a general industrial plan on stock returns, it strengthens the positive impact of the general industrial plan on stock returns; thus,  $H_3$  and  $H_4$  are supported. Regarding the effects of marketing strategies, we found that the coefficient of advertising was associated significantly and negatively with *CAR* ( $\beta_2 = -.007$ ,  $p < .05$ ) in event 1, whereas the coefficient of advertising was associated significantly and positively with *CAR* ( $\beta_2 = .138$ ,  $p < .1$ ) in event 2. These two results suggest that advertising expenditures strengthen the negative impact of a general industrial policy and the positive impact of a concrete industrial policy thus supporting  $H_5$  and  $H_6$ , respectively. Additionally, the coefficient of firm size is significantly and positively associated with *CAR* in both event 1 ( $\beta_3 = 0.006$ ,  $p < .05$ ) and event 2 ( $\beta_3 = .0024$ ,  $p < .05$ ), implying that larger firms may obtain greater benefits from such policies.

Table 3a: Regression Analysis for the Cumulative Abnormal Returns of Event 1

	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t
<i>SIZE</i>	0.006	0.003	0.277	2.010**
<i>DET</i>	0.018	0.035	0.160	0.510
<i>OWNER</i>	-0.022	0.048	-0.177	-0.462
<i>RD</i>	0.006	0.002	0.056	2.066**
<i>AD</i>	-0.007	0.004	-0.051	-2.173*
<i>constant</i>	-0.122			* -0.510

Note: \*\*  $p < 0.05$ , *F-value* 2.215\*\*, Adj.  $R^2$  0.204

Table 3b: Regression Analysis for the Cumulative Abnormal Returns of Event 2

	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t
<i>SIZE</i>	0.0024	0.001	0.033	2.100**
<i>DET</i>	-0.107	0.046	-0.218	-2.325**
<i>OWNER</i>	-0.150	0.104	-0.562	-1.436
<i>RD</i>	0.087	0.040	0.212	2.196**
<i>AD</i>	0.138	0.078	0.489	1.757*
<i>constant</i>	-0.007			-2.106

Note: \*\*  $p < 0.05$ ; \*  $p < 0.1$ , *F-value* 2.770\*\*, Adj.  $R^2$  0.325

The result of benchmark regression is shown in Table 4. The result shows that the coefficients of R&D and advertising are not significant. In contrast, the coefficients of R&D and advertising in the regression model with the releases of policies are significant in positive and negative directions (Table 3a and Table 3b). Thus, a significant difference exists between the two coefficients of R&D and advertising factors from the two models. Therefore, the moderating effects of R&D and advertising were verified.

Table 4: Regression Analysis for Stock Returns of the Period without the Release of Policy

	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t
<i>SIZE</i>	0.003	0.001	0.217	3.144***
<i>DET</i>	0.335	0.144	1.426	2.326**
<i>OWNER</i>	-0.451	0.190	-1.469	-2.376**
<i>RD</i>	0.015	0.048	0.086	0.313
<i>AD</i>	-0.057	0.086	-0.269	-0.663
<i>constant</i>	-0.235			-0.510
<i>F-value</i>	2.410**			
Adj. $R^2$	0.185			

Note: \*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ .

## 5. General Discussion

In emerging markets where the e-business industry is rapidly growing (though still immature), we investigated whether investors consider industry-related policies when making decisions. This study tends to enrich the understanding of financial value creation in the e-business industry by investigating the impact of industry policies on stock returns. Specifically, two types (concrete and general) of industry policies are associated with opposite (positive vs. negative) abnormal returns at the time of policy release. Further, not all firms benefit or lose equally from e-business policies as investors' reactions vary substantially depending on the firms' marketing strategies. In this study, the financial value of policies was strengthened or weakened by R&D and advertising expenditures. Accordingly, we provide theoretical implications, as shown below.

### 5.1 Research Contributions

First, this study extends existing research regarding the connection between e-business and financial performance from behavior at the firm level to the level of an entire industry. While the e-business initiative plays an important role in influencing firms via investors' investment behaviors, research on the impact of industry policy has been considerably limited. By examining financial market responses to positive industry policies (general and concrete) in emerging markets, we have revealed that investors consider industry policy when making investment decisions. These findings enrich the extant research on the financial impact of e-businesses and further demonstrate the importance of public policy, especially in emerging markets where governments play vital roles in the e-business industry.

Second, this study deepens the research on the financial impact of industry policy. Industrial policies normally include regulations and resources. Generally, it is acknowledged that regulations impose constraints and induce negative impact; recourse usually implies the need for support or positive influence. However, contrary to common sense, we found that positive but general policies produce negative abnormal returns; only concrete positive policies create positive abnormal returns. These findings add sophistication to the research on industry policy.

Third, this study also contributes to IS-finance literature by advancing understanding regarding the effect of marketing leverage on firms' financial values. While extant research in this area has focused largely on the direct value that e-businesses may create for firms, we have shown that e-businesses that spend more on R&D may lose less from general policies and benefit more from concrete policies. Additionally, advertising spending can enlarge both negative returns from general policies and positive returns from concrete policies. On the one hand, this finding indicates that R&D can create value for firms by strengthening the positive effect and weakening the negative effect of industry policies in financial markets. On the other hand, advertising amplifies either positive or negative effects of policy. Thus, our study enhances understanding of the value of marketing tools and elucidates the importance of marketing in IS literature and financial interfaces.

### 5.2 Managerial Implications

Our findings provide several managerial implications for governments, investors, and firms in emerging markets. First, our findings indicate to policy makers that e-business industry policy impacts investors. The increased industry and financial market relatedness may expose e-business firms to government intervention in financial markets when policies are released. Moreover, while some policies may have no immediate impact on cash flow, they garner a quick investor response. Thus, policy makers must not only guide firms but also manage investors' expectations. Specifically, although an industry policy may benefit e-businesses through allocation of resources and technological development, our findings remind policy makers in emerging markets that an unexpected response may occur in the stock market because positive policies that are too general are inefficient in reducing risk and only concrete positive policies can satisfy investors' expectations and thus enhance firm value. Thus, policy makers should issue industry policies more carefully and cautiously.

Second, our findings warn investors that not all positive policies produce good returns. According to Table 2, by restricting investments in e-businesses, investors can lose on average about 1.7% in abnormal returns on the day a policy that is too general is released and cumulatively as much as 2.13% in abnormal returns within two days prior to and two days after the release of the policy. Our findings suggest that investors can gain positive abnormal returns by investing in e-businesses when positive industry policies are concrete and include detailed measures to support these businesses; however, investors may experience losses from investing in e-businesses in the short term when positive but general policies are issued.

Third, our findings provide e-business firms some guidance in taking advantage of industry policy effectively. Specifically, firms with large R&D expenditures can anticipate less loss and more gain than the average abnormal return. Large advertising spending is a double-edged sword that benefits firms when industry policies are concrete and hurts firms when policies are too general. Thus, when allocating limited resources to marketing strategies, firms may wish to consider the interplay between policies and such strategies. On the other hand, it is very important to take into account the maturity of investors toward information about firms. Mature investors anticipate a firm's

value and make rational decisions on the basis of high-quality information regarding financial fundamentals (e.g., revenues and risks) rather than imperfect signals or incomplete proxy statements. It is vital that firms become more transparent in disclosing information to build investor confidence.

### 5.3 Limitations and Future Research

The focus of this study has been Chinese e-businesses, which serve as industry examples for emerging markets; future works could examine the financial impact of e-business policies in other emerging markets such as India, South Africa, etc. Furthermore, this study focuses only on the short-term financial values of policies in emerging markets using an event study methodology. Future research could investigate the long-term impact of announcements regarding industry policies on financial performance in emerging markets through an examination of annual stock returns of related firms, performance of investment funds for related firms, and related sector indices. Moreover, this study only examines the impact of two types of resource policies for e-business: concrete and general. Future works could include investigations regarding the impact of other types of policies, such as regulations for e-businesses, the sequence for releasing general information early and specific details later, or the impact of hybrid policies (i.e., both general and concrete)

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