



Signaling or experiencing: Commitment HRM effects on recruitment and employees' online ratings

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ABSTRACT

Even though existing studies on website information have focused on e-commerce views such as product information and customer responses, firms and employees also frequently dispatch information on websites regarding the firms' human resource management (HRM). Using signaling theory as well as findings from strategic HRM, the present research explores the causes and effects of HRM information flow on websites. Data were collected with a longitudinal and multisource frame of two HR manager surveys and two website analyses. Path analyses using AMOS provide evidence that (1) firms implementing commitment HRM signaled more detailed HRM information on their websites, (2) firms' website signaling had a significant effect on recruitment trends as a *before-experience* outcome but no effect on employees' web ratings as an *after-experience* outcome, and (3) website ratings by employees were significantly influenced by firms' actual use of commitment HRM. A discussion of the theoretical contributions and practical implications is included.

1. Introduction

The Internet has moved those boundaries by collapsing time and distance in the information communication dimensions of markets.

(Spence, 2002: 435)

Information flow is central to markets (Etzion & Pe'er, 2014), and information on firms' human resource management (HRM, hereafter) flows extensively and continuously on diverse websites. It is reported that firm websites provide more detailed information regarding jobs and HRM than other sources such as brochures and advertisements (Cober, Brown, Keeping, & Levy, 2004), and that a firm's website is where individuals first seek and acquire firm information (e.g., Jones, Willness, & Madey, 2014; Peters, 2001). Nowadays, employees also actively dispatch their opinions on firms' management on websites (e.g., Glassdoor in the US). Accordingly, information on firms' HRM has proliferated rapidly online, but basically no knowledge has been accumulated regarding their associations: Are they delivering consistent messages? Are they contradictory? What factors influence signals sent by firms and by employees?

Signaling theory provides a persuasive tool for analyzing HRM information flow and its effects. Notably, Nelson (1974) differentiated search products from experience products by insisting that the quality of the former is apparent prior to purchase, while the quality of the latter is more difficult to evaluate before purchase. Wells, Valacich, and

Hess (2011) further explained that signaling premises are especially persuasive in *experienced goods* (or products) because they are characterized by a combination of high pre-purchase information scarcity (meaning that a consumer cannot interpret a product's quality attributes before making a purchase) and high post-purchase information clarity (meaning that a consumer can assess the quality of a product after purchase or use). HRM represents a good case of experienced goods. Pre-purchase information scarcity is especially notable in HRM because, unlike financial statements, HRM information is not officially reported (Benson, Young, & Lawler, 2006), and outside of firm home pages, individuals have very few alternative channels revealing HRM information. However, after joining firms, individuals accumulate experiences with HRM.

The merits of signaling theory include that pre-purchase information scarcity and post-purchase information clarity may result in distinctive outcomes. As Pavlou, Liang, and Xue (2006) have explained, the uncertainties that individuals perceive differ before and after making a purchase. Before purchase, information asymmetry dominates, which may lead to opportunism on the part of firms, who can send out information that suggests they provide a higher quality than they actually do (Liebeskind & Rumelt, 1989). In this before-experience situation, individuals are unable to verify the information (at least in the case of firms' HRM information), and thus, signaling has a dominant impact; individuals assume a separating equilibrium in believing that

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low-quality firms do not mimic high-quality firms because of the costs inherent in doing so. However, the impact of signaling may be attenuated in the post-purchase situation because at that point individuals are able to evaluate the quality of the product or the validity of the provided information (Wells et al., 2011). In other words, experiencing the product (or a firm's HRM) reduces uncertainties regarding the product's quality and thus enhances the power of the individual (Luo, Ba, & Zhang, 2012). Thus, the effects of signaling should differ between before and after experiencing information.

Extending the existing studies on marketing and e-commerce (Wells et al., 2011 for a review), the present research explores the agenda of HRM signaling as an *experienced good*. Specifically, it examines the causes of firms' HRM signaling on websites as well as its differential effects on before and after experiences. Results of the exploration will improve understanding of the causes and effects of firms' HRM signaling on websites as well as the associations between the online voices of firms and employees, which will also expand the realm of existing signaling studies by empirically examining after-experience outcomes. To explore the agenda, data were collected from multiple sources with a longitudinal frame of three years. Two online surveys were given to HR managers during a three-year interval. The first survey measured firms' HRM, and the second survey measured applicant trends in recruitment as a *before-experience outcome*. Websites analyses were also performed in two waves: First, we analyzed HRM signaling on each firm's website, and after three years, we analyzed another website delivering employees' ratings of each firm as an *after-experience outcome*.

The following figure illustrates the research frame and provides information about data sources (Fig. 1).

2. Research hypotheses

2.1. Signaling theory

Signaling theory deals with the informational aspects of markets (Spence, 1973). Signaling is composed of information and inferences made about the information. The peculiarities and merits of signaling theory seem to be that the costs and returns of signaling are mainly the result of *inferences* based on the information provided. Two aspects of inferences are notable in the signaling process. First, inferences are made about unobservable qualities. For instance, Kihlstrom and Riordan (1984) argued that advertising as a signal brings returns to a firm even though a great deal of advertising conveys no direct information about product qualities because consumers can infer unobservable qualities about products from observable advertisements. Second, inferences rely upon customers' belief in the difficulties of imitation. Because quality signals are confirmable after purchase, customers believe that mimicking a high-quality seller incurs significant costs to a low-quality seller (Kihlstrom & Riordan, 1984; Morris, 1987; Nelson, 1974). Customers believe that a firm without a quality product

will bear the costs of misleading advertising, and thus infer that the signal is valid and reliable. The role of inference is also emphasized by Weiss (1995), who explained that while the human capital view assumes that education level directly increases a worker's productivity, signaling theory relies more upon inferences for unobservable characteristics associated with education level, such as less propensity to quit or be absent.

Customer *inference* develops a market mechanism where firms with high-quality products have incentives to dispatch information externally to outsiders (Boulding & Kirmani, 1993; Connelly, Certo, Ireland, & Reutzel, 2011). Information dispatched by firms leads to two types of equilibrium states in markets: *separating* and *pooling*. When the cost of attaining a signal is high enough to deter low-quality actors from pursuing a signaling action, the resultant separation yields two clearly demarcated subpopulations, with only high-quality actors generating a signal. When the contingencies are absent, both high-quality and low-quality actors dispatch information, leading to pooling (Boulding & Kirmani, 1993; Etzion & Pe'er, 2014). Therefore, a firm's action is a signal in a separating equilibrium but not in a pooling equilibrium (Boulding & Kirmani, 1993; Connelly et al., 2011).

Finally, signaling occurs more frequently and conveys more meaning in *frequent* markets. Frequent markets develop where primary signalers are relatively numerous (Spence, 1973), or when vigorous competition exists (Michael, 2009). By sending out information that competitors cannot imitate, signaling is effective in achieving an advantage in highly competitive markets. In contrast, in *infrequent* markets, individuals are not interested in signals and thus are not expected to invest time, money, and effort in sending or acquiring signals (Spence, 1973). Therefore, in job markets where numerous applicants compete for limited positions, or in product markets where numerous firms compete to increase market shares, the role of signaling becomes especially significant.

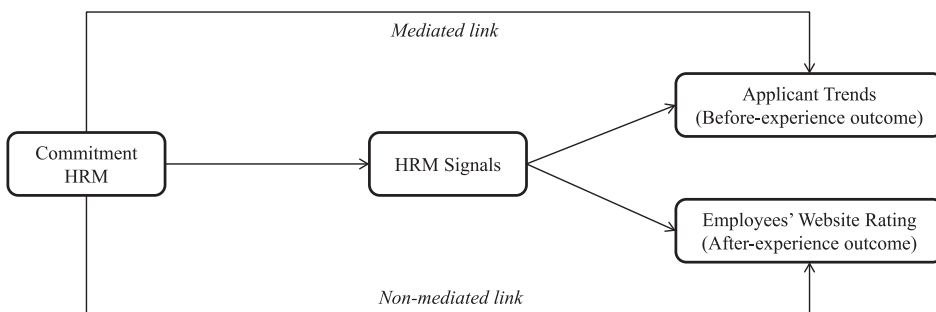
2.2. Signaling firms' HRM information on websites

As Spence has noted, "If the incentives for veracity in reporting anything by means of a conventional signaling code are weak, then one must look for other means by which information transfers take place" (Spence, 1973: 356). The Internet has fundamentally changed information transactions between firms and society, and firm websites have become the most common medium for relaying information to outsiders (Allen, Mahto, & Otondo, 2007; Behrend, Baker, & Thompson, 2009; Ployhart, 2006; Spence, 2002). Individuals first seek and acquire firm information on a firm's website (e.g., Jones et al., 2014; Peters, 2001), and acquire more detailed information from a website than from other materials (Cober et al., 2004).

Signaling HRM information on websites satisfies the premises related to *separating* equilibrium and *frequent* markets. Information transactions on websites function as a separating equilibrium. Boulding

<1st Survey> <Website analysis> <2nd Survey & Website analysis>

Fig. 1. Research frame.



and Kirmani (1993) have pointed out that the credibility of a signal is the linchpin in a separating equilibrium: Consumers must believe that high-quality firms are using signals that are too costly for low-quality firms to use and that a signal can incur costs for a firm if the signal turns out to be false. Website signaling of HRM practices satisfies these criteria because websites are accessible to basically everyone, including insiders (current employees and unions). Because of this openness, individual viewers assume that providing false information about firm HRM practices on websites carries a substantial risk for firms of revealing unethical intentions or creating conflicts with employees (Suazo, Martinez, & Sandoval, 2009). Thus, outsiders believe that the two types of firms (i.e., firms with and without high quality) follow separate strategies in signaling on websites.

In addition, websites represent frequent markets. Costs are important for both senders and receivers in the signaling process. Regarding senders, when sending out information incurs heavy costs for firms, or if costs vary significantly, not all firms will actively try to signal information to outsiders (Michael, 2009). Website development incurs costs, but those costs do not significantly vary among firms once the levels of content and formats are strategically determined. For receivers, on the other hand, if acquisition costs differ substantially, the signaling effects will also be limited because those with lower acquisition costs have an advantage in accessing signals. However, once firms offer a wide range of information on their websites, the information is observable to any individual user with minimal reading and computer skills who has access to the Internet. The availability of an unlimited amount of information at little cost and without geographic limitations has indeed made website use grow dramatically (Peters, 2001). Therefore, websites are appropriate sites for exploring firms' HRM information signaling.

2.3. Signaling firms' commitment HRM

Signaling theory seems to have gained validity in explaining the effects of HRM in general. For instance, it is reported that when HR signals are effectively sent to employees, the interpretations induce more positive outcomes from employees (Haggerty & Wright, 2009). As Bowen and Ostroff (2004) noted, "HRM can send unambiguous messages to employees that result in a shared construction of the meaning of the situation" (p.206). In the process, HR specialists and managers play important roles as signal dispatchers (Townsend, Wilkinson, Allan, & Bamber, 2012). The studies support the importance of HRM information provided by the firm to current employees, but the logic can also be expanded to those outside of the firm, i.e., the external market. That is, because current employees' interpretations of HRM information are important determinants of their attitudes at the workplace, the information that outsiders receive triggers significant impacts on their opinions of the firm.

We have focused on external signaling, in the present research, because information asymmetry is much more notable in the external market. Information asymmetry concerning HRM prevails in the relationships between firms and outsiders. To resolve this asymmetrical situation, a signaler sends out information, thereby influencing the receivers to develop positive inferences (Connelly et al., 2011). Information about commitment HRMs (Arthur, 1994) or similarly high-performance work practices (Pfeffer, 1998) is regarded as such information. Commitment HRM, in contrast to a cost-centered control perspective, indicates a concerted effort to develop trust-based long-term relationships between a firm and employees (Appelbaum, Bailey, Berg, & Kalleberg, 2000; Kossek & Block, 2000; MacDuffie, 1995; Tsui, Pearce, Porter, & Hite, 1995). In the United States, adoption of commitment practices accelerated in the 1990s and has largely been found effective in boosting firms' financial performance as well as employees' motivation (Benson et al., 2006). Moreover, these positive effects have been consistently reported in societies other than the United States (e.g., Bae & Lawler, 2000; Chadwick, Super, & Kwon, 2015; Chang,

2006; Guthrie, 2001).

As stated, information asymmetry prevails in HRM because outsiders cannot recognize how a firm manages human resources unless that information is provided. Signaling theory suggests that a firm using commitment HRM is apt to release such beneficial information because it sends a valuable message to the market that the firm has developed or is developing long-term trust-based relationships with its employees and that employees are satisfied and committed to working in the firm. Therefore, firms with commitment HRM will provide more information regarding their management practices than those without it. Firms without commitment HRM will avoid costly signals because of the risks of negative reactions to false information from current employees and labor unions, who can also access the firm's website. Supplying misleading HRM information on websites is risky when recruiting new employees because the information creates psychological and legal contracts (Suazo et al., 2009). It has been widely reported that violation of contracts is associated with various negative outcomes, such as legal disputes, reduced commitment to the firm, and increased turnover (Robinson, 1996; Robinson, Kraatz, & Rousseau, 1994).

In sum, signaling theory explains why firms release more information to outsiders, especially information beneficial to the firm, enabling receivers to develop positive attitudes toward the firm (Connelly et al., 2011). Firms with commitment HRM are apt to dispatch the signals because the information, when released, will enhance outsiders' understanding and appreciation of firm practices. Studies differ in articulating the specific combinations of practices, but the consensus seems to be that commitment HRM comprises job-based management, performance-based compensation, training and development programs, and provision of diverse benefit programs (Arthur, 1994; Chadwick et al., 2015; MacDuffie, 1995; Pfeffer, 1998). Notably, the categories of commitment HRM are in general consistent with those frequently found on firms' websites (Cable & Turban, 2003). Therefore, firms utilizing commitment HRM more will signal more HRM information on websites. Therefore, it was hypothesized that:

Hypothesis 1. Firms utilizing more commitment HRM will signal more HRM information on websites.

2.4. Signaling effects on a before-experience outcome

An outcome occurs because of high pre-purchase information scarcity (Wells et al., 2011), which, in the case of HRM, can be detected by changes in recruitment. External signaling effects should be notable in recruitment because recruitment marks the beginning of a relationship between a firm and outsiders (Suazo et al., 2009), and also because job seekers face great uncertainty about firm practices (Allen et al., 2007; Dineen & Williamson, 2012; Earnest, Allen, & Landis, 2011; Ganzach, Pazy, Ohayun, & Brainin, 2001; Rynes & Barber, 1990; Turban, 2001). Moreover, it is reported that outsiders especially look for information that differentiates firms with superior management practices from others (Bergh & Gibbons, 2011).

Effects of web signaling on recruitment as a before-experience outcome can be supported by two perspectives. The first is related to the content of the HRM information. HRM scholars have pointed out that developing a wide pool of applicants is a requisite for selecting capable employees (e.g., Pfeffer, 1998), and signaling HRM information on a website can have the effect of widening the recruitment pool through an early provision of practical information. Potential applicants experience a high degree of uncertainty regarding the firm's practices (Allen et al., 2007; Barber & Roehling, 1993). When information on the firm's diverse HRM features is released early, uncertainty is reduced, which, in turn, improves the firm's image. Moreover, HRM signals on websites can enhance the firm's reputation in the market. Several studies have reported the effects of HR information on firm reputation. For instance, a study by Jones et al. (2014) has shown that signaling information provided on websites about a firm's social

performance influences job seekers' perception of its reputation and enhances their attraction to the firm. When a firm's reputation is recognized, individuals perceive that they will feel pride in joining the firm (Behrend et al., 2009). Cable and Turban (2003) explained that just as a strong brand generates advantages for a firm by influencing consumers' purchase decisions, positive perceptions of a firm's reputation make becoming part of the firm appealing. App, Merk, and Büttgen (2012) also insisted on the importance of sustainable HRM such as commitment HRM in addressing the diverse needs and expectations of potential and current employees. The authors explained that when effectively developed, sustainable HRM practices help firms attract and retain high-quality employees. Therefore, it is reasonable to believe that a firm's desirable practices such as commitment HRM, when signaled, contribute to developing a good image and reputation in markets, which then increases the firm's attractiveness to job seekers and expands the pool of applicants (Celani & Singh, 2011; Chapman, Uggerslev, Carroll, Piasentin, & Jones, 2005; Ployhart, 2006).

The second support, on the other hand, can be found in studies on websites. Studies showed that individuals can readily assess the quality of a website and thus can infer the relative investment necessary to develop a high-quality website (Huizingh, 2000; Loiacono, Watson, & Goodhue, 2007; Yoo & Donthu, 2001). Thus, perceptions of the quality of websites influence the decisions of viewers because they perceive that the firms are trying to release information beneficial to outsiders. For instance, Wells et al. (2011) reported that website quality functions as a signal, which influences perceptions of a high product quality and thus leads to an intention to purchase the product. Luo et al. (2012) also provide a consistent message that a well-designed website reduces the negative impact of product uncertainty on customer satisfaction. Thus, well-developed websites provide more and a better quality of information, which reduces individuals' uncertainty perceptions and perceptions of risk in pursuing transactions. Even though a website with more diverse and detailed information does not directly indicate a visually well-designed site, a website providing more diverse and detailed HRM information will, at least partially, enhance individuals' perceptions that the firm has invested resources to develop a high-quality and reliable website, a reflection of the firm's HRM signaling effort. The perception will contribute to reducing uncertainties and risks associated with a decision to join the firm.

Based on these assertions, it seems reasonable to assume that websites providing high-quality HRM information will reduce individuals' pre-purchase uncertainties (Walker et al., 2013), and thus contribute to developing favorable images of the firm (Suazo et al., 2009) and to building the firm's reputation to attract more applicants (Allen et al., 2007). Therefore, it was hypothesized that:

Hypothesis 2-(a). Firms signaling more HRM information on websites will experience a trend of more applicants.

As stated, commitment HRM indicates superior management practices and thus contributes to increasing recruitment pools (Arthur, 1994; Chadwick et al., 2015; MacDuffie, 1995; Pfeffer, 1998), but the effects will be fully mediated by firms' signaling because recruitment occurs in a high pre-purchase information asymmetry situation. HRM information indicates a case of experience goods, and individuals are unable to evaluate the truth of the information until they experience the product. Therefore, they depend entirely upon the information provided by the firm. Unlike financial statements, HRM information is not officially reported and for that reason is scarce to outsiders (Benson et al., 2006). The scarcity of information makes the signaling effects especially notable (Kihlstrom & Riordan, 1984). In addition, it is the basic premise of signaling theory that signaling starts with the intentional actions of insiders to communicate with outsiders (Boulding & Kirmani, 1993; Connelly et al., 2011; Spence, 1973, 2002). In other words, signaling effects occur only when a sender dispatches information and an outsider receives and makes inferences from that information, and, unless information is signaled, individuals may make

adverse selections (Kirmani & Rao, 2000). Thus, the *before-experience* outcome, or effect on recruitment, should be fully mediated by firms' HRM signaling. Therefore, it was hypothesized that:

Hypothesis 2-(b). HRM information signaling will fully mediate the effects of firms' commitment HRM on recruitment.

2.5. Signaling effects on an after-experience outcome

After joining a firm, individuals start accumulating direct and indirect experiences regarding the validity of the signaled HRM information. Accumulation of individuals' experiences with firms leads to a decrease in information asymmetry between the individuals and the firms. Even though signaling effects predominate under information asymmetry (Huston & Spencer, 2002), the asymmetry is mitigated by individuals' experiences with the firm. As stated, the superiority of commitment HRM has been widely noted in enhancing the commitment, satisfaction, and trust of employees (Appelbaum et al., 2000; Benson et al., 2006; Chadwick et al., 2015; Kossek & Block, 2000; MacDuffie, 1995; Tsui, Pearce, Porter, & Tripoli, 1997). Therefore, individuals experiencing firms' commitment HRM will positively evaluate the firms' management, and the effects of commitment HRM on employees' attitudes may occur independently of firms' HRM information signaling.

Regarding after-experience outcomes such as employee satisfaction or commitment, most existing studies have reported results obtained by survey methods or turnover rates (e.g., Chang, 2006; MacDuffie, 1995; Tsui et al., 1997). The studies further suggested that the effects might derive from the role that psychological contracts play in employer-employee relationships. A psychological contract is defined as an individual's beliefs about the terms and conditions of a reciprocal exchange agreement (Robinson, 1996). Scholars have argued that psychological contracts contain transactional components, or short-term monetizable obligations, and relational components, or socioemotional elements (Morrison & Robinson, 1997). It is further reported that when employees perceive long-term employment relations with the firm, they tend to establish relational exchanges (Mai, Ellis, Christian, & Porter, 2016; Shore & Tetrick, 1994). Commitment HRM fundamentally reflects firms' commitment to employment security and trust-based relationships with employees, which will foster employees' positive attitudes toward social or relational exchanges. That is, when employees experience commitment HRM, they perceive that companies are performing with due responsibility to maintain long-term relationships, invest in the development of human capital, and evaluate and compensate employees using objective measures, practices that lead to employees' perceptions of psychological contract fulfillment (MacDuffie, 1995).

The perception of psychological contract fulfillment enhances employees' commitment to and trust in their firms, which will be reflected in their ratings online. Employees actively reveal their opinions and evaluations of their firms' HRM on websites (e.g., *glassdoor.com* in the U.S. and *jobplanet.co.kr* in Korea). The online evaluations or web ratings are made anonymously, which induce candid responses from employees. Moreover, online evaluations are open to outsiders and thus may trigger direct and significant impacts on the firms' reputations in the market. The websites are relatively newly developed, and the voices of employees on websites have been rarely examined in academic studies, but they have recently started gaining attention as a valuable source of information (Chandra, 2012).

All in all, the online evaluations of employees are made after they experience firms' HRM and thus indicate after-experience outcomes in the signaling frame. Considering the premise that signaling impact diminishes after purchase (Wells et al., 2011), hypotheses were developed such that:

Hypothesis 3. (a) Firms' actual HRM will influence employees' after-

experience outcomes such that firms' commitment HRM will increase employees' online ratings. (b) Firms' HRM signals will not influence employees' online ratings when the effect of firms' commitment HRM is controlled.

3. Methods

3.1. Data collection procedures

The present research used longitudinal and multisource data. For the HRM variables, a survey method was used, and information on firms' signaling and employees' ratings were collected from online sources. From October 2012 to March 2013, questionnaires were submitted to HR managers to collect data regarding their firms' HRM practices. Alumni lists from a large business school in Seoul and member directories for the Korean CEO's Association of Multinational Corporations and the Korea Trade Investment Promotion Agency provided contact information. In total, 341 HR managers or directors were invited to participate in the study, 176 of whom completed the survey (a 51.6% response rate).

The second data collection procedure consisted of analyses of firms' websites, which were performed almost simultaneously, but only for the responding firms. As a pretest, five large well-known firms were selected and two research assistants majoring in HRM at the graduate level were trained to analyze the signaling information provided on firm websites. In this session, we found that firms tended to release information about five facets of HRM: recruitment, job descriptions, training and development, pay, and benefits. These HRM facets were generally consistent with those presented in previous studies on HRM signaling (e.g., Rynes & Barber, 1990) and commitment HRM (e.g., Arthur, 1994; Delaney & Huselid, 1996). A coding manual was created, and the two assistants independently analyzed website information from 20 firms as a pretest. For coding of the 20 firms, the interrater reliability was calculated using Cohen's kappa statistic, the most commonly used coefficient (Son, Tu, & Benbasat, 2006). All five items showed at least moderate agreement levels, with kappa scores between 0.41 and 0.60. Based on general guidelines found in the literature (e.g., Frey, Botan, & Kreps, 2000), these results can be regarded as satisfactory, suggesting that discrepancies between the two coders' observations may not be a serious problem. Average scores of the two sets of coding were used in the statistical analyses. Of the 176 firms, firms without appropriate HRM information and foreign-based MNCs with no websites for Korean units or no information on HRM practices in Korea were excluded. After excluding these cases, the matched data set was reduced to 142 firms.

Finally, two outcome variables were measured from two sources. For the recruitment trend as a before-experience outcome variable, an online survey was performed with the 142 firms from July to October 2015, asking managers about applicant trends for the previous three years. Employee evaluations of each firm were measured as an after-experience outcome in March 2016. The information was collected from the website *JobPlanet* (<https://www.jobplanet.co.kr/>), which is operated by the company Brain Commerce. The website opened in 2014 and thus the information largely represents employees' ratings from 2015 and 2016. Out of the 121 firms, firms with no information, those with less than three evaluators, or companies whose ownership changed during the period were excluded. Finally, data on a total of 108 firms were used for the statistical analyses.

3.2. Variables and measurement

3.2.1. Commitment HRM

This variable was measured in the first survey given to HR managers. Items were drawn from existing studies on commitment HRM (Arthur, 1994; Delaney & Huselid, 1996; Guthrie, 2001). Seven HR

practices were measured: ① proportion of employees who receive formal and objective performance appraisal (performance appraisal, hereafter); ② importance of individual performance as a determinant of compensation (pay for performance, hereafter); ③ use of a grievance system (grievance, hereafter); ④ use of a suggestion system (suggestion, hereafter); ⑤ degree to which firm policy tries to avoid layoffs when experiencing financial difficulties (employment security, hereafter); ⑥ proportion of employees who undertook formal job training last year (training, hereafter); and ⑦ emphasis on benefit expenditures for the most recent three years (benefits, hereafter).

3.2.2. Firms' website signals

Following an existing study on website HRM information (Cable & Turban, 2003) as well as the basic framework of commitment HRM (Arthur, 1994; Delaney & Huselid, 1996), five categories of HRM information on websites were analyzed: recruitment, job descriptions, training and development, pay, and benefits programs. In addition, relying upon the e-commerce premise that high-quality firms tend to reveal more detailed information than low-quality firms (Mavlanova, Benbunan-Fich, & Koufaris, 2012), degrees of specificity and richness of information on each practice were measured. Recruitment indicated provision of detailed information regarding recruitment practices. It was coded using three scores: 0 for no information, 1 for brief descriptions (e.g., title only), and 2 for detailed information regarding the firms' practices. Job description was defined as major job information on the firm, and it was coded as 0 for no information, 1 if only titles of general categories were provided, and 2 if detailed information about each job category was presented. This variable is important because it represents information regarding the job analysis facet of commitment HRM. Training and development programs were measured by the number of programs explained on the website. This variable represents information regarding the training facet of commitment HRM. Pay was coded using three scores: 0 for no information, 1 for general information (e.g., "fair pay"), and 2 if specific ranges of compensation or descriptions such as "the best in the industry" were provided. This variable is associated with the pay dimension of commitment HRM. Benefits were coded as the number of benefit programs listed on the websites, and this variable corresponds to the benefits facet of commitment HRM. Measurement scales are also provided in Appendix 1.

3.2.3. Applicant trends

This variable was measured as a before-experience outcome. It was measured in the second survey given to HR managers by asking about trends in the number of applicants responding to job position offers for the last three years. The item was measured on a 7-point scale, with 1 for "greatly decreased" and 7 for "greatly increased."

3.2.4. Employees' website ratings

This variable was measured as an after-experience outcome, and obtained from an online rating site, *JobPlanet*. The website, launched in 2014, provides ratings made by current or previous employees from about ten thousand firms. The site provides an overall score for promotion, compensation, benefit programs, and culture for each firm on a 5-point Likert scale from 1, very dissatisfied, to 5, very satisfied.

3.2.5. Control variables

Five firm-level variables were controlled in the analyses. Firm size was controlled because, in previous studies, firm size was identified as a variable that is positively related to the adoption of commitment HRM (e.g., Chadwick et al., 2015), and because larger firms may have more resources to develop more informative websites. The variable was measured in the first survey by asking the number of employees in each firm. As in McEvily and Zaheer (1999), the standardized value of the number of employees was used. Firm age was also controlled because older firms had more opportunities and time to develop and nurture their commitment HRM. This variable was transformed into a

standardized value in the analysis.

We controlled existence of a union in the firm because some researchers have insisted on the positive relationships between unions and commitment HRM (e.g. Guthrie, Spell, & Nyamori, 2002). We collected data on the existence of unions for each company from the Korean Ministry of Employment and Labor. Union existence was measured as a dichotomous variable coded 0 for firms with no unions and 1 for firms with unions.

Whether the ownership of firms was foreign-based or Korean domestic was controlled because foreign-based MNCs' intention and capability to signal HRM information to the local market is significantly limited, while the entities in Korea possess authority over their HRM practices. The dummy variable was created and coded 0 for Korean domestic firms and 1 for foreign-based firms.

Finally, one industry factor was controlled. Although industry differences on website signaling have not yet been reported, it is plausible that industry factors such as labor supply and demand significantly influence firms' HRM decisions. To control the industry factor, a stock market volatility index was measured instead of including several meaningless industry dummies. The variable was measured because uncertainty embedded in industries significantly influences HR decisions about recruitment, training, and compensation (Bhattacharya & Wright, 2005; Foote & Folta, 2002; Oriani & Sobrero, 2008), and because the share return volatility of firms significantly correlates with a range of other uncertainty proxies, such as sales growth (Bloom, 2009). Industry classification was based upon standard industry classifications provided by Statistics Korea and DART (Data Analysis, Retrieval, and Transfer System). For each industry, stock market volatility in the last three years was measured using data from the KIS Credit Information Service. The measure was derived by multiplying the squared number of trading days by the standard deviation of a stock return for a year. For example, if the standard deviation is 1 and the number of trading days is 252, then the stock return volatility will be 15.87. Using this method, each firm was associated with the uncertainty level of the industry to which it belongs. Appendix 2 shows the industries included in the present research along with the number of firms in each industry. Volatility was lowest in the category of "manufacture of gas, distribution of gaseous fuel through mains" and highest in "general construction."

4. Results

We first performed exploratory factor analyses of the items for commitment HRM and website signals. The five items of website signals were factored as one. However, regarding commitment HRM, five facets of HR practices were clustered as one factor, while the other two (performance appraisal and benefits) were loaded separately and individually on two other factors. Thus, for further analyses, we used the five HR practices as commitment HRM: pay for performance, training, grievance, suggestion, and employment security. To examine the research hypotheses, we performed structural equation modeling (SEM), which permits simultaneous estimation of the multiple relationships of observed and latent variables and suggests the fit indices of the measurement model and hypothesized model. We used AMOS 21 Software to test all model estimations because we were interested in figuring out the paths among the variables. Table 1 is the descriptive statistics and Pearson correlation analysis.

To test hypotheses, we conducted a mediation analysis using AMOS 21. The results for the standardized path coefficients are presented in Fig. 2. The fit indices of the model show $\chi^2/df = 1.11$ ($p = 0.23$), along with 0.96 for comparative fit index [CFI], 0.97 for incremental fit index [IFI], 0.93 for Tucker–Lewis Index [TLI], and 0.03 for RMSEA, along with 0.00 for the RMSEA lower bound of 90%. These indices suggest that the model fits the data at a generally acceptable level.

The first hypothesis predicted a positive effect for a firm's commitment HRM on its HRM information signaling. The effect is found to be

positive and significant ($\beta = 0.42$, $p < 0.05$), supporting Hypothesis 1. Hypothesis 2-(a) predicted that HRM information signals would positively influence applicant trends, which is also found to be significant ($\beta = 0.37$, $p < 0.01$), supporting the hypothesis. Hypothesis 2-(b) predicted the full mediation of HRM information signaling in the influence of commitment HRM on applicant trends, and the effect of commitment HRM on the applicant trend variable is found to be non-significant when the path of HRM signaling is included. Thus, the hypothesis is supported.

Hypothesis 3-(a) predicted that commitment HRM would enhance employees' satisfaction measured by website ratings, which is supported ($\beta = 0.37$, $p < 0.05$, Fig. 2). Finally, Hypothesis 3-(b) predicted that firms' HRM signals would not influence employees' ratings when the effect of firms' commitment HRM is considered. As shown in Fig. 2, HRM signals do not influence employees' ratings after commitment HRM is controlled. Thus, Hypothesis 3-(b) is supported. Even though the effects of control variables are not reported in Fig. 2, among the control variables, firm age showed significant effects on website ratings ($\beta = -0.25$, $p < 0.05$), and firm ownership negatively influenced applicant trends ($\beta = -0.22$, $p < 0.05$). Other control variables did not show significant effects.

Finally, as an additional analysis, we used a bootstrapping approach suggested by Preacher and Hayes (2008) to examine the indirect effects of HRM on outcome variables via website signaling. We did bootstrapping tests, with 1000 bootstrap samples was conducted using AMOS (Hayes, 2013; Preacher & Hayes, 2004) to explore the mediation effect on each dependent variable. The mediation effect of website signaling on applicant trends was significant ($B = 0.155$, $p = 0.042$, 95% Bias-corrected confidence interval = $[0.032_{\text{lower}}, 2.607_{\text{upper}}]$), while the mediation effect of website signaling on employees' website rating was not ($B = 0.012$, $p = 0.555$, 95% Bias-corrected confidence interval = $[-0.0187_{\text{lower}}, 0.200_{\text{upper}}]$). Thus, the results reconfirm the findings.

5. Discussion

The present study applied signaling theory to explore HRM signaling on websites and its effects. Using a longitudinal and multisource data set, AMOS results support the hypotheses that firms using commitment HRM signaled more HRM information on their websites; moreover, website signaling had a significant effect on recruitment trends as a *before-experience* outcome, and fully mediated the effect from commitment HRM on recruitment trends. However, employees' ratings as an *after-experience* outcome were not influenced by firms' signaling but only by the firms' actual commitment HRM.

The most notable contribution of the present research is that it expanded website-based studies to include the issues of HRM by utilizing signaling theory. The existing studies on e-commerce report the importance of developing high-quality websites to influence customers (e.g., Huizingh, 2000; Loiacono et al., 2007; Yoo & Donthu, 2001), and the present research applied the assertions to the case of HRM. In addition, the present research explored two distinct outcomes of HRM signaling on websites. While most of the signaling and website-based studies on e-commerce issues have exclusively focused on before-experience outcomes, such as intention to purchase a product, the present research provides support for the distinct effects of signaling on before- and after-experience outcomes. The results of the present research provide empirical support for the signaling theory premise that individuals' experiences with a signaled product mitigate the prior-contract uncertainties, reduce information asymmetry (Liebeskind & Rumelt, 1989; Wells et al., 2011), and empower individuals to make informed decisions (Luo et al., 2012).

Second, the present research also expanded the realm of HRM by highlighting the importance of website signaling. Though most studies on HRM have focused on the internal consequences of commitment HRM (e.g., Arthur, 1994; MacDuffie, 1995; Tsui et al., 1997), the

Table 1
Descriptive statistics and Pearson correlation analyses.

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Pay for Performance ^a	5.53	1.48																
2. Grievance ^a	0.90	0.29	0.13															
3. Suggestion ^a	0.83	0.37	0.15	0.37**														
4. Employment Security ^a	5.81	1.35	0.02	0.17	0.17													
5. Training ^a	5.57	1.86	0.12	0.19	0.27**	0.11												
6. Recruitment ^b	0.66	0.42	0.01	0.01	0.22*	-0.01	-0.01											
7. Job Descriptions ^b	0.90	0.84	0.08	0.07	0.10	0.02	0.12	0.27*										
8. Training & Development ^b	6.63	5.02	0.04	0.16	0.11	-0.03	-0.10	0.40**	0.13									
9. Pay ^b	0.73	0.65	0.06	0.03	0.06	0.08	0.00	0.36**	0.39**	0.18								
10. Benefits ^b	8.40	5.92	-0.03	0.10	0.10	0.07	0.01	0.27**	0.22*	0.41**	0.41**							
11. Applicants Trends	5.14	0.81	-0.11	0.10	0.11	-0.04	0.14	0.21	0.23*	0.17	0.37**	0.20*						
12. Website Rating	3.28	0.45	0.14	0.22*	0.24*	0.20*	0.20*	-0.06	0.05	0.03	0.15	0.12	0.12					
13. Firm Size ^c	0.00	1.00	0.08	0.09	0.10	0.12	-0.06	0.25*	0.24*	0.12	0.27**	0.17	0.02	0.08				
14. Firm Age ^d	0.00	1.00	-0.10	-0.01	-0.03	-0.18	-0.12	0.30**	0.06	0.08	-0.00	0.10	0.04	-0.32	0.14			
15. Industry Factor	54.60	26.05	0.09	0.11	-0.06	-0.12	0.03	0.06	0.13	0.16	0.18	0.16	0.06	0.04	0.07	0.12		
16. Unions ^e	0.39	0.49	-0.15	0.20*	0.21*	0.10	-0.03	0.17	-0.15	0.16	0.01	0.06	0.05	-0.05	0.09	0.33**	-0.11	
17. Ownership ^f	0.26	0.44	0.09	0.19*	-0.02	0.11	0.01	-0.57**	0.00	-0.18	-0.11	-0.11	-0.21*	0.21*	-0.21*	-0.31**	-0.07	-0.13

N = 108.
 * p < 0.05.
 ** p < 0.01.
^a Commitment HRM.
^b HRM information signals.
^c The standardized value of employees.
^d The standardized value of firm age.
^e Dummy variable, 1 = Company with unions; 0 = Company with no union.
^f Dummy variable, 1 = Foreign-based firm; 0 = Korean-owned firm.

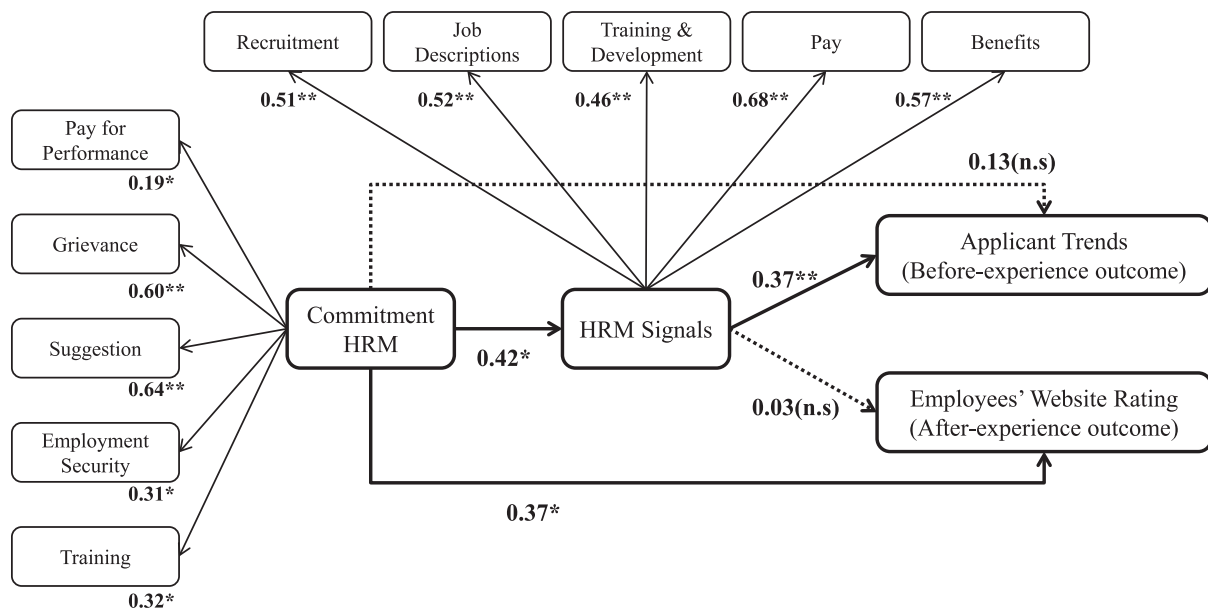


Fig. 2. Standardized path estimates of the hypothesized model.

* $p < 0.05$, ** $p < 0.01$.

present research supported the importance of external signaling of firms' HRM information and employees' satisfaction being revealed externally. This contribution is also related to recruitment studies. The existing application of signaling theory has been limited to the recruitment and selection process (e.g., Breauigh & Starke, 2000; Phillips, 1998; Rynes & Barber, 1990). However, signaling on websites targets a larger pool of receivers with more heterogeneous interests in the firm than job applicants, and the present research supports the importance of continuous HRM signaling to the external market to boost recruitment effectiveness. On a related note, Walker et al. (2013) pointed out that recruitment studies are generally weak in theoretical grounding, and the present research addressed this concern by integrating signaling theory into the recruitment studies.

The results also provide practical implications. The present research affirmed the vital role of firm websites in developing an effective pool of applicants. Effective recruitment practices can start from the moment a firm's HRM information is revealed externally. Information asymmetry between a firm and individuals can be resolved by sending out information regarding firm practices on websites, which causes outsiders to develop positive perceptions and evaluations of the firm. Accordingly, this study's application of website-based signaling widens the scope of recruitment practices to include website communications occurring every day, not just during recruitment season. With this in mind, the voices and experiences of HR managers should play a greater role in developing and managing firm websites.

In addition, the present research delivers an important practical message to firms that they need to pay special attention to their employees' website ratings. Unlike traditional indexes such as those measuring turnover rates, absenteeism, or employees' satisfaction measured from surveys, employees' website ratings are readily revealed externally so that any outsider can easily access the information. Thus, online ratings may significantly contribute to boosting or hampering firms' reputations in the market. Even though firms invest financial resources to release positive information on their homepages, the ratings made by employees on other websites may nullify the actions if the ratings deliver negative messages. Thus, firms will need to seriously consider the voices of their employees expressed online.

Finally, the results on the commitment HRM dimensions provide meaningful messages to firms. The factor analysis provides notably high loadings of suggestion and grievance systems (0.61 and 0.54

respectively, Fig. 2) compared to those of appraisal communication and pay for performance (0.27 and 0.26 respectively, Fig. 2). Factor analysis results are data-driven, and thus more research is needed to assert the relative importance of each practice. However, the results may suggest the notable importance of practices focusing on the procedural components of HRM in firms. Compared to performance appraisal and pay systems focusing on outcomes, suggestion and grievance systems aim effectively at managing the "voice" of employees in decision making or the communication facets within firms. Paré & Tremblay (2007, p.332–333) emphasized the importance of procedural justice being boosted when implementing commitment HRM, and the factor analysis seems to provide results supporting the assertion. Therefore, when implementing commitment HRM, firms will need to pay special attention to improving the procedural or communication facets.

6. Limitations and suggestions for future research

Despite its contributions, the present research is bound by several limitations. Several issues need to be considered from a methodological perspective. The most notable issue is related to the dependent variable the web-rating of employees. In our attempt to explore employees' opinions provided by websites, we had to rely upon the data on *JobPlanet*, the popular site that most many individuals frequently visit when seeking firm information. The site provides an overall average of several dimensions for each firm—promotion, compensation, benefit programs, and culture—following a fundamentally 5-point Likert scale measurement. However, it is obvious that the items have been developed more for convenience or custom-based criteria (i.e., items that individuals are the most interested in) rather than by academically sophisticated criteria, including construct validity. Therefore, even though individuals visiting the site may find the average score meaningful in judging a firm's HRM, the score may be criticized for being too practical for academic analyses. Thus, the measurement should be noted as a limitation of the present research, and future research may need to incorporate more refined measurements to examine the web information.

Next, it should be noted that the premise of *subjectivity* in interpreting information has not been considered. In economic terms, individuals are supposed to make decisions and select behaviors in predictable ways (Becker, 1995), but subjectivity also allows for the

possibility of individuals' diverse and unpredictable reactions even when receiving the same signal. Subjective perception has long been a focus of psychology-based research. For instance, Ehrhart and Ziegert (2005) have argued that *perceived* characteristics are more proximal to attraction than the actual characteristics of a firm. When applying signaling theory in management studies, researchers have also pointed out the possibility that providing information can sometimes cause unintended consequences and that signaling processes could vary with receivers' diverse preferences and interpretations (Connelly et al., 2011). Related issues are discussed in marketing studies, in which the preference rankings among signals are issued, e.g., consumers may prefer brands to warranties (e.g., Price & Dawar, 2002; Roselius, 1971). Signaling theory also considers the importance of individual preferences or values in receiving diverse signals (Bretz & Judge, 1998). Preferences vary among individuals, and the subjective interpretations of receivers, more than the intentions of the sender, may significantly influence receivers' decisions. All in all, exploring how subjectivity plays a part in receiving signals deserves more attention in future research.

The issue of subjectivity becomes more serious in the present research because the online site *JobPlanet* provides mixed ranks by the former and current employee. Even though employees may decide to leave the firm for diverse reasons, studies have shown that those with less commitment and satisfaction at the workplace are most likely to leave (Cohen, 1993; Griffith, Hom, & Gaertner, 2000). Therefore, it is possible that the rankings provided by former employees (i.e., those who left the firm) might have significantly undermined the average ranking of each firm. Currently the website does not provide the scales separately, but, when ranks by former and current employees are separately delivered, the information may more accurately represent employees' opinions and achieve more validity.

In using websites as signaling sites, the present research did not consider the interactions of two parties: firms and outsiders. The present research only examined the firm's, or the sender's, view, and did not incorporate the receiver's view. The study did not analyze receiver feedback although feedback is an important aspect of signaling theory (Connelly et al., 2011). Furthermore, uncertainty reduction theory argues that individuals facing uncertainty seek out information instrumental in reducing their uncertainty and that information-seeking behavior occurs more as levels of uncertainty increase (Berger & Calabrese, 1975; Kramer, 1999; Walker et al., 2013). Therefore, it is plausible to assume that receivers' information-seeking behaviors may influence the signaling activities of senders. This is also aligned with the need to consider diverse sources of information in job search processes (e.g., Saks & Ashforth, 1997; Williams, Labig, & Stone, 1993). Therefore, future research needs to examine the reciprocal dynamics of signaling between senders (firms) and receivers (current and future employees).

Limitations should also be discussed regarding sample and variable coding. First, the study's small sample size and convenience sampling may raise questions concerning the representativeness of the population (Schwab, 1999) as well as the problem of endogeneity (McNabb & Whitfield, 2007; Semykina & Wooldridge, 2010). The small sample size, moreover, may have resulted in a limitation in coding certain constructs. In addition, it should be noted that the commitment HR practices were measured on differing scales. Even though such measurement methods are not rare (e.g., Guthrie, 2001; Way, 2002), differing scales among variables might cause differing weights among factors if used as a combination index. This is an important methodological issue that needs to be considered in future research on the HRM bundle in general.

In addition, the present research exclusively focused on website information. The choice of focus in the present research was based on the belief that website information satisfies several requirements of signaling, such as observability and costs (e.g., Connelly et al., 2011), in addition to the advantages of the widespread adoption of the Internet

(e.g., Spence, 2002). However, firms may use various methods of signaling, including advertising media and newspapers and thus it is possible that website information may not sufficiently represent all signaling activities of firms. More research is needed to consider the diverse mechanisms of firms' signaling activities.

Finally, future studies on HRM signaling need to consider a more rigorous incorporation of studies on e-commerce. Incorporation of these studies includes highlighting the importance of creating attractive websites. Individuals frequently search for a firm's information by visiting its website, and developing an attractive website can be an effective method to induce individuals' visits. Studies on the visual design of e-commerce have shown that an effectively designed website enhances emotional appeal and accordingly results in shaping more positive attitudes as well as approaching behaviors in users (e.g., Cyr, Head, Larios, & Pan, 2009; Deng & Poole, 2010). Moreover, the assertion that emotional appeal can strengthen the credibility of the information (e.g., Yoo & MacInnis, 2005) should be considered in HRM signaling because most HRM information on websites is cognition based (e.g., delivering factual information). Creating a "bonding" component is critical in signaling (Boulding & Kirmani, 1993); the ultimate objective of signaling is to influence receivers' attitudes and decisions. Therefore, developing an emotionally appealing website in addition to setting up/offering a more informative site is important in boosting the effectiveness of signaling HRM information. The issue should be examined further in future studies on HRM signaling.

Appendix 1
Items and scales of measurements.

Variables	Items & descriptions	Scales
Commitment HRM	Pay for Performance	"Compared to individual seniority; the importance of individual performance as a determinant of pay increase" 7 point from ① seniority only to ⑦ individual performance only
	Grievance	"Does the company utilize formal grievance system?" 0 for no, 1 for yes
	Suggestion	"Does the company utilize formal suggestion system?" 0 for no, 1 for yes
	Employment Security	"If the organization is facing economic problems, employees will be the last to get cut" 7 point from ① very disagree to ⑦ very agree
	Training	"What proportion of the total employees participates in the formal job training?" ① < 20% ② 20–29% ③ 30–39% ④ 40–49% ⑤ 50–59% ⑥ 60–69% ⑦ > 70%
HRM Signals	Recruitment	Degree of Detailed Information 0 for no information 1 for brief words & titles
	Job Descriptions	Job Information

Applicant Trends	Pay	Description of Pay Level and Method	2 for detailed information
	Training & Development	Number of Training & Development Programs	numbers
	Benefits	Number of Benefit Programs	
	Change in applicant numbers	“What is the trend in the number of applicants for job opening for the recent three years?”	7 point from ① very decrease to ⑦ very increase
Web Ratings of Employees	Promotion Compensation & Benefit Work & Life Balance Organization Culture Management	Click stars on each item	5 point from ① very dissatisfied (one star) to ⑤ very satisfied (five stars)

Appendix 2
Industry classifications of sampled firms.

Industry classification by Statistics Korea	# of firms in the sample
Activities of Head Offices, Holding Companies and Management Consultancy	11
Banking and Savings Institutions	6
Broadcasting	2
Data Processing, Hosting, Portals and Other Internet Information Media Service Activities	2
General Construction	5
Hotels	3
Insurance	9
Manufacture of Alcoholic Beverages	1
Manufacture of Basic Metal Products	3
Manufacture of Chemicals and Chemical Products except Pharmaceuticals, Medicinal Chemicals	12
Manufacture of Electronic Components, Computer, Radio, Television and Communication Equipment and Apparatuses	9
Manufacture of Food Products and Beverages	1
Manufacture of Gas, Distribution of Gaseous Fuel Through Mains	5
Manufacture of Motor Vehicles, Trailers and Semitrailers	4
Manufacture of Other Non-metallic Mineral Products	2
Manufacture of Other Transport Equipment	6
Manufacture of Pharmaceuticals, Medicinal Chemicals and Botanical Products	9
Securities Dealing Activities	9
Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	12

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