

Voices of Firms and Employees on Websites:  
A Signaling Theory Explanation of HRM Information

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, hereafter). Using signaling theory as well as findings from strategic HRM, the present research explores the causes and effects of HRM information flows on websites. Data were collected with a longitudinal and multisource frame of two HR surveys and two website analyses. AMOS analyses provide evidence that (1) firms implementing commitment HRM signaled more and detailed HRM information on their websites, (2) website signaling had a significant effect on recruitment trends as a *before-experience* outcome but no effect on employees' web rating as an *after-experience* outcome, and (3) website ratings by employees were significantly influenced by firms' commitment HRM. A discussion of the theoretical contributions and practical implications is included.

Keywords:       signaling theory, HRM signaling, website signaling,  
                      website rating, before- and after-experience outcomes

*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 and Pe'er, 2014), and information on firms' human resource management (HRM, hereafter) flows extensively and continuously on diverse websites. A firm's website is where individuals first seek and acquire firm information (e.g., Jones, Willness, and Madey, 2014; Peters, 2001); moreover, firm websites are reported to provide more detailed information regarding jobs and HRM than other sources such as brochures and advertisements (Cober et al., 2004). Firms signal their HRM superiority on their homepages, and employees similarly dispatch their experiences with firms' management on other websites (e.g., *Glassdoor* in the US). While the previous studies on websites have exclusively examined the issues of marketing and e-commerce (Wells, Valacich, and Hess, 2011 for a review), interactions on websites between firms and individuals regarding firms' HR management have proliferated rapidly and thus require more studies.

Signaling theory provides a persuasive tool for analyzing both the flow and the effects of HRM information on websites. 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 and colleagues (2011) also explained that signaling premises are especially persuasive in *experienced goods* (or products) because the goods are characterized by a combination of high pre-purchase information scarcity (meaning that a consumer cannot access 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 such a case. Pre-purchase information scarcity is especially notable in HRM. Unlike financial statements, HRM information is not officially reported (Benson, Young, and Lawler, 2006), and outside of firm home pages, individuals do not have alternative channels revealing firms' HRM information. However, after joining firms, individuals accumulate experiences with firms' HRM and thus post-purchase information clarity is notable).

The merit of signaling theory is that pre-purchase information scarcity and post-purchase information clarity may result in distinctive outcomes because, as Pavlou, Liang, and Xue (2007) 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 and 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 because individuals assume a separating equilibrium in believing that 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 reduces uncertainties regarding the product's quality and thus enhances the power of the individual (Luo, Ba and Zhang, 2012), and thus, the effects of signaling should differ between pre and post experiences of the information.

The present research explores the agenda of HRM signaling as an *experienced good*. Specifically, it examines the causes of 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 of HRM signaling on websites, which will also expand the realm of the existing signaling studies to empirically examine after-experience outcomes. To explore the agenda, data were collected from multiple sources with a longitudinal frame of three years. Two surveys were performed using 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: The first was on the HRM signaling on each firm's website, and after three years, the second analysis was done for 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.

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Insert Figure 1 about here  
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## RESEARCH HYPOTHESES

### Signaling Theory

Signaling theory deals with the informational aspects of markets (Spence, 1973). Signaling is composed of information and inferences made about the information. However, not all information constitutes a signal. A signal should be alterable (e.g., education), not unalterable (e.g., age, gender). Signals are altered by incurring costs and returns. In the case of education as a signal, a job applicant needs to invest in education but only when there are sufficient returns

offered in the wage schedule (Spence, 1973). Thus, signaling should be considered within the context of costs and returns: Investment in signaling makes sense only if the returns outweigh the costs.

The peculiarities and also merits of signaling theory seem to be that costs and returns 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 for 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 must believe that mimicking a high-quality seller incurs significant costs to a low-quality seller (Kihlstrom and 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 reliable. The role of inference is also emphasized by Weiss (1995), who explained that, regarding education as a signal, the human capital view assumes that education level directly increases a worker's productivity, but that signaling theory relies more upon inferences for unobservable characteristics associated with education level, such as less propensity to quit or be absent.

Firms with superior information (e.g., a high-quality product) have incentives to communicate with outsiders in order to achieve information equilibrium in the market (Boulding and Kirmani, 1993; Connelly et al., 2011). Information flow along with customers' inferences, leads to two types of equilibrium states in markets: *separating* or *pooling*. When the cost of attaining a signal is sufficiently high to deter low-quality actors from pursuing the 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 and Kirmani, 1993; Etzion and Pe'er, 2014). Therefore, a firm's action is a signal in a separating equilibrium but not in a pooling equilibrium (Boulding and Kirmani, 1993; Connelly et al., 2011). Recently, Etzion and Pe'er (2014) added the concept of an episodic equilibrium, indicating varying situations over time in which a market alternates between being in equilibrium (either separating or pooling) and disequilibrium.

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 a job market 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.

### **Signaling on Websites**

Spence 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: p. 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, and Otondo, 2007; Behrend, Baker, and Thompson, 2009; Ployhart, 2006; Spence, 2002). Individuals first seek and acquire firm information on the firm's websites (e.g., Jones, Willness, and Madey, 2014; Peters, 2001), and acquire more detailed information from websites 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 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, and Sandoval, 2009). Thus, outsiders believe that the two types of firms (i.e., firms with and without high quality or commitment HRM in the present research) follow separate strategies in signaling on websites, which satisfies the criterion for a separating equilibrium.

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 to explore firms' HRM information signaling.

### **Signaling Commitment HRM on Websites**

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 inferences and to make decisions that benefit the signaler (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 et al., 2000; Kossek and Block, 2000; MacDuffie, 1995; Tsui, Pearce, Porter, and Hite, 1995). In the United States, adoption of commitment practices accelerated in the 1990s, and the practices have 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 and Lawler, 2000; Chadwick et al., 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 also that employees are satisfied and committed to working in the firm. The signaling occurs on websites with a provision of more information on HRM. As Mavlanova, Benbunan-Fich and Marios Koufaris (2012) insisted, low-quality product sellers avoid costly signals and use fewer signals than high-quality product sellers. Therefore, firms with commitment HRM will provide more information regarding their management than those who have not adopted 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 also 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, and Rousseau, 1994).

In sum, signaling theory explains how 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, like high-quality products, HRM information, when released, they will enhance outsiders' understanding and appreciation of firm practices. Studies differ in articulating the specific combinations of practices, but the general 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 and 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.*

### **Signaling Effects on a Before-Experience Outcome**

Signaling effects can be examined on the applicant trends in recruitment, as the *before-experience outcome*. This outcome indicates an effect occurring because of high pre-purchase information scarcity (Wells et al., 2011), and in the case of HRM, can be detected by changes in recruitment, which marks the beginning of a relationship between a firm and outsiders (Suazo et al., 2009). External signaling effects should be notable in during recruitment because job seekers face great uncertainty about firm practices (Allen *et al.*, 2007; Dineen and Williamson, 2012; Earnest et al., 2011; Ganzach et al., 2001; Rynes and Barber, 1990; Turban, 2001), and also because outsiders look for information that differentiates firms with superior management practices from others (Bergh and 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 information as advocated by HRM

studies. 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 have an interest in a firm but, at the same time, experience a high degree of uncertainty regarding the firm's practices (Allen et al., 2007; Barber and Roehling, 1993). When information on the firm's diverse HRM features is released early, uncertainty is reduced, which in turn, improves the firm 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 and colleagues (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, perceptions of a firm's reputation makes becoming part of the firm appealing. Therefore, it is reasonable to believe that a firm's desirable practices or values, 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 and Singh, 2011; Chapman et al., 2005; Ployhart, 2006).

The second view, on the other hand, draws on studies on website quality and content. The 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 et al. 2007; Yoo and Donthu 2001). Thus, perceptions of the quality of websites influence the decisions of the viewers because they perceive that the firms are trying to release information beneficial to outsiders. For instance, Wells and colleagues (2011) reported that website quality functions as a signal, which influences perceptions of a high product quality and thus leads an intention to purchase the product. Luo and colleagues (2012) also provide consistent results that a well-designed website reduces the negative impact of product uncertainty on customer satisfaction. Thus, well-developed websites provide more and better quality information, which reduces the individuals' uncertainty perceptions and also perceptions of risk in pursuing the transactions (Pavlou et al., 2007). Therefore, a provision of more HRM information on a website enhances individuals' perceptions that the firm has invested resources to develop a high-quality and reliable website, a reflection of the firm's signaling effort, which reduces perceptions of uncertainties and risks associated with a decision to join the firms.

Based on these assertions, it seems reasonable to assume that high-quality websites providing more information along with high-quality HRM content reduce individuals' pre-purchase uncertainties (Walker et al., 2013), develop favorable images of the firm (Suazo et al., 2009), and also contribute to building the firm's reputation, attracting 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 thus is scarce to outsiders (Benson *et al.*, 2006). The scarcity of information makes the signaling effects especially notable (Kihlstrom and Riordan, 1984). In addition, it is the basic premise of signaling theory that signaling consists of the intentional actions of insiders to communicate with outsiders (Boulding and Kirmani, 1993; Connelly *et al.*, 2011; Spence, 1973, 2002). Moreover, signaling effects occur only when a sender dispatches information and an outsider receives and makes inferences from the information, and unless information is signaled, individuals may make adverse selections (Kirmani and Rao, 2000). Thus, the *before-experience* outcome, or effect on recruitment, should be fully mediated by HRM signaling. Therefore, it was hypothesized that:

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

### **Signaling Effects on a *After Experience* Outcome**

After joining a firm, individuals start accumulating direct and indirect experiences regarding the validity of the signaled information, and the accumulation of individuals' experiences with firms indicates a decrease in the information asymmetry between the individuals and the firms. 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; Kosssek and Block, 2000; MacDuffie, 1995; Tsui *et al.*, 1997). Therefore, individuals experiencing firms' commitment HRM maintain positive evaluations of the firms' management because commitment HRM boosts employees' trust and their satisfaction with the firms. These effects may occur independently of the effects of HRM information signaling on websites. Even though signaling effects predominate under information asymmetry (Houston and Spencer, 2002), the asymmetry is mitigated by individuals' experiences as employees of a firm. Therefore, the actual practice of firms will have influence over individuals' after-experience outcome. Considering the premises, the hypotheses for the after-experience outcomes were developed such that:

*Hypothesis 3. (a) firms' HRM will influence employees' ratings after experiences with their firms so that high commitment HRM will increase employees' ratings.*

*(b) when the effects of firms' commitment HRM are considered, website signals of firms will not trigger significant impacts on individuals' ratings of their firms.*

## **METHODS**

### **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 analyses of firms' websites. From October 2012 to March 2013, questionnaires were submitted to HR managers to collect data regarding 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 was 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 examine how 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 and Barber, 1990) and also commitment HRM (e.g., Arthur 1994; Delaney and Huselid, 1996). A coding manual was made, 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, and 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, and 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. As a result of 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, a short online survey was performed with the 142 firms from July to October 2015, asking managers about applicant trends for the previous three years. A total of 121 firms replied, representing an 85.2% response rate for this second survey. Finally, employee evaluations of each firm were measured as an after-experience outcome in March 2016. The information was collected from a website entitled Jobplanet (<https://www.jobplanet.co.kr/>) operated by the Brain Commerce. The website opened in 2014 and the information largely represents employees' ratings from 2015 and 2016. Out of the 121 firms, information on ten firms was not provided on the website, and data on a total of 111 firms were used for the statistical analyses.

## **Variables and Measurement**

*Commitment HRM.* This variable was measured in the first survey given to HR managers. Items were drawn from the existing studies on commitment HRM (Arthur, 1994; Delaney and 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). Considering the differing



characteristics of the diverse practices, scales for variable measurement were adjusted accordingly, as explained in Appendix 1. Conceptually, the present research is about a firm's utilization of diverse commitment HRM practices as a whole, and thus, the bundle approach was used (Chadwick et al., 2015; MacDuffie, 1995). Considering the differences in measurement scales for each practice, a standardized average was used to compose the bundle index.

*Web Signals.* Firms reveal a variety of HRM information on firm websites advertising their HRM practices. Following an existing study on website information (Cable and Turban, 2003) and also utilizing the basic framework of commitment HRM (Arthur, 1994; Delaney and Huselid, 1996), five categories of HRM information on websites were analyzed: recruitment, job descriptions, training and development, pay, and benefits programs. 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 information about major job information of 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. As equivalents to commitment HRM, all information items were also treated as a bundle, and a standardized average was taken to reflect the index.

*Applicant Trends* This variable was measured as a before-experience outcome. This variable 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."

*Employees' Web Rating.* This variable was measured as an after-experience outcome, and obtained from an online rating site, Job Planet. The website opened in 2014, and provides ratings made by current or previous employees of about ten thousand firms. The site provides an overall score on promotion, compensation, benefit programs, and culture of each firm on a 5-point Likert scale from 1, very poor, to 5, very good.

*Control Variables.* Size of the firm was measured in the survey by asking the number of employees in each firm 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 also because larger firms may have more resources to develop more informative websites. As in McEvily and Zaheer (1999), the standardized value of the number of employees was controlled in the analysis.

Authority in HR decision making needed to be controlled because 33 firms in the sample (about 30%) were foreign-based MNCs, and unless these entities in Korea possess authority over their HRM practices, their intention and capability to signal HRM information to the local market is significantly limited. The variable was measured by asking HR managers whether the units in Korea held decision-making authority over three major HRM issues: HR budgets, selection of managers, and compensation policy. The three items were each coded as 3 if the

decisions were made by the unit in Korea, 2 if made by regional headquarters, and 1 if made by corporate headquarters.

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 demand and supply significantly influence firms' HRM decisions. To control the industry factor, instead of including several meaningless industry dummies, a stock market volatility index was measured. The variable was measured because uncertainty embedded in industries significantly influences HR decisions about recruitment, training, and compensation (Bhattacharya and Wright, 2005; Foote and Folta, 2002; Oriani and Sobrero, 2008), and also 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 is 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 my 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."

## RESULTS

Descriptive statistics and results of the correlation analysis are presented in Table 1. Commitment HRM is related with HRM signal at  $r = .24$  ( $p < .05$ ) and also with web ratings of employees at  $r = .33$  ( $p < .01$ ). HRM signals are related with applicant trends at  $r = .29$  ( $p < .01$ ). In addition, HRM signals show significant correlations with the three control variables, showing that firms tend to signal more HRM information on websites when they are bigger ( $r = .32$ ,  $p < .01$ ), operate in a volatile industry ( $r = .20$ ,  $p < .05$ ), or have authority to make major HRM decisions ( $r = .24$ ,  $p < .05$ ). However, no such relationships are found between commitment HRM and control variables. Finally, no relationships are found among the three control variables.

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The present research measured formative index variables related to commitment HRM as well as website information. Consistent with the studies on website information (Luo et al., 2012; Petter et al. 2007), the variables included in the present research represent formative measures. Unlike a reflective measurement, formative constructs are a composite of multiple measures (Cenfetell and Bassellier, 2009; Petter, Straub and Rai, 2007), and thus, a multivariate path analysis was applied using AMOS. Results of the path analyses are presented in Figure 2. The fit indices of the model show  $\chi^2/df = 1.03$  ( $p = .414$ ), along with .989 for comparative fit index [CFI], .991 for incremental fit index [IFI], and .018 for RMSEA along with .000 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 of a firm's commitment HRM on its HRM information signaling. The effect is found to be positive and significant ( $\beta = .21$ ,  $p < .05$ ), supporting Hypothesis 1. Hypothesis 2-(a) predicted that HRM information signals would positively influence applicant trends, which is also found to be significant ( $\beta = .26$ ,  $p < .01$ ), 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 ( $\beta = .33$ ,  $p < .01$ , Figure 2). Finally, Hypothesis 3-(b) predicted that HRM signals would not influence employees' web ratings when commitment HRM is controlled. As shown in Figure 2, HRM signals do not influence employees' web ratings after commitment HRM is considered. Thus, Hypothesis 3- (b) is supported. Even though the effects of control variables are not reported in Figure 2, results showed that firm size and degree of centralization of HR decision making triggered positive effects on HRM signals ( $\beta = .27$ ,  $p < .01$  for firm size and  $\beta = .38$ ,  $p < .01$  for the degree of centralization of HR decision making). However, the effect of the industry factor was marginal ( $\beta = .18$ ,  $p < .10$ ).

Finally, a bootstrapping approach was used to examine the indirect effects of commitment HRM on applicant trends. Bootstrapping does not impose assumptions about the distribution of a sample, and thus it is reported to be a better approach for testing indirect effects than the traditional Sobel test (MacKinnon *et al.*, 2002). I resampled 5,000 times, and obtained the estimates and confidence intervals for the indirect effects with AMOS. The indirect effect of commitment HRM on applicant trends was found to be significant because the interval does not include zero (Table 2).

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## DISCUSSION

The present study applied signaling theory to explore HRM signaling on websites. Using a longitudinal and multisource data set, AMOS results support the hypotheses that firms using commitment HRM signaled more HRM information on their websites. 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 was not influenced by firms' signaling but only by the firms' HRM commitment.

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' intention to purchase (e.g., Huizingh, 2000; Loiacono et al. 2007; Yoo and Donthu 2001), and the present research applied the assertions to the case of HRM. Specifically, the present research explored the cause and 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 present research found that website signaling fully mediates the impact of HRM on applicant trends as a before-experience outcome but not on an after-experience outcome measured by employees' website ratings of firms. The results provide empirical support for the signaling theory premise that individuals' experiences with a product mitigate the prior-contract uncertainties, and thus reduce information asymmetry (Liebeskind and Rumelt 1989; Wells et al., 2011), enhancing the power of the individual (Luo et al., 2012).

Second, the present research expanded the realm of HRM by highlighting the importance of website signaling. Though many studies have focused on the internal effects of commitment HRM on firms (e.g., Arthur, 1984; MacDuffie, 1995; Tsui et al., 1997), the present research supported the importance of external web-based signaling of HRM information. 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., Breaugh and Starke, 2000; Phillips, 1998; Rynes and Barber, 1990). However, signaling on websites targets a larger pool of receivers with more heterogeneous interests in the firm than just job applicants, and the present research supports the importance of continuous HRM signaling to the external market. On a related note, Walker and colleagues (2013) pointed out that recruitment studies are largely weak in theoretical grounding, and the present research addressed this concern by integrating signaling theory into the recruitment facet.

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 web-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.

## **LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH**

Despite its contributions, the present research is bound by several limitations. From a methodological perspective, 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 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 interpretations (Connelly et al., 2011). Related issues are discussed in marketing studies, in which the preference rankings among signals are issued; for instance, consumers may prefer brands to warranties (e.g., Price and Dawar, 2002; Roselius, 1971). Signaling theory also considers the importance of individual preferences or values in receiving diverse signals (Bretz and Judge, 1998). Preferences vary among individuals, and the subjective

interpretations of receivers, more than the intentions of the sender, may significantly influence receivers' decisions. Exploring how subjectivity plays a part in receiving signals deserves more attention in future research.

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 receivers' views. 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 and Calabrese, 1975; Kramer 1999; Walker et al., 2013). Receivers' information seeking may in turn 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 and Ashforth, 1997; Williams et al., 1993). Future research needs to examine the reciprocal dynamics of signaling between senders (firms) and receivers (current and future employees) as well as the diverse sources of information available in addition to the Internet.

Limitations should also be discussed with regard to sample and variable coding. First, the 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 and Whitfield, 2007; Semykina and Wooldridge, 2010). The small sample size, moreover, may have resulted in a limitation in coding certain constructs. For instance, the control variable, authority in HR decisions, was included in the research because a significant portion of the sample is owned by foreign-based firms. The variable needed to be controlled because HRM decisions have to be decentralized to Korean units in order to release HRM information to the Korean labor market. This measurement seems to be more appropriate than a mere dummy coding of ownership type (i.e., whether Korean or foreign) because significant variances exist among foreign-based MNCs regarding HR decision-making authority. However, the chosen coding method resulted in treating the Korean-owned firms the same as foreign subsidiaries making their own decisions in Korea. Although decision-making authority is much more important than mere ownership type in the present study, the results may partially reflect the effects of ownership type. By increasing the sample size and diversity of ownership in future research, the separate effects of each construct may be determined.

In addition, the present research exclusively focused on website information in analyzing firm signaling. Various types of advertising media, such as newspapers, which were not included in the analyses, can also be utilized as signaling channels. 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, 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 practices.

Finally, future studies on HRM signaling need to consider a more rigorous incorporation of studies on e-commerce. Incorporation of the studies on website information and e-commerce will contribute to highlighting the importance of creating visually effective websites. Individuals frequently search for a firm's information by visiting its website, and thus developing a high-quality website can be an effective method to attract individuals' interest. For instance, studies on the visual design of e-commerce have shown that an effectively designed website improves emotional appeal, more positive attitudes, and also the approaching behavior of users (e.g., Cyr,

Head, Larios, and Pan, 2009; Deng and Poole, 2010). Moreover, the assertion of the importance of emotional appeal in enhancing the credibility of the information (e.g., Yoo and MacInnis, 2005) also provides insight because most HRM information appearing on websites is cognition-based (e.g., delivering factual information). Signaling theory also argues for the importance of signaling media and processes in triggering signaling effects (Connelly et al., 2011), and the ultimate objective of signaling is to influence receivers' attitudes and decisions. In both cases of choosing a product or a firm, information signaling should bring a "bonding" component (Boulding and Kirmani, 1993) from the decision makers, which is not possible without emotional arousal. Therefore, HRM information signaling should not undervalue the importance of the insights provided by the results on e-commerce website design, and more studies should be performed on this facet.



## REFERENCES

- Allen, D. G., Mahto, R. V., and Otondo, R. F. 2007. "Web-Based Recruitment: Effects of Information, Organizational Brand, and Attitudes toward a Web site on application attraction." *Journal of Applied Psychology* (92), pp. 1696-1708.
- Appelbaum, E. T., Bailey, T., Berg, P., and Kalleberg, A. L. 2000. *Manufacturing Advantage: Why High Performance Work Systems Pay Off*, Ithaca, NY: Cornell University Press.
- Arthur, J. B. 1994. "Effects of Human Resource Systems on Manufacturing Performance and Turnover." *Academy of Management Journal* (37), pp. 670-687.
- Bae, J., and Lawler, J. J. 2000. "Organizational and HRM Strategies in Korea: Impact on Firm Performance in an Emerging Economy." *Academy of Management Journal* (43), pp. 502-517.
- Barber, A. E., and Roehling, M. V. 1993. "Job Postings and the Decision to Interview: A Verbal Protocol Analysis." *Journal of Applied Psychology* (78), pp. 845-856.
- Becker, G. S. 1995. "Nobel lecture: The Economic Way of Looking at Behaviors." *The Journal of Political Economy* (101), pp. 385-409.
- Behrend, T. S., Baker, B. A., and Thompson, L. F. 2009. "Effects of Pro-Environmental Recruiting Message: The Role of Organizational Reputation." *Journal of Business and Psychology* (24), pp. 341-350.
- Benson, G. S., Young, S. M., and Lawler, E. E. 2006. "High-Involvement Work Practices and Analysts' Forecasts of Corporate Earnings." *Human Resource Management* (45), pp. 519-537.
- Berger, C. R., and Calabrese, R. J. 1975. "Some Explorations in Initial Interaction and Beyond: Toward a Developmental Theory of Interpersonal Communication." *Human Communication Research* (1), pp. 99-112.
- Bergh, D. D., and Gibbons, P. 2011. "The Stock Market Reaction to the Hiring of Management Consultants: A Signaling Theory Approach." *Journal of Management Studies* (48), pp. 544-567.
- Bhattacharya, M., and Wright, P. 2005. "Managing human assets in an uncertain world applying real options theory to HRM." *International Journal of Human Resource Management* (16), pp. 929-948.
- Bloom, N. 2009. "The impact of uncertainty shocks." *Econometrica* (77) 623-685.
- Boulding, W., and Kirmani, A. 1993. "A Consumer-Side Experimental Examination of Signaling Theory: Do Consumers Perceive Warranties as Signals of Quality?" *Journal of Consumer Research* (20), pp. 11-23.
- Breaugh, J.A., and Starke, M. 2000. "Research on Employee Recruitment: So Many Studies So Many Remaining Questions." *Journal of Management* (26), pp. 405-434.
- Bretz, R. D., and Judge, T. A. 1998. "Realistic Job Previews: A Test of the Adverse Self-Selection Hypothesis." *Journal of Applied Psychology* (83), pp. 330-337.
- Cable, D. M., and Turban, D. B. 2003. "The Values of Organizational Reputation in the Recruitment Context: A Brand-Equity Perspective." *Journal of Applied Social Psychology* (33), pp. 2244-2266.
- Celani, A., and Singh, P. 2011. "Signaling Theory and Applicant Attraction Outcomes." *Personnel Review* (40), pp. 222-238.
- Cenfetell, R., and Bassellier, G. 2009. "Interpretation of Formative Measurement in IS Research." *MIS Quarterly* (33:4), pp. 689-707
- Chadwick, C., Super, J. F., and Kwon, K. 2015. "Resource orchestration in practice: CEO emphasis on SHRM, commitment-based HR systems, and firm performance." *Strategic Management Journal* (36:3), pp. 360-376.
- Chang, E. 2006. "Individual Pay-For-Performance and Commitment HR Bundle in South Korea." *Journal of World Business* (41), pp. 368-381.
- Chapman, D. S., Uggerslev, K. L., Carroll, S. A., Piasentin, K. A., and Jones, D. A. 2005. "Applicant Attraction to Organization and Job Choice: A Meta-Analytic View of the Correlates of Recruiting Outcomes." *Journal of Applied Psychology* (90), pp. 928-944.
- Cober, R. T., Brown, D. J., Keeping, L. M., and Levy, P. E. 2004. "Recruitment on the Net: How Do

- Organizational Web Site Characteristics Influence Applicant Attraction?" *Journal of Management* (30), pp. 623-646.
- Connelly, B. L., Certo, S. T., Ireland, R. D., and Reutzel, C. R. 2011. "Signaling Theory: A Review and Assessment." *Journal of Management* (37), pp. 39-67.
- Cyr, D., Head, M., Larios, H., and Pan, B. 2009. "Exploring human images in website design: a multi-method approach." *MIS quarterly* pp. 539-566.
- Delaney, J. L., and Huselid, M. A. 1996. "The Impact of Human Resource Management Practices on Perceptions of Organizational Performance." *Academy of Management Journal* (39), pp. 949-969.
- Deng, L., and Poole, M. S. 2010. "Affect in web interfaces: a study of the impacts of web page visual complexity and order." *Mis Quarterly* pp. 711-730.
- Dineen, B. R., and Williamson, I. O. 2012. "Screening-Oriented Recruitment Messages: Antecedents and Relationships with Applicant Pool Quality." *Human Resource Management* (51), pp. 343-360.
- Earnest, D. R., Allen, D. G., and Landis, R. S. 2011. "Mechanisms Linking Realistic Job Previews with Turnover: A Meta-Analytic Path Analysis." *Personnel Psychology* (64), pp. 865-897.
- Ehrhart, K. H., and Ziegert, J. C. 2005. "Why Are Individuals Attracted to Organizations?" *Journal of Management* (31), pp. 901-919.
- Etzion, D., and Pe'er, A. 2014. "Mixed signals: A dynamic analysis of warranty provision in the automotive industry, 1960-2008." *Strategic Management Journal* (35), pp. 1605-1725.
- Foote, D., and Folta, T. 2002. "Temporary workers as real options." *Human Resource Management Review* (12), pp. 579-597.
- Frey, L. R., and Botan, C. H., and Kreps, G. L. 2000. *Investigating Communication: An Introduction to Research Methods*, 2nd edition, Boston: Allyn & Bacon.
- Ganzach, Y., Pazy, A., Ohayun, Y., and Brainin, E. 2001. "Social Exchange and Organizational Commitment: Decision-Making Training for Job Choice as an Alternative to the Realistic Job Preview." *Personnel Psychology* (55), pp. 613-637.
- Guthrie, J. P. 2001. "High-Involvement Work Practices, Turnover, and Productivity: Evidence from New Zealand." *Academy of Management Journal* (44), pp. 180-190.
- Huizingh, E. K. 2000. "The content and design of web sites: an empirical study." *Information & Management* (37:3), pp. 123-134.
- Huston, J. and Spencer, R. 2002. "Quality, uncertainty and the internet: The market for lemons". *American Economist* (46:1), pp. 50-60.
- Jones, D. A., Willness, C. R., Madey, S. 2014. "Why Are Job Seekers Attracted by Corporate Social Performance? Experimental and Field Tests of Three Signal-Based Mechanisms." *Academy of Management Journal* (57), pp. 383-404.
- Liebeskind, J., and Rumelt, R. P. 1989. "Markets for Experience Goods with Performance Uncertainty." *The RAND Journal of Economics* (20), pp. 601-621.
- Kihlstrom, R. E., and Riordan, M. H. 1984. "Advertising as a signal." *Journal of Political Economy*. (92), pp. 427-450.
- Kirmani, A. 1997. "Advertising repetition as a signal of quality: If it's advertised so much, something must be wrong." *Journal of advertising* (26:3), pp. 77-86.
- Kirmani, A., and Rao, A. R. 2000. "No Pain, No Gain: A Critical Review of the Literature on Signaling Unobservable Product Quality." *Journal of Marketing* (64), pp. 66-79.
- Kossek, E.E., and Block, R. N. 2000. *New employment relations*. In E. Kossek and R. Block (Eds.), *Managing Human Resources in the 21<sup>st</sup> Century*, Cincinnati: South-Western College Publishing.
- Kramer, M. W. 1999. "Motivation to Reduce Uncertainty: A Reconceptualization of Uncertainty Reduction Theory." *Management Communication Quarterly* (13), pp. 305-316.
- Loiacono, E., Watson, R., and Goodhue, D. 2007. "Webqual: An Instrument for Consumer Evaluation of Web Sites." *International Journal of Electronic Commerce* (11:3), pp. 51-87.
- Luo, J., Ba, S., and Zhang, H. 2012. "The effectiveness of online shopping characteristics and well-designed websites on satisfaction". *MIS Quarterly* (36:4), pp. 1131-1144.

- MacDuffie, J. P. 1995. "Human Resource Bundles and Manufacturing Performance: Organizational Logic and Flexible Production Systems in the World Auto Industry." *Industrial and Labor Relations Review* (48), pp. 197-221.
- Mavlanova, T., Benbunan-Fich, R., and Koufaris, M. 2012. "Signaling theory and information asymmetry in online commerce." *Information & Management* (49:5), pp. 240-247.
- McEvily, B., and Zaheer, A. 1999. "Bridging Ties: A Source of Firm Heterogeneity in Competitive Capabilities." *Strategic Management Journal* (20), pp. 1133-1156.
- McNabb, R., Whitfield, K. 2007. "The impact of varying types of performance-related pay and employee participation on earnings." *The international journal of human resource management* (18:6), pp. 1004-1025.
- Michael, S. C. 2009. "Entrepreneurial Signaling to Attract Resources: The Case of Franchising." *Managerial and Decision Economics* (30), pp. 405-422.
- Morris, R. D. 1987. "Signaling, Agency Theory and Accounting Policy Choice." *Accounting and Business Research* (18), pp. 47-56.
- Nelson, P. 1974. "Advertising as Information." *Journal of Political Economy* (82), pp. 729-754.
- Oriani, R., and Sobrero, M. 2008. "Uncertainty and the market valuation of R&D within a real options logic." *Strategic Management Journal* (29), pp. 343-361.
- Pavlou, P. A., Liang, H., and Xue, Y. 2006. "Understanding and mitigating uncertainty in online environments: a principal-agent perspective." *MIS quarterly* (31:1), pp. 105-136.
- Peters, K. 2001. "Five Keys to Effective e-cruiting." *Ivey Business Journal* (65), pp. 8-10.
- Petter, S., Straub, D., and Rai, A. 2007. "Specifying formative constructs in information systems research." *Mis Quarterly* pp. 623-656.
- Pfeffer, J. 1998. *The Human Equation*, Boston, MA: Harvard Business School Press.
- Phillips, J. M. 1998. "Effects on Realistic Job Previews on Multiple Organizational Outcomes: A Meta-Analysis." *Academy of Management Journal* (41), pp. 673-690.
- Ployhart, R. E. 2006. "Staffing in the 21<sup>st</sup> Century: New Challenges and Strategic Opportunities." *Journal of Management* (32), pp. 868-897.
- Price, L. J., and Dawar, N. 2002. "The joint effects of brands and warranties in signaling new product quality." *Journal of Economic Psychology* (23:2), pp. 165-190.
- Robinson, S. L. 1996. "Trust and Breach of the Psychological Contract." *Administrative Science Quarterly* (41), pp. 574-599.
- Robinson, S. L., Kraatz, M. S., and Rousseau, D. M. 1994. "Changing Obligations and the Psychological Contract: A Longitudinal Study." *Academy of Management Journal* (37), pp. 137-152.
- Roselius, T. 1971. "Consumer rankings of risk reduction methods." *Journal of Marketing* (35), pp. 56-61.
- Rynes, S. L., and Barber, A. E. 1990. "Applicant Attraction Strategies: An Organizational Perspective." *Academy of Management Review* (15), pp. 286-310.
- Saks, A. M., and Ashforth, B. E. 1997. "A Longitudinal Investigation of the Relationships between Job Information Sources, Applicant Perceptions of Fit, and Work Outcomes." *Personnel Psychology* (50), pp. 395-426.
- Semykina, A., and Wooldridge, J. M. 2010. "Estimating panel data models in the presence of endogeneity and selection." *Journal of Econometrics* (157:2), pp. 375-380.
- Son, J. Y., Tu, L., and Benbasat, I. 2006. "A Descriptive Content Analysis of Trust-Building Measures in B2B Electronic Marketplaces." *Communications of AIS* (18), pp. 99-128.
- Spence, M. A. 1973. "Job Market Signaling." *Quarterly Journal of Economics* (87), pp. 355-379.
- Spence, M. A. 2002. "Signaling in Retrospect and the Informational Structure of Markets." *American Economic Review* (92), pp. 434-459.
- Suazo, M. M., Martinez, P. G., and Sandoval, R. 2009. "Creating Psychological and Legal Contracts through Human Resource Practices: A Signaling Theory Perspective." *Human Resource Management Review* (19), pp. 154-166.
- Turban, D. B. 2001. "Organizational Attractiveness as an Employer on College Campuses: An

- Examination of the Applicant Population.” *Journal of Vocational Behavior* (58), pp. 293-312.
- Tsui, A. S., Pearce, J. L., Porter, L. W., and Hite, J. P. 1995. “Choice of Employee-Organization Relationship: Influence of External and Internal Organizational Factors.” *Research in Personnel and Human Resource Management* (13), pp. 117-151. Greenwich, CT: JAI Press.
- Walker, H. J., Bauer, T. N., Cole, M.S., Bernerth, J. B., Field, H. S., and Short, J. C. 2013. “Is This How I Will be Treated? Reducing Uncertainty through Recruitment Interactions.” *Academy of Management Journal* (56), pp. 1325-1347.
- Weiss, A. 1995. “Human Capital vs. Signaling: Explanations of Wages.” *Journal of Economic Perspectives* (9), pp. 133-154.
- Wells, J. D., Valacich, J. S., and Hess, T. J. 2011. “What Signals Are You Sending? How Website Quality Influences Perceptions of Product Quality and Purchase Intentions.” *MIS quarterly* (35:2), pp. 373-396.
- Williams, C. R., Labig, C. E., and Stone, T. H. 1993. “Recruitment Sources and Posthire Outcomes for Applicants and New Hires: A Test of Two Hypotheses.” *The Academy of Journal of Applied Psychology* (78), pp. 163-172.
- Yoo, B., and Donthu, N. 2001. “Developing and validating a multidimensional consumer-based brand equity scale.” *Journal of business research* (52:1), pp. 1-14.
- Yoo, C., and MacInnis, D. 2005. “The brand attitude formation process of emotional and informational ads.” *Journal of Business Research* (58:10), pp. 1397-1406.

FIGURE 1 Research Frame

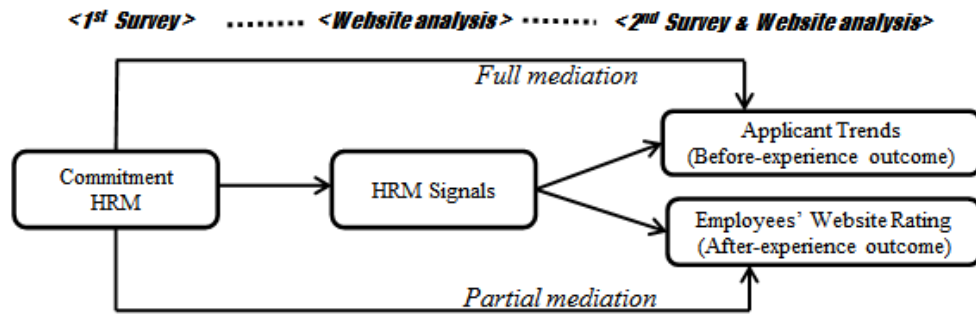


FIGURE 2 Standardized Path Estimates of the Hypothesized Model

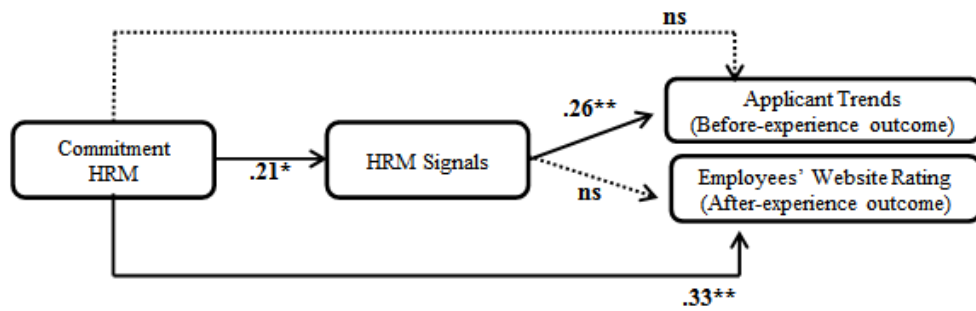


TABLE 1 Descriptive Statistics and Pearson Correlation Analyses

	Mean	S.D	1	2	3	4	5	6
1. Commitment HRM	.14	3.69	-					
2. Web Signals	.25	3.41	.24*	-				
3. Applicants Trends	5.15	.81	.18	.29**	-			
4. Website Rating	3.30	.45	.33**	.08	.12	-		
5. Firm size	.00	1.04	.18	.32**	.00	.01	-	
6. Industry Factor	.00	1.00	.09	.20*	.07	.04	.07	-
7. HRM Decisions	.10	2.59	-.10	.24*	.09	-.10	.16	-.02

n=111, \* p<.05, \*\* p<.01

## APPENDIX 1 Items and Scales of Measurements

Variables		Items & Descriptions	Scales
Commitment HRM	Performance Appraisal	"What is the proportion of employees who receive formal and objective performance appraisal?"	①0-10% ②11-30% ③31-50% ④51-80% ⑤81-100%
	Pay for Performance	"Compared to individual seniority, the importance of individual performance as a determinant of pay increase"	7 point from ①seniority only to ⑦individual 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 ①very disagree to ⑦very agree
	Training	"What proportion of the total employees participates in the formal job training?"	①less than 20% ②20~29% ③30~39% ④40~49% ⑤50~59% ⑥60~69% ⑦more than 70%
	Benefits	"What is the trend of benefit expenditures for the recent three years?"	7 point from ①very decrease to ⑦very increase
HRM Signals	Recruitment	Degree of detailed information	0 for no information 1 for brief words & titles 2 for detailed information
	Job descriptions	Job information	0 for no information 1 for brief words & titles 2 for detailed information
	Training & Development	Number of training and development programs	numbers
	Pay	Description of pay level and method	0 for no information 1 for general information 2 for specific ranges
	Benefits	Number of benefit programs	numbers
Applicant Trends	Change in applicant numbers	"What is the trend in the number of applicants for job opening for the recent three years?"	7 point from ①very decrease to ⑦very increase



## 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 Apparatus	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