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THE IMPACT OF TECHNOLOGY ORIENTATION AND CUSTOMER ORIENTATION ON FIRM PERFORMANCE: EVIDENCE FORM CHINESE FIRMS

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ABSTRACT

This study examines how Technology Orientation (TO) and Customer Orientation (CO) with organizational characteristics e.g. firm size and culture collectively impact firm performance. A sample of 158 Chinese firms were clustered of the basis of their mix of Technology Orientation (TO) and Customer Orientation (CO). The paper provides evidence that firms combining several strategic orientations such as (TO) and (CO) perform better. The second key finding is that organizational characteristics e.g. firm size and collectivism have a positive influence on firm performance while power distance and risk taking have a negative influence on firm performance. Implications of the findings are discussed.

JEL: M3

KEY WORDS: Technology Orientation (TO), Customer Orientation (CO) and Firm Performance

INTRODUCTION

Strategic orientations are fundamental rules that influence the activities of firms and create behaviors that are crucial for firm performance (Gatignon and Xuereb, 1997). Firms that operate in developing and industrialized countries face many challenges when endeavoring into the modern global business environment. To cope, they should have capacity to adjust and respond to this changing realm efficiently and effectively. Over that past few decades, marketing discipline has made considerable progress in addressing scientific and managerial problems. Much work in this regard has been done in high income industrialized economies. The literature has defined different orientation constructs including marketing orientations (MO), entrepreneurial orientation (EO), technology orientation (TO) and customer orientations (CO) and test these propositions independently. A few studies that have examined the combination of these orientations. Currently (MO) gets lot of attention from scholars because of its pivotal role in market discipline (Kirca, Jayachandran, & Bearden, 2005). Various studies show that (MO) has a positive impact on firm performance as (Kohli & Jaworski, 1990); (Matsuno, Mentzer, & Özsomer, 2002); (Narver & Slater, 1990); (Slater & Narver, 1994).

However, market orientation is not only executable option available for firms. There are many companies following (TO) (Gatignon & Xuereb, 1997) or selling orientation (Noble, Sinha, & Kumar, 2002) with considerable success. For instance a strand of literature asserts that (CO) plays a vital role for reflecting the organization's culture. This literature argues (CO) creates behavior which enhances firm performance (Deshpandé, Farley, & Webster Jr, 1993) and (Kohli & Jaworski, 1990). Noble et al., (2002) argued that (CO) is not the only viable strategic orientation. The importance of (TO) is highlighted by (Prahalad & Hamel, 1994) and (Grinstein, 2008) through their findings that the long term success is best achieved through new technological solutions, products and service.

Some studies investigate the separate effects of these orientations (Li, 2005) and (Zhou, Yim, & Tse, 2005) rather than the combined effect. Meanwhile, some studies investigate the combined influence of customer orientation and entrepreneurial orientation (Bhuian, Menguc, & Bell, 2005). But these studies appear to consider orientations as alternatives rather than a complementary set of measures. To fill this research space, we examine the impact that different strategic orientations have on business performance in transitional economy in China. In particular, we examine two types of strategic orientations: (TO) and (CO) with organizational characteristics such as firm size; culture (Collectivism, Power distance, Risk taking) and impact on firm performance.

There are two particular reasons that we focus the examination on China. First, because it is the largest and fastest growing transitional economy. The market economy continuously changes in China. Stout and rapid changes provide great opportunities and raise serious strategic problems that are big challenge for business operation in China as stated by (Hoskisson, Eden, Lau, & Wright, 2000); (Quer, Claver, & Rienda, 2007) and (Zhou, David, & Li, 2006). Second, China has been member of World Trade Organization (WTO) since 11 Dec 2001. Continuous change allows for the betterment of state-owned enterprises and increased contribution to the world economy. It has become one of the largest target countries for foreign direct investments (FDI) and the second largest economy in the world after the United State. Zhou et al., (2005) presents business philosophies and strategic orientations as playing a terminate role in business success. Hence, these rampant environment changes in China provide a rich opportunity for research. The remainder of the article is organized as follows. In the next section, we provide a discussion of the extant literature. Next we describe the data used in the analysis. The following section includes the results of statistical test. The paper closes with some concluding comments.

REVIEW OF LITERATURE

A large amount of resources has been and continue to be invested in (TO). Much of this investment is made on the basis of faith that good returns will come. (TO) holds that consumers prefer products and services with technological superiority (Gatignon & Xuereb, 1997). According to this philosophy, firms devotes their resources to R&D, actively acquire new technologies and use sophisticated production technologies (Voss & Voss, 2000). Accordingly, a technology oriented firm is one "with the ability and will to acquire a substantial technological background and use it in the development of new products" (Gatignon & Xuereb, 1997). Because of their strong commitment to R&D and application of latest technologies, technology-oriented firms can build new technical solutions and offers new and advanced products to meet customer needs. Thus, technology-oriented firms have a competitive advantage in terms of technology leadership and offering differentiated products, which can lead to superior performance (Prahalad & Hamel, 1994). The literature also suggests that a (TO) has a positive relationship with new products (Gatignon & Xuereb, 1997) and firm's performance (Voss & Voss, 2000). When the market environment is marked by rapid technological advances, the value and impact of prior technology deteriorates very quickly (Srinivasan, Lilien, & Rangaswamy, 2002). Firms must allocate more resources to technology development, experiment with new technologies and manage uncertainty through innovations. Otherwise, they will be driven out of the market due to increasingly obsolete technology.

The emphasis on technological orientation means competition that should reduce the importance of market orientation (Grewal & Tansuhaj, 2001). Firms characterized by high technological uncertainty compete more on the basis of technology than on the basis of market orientation in contrast to firms characterized by low technological uncertainty (Hayes & Wheelwright, 1984). Computer supported designing models increase the performance of machines and products with the help of advanced simulation techniques. A firm's high performance depends on technological proficiency. Unless a firm predicts and follows technological developments and uses these developments for improvement of its own product and process, high firm performance may not occur (Freeman & Soete, 1997) and (Meeus & Oerlemans, 2000).

China is an emerging economy and technology is changing dramatically for different industries. While some industries experience incremental technological development, others have absorbed cutting-edge technology from foreign firms through licensing or forming joint ventures (Zhou et al., 2005). In recent years, an increasing number of multinational firms have set up R&D centers in China and some Chinese firms established offices abroad to acquire advanced technology. This provides a dynamic environment that may moderate the effect of (TO). Technology is being presented as something new as it drives change at an ever increasing rate (Chaharbaghi & Willis, 2000) and the correct manufacturing technologies can provide the organization with considerable operational and competitive benefits (Sohal & Terziovski, 2000). Both the pace and degree of innovation and change in technology induce technological uncertainty as documented by (Grewal & Tansuhaj, 2001). Market orientation matters a lot for stable technological industries in comparison with non-stable technological industries (Kohli & Jaworski, 1990). Consequently, organizations often use (TO) as an alternative to market orientation in building sustainable competitive advantages.

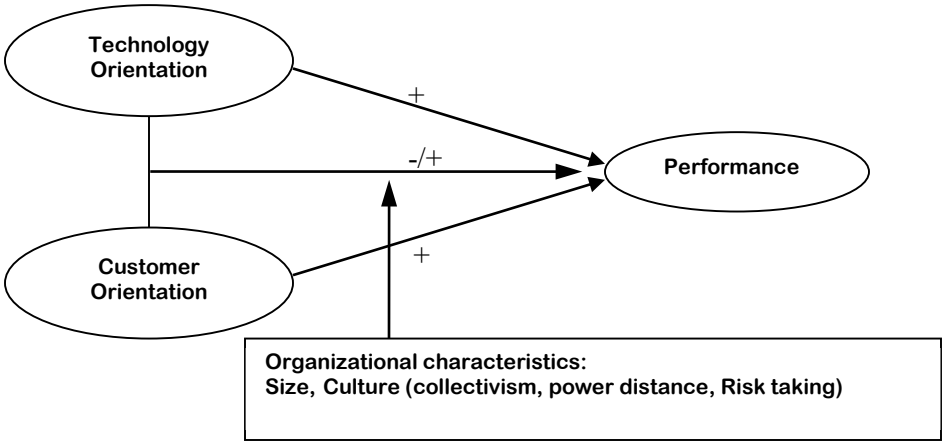
(CO) is define as "the set of beliefs that puts the customer's interest first, while not excluding those of all other stakeholder; in order to develop a long-term profitable viable enterprise" (Deshpandé et al., 1993). (CO) is all about the set of beliefs and vary from culture to culture. The cultural transformation process is difficult to investigate. Researchers agree that understanding of implementing a customer-focused culture is inadequate (Day, 1994 and Narver, Slater, & Tietje, 1998). The management literature states that cultural transformation requires an active role of top management in setting organizational vision. It also creates a link between management and marketing (Argyris, 1966); (Bass & Stogdill, 1990); (Bate, 2010); (House & Podsakoff, 1994); (Pfeffer, 1977) and (Senge, 2014). Marketing scholars document that without senior management support (CO) is not possible (Day, 1994); (Kohli & Jaworski, 1990); (Levitt, 1960); (McKitterick, 1957) and (Narver & Slater, 1990). Deshpandé et al., (1993) explains, "Everyone's job is defined in terms of how it helps to create and delivers value for the customer and internal processes are designed and managed to ensure responsiveness to customer needs and maximize efficiency in value of delivery". (CO) is all about understanding target customers and delivering them superior values. Thus, customer-oriented firms show a continuous and proactive disposition toward identifying and meeting customer needs (Han, Kim, & Srivastava, 1998). For positive financial outcomes, firms satisfy customer needs (Zhou & Li, 2010). Closer relationships with customers leads to a better understanding of customer needs, closer tailoring of products and services, higher customer satisfaction and easier forecasting of demand. On the other hand, loose connections result in broader threats that could hurt the firm badly (Danneels, 2003). It is equally important for firms to serve existing customers. Creating new customers could be accomplished by new products and services and innovation (Henard & Szymanski, (2001) and Langerak, Hultink, & Robben, (2004).

DATA AND METHODOLOGY

This study examines the impact of (TO) and (CO) with organizational characteristics firm's size & culture (collectivism, power distance, risk taking) on Chinese firm performance. To achieve the objective, we used a quantitative research approach to examine the applicability of the conceptual framework of strategic orientations. The quantitative approach involved the collection of primary data from 158 firms in China. A structured questionnaire, translated into Chinese, was distributed to collect the data.

Figure 1 shows the expected impact of technology orientation and customer orientation with the organizational characteristics size of firm and culture (collectivism, power distance, risk taking) on firm performance. Through the framework proposed in Figure 1, we developed the following research questions How does (TO) influence firm performance? Does (CO) matter for firm performance? Does the ambidexterity (TO & CO) correlate with firm performance? And Do the organizational characteristics such as firm size and culture's (collectivism, power distance, risk taking) have any relationship with Firms Performance?

Figure 1: Conceptual Model of the Study



This figure displays the expected impact of technology orientation and customer orientation with the organizational characteristics size of firm and culture on firm performance

To measure and achieve the study object, we used valid, well tested and reliable instruments that have been extensively used in the literature. We followed the Gatignon & Xuereb (1997) method to measure (TO). This four-item measurement represents a firm's ability and willingness to develop new technologies and use sophisticated technologies in new product development. We measured (CO) from Narver & Slater (1990) scales, that are measured by six items to assesses a firm's understanding of its customer's need and its ability to create superior customer values continuously. SPSS software is used for data analysis.

RESULTS AND DISCUSSION

Table 1 shows descriptive statistics of the study variables. These variables are mixed in nature. Some variables are quantitative in nature and some are qualitative. The qualitative variables are further converted into quantitative variables with the help of a Likert scale to conduct the analysis.

Table 1: Descriptive Statistics

Variable	Mean	Min	Max	Std. Dev.
Age in years	15.60	2.00	35.00	18.76
Size*	2.79	-115.00	978.00	21.15
SOE	0.71	0.00	1.00	0.23
POE	0.66	0.00	1.00	0.21
Hybrid	0.37	0.00	1.00	0.15
Listed	0.43	0.00	1.00	0.17
Technology oriented	3.45	1.00	5.00	1.53
Customer Oriented	2.79	1.00	5.00	1.83
Return on Equity in %	0.12	-156.36	615.20	6.89
Return on Asset in %	0.03	-41.45	21.54	0.45
Return on Invested Capital in %	0.12	-321.77	211.56	4.12
Market Value*	92.10	-4.34	12,300.00	245.00

*This table displays descriptive statistics analysis of the sample. Note: * in RMB in 100 Millions*

The age of a firm is given in years. The mean age of the sampled firms are 15.60 years with an 18.70 standard deviations. The return on equity, return on asset, return on invested capital and market value of firm are proxies as performance variables. The results show the mean values for ROE, ROA, ROIC and

market values are 12%, 3%, 12% and 92.40 billion RMB respectively. The high standard deviations of these variables shows that the firm performance indicators are highly volatile. Total assets is used as a proxy for size of the firm and its mean value is 2.79 billion RMB. Apart from quantitative variables, there are some quantitative and dummy variables also included in this analysis. SOE, POE, Hybrid and Listed are dummy variables. In case of SOE, 0 shows that a firm is non-SOE whereas 1 shows a firm is SOE. The same coding system is used for POE, Hybrid and Listed variables. The mean value of SOE is 0.71 which shows that a majority of firms are SOE. The same is the case of POE, where the mean value is 0.66. In the case of Hybrid and Listed the mean value is 0.37 and 0.43 respectively. This shows that on average sampled firms are non-listed and non-hybrid. The Technology orientated and Customer orientations are measured with a structured instruments developed by the researchers. The mean value of (TO) is 3.45 which shows on average firms are technology oriented. The mean value of (CO) is 2.79 which show that firms on average are close to neutral with regard to customer oriented approach. The equation that was estimated is specified by Equation 1 as follows:

$$FirmPerformance = \alpha_1 + \beta_1(Age) + \beta_2(Size) + \beta_3(SOE) + \beta_4(POE) + \beta_5(Hybrid) + \beta_6(Listed) + \beta_7(TO) + \beta_8(CO) + \varepsilon_1 \quad (1)$$

Where:

Age = Life of the Enterprise
Size = Total Assets of the Enterprise
SOE = State Owned Enterprise
POE = Private Owned Enterprise
Hybrid = Mixed Characteristics of State and Private Enterprise
Listed = Listed on the Securities Exchange Commission
TO = Technology Orientation
CO = Customer Orientation

Table 2 demonstrates the results of how the suggested variables influence the performance of the firm. All variables show a positive influence on firm performance. The results show that nature of the business matters significantly as hybrid firms contributes noticeably to performance of the firms as evident by (0.216, 0.084*).

Table 2: Regression Analysis Results of Suggested Variables

F	R-Square	Adjusted R-Square
4.284	0.301	0.231
Age	0.021	
	(0.063)	
Size	0.083	
	(0.063)	
SOE	0.051	
	(0.073)	
POE	0.062	
	(0.083)	
Hybrid	0.216	
	(0.084*)	
Listed	0.09	
	(0.063)	
Technology Orientation (TO)	0.276	
	(0.073*)	
Customer Orientation (CO)	0.312	
	(0.062*)	

*This table displays the results of the suggested variables and their impact on firm performance. *p<0.1, **p<0.05& 0.1 and ***p<0.00, 0.05 &0.1*

$$FirmPerformance = \alpha_2 + \beta_1(Age) + \beta_2(Size) + \beta_3(SOE) + \beta_4(POE) + \beta_5(Hybrid) + \beta_6(Listed) + \beta_7(TO) + \beta_8(CO) + \beta 9(TO \times CO) + \varepsilon_2 \quad (2)$$

Table 3 shows the results of the combination of (TO) and (CO) with the principle model. By applying the regression analysis we observe that (TO) is significant at the 5% and 10% alpha. (CO) significantly contributes in the performance of the firms as follows (0.308, 0.006***). We found that enterprises with the combination of (TO) and (CO) enjoy sound performance evidence by (0.122, 0.008***). This was expected from the literature as reported by (Gatignon & Xuereb, 1997).

Table 3: Regression Analysis Results Of TO & CO Combine Impact on Firm Performance

F	R-Square	Adjusted R-Square
3.722	0.306	0.224
Age	0.041	
	(0.064)	
Size	0.076	
	(0.064)	
SOE	0.031	
	(0.073)	
POE	0.061	
	(0.083)	
Hybrid	0.202	
	(0.085*)	
Listed	0.104	
	(0.064)	
Technology Orientation (TO)	0.271	
	(0.034**)	
Customer Orientation (CO)	0.308	
	(0.006***)	
TO×CO	0.122	
	(0.008***)	

*This table displays the results that the combination impact of technology orientation and customer orientation on firm's performance. *p<0.1, **p<0.05 & 0.1 and ***p<0.00, 0.05 &0.1*

To continue the analysis we estimate Equation 3, which include interaction terms.

$$FirmPerformance = \alpha_3 + \beta_1(Age) + \beta_2(Size) + \beta_3(SOE) + \beta_4(POE) + \beta_5(Hybrid) + \beta_6(Listed) + \beta_7(TO) + \beta_8(CO) + \beta 9(TO \times CO) + \beta 10(TO \times CO \times Size) + \varepsilon_3 \quad (3)$$

The results are presented in Table 4. The results include the combined influence of (TO), (CO) and size of firms all together by keeping the other variables constant. Only size of the enterprise contributes to the performance of the enterprise but is significant at the 10% level. Combining the size with the (TO) and (CO) it becomes significant at the 5% and 10% (0.186, 0.049**) levels. This implies that an enterprise with strong (TO) and (CO) also gains the benefit of size. Furthermore, size as an individual factor, does not contributing as well as with (TO) and (CO).

Table 4: Results of to & CO with Size of Firm Impact on Firm Performance

F	R-Square	Adjusted R-Square
3.957	0.33	0.246
Age	0.016	
	(0.063)	
Size	0.093	
	(0.063)	
SOE	0.031	
	(0.072)	
POE	0.049	
	(0.082)	
Hybrid	0.199	
	(0.083)	
Listed	0.130	
	(0.064)	
Technology	0.265	
Orientation (TO)	(0.023**)	
Customer	0.289	
Orientation (CO)	(0.009***)	
TO×CO	0.194	
	(0.006***)	
TO×CO×Size	0.186	
	(0.049**)	

*This table displays the results of both technology orientation and customer orientation includes size of the firm to influence the firm's performance. *p<0.1, **p<0.05 & 0.1 and ***p<0.00, 0.05 &0.1*

Finally, we estimate Equation 5 as follows:

$$FirmPerformance = \alpha_4 + \beta_1(Age) + \beta_2(Size) + \beta_3(SOE) + \beta_4(POE) + \beta_5(Hybrid) + \beta_6(Listed) + \beta_7(TO) + \beta_8(CO) + \beta 9(TO \times CO) + \beta 10(TO \times CO \times Size) + \beta 11(TO \times CO \times Collectivism) + \beta 12(TO \times CO \times PowerDis\tan ce) + \beta 13(TO \times CO \times RiskTaking) + \varepsilon_4 \quad (5)$$

Where:

Collectivism = Working Environment Collectivism
Power Distance = either high or low
Risk Taking= either risk lover or risk averse

Table 5 shows the results related to the impact of collectivism, power distance and risk taking with (TO) and (CO). Firms believe in the collectivism performing well and it contributes positively (0.317, 0.008***) to the performance of firms. We found that firms with high power distance loose the benefits of (TO) and (CO) and are negatively related (-0.155, 0.043**) to firm performance. Although risk taking is good in some circumstances our sample firms show that risk taking is adversely affected by the performance of firms (-0.239, 0.036**). In a nutshell, firms with high (TO) and (CO) realize good performance.

CONCLUDING COMMENTS

This is study is unique because it evaluates the influence of (TO) and (CO) along with organizational characteristics such as firm size, culture (collectivism, power distance and risk taking) among Chinese firms. We found fruitful and interesting facts for firms which are in the implementing phase of technology orientation and customer orientation. Usually, TO and CO significantly enhance firm performance. Gatignon & Xuereb, (1997) observed the same relationship. This study highlights and supports that the Hybrid form of firms enjoy more profits as shown in Table 2, (0.216, 0.084*). The findings also show that larger firms gain more advantages from TO and CO. We also find that collectivism plays a significant role

in firm performance. Being in an Asian country, it is not unusual that higher power distance hurts firm performance (-0.155, 0.043**) as shown in Table 5.

Table 5: Regression Results of Collectivism, Power Distance and Risk Taking with TO & CO on Firm Performance

F	R-Square	Adjusted R-Square
4.402	0.396	0.298
Age	0.001	
	(0.062)	
Size	0.102	
	(0.062)	
SOE	0.035	
	(0.074)	
POE	0.004	
	(0.086)	
Hybrid	0.128	
	(0.082)	
Listed	0.144	
	(0.062)	
Technology Orientation (TO)	0.262 (0.050**)	
Customer Orientation (CO)	0.321 (0.009***)	
TO×CO	0.312 (0.006***)	
TO×CO×Size	0.120 (0.038**)	
TO×CO×Collectivism	0.317 (0.008***)	
TO×CO×Power Distance	-0.155 (0.043**)	
TO×CO×Risk-taking	-0.239 (0.036**)	

*This table shows the impact of collectivism, power distance and risk taking with technology orientation and customer orientation on firm performance. *p<0.1, **p<0.05 & 0.1 and ***p<0.00, 0.05 &0.1*

Our results are consistent with prior studies that documented (TO) and (CO) contribute positively to firm performance (Henard & Szymanski, (2001) and Langerak et al., 2004). However, this study provides a better understanding of the combined effect of (TO) and (CO) and organizational characteristics. Overall, (TO) and (CO) are particularly effective at improving firm performance. Our study explicitly considered the role of organizational characteristics size, culture (collectivism, power distance and risk taking). Firm size contributes positively to firm performance. We conclude that higher power distance not only hurt (TO) and (CO) benefits but also overall firm performance. This is consistent with existing studies such as as (Day, 1994); (Kohli & Jaworski, 1990); (Levitt, 1960); (McKitterick, 1957) and (Slater & Narver, 1994) who that argued that effective (CO) could not be achieved without the role of the top management.

Identification of a successful mix of strategic orientations such as (TO) and (CO) with organizational characteristics size, culture (collectivism, power distance and risk taking) is a most complex challenge for management. We urge firm managers to develop a culture that nurtures organizational learning. The study suggests that managers should not ignore organizational factors and must develop the mix of orientations that enables adaptation to a dynamic business environment. This paper is subject to the usual limitations. We examine a single country and examine a sample with limited sample size. Further research in other countries is needed to confirm and extend the results. Our statistical tests show satisfactory influence of (TO) and (CO) on firm performance but the underlying phenomena is difficult to measure in practice.

Therefore, development of more differentiated measurements for (TO) and (CO) would be a valuable avenue for future research.

REFERENCES

Argyris, Chris. (1966). Interpersonal Barriers to Decision Making. *Journal of Occupational and Environmental Medicine*, 8(11), 611.

Bass, Bernard M, & Stogdill, Ralph M. (1990). Handbook of leadership. Theory, Research & Managerial Applications, 3.

Bate, S Paul. (2010). Strategies for cultural change: Routledge.

Bhuian, Shahid N, Menguc, Bulent, & Bell, Simon J. (2005). Just entrepreneurial enough: the moderating effect of entrepreneurship on the relationship between market orientation and performance. *Journal of Business Research*, 58(1), 9-17.

Chaharbaghi, Kazem, & Willis, Robert. (2000). The technology, mythology and economy of technology. *Management Decision*, 38(6), 394-402.

Danneels, Erwin. (2003). Tight–loose coupling with customers: the enactment of customer orientation. *Strategic Management Journal*, 24(6), 559-576.

Day, George S. (1994). The capabilities of market-driven organizations. *The Journal of Marketing*, 37-52.

Deshpandé, Rohit, Farley, John U, & Webster Jr, Frederick E. (1993). Corporate culture, customer orientation, and innovativeness in Japanese firms: a quadrad analysis. *The Journal of Marketing*, 23-37.

Freeman, Christopher, & Soete, Luc. (1997). The economics of industrial innovation: Psychology Press.
Gatignon, Hubert, & Xuereb, Jean-Marc. (1997). Strategic orientation of the firm and new product performance. *Journal of Marketing Research*, 77-90.

Grewal, Rajdeep, & Tansuhaj, Patriya. (2001). Building organizational capabilities for managing economic crisis: The role of market orientation and strategic flexibility. *Journal of Marketing*, 65(2), 67-80.

Grinstein, Amir. (2008). The relationships between market orientation and alternative strategic orientations: A meta-analysis. *European Journal of Marketing*, 42(1/2), 115-134.

Han, Jin K, Kim, Namwoon, & Srivastava, Rajendra K. (1998). Market orientation and organizational performance: is innovation a missing link? *The Journal of Marketing*, 30-45.

Hayes, Robert H, & Wheelwright, Steven C. (1984). Restoring our competitive edge: competing through manufacturing.

Henard, David H, & Szymanski, David M. (2001). Why some new products are more successful than others. *Journal of Marketing Research*, 38(3), 362-375.

Hoskisson, Robert E, Eden, Lorraine, Lau, Chung Ming, & Wright, Mike. (2000). Strategy in emerging economies. *Academy of Management Journal*, 43(3), 249-267.

House, Robert J, & Podsakoff, Philip M. (1994). Leadership effectiveness: Past perspectives and future directions for research: Lawrence Erlbaum Associates, Inc.

Kirca, Ahmet H, Jayachandran, Satish, & Bearden, William O. (2005). Market orientation: A meta-analytic review and assessment of its antecedents and impact on performance. *Journal of Marketing*, 69(2), 24-41.

Kohli, Ajay K, & Jaworski, Bernard J. (1990). Market orientation: the construct, research propositions, and managerial implications. *The Journal of Marketing*, 1-18.

Langerak, Fred, Hultink, Erik Jan, & Robben, Henry SJ. (2004). The impact of market orientation, product advantage, and launch proficiency on new product performance and organizational performance. *Journal of Product Innovation Management*, 21(2), 79-94.

Levitt, Theodore. (1960). Marketing myopia. Harvard business review, 38(4), 24-47.

Li, Julie Juan. (2005). The formation of managerial networks of foreign firms in China: The effects of strategic orientations. *Asia Pacific Journal of Management*, 22(4), 423-443.

Matsuno, Ken, Mentzer, John T, & Özsomer, Ayşegül. (2002). The effects of entrepreneurial proclivity and market orientation on business performance. *Journal of Marketing*, 66(3), 18-32.

McKitterick, JB. (1957). What is the marketing management concept: Chicago, IL.

Meeus, Marius TH, & Oerlemans, Leon AG. (2000). Firm behaviour and innovative performance: An empirical exploration of the selection–adaptation debate. *Research Policy*, 29(1), 41-58.

Narver, John C, & Slater, Stanley F. (1990). The effect of a market orientation on business profitability. *The Journal of Marketing*, 20-35.

Narver, John C, Slater, Stanley F, & Tietje, Brian. (1998). Creating a market orientation. *Journal of Market-focused Management*, 2(3), 241-255.

Noble, Charles H, Sinha, Rajiv K, & Kumar, Ajith. (2002). Market orientation and alternative strategic orientations: a longitudinal assessment of performance implications. *Journal of Marketing*, 66(4), 25-39.

Pfeffer, Jeffrey. (1977). The ambiguity of leadership. *Academy of Management Review*, 2(1), 104-112.

Prahalad, Coimbatore K, & Hamel, Gary. (1994). Strategy as a field of study: Why search for a new paradigm? *Strategic Management Journal*, 15(S2), 5-16.

Quer, Diego, Claver, Enrique, & Rienda, Laura. (2007). Business and management in China: A review of empirical research in leading international journals. *Asia Pacific Journal of Management*, 24(3), 359-384.

Senge, Peter M. (2014). The fifth discipline fieldbook: Strategies and tools for building a learning organization: Crown Business.

Slater, Stanley F, & Narver, John C. (1994). Market orientation, customer value, and superior performance. *Business Horizons*, 37(2), 22-28.

Sohal, AS, & Terziovski, M. (2000). TQM in Australian manufacturing: factors critical to success. *International Journal of Quality & Reliability Management*, 17(2), 158-168.

Srinivasan, Raji, Lilien, Gary L, & Rangaswamy, Arvind. (2002). Technological opportunism and radical technology adoption: An application to e-business. *Journal of Marketing*, 66(3), 47-60.

Voss, Glenn B, & Voss, Zannie Giraud. (2000). Strategic orientation and firm performance in an artistic environment. *Journal of Marketing*, 64(1), 67-83.

Zhou, Kevin Zheng, David, K Tse, & Li, Julie Juan. (2006). Organizational changes in emerging economies: Drivers and consequences. *Journal of International Business Studies*, 37(2), 248-263.

Zhou, Kevin Zheng, & Li, Caroline Bingxin. (2010). How strategic orientations influence the building of dynamic capability in emerging economies. *Journal of Business Research*, 63(3), 224-231.

Zhou, Kevin Zheng, Yim, Chi Kin, & Tse, David K. (2005). The effects of strategic orientations on technology-and market-based breakthrough innovations. *Journal of Marketing*, 69(2), 42-60.

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BIOGRAPHY

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THE EFFECTS OF PRODUCT FIT AND BRAND FIT ON MEMORY RETENTION FOR BRAND ALLIANCES: WHEN LESS IS MORE

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ABSTRACT

The literature on brand alliances establishes the significance of the "fit" concept. Specifically, it has been shown that consumers evaluate the extent to which the brands and products in a brand alliance are congruent. Various articles have studied the effects of brand and product fit on attitude toward the brand alliance suggesting that stronger degrees of fit result in the most favorable outcomes. However, there is a lack of research on the effects of brand and product fit on memory retention. This research is based on concepts in cognitive psychology, leading to hypotheses that suggest that stronger fit is not always better. A 2 x 2 experiment provides support for those hypotheses.

JEL: M310, C30

KEY WORDS: Brand Alliances, Brand Promotion, Consumer Behavior, Memory Effects, Brand Identity, Brand Management

INTRODUCTION

The practice of cooperative brand activities is as prevalent as ever. According to Mastercard, co-branded cardholders outspend holders of standard bank credit cards by approximately $4,900 every year and account for approximately 50 percent of all credit card spending. Additionally, co-branded card spend is growing at a faster rate than that of standard credit cards (Mastercard, 2012). It is that kind of promise that has the likes of Saks Fifth Avenue, Exxon Mobil, Frontier Airlines, Best Buy, and hundreds of other companies teaming up with credit card providers.

Beyond the co-branding of credit cards, cooperative brand activities vary in nature. Other recent examples include Dairy Queen's Girl Scout cookie Blizzard add-ins, the Ford F-150 Harley-Davidson Edition, Benjamin Moore's Pottery Barn paint colors, and T.G.I. Friday's Jack Daniel's menu selections. In practice as well as in academic research, such cooperative brand activities have gone by various terms, including brand alliances, co-branding, co-marketing, cross-promotion, joint branding, and joint sales promotion. While subtle characteristics distinguish these cooperative marketing tactics from one another, this research focuses specifically brand alliances. Brand alliances involve the association or combination of two or more individual brands and products in a single context and are commonly represented through some means of promotion (Rao and Ruekert, 1994, and Simonin and Ruth, 1998).

Key empirical studies have contributed to the knowledge of the effects of brand alliances on consumer evaluations and cognitive processing. Specifically, it has been shown that brand alliances have an impact on the attitude toward partnering brands (Bendik *et al*, 2015, Beth *et al*, 2013, Gammoh *et al*, 2006, Simonin and Ruth, 1998, and Walchli, 2007), exhibit effects on brand awareness, accessibility, beliefs, and attitudes for newly introduced brands (Samu *et al*, 1999), affect shopping and purchase intentions (Arnett *et al*, 2010), and create a link whereby attribute and quality information transfers from one brand to another (Rao *et al*, 1999, Levin and Levin, 2000, and Voss *et al*, 2012). Many of these brand alliance studies address the

issue of "fit" between the entities involved. While the concept of brand alliance fit has most often been operationalized very simply as product complementarity, congruity between brand partners has also been explored (Walchli, 2007). Simonin and Ruth (1998) clearly define two separate dimensions of brand alliance fit establishing that as consumers process a brand alliance, they simultaneously evaluate the extent to which the product categories involved in a brand alliance are related or compatible (product fit) as well as the degree to which the images of both brands are consistent with or complementary to each other (brand fit). More recently, brand alliance fit has been defined as a two-dimensional construct based on the expectancy and relevancy of the partner brand (Hao, 2015).

The most common outcome of brand alliance studies that test for the effects of fit is that "more is better." Specifically, studies find that higher levels of brand alliance fit result in more positive attitudes toward the alliance as well as partner brands involved in the alliance (Arnet *et al*, 2010, Bigné *et al*, 2012, James, 2005, Lanseng and Olsen, 2008, and Simonin and Ruth, 1998). While developing more positive attitudes toward brands is certainly something that brand managers should find appealing, the comprehensive management of these complex entities begs for a greater understanding of the cognitive processes that ultimately affect the attitudes and behaviors of customers. Thus, the effects of combining different product types and different brands on memory In moving towards a more complete understanding of the effects of brand alliances, one factor that should be investigated more extensively is memory.

It has been shown that the ability to remember brand names and attributes is a significant factor in the processing of consumer information (Alba *et al*, 1991). While memory is one of many inputs affecting consumer behavior, it has been shown that the likelihood that some input (brand name, attribute, relevant piece of information) will be used in a judgment (attitude formation, belief, buying decision) is both a positive function of the accessibility of that input in memory and a negative function of the accessibility of alternative inputs in memory (Lynch *et al*, 1988). The purpose of this research is to investigate the effects of product and brand fit on memory retention for brand alliance advertisements. A review of the literature on congruency, categorization, and elaboration will establish a theoretical basis for hypothesizing the relationships between the two dimensions of brand alliance fit and consumers' ability to remember promotional information. Based on the social cognition and cognitive psychology research for these concepts, this approach will establish that in some cases, lower levels of fit can actually enhance memory.

LITERATURE REVIEW

Based on the definitions of brand fit and product fit that have been given, brand alliance fit, in the most basic sense, is a process of determining the degree to which two branded products can be grouped together in a logical manner. The concept of congruency is explored in order to accomplish the purposes of this manuscript and gain a better understanding of the effects of brand alliance fit on cognitive processing. Congruency has been examined in various marketing contexts (Lee and Mason, 1999, Meyers-Levy, 1991, Meyers-Levy and Tybout, 1989, Salgado-Montejo *et al*, 2014, Subhadip *et al*, 2015, Sujan *et al*, 1986, and Walchli, 2007) based on work in social cognition (Hastie, 1980, Hastie, 1981, Srull, 1981, and Srull *et al*, 1985) and other areas of cognitive psychology (Fiske and Pavelchak, 1986, Friedman 1979, Goodman 1980, and Thorndyke, 1977). Overall, this research examines the role of elaboration in determining the degree to which two or more items or pieces of information are congruent with some previously developed schema. Because the brands and products contained in brand alliances are essentially complex pieces of information, each can be evaluated with respect to congruency with a particular schema the elaboration processes required for making such evaluations.

From a synthesis of the congruency literature emerge two distinct dimensions of congruency (Heckler and Childers, 1992). The first of these, relevancy, is defined as the degree to which information pertains directly to or contributes to the identification of a central theme or primary message. As the name implies, it is the degree to which information is relevant to some main idea. Within any given episode or any evoked

schema, there will be a certain variables (i.e., people or other agents, objects, settings, and even goals) that combine to develop the theme (Goodman, 1980). If two pieces of information are considered to reflect the same theme, then a high level of relevancy between those two elements results.

The second dimension of congruency is expectancy. Formally defined, expectancy is "the degree to which information elicits or falls into some predetermined pattern or structure evoked by the theme" (Heckler and Childers 1992, p. 477). Expectancy is related to relevancy as the variables that combine to develop a theme can be instantiated in a variety of different ways. These instantiations vary in their degree of expectancy. An individual develops certain expectancies associated with how such thematic elements should be manifested based on their world knowledge such as personal experience, information from other people or sources, or even general appearances of objects. Thus, any given item (be it relevant or irrelevant) can vary as to whether it is expected or unexpected. While the thematic elements of any given combination vary on the dimension of relevancy, the instantiations of those elements vary on the dimension of expectancy. This takes on an important application in brand alliances as this cooperative marketing tactic not only brings together multiple brands and products, but the success of the promotional effort rests on the notion of establishing some common purpose – or theme – for the combination.

The significance of the duel congruency dimensions of relevancy and expectancy to brand alliances extends to the generally accepted positive relationship between congruency and elaboration. More important still is the recognition that two types of elaboration play a role in the evaluation of products (Meyers-Levy, 1991). Relational elaboration is a facilitative process that takes place when distinct pieces of information presented in the same context can be grouped based on a shared theme (Bransford and Franks, 1971, and Hayes-Roth, 1977). If two distinct items can be associated with each other through relational elaboration, then it can be said that each can be associated with a central theme. Once this association has taken place, each item then benefits from an instantaneous network of associated items. Not only does this help to encode each item more deeply, but this also provides more cues by which either item can be retrieved.

Item-specific elaboration is a discriminative process that occurs when obvious distinctions are present between different items (Eysenck, 1979). This type of elaboration generally takes place when an item or piece of information is given that appears to be discrepant or unique from any and all other items in the given context. While item-specific elaboration does not benefit from the same associative processes that occur through relational elaboration, it prompts greater effort during encoding. This greater effort occurs as an attempt to associate the new information with pre-existing information. Any given brand alliance varies as to the extent that a solid theme is apparent. A theme may be established based on the combination of brands or the combination of products represented in a brand alliance. Consider a brand alliance with the product combination of peanut butter and jelly. These products prompt a common theme of "sandwich foods". Consider also a second brand alliance between the brands Gucci and Rolex. These two brands prompt a common theme of "high status". These examples both involve pairs that could easily be argued to have a high level of fit. While it is apparent that either the product or brand combination in a brand alliance could establish a theme, literature on categorization processes establishes that product combinations frequently provide a more direct cognitive path for establishing brand alliance theme.

A category is "two or more distinguishable objects that are treated equivalently" (Mervis and Rosch, 1981). In evaluating brand alliances, the components may not seem to share any common attributes on the basis of comparing the lower order product or brand categories to which they belong. However, when a higher order category to which both categories can be considered members is considered, this perception can change. This hierarchical approach to categorization has been used in various contexts (Rosch, 1978, and Turner, 1987). In the processing of information according to a hierarchy or categories, attributes vary according to degrees of abstraction. The higher a person has to search on such a hierarchy, the higher the degree of abstraction. Members of a concrete category are viewed as having a greater degree of category membership as opposed to members of an abstract category, which have a less binding degree of

membership. The concept of higher-order categorization is relevant to the inclusion of product and brand combinations in brand alliances as products are more concrete than brands by nature. Products are comprised of features and attributes. Brands, on the other hand, are defined more abstractly by concepts, ideas, and images that reflect consumer associations including physical attributes, psychological benefits, and attitudes (Keller, 1993).

Thus, the principles of relevancy and expectancy can be applied to the practice of brand alliances. A central theme can be thought of in terms of a category with different bits of information being potential members of that category. Two pieces of information considered to reflect the same theme can be thought of as members belonging to the same category. Because product categories are more concrete, there is a far greater likelihood that the products involved in a brand alliance will serve as the bases for establishing (or failing to establish) a theme. In this respect, product fit is representative of the relevancy of a brand alliance. If there is a strong degree of product fit, then both products will also be relevant to the central theme. If there is a weak degree of product fit, then one or both products will be irrelevant to the central theme. As the relevancy of brand alliance components is established by product fit, brand fit is representative of the expectancy of a brand alliance. Because brand fit is the degree to which the images of each brand are complementary to each other, the level of brand fit also represents the level of expectancy for both brands in relation to each other. Each branded product is a thematic variable. If each product is an element that varies in relation to the theme of the promotion, the brand is an instantiation of that product.

As a means of demonstrating relevancy and expectancy in a cross-promotional context, consider an advertisement promoting the combination of Windex glass cleaner and Scott paper towels. The context of this ad definitely contains an overall theme. It could be said that the theme is that of "window cleaning". Both products, glass cleaner and paper towels, are very relevant to this theme. In fact, it can be said that the reason this theme is so easily identifiable is not only because both products are relevant to the theme, but that they actually comprise the theme. It follows then that both products are very complementary to each other. Therefore, this product combination, by definition, has a high level of product fit. There are various brands of glass cleaner and various brands of paper towels. The fact that the Windex brand is all but synonymous (it should be noted this will not generally be the case for other branded products) with the product of glass cleaner leaves little argument that the Windex brand is, therefore, highly expected in the context of "window cleaning".

The Scott brand is well-known for various paper products, particularly towels. Because paper towels are the most common household item used to clean glass and other hard surfaces makes it logical that the Scott brand is also highly expected in the context of "window cleaning". Because both brands have a high level of expectancy in the same context, it can be said that the union of the two is also expected. In addition, both brands represent a quality standard for their categories and are top sellers. Because the images of these two brands are complementary, it follows that a high level of brand fit exists. The assertion that the processes of evaluating relevancy and expectancy are indeed involved in evaluating product fit and brand fit is crucial to hypothesizing the relationship between product fit and brand fit in brand alliances and cognitive processes which affect memory retention. As noted in the previous section, the congruency literature identifies the effects of relevancy and expectancy on elaboration and associative processes. This is particularly significant in light of the fact that the extant brand alliance literature has not revealed the underlying dimensions of brand and product fit. This literature, therefore, has left gaps in the understanding of brand alliance effects. If, in fact, the fit dimensions of product fit and brand fit are measuring similar constructs as the congruency dimensions of relevancy and expectancy, then product fit and brand fit should have similar effects on elaboration and associative processes. The congruency literature, therefore, provides a theoretical foundation for an examination of the effects of product fit and brand fit and a basis upon which to hypothesize the various relationships.

The literature on congruency (Hastie, 1980, 1981, and Srull, 1981) gives insight as to the effects of relevancy on memory. When an object is relevant to a theme, it enhances or actually helps to create that theme. As described in the literature review, the product categories in a brand alliance have the potential to create a theme. When a central, higher-order category is prompted by the two product categories as a grouping mechanism, that higher-order category can be considered as a theme created by the combination of the products. According to Meyers-Levy (1991), a situation in which items can be grouped according to a shared theme prompts relational elaboration. Additionally, when information is relevant to a central theme, this information becomes more strongly linked within the associative network based on the established nature of that theme and prior knowledge structures already present. Thus, retrieving this information from memory requires little effort due to the increase in the number and strength of linkages with those knowledge structures. In the same manner, information that is irrelevant to a theme is not processed with the facilitation of relational elaboration. Information that is irrelevant suffers from a lack of notability. While this information may still be processed, the elaborative effort exerted is much weaker. Because the information is not be linked through a central theme, the items are not associated with each other nor with other linkages in memory. Thus, the resulting retrievability is weak.

In a brand alliance context, a product pair with a high level of relevancy to a central theme (i.e., product categories are complementary resulting in strong product fit) should also facilitate this formation of associative linkages within the memory network. This causes deeper encoding of the products themselves as well as other information in the ad that pertains to the theme. The deeper encoding takes places via relational elaboration and then facilitates information retrieval. Consider a promotion involving a computer chip and software designed to be used with that chip. The central theme of using personal computers naturally invokes certain items that are strongly associated with it. Computer chips and software would likely be two such items. Therefore, not only would they be considered relevant to the theme, but should be strongly associated to each other as well as to theme related information. The following hypothesis then results:

H_1: In a brand alliance, a product pair with a high level of product fit will lead to greater recall, and enhanced overall recognition of ad information compared to a product pair with a low level of product fit.

According to social cognition frameworks (Hastie 1980, Hastie 1981, and Srull 1981), unexpected information requires more processing effort in the form of elaboration than expected information during encoding. This is due to the fact that, particularly in the processing of complex information, the reason for the presence of an unexpected object or piece of information is not readily clear and does not fit within some pre-determined schema. Thus, the individual must exert more effort in an attempt to understand why that information is presented in the given context. While the social cognition literature does not distinguish this effort as a specific type of elaboration, the type of elaboration prompted by distinctive properties of information fits the Meyers-Levy (1991) description of item-specific elaboration.

Consider an example of a cross-promotion involving Intel and Lego. The images of these two brands would initially seem to have little in common. Additionally, the two brand images are composed of elements so distinctive from each other that the combination of two such brands is likely to be unexpected or have a low level of brand fit. The distinctive characteristics of these two brands would then result in a "surprise effect", invoking high levels of item-specific elaboration in an attempt to make sense out of the combination. This increased level of item-specific elaboration leads to more vivid encoding and increased memory retention. Thus,

H_2: In a brand alliance, a brand pair with a low level of brand fit will lead to greater recall and enhanced overall recognition of ad information compare to a brand pair with a high level of brand fit.

As discussed previously, while there is support for two distinct dimensions of incongruency, these dimensions do not exist in isolation. Thus, while the main effects of both product fit and brand fit on memory retention can be hypothesized and examined separately, more important to understanding the relation of these dimensions to memory are the dynamics of the simultaneous effects of these fit dimensions.

Based on the two previous hypotheses, the conditions leading to memory enhancement are those of low brand fit and high product fit. Such a combination of the fit dimensions should provide the benefits of increasing both relational elaboration and item-specific elaboration. Prior research on these two types of elaboration resulting from a single dimension of congruency does not examine the possibility that a given item of information could prompt both types of elaboration.

However, when congruency is considered as a two-dimensional construct (Heckler and Childers, 1992), it is evident that it is possible for a particular object to have different levels of each dimension of congruency, prompting both types of elaboration. A cross-promotion satisfying the low brand fit/high product fit condition should produce this situation and, thus, result in the highest level of memory performance.A brand alliance combining the Intel Pentium processor and Lego Creator software states that Lego's new software for children to create images on a computer was designed to specifically use the capabilities of the Intel processor. As mentioned before, the two brands would prompt an increase in both relational and item-specific elaboration. Both of these processes would facilitate memory retention. In a similar manner, a condition in which brand fit is high and product fit is high (such as Intel processor and Adobe Photoshop) would benefit from increased relational elaboration, but not item-specific elaboration. Likewise, a condition in which brand fit is low and product fit is low (such as an Intel processor and Lego building blocks) would not benefit from relational elaboration, but would benefit from increased item-specific elaboration. Thus, a product pair satisfying either conditions of high brand fit/high product fit or low brand fit/low product fit should produce a relatively moderate level of memory performance. Ultimately, a brand alliance defined by a high brand fit/low product fit condition would not achieve the benefits of either type of elaboration. On the basis of this discussion, the following effects are hypothesized:

H_3: A brand alliance with a low brand fit/high product fit will lead to greater recall and overall recognition of ad information compared to a brand alliance with either a low brand fit/low product fit or a high brand fit/high product fit.

H_4: A brand alliance with either a low brand fit/low product fit or a high brand fit/high product fit will lead to greater recall and overall recognition of ad information compared to brand alliance with a high brand fit/low product fit.

It is important to note here that while Hypotheses 3 and 4 predict memory effects based on the simultaneous consideration of both fit dimensions, the effect is not hypothesized to be interactive. This is not meant to imply that an interaction effect does not exist. The conditions resulting in the highest (low brand fit/high product fit) and the lowest (high brand fit/low product fit) memory performance are easily distinguishable. However, because the conditions of both low product fit/low brand fit and high product fit/high brand fit each benefit from one type of elaboration, the predicted levels of memory retention fall between the other two conditions. While it is possible that a significant difference could exist between the memory results for the low product fit/low brand fit and high product fit/high brand fit conditions, there is no theoretical basis to predict one. Thus, while an interaction between brand fit and product fit could result, it is quite possible that Hypotheses 3 and 4 could be supported while the slopes for the effects of both fit dimensions remain parallel. It should be mentioned that a cross-over interaction could only result if the direction of the cell means were to not support H_3 and H_4. However, a "fan" interaction could result with the hypotheses being supported.

DATA AND METHODOLOGY

A 2 (product fit: high-low) x 2 (brand fit: high-low) factorial experiment was conducted to test the hypotheses. In developing and conducting these studies real products made by real brands were used. Subjects for this study were supplied by a student subject pool at a large southwestern university in 2003 (see Table 1 for summary statistics of this sample).

Table 1: Sample Summary Statistics

N	**105**
Age range	19-48
Ages 20-22	70%
Female	49%
Male	51%
Caucasian	71%
African-American	2%
Asian	5%
Hispanic	22%
Native American	1%

This table shows summary statistics for the composition of the sample.

In order to conduct a reliable experiment, cell conditions were created that consisted of four print ads each. The print ads depicted a brand alliance based on some kind of offer involving the branded products in each ad. Because the variables of interest were brand fit and product fit, the objective was to create ad conditions that adequately represented each cell in the 2 x 2 (i.e., high product fit/high brand fit, high product fit/low brand fit, low product fit/high brand fit, low product fit/low brand fit). In addition, the ad conditions needed to control for factors other than brand fit and product fit. Pretests accomplished these objectives. Based on the results from pretesting, advertisements were created for each of the resulting 16 pairs of branded products, four ads in each of the four conditions. Each advertisement was designed according to a specific format. This format included brand logos and marks at the top of each ad with a pictorial representation of the two products. Each ad then contained a verbal description of the promotion. All ads were consistent with respect to the number of words (approximately 85) and statements (five) made. Complex visual images and ad copy were not included in order to reduce any effects of the ads, resulting in more precise brand and product fit conditions.

Nine sessions of the experiment were conducted. Within each session, subjects were randomly assigned to one of four groups representing the four different cell conditions (high product fit/high brand fit, high product fit/low brand fit, low product fit/high brand fit, low product fit/low brand fit). Subjects were presented with survey packets. Because the advertisements in this packet were not commercially produced, subjects were instructed to consider that the ads they would see were ads in early stages of development. The first section of the packets contained four brand alliance ads reach representing the same cell conditions. Fit conditions were not mixed within subjects so that the evaluation of one ad would not skew subsequent ad evaluations. All ads were counterbalanced resulting in two different orders of the same ads in each cell condition. Subjects were given 35 seconds to view each advertisement. This duration of exposure was determined a priori as an adequate length of time for an average student to consider the ad and read the information. Following exposure to the advertisements, an unrelated distracter task was given to subjects for the purpose of clearing information from short-term memory. Subjects then responded to measures for the dependent variables. The hypotheses require various measures of memory. Unaided recall was assessed by asking subjects to respond to the single open statement, “In the space below, please list all the brands that you can remember from the advertisements that you viewed previously” (total of eight brands possible, two per condition).

Aided recall was measured via two different tasks. In the first task, subjects were given the product combination for each of the four cross-promotions that they viewed. Subjects were then asked to recall as much detail as possible from that ad. Key items to be remembered included the brand names, the promotional offer, and any of four key facts included in the advertisement. Coding forms were created a priori by the experimenter in order to identify the presence of these items in the memory protocols. Identifying the presence of the brands' names and the promotional offer was a very objective task and could be accomplished by the experimenter. However, identifying whether or not the memory protocols correctly contained each of the four key facts was more subjective. Therefore, two independent coders were used for this task. The second measure of aided recall was taken by providing the combination of brands and products for each advertisement and asking subjects to recall the promotional offer for that ad.

RESULTS AND DISCUSSION

105 participants completed the experiment. Cell sizes for each of the four cell conditions ranged from 25 to 28. Both unaided and aided recall measures were described previously. These measures look at memory for the brands (0-2 possibility), memory for the offer (0-1 possibility), cued memory for the offer (0-1 possibility), and memory for four main facts in each ad (0-4 possibility). Because these measures had very small ranges (and therefore provide little variance), a variable for total memory (MEMTOT) was created by adding all memory variables together. The hypotheses were first examined by analyzing the MEMTOT variable. Throughout the analyses, ceiling effects were apparent in memory for the brand names. It was thought that a few factors could have contributed to this phenomenon. First, subjects were allowed 35 seconds to view each ad. While this length of time was thought to be an appropriate interval for average readers, it was evident throughout the distribution of the experiment that 35 seconds was more than sufficient for most participants. Because the brands were mentioned more than any other single item in each ad, subjects may have been able to rehearse the brand names. However, more than likely, the ceiling effects were brought on by the high familiarity of all brands involved.

Because ceiling effects were evident in the memory of brands, both the total memory variable (MEMTOT) and the memory for additional facts in each ad (FACTS) were used in the testing of memory hypotheses. Additionally, the analyses included a variable identifying each ad in order to account ad effects. The analysis of MEMTOT revealed the lack of a significant main effect for product fit ($F = 1.79$, $p = 0.1835$; see Table 2 for ANOVA results). While product fit is not significant, contrast analysis shows that there is some indication of support for this hypothesis. A comparison of cell means shows that MEMTOT was greater ($F = 2.89$, $p = 0.09$) for cross-promotions with a high level of product fit (Mean = 4.03) than for cross-promotions with a low level of product fit (Mean = 3.81; see Table 2). However, as mentioned previously, effects of the MEMTOT variable were likely affected by ceiling effects for memory of the brand names in all conditions.

Table 2: ANOVA Results for Product and Brand Fit on Dependent Measures

Independent Variable	Type I Sum Of Squares	F	P
Panel A: Dependent Variable MEMTOT (Model R-Square = .5173)			
Product Fit	4.22	1.79	0.1835
Brand Fit	9.81	4.17	0.0439**
Product Fit x Brand Fit	35.38	15.03	0.0002***
Panel B: Dependent Variable Facts (Model R-Square = .5683)			
Product Fit	19.66	22.26	<0.0001***
Brand Fit	4.66	5.28	0.0237**
Product Fit x Brand Fit	3.12	3.54	0.0631*

*This table shows the Type I sum of squares, F-values, and P-values for a full-factorial analysis of variance model of the independent variables product fit and brand fit on the dependent variables MEMTOT and FACTS. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.*

By examining the effects of product fit on the more specific variable of FACTS, support for the hypothesis emerges. The impact of product fit on FACTS in a much stronger effect ($F = 22.26$, $p<0.0001$). In addition, the number of FACTS remembered for each ad was greater ($F = 31.54$, $p<0.0001$) in a condition of high product fit (Mean = 0.99) than low product fit (Mean = 0.54). The effect of brand fit on subjects' ability to retain information in memory was also significant. Analysis reveals that brand fit has a strong main effect on both MEMTOT ($F = 4.17$, $p = 0.0439$) and FACTS ($F = 5.28$, $p = 0.0237$). In addition, the contrast of cell means shows support in the hypothesized direction (see Table 3). Specifically, MEMTOT was greater ($F = 6.45$, $p = 0.0115$) for ads in the low brand fit condition (Mean = 4.08) than for ads in the high brand fit condition (Mean = 3.76). In a similar manner, FACTS was greater ($F = 9.02$, $p = 0.0028$) for ads in the low brand fit condition (Mean = 0.88) than for ads in the high brand fit condition (Means = 0.64). Thus, H_2 is supported.

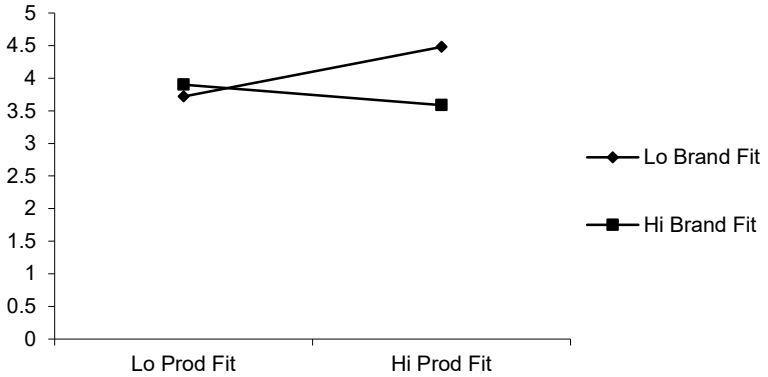
Table 3: Means for Product Fit and Brand Fit Conditions

Dependent Variable	High Fit	Low Fit
Panel A: Product Fit Cell Means and Standard Deviations		
MEMTOT	4.03 (1.34)	3.81 (1.15)
FACTS	0.99 (.85)	0.54 (.69)
Panel B: Brand Fit Cell Means and Standard Deviations		
MEMTOT	3.76 (1.25)	4.08 (1.22)
FACTS	0.64 (.74)	0.88 (.85)

This table shows the means and standard deviations for the experimental conditions. Panel A shows the cell means for the high product fit and the low product fit conditions. Panel B shows the cell means for the high brand fit and the low brand fit conditions. Standard deviations are shown in parentheses.

The analysis of memory retention shows a significant interaction effect between product fit and brand fit on both MEMTOT ($F = 15.03$, $p<0.0002$) and FACTS ($F = 3.54$, $p = 0.0631$; see Figure 1 and Figure 2). As noted previously, H_3 and H_4 could be supported with or without a significant interaction. The resulting interaction effect on both dependent measures is strong. Yet, the interaction present in MEMTOT is a cross-over. As previously mentioned, this type of interaction is not supportive of the hypotheses.

Figure 1: Effects of Product Fit and Brand Fit on MEMTOT



This figure plots the cell means for the dependent variable MEMTOT across each of the four experimental conditions: high product fit/high brand fit, high product fit/low brand fit, low product fit/high brand fit, and low product fit/low brand fit. While an interaction exists and the cross-over pattern is unique, this pattern does not support the hypotheses.

A comparison of the cell means confirms this. Contrast analysis of MEMTOT shows that the mean (see Table 4) for the low brand fit/high product fit cell (4.48) is higher than all others cells ($t = 4.15$, $p<0.0001$)

as hypothesized. However, while the high brand fit/low product fit cell is hypothesized to have the lowest level of memory retention, the MEMTOT mean (3.90) is significantly higher (see Table 5) than the mean for the high brand fit/high product fit cell (3.59).

Table 4: Means for MEMTOT - Product Fit X Brand Fit

	High Product Fit Mean (SD)	**Low Product Fit Mean (SD)**
High Brand Fit	A 3.59 (1.31)	B 3.90 (1.19)
Low Brand Fit	C 4.48 (1.21)	D 3.72 (1.10)

This table summarizes the cell means for the dependent variable MEMTOT across the four experimental conditions as illustrated in Figure 1. Also included are standard deviations in parentheses. The hypothesized outcome for the condition means (C > A/D > B) is not supported by these results.

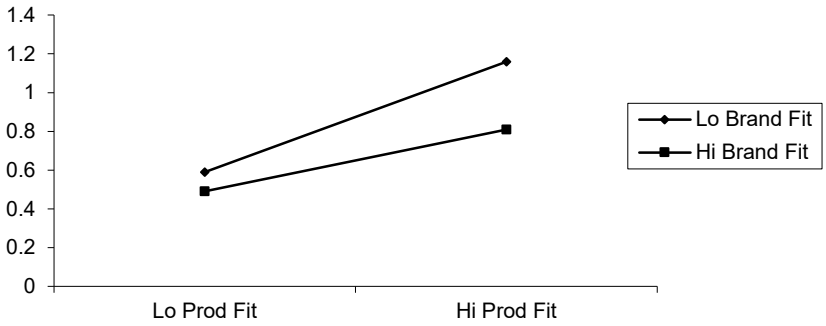
Table 5: Contrasts for MEMTOT - Product Fit X Brand Fit

Contrast	**F**	**P**
High Brand Fit/High Product Fit vs High Brand Fit/Low Product Fit	3.06	0.0812*
High Brand Fit/High Product Fit vs Low Brand Fit/High Product Fit	22.93	<0.0001***
High Brand Fit/Low Product Fit vs Low Brand Fit/Low Product Fit	1.00	0.3174
Low Brand Fit/High Product Fit vs Low Brand Fit/Low Product Fit	17.18	<0.0001***

*This table summarizes the contrast tests of significance on the means for MEMTOT across the four experimental conditions. As hypothesized, the mean for the low/brand fit/high product fit condition is higher than all other conditions. However, while the mean for the high brand fit/low product fit cell is hypothesized to have the lowest level of memory retention, this table shows that the MEMTOT mean for the high brand fit/high product fit condition is the lowest. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.*

Yet when memory for ad details (FACTS) is examined, the resulting interaction is in the form of a fan (see Figure 2). Contrasts confirm full directional support for the H_3 and H_4 (see Table 6). In addition, all relations are statistically significant with the exception of the contrast between the high brand fit/low product fit and the low brand fit/low product fit (see Table 7). This is due to the fact that the memory scores for both the low product fit conditions are not significantly different from one another suggesting that brand fit does not affect memory when product fit is low.

Figure 2: Effects of Product Fit and Brand Fit on FACTS



This figure plots the cell means for the dependent variable FACTS across each of the four experimental conditions: high product fit/high brand fit, high product fit/low brand fit, low product fit/high brand fit, and low product fit/low brand fit. While an interaction exists and the cross-over pattern is unique, this pattern does not support the hypotheses.

Table 6: Means for Facts - Product Fit X Brand Fit

	High Product Fit Mean (SD)	**Low Product Fit Mean (SD)**
High Brand Fit	A 0.81 (0.81)	B 0.49 (0.64)
Low Brand Fit	C 1.16 (0.85)	D 0.59 (0.75)

This table summarizes the cell means for the dependent variable FACTS across the four experimental conditions as illustrated in Figure 2. Also included are standard deviations in parentheses. The hypothesized outcome for the condition means is (C > A/D > B) is supported by these results.

Table 7: Contrasts for Facts - Product Fit X Brand Fit

Contrast	**F**	**P**
High Brand Fit/High Product Fit vs High Brand Fit/Low Product Fit	8.77	0.0032***
High Brand Fit/High Product Fit vs Low Brand Fit/High Product Fit	8.91	0.0030***
High Brand Fit/Low Product Fit vs Low Brand Fit/Low Product Fit	1.23	0.2676
Low Brand Fit/High Product Fit vs Low Brand Fit/Low Product Fit	23.83	<0.0001***

*This table summarizes the contrast tests of significance on the means for FACTS across the four experimental conditions. All contrasts are statistically significant except for that between the high brand fit/low product fit and the low brand fit/low product fit conditions. While the means do provide directional support for the hypotheses, the contrast tests provide only partial support. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.*

A potential reason for results of the tests on the FACTS variable is considered. Hunt and McDaniel (1993) provide a thorough review of literature that examines the effects of similarity and distinctiveness on memory. This review supports the development and logic behind the memory hypotheses of this study. However, a condition is revealed that explains why variance in brand fit might not have a significant effect on memory when product fit is low. Based on a condition known as the isolation effect, when a distinct item is placed in a context of organized items that reflect a "code" or category, the distinctiveness results in clear item-specific elaboration and memory effects are present. However, when that same distinct item is placed in a context of unorganized items that are not clearly similar as a group, then the target item is no more distinct as each item is from all the others. This results in no apparent item-specific or relational memory benefits. Considered in this context, when product fit is low, the cross-promotion does not display a clear theme or unifying category as is the case when product fit is high. Thus, any distinctiveness of the brand image (low brand fit) would provide no memory benefit over brand images that are not distinct (high brand fit). While Heckler and Childers (1992) do find support for memory effects of expectancy (brand fit) in a condition of low relevancy (product fit), those findings are not contradictory to this discussion. The stimuli tested in their studies were all placed in an organized context with a well-defined theme. This current study of cross-promotion differs in that the theme is developed by the product combinations. Thus, when product fit is low, no theme (and thus no organization) is apparent.

The importance of studying memory as an effect of promotion in general has been identified based on the fact that the likelihood that some piece of information will be used in making judgments is a positive function of the accessibility of that information in memory (Lynch *et al*, 1988). In addition, while there may be many possible objectives for utilizing brand alliances (Varadarajan, 1986), it is apparent that achieving most managerial objectives relies on consumer memory. The results of this study indeed show that the product and brand combinations in brand alliances have a significant effect on consumer memory.

Perhaps more importantly, this research identifies the psychological processes involved in the cognitive processing of cross-promotion. Specifically, the dimensions of product fit and brand fit can each be shown to affect elaboration in different ways. As previously noted, elaboration has been shown to exist in two-distinct forms based on incongruities in information (Meyers-Levy, 1991). The results of this research have shown that high levels of product fit result in greater memory performance. This can be linked to the involvement of relational elaboration. Low levels of brand fit also result in greater memory performance. This can be linked to the involvement of item-specific elaboration. The current research creates a previously unidentified link between two types of elaboration and the two dimensions of congruency. This link essentially establishes that relational elaboration and item-specific elaboration do not occur at opposite ends of the same dimension of congruency as previously thought (Meyers-Levy, 1991). Viewed as a two-dimensional construct, the results of this research show that each type of elaboration occurs in a specific dimension of congruency present in the evaluation of each type of brand alliance fit. Significantly, the results of this study establish differential effects of product fit and brand fit on memory retention in brand alliances. That is, where memory retention is concerned, the most favorable type of brand alliance is one with a high degree of product fit, but a low degree of brand fit.

CONCLUDING COMMENTS

It is the purpose of this manuscript to provide an investigation of the effects of product fit and brand fit in brand alliances on memory retention as this has not been previously studied. To accomplish this, hypotheses were developed based on the theoretical roots of the literature on congruency, categorization, and elaboration. As a general hypothesis, the purpose of this paper was to also demonstrate that stronger levels of fit do not always provide the most desirable outcome. A between-subjects design was employed for this work based on data gathered from university student participants. While the homogeneity of a student sample does present limitations associated with generalizability to a broader population, it also provides the benefit of stronger internal validity (Calder, *et al,* 1981). The between-subjects design was also chosen for certain advantages gained in spite of limitations. Specifically, a between-subjects design reduces carry-over effects, practice effects, and the likelihood that demand artifacts will result. However, this comes at the cost of the benefit of reducing variance due to individual differences that a within-subjects design provides. In spite of the controls taken in this experiment, individual differences may still exist. A within-subjects design would rule out individual differences by having each subject serve as his/her own control group. These limitations are generally recognized tradeoffs inherent in the research design. While they do represent shortcomings, this research was conducted in such a manner as to minimize the effects. However, additional exploration of the variables employed in this research through within-subjects experimentation would provide greater insight and validation.

This research presents four hypothesized relationships between the independent variables of product fit and brand fit on memory retention. The study operationalizes memory retention by the variables MEMTOT and FACTS. Overall, there is support for these hypotheses. Specifically, a brand alliance with a high degree of product fit will prompt greater memory retention than one with a low degree of product fit (H_1) based on the theory that the product categories are relevant to a central theme which makes deeper encoding possible. But in a counter-intuitive manner, higher levels of brand fit do not exhibit stronger effects on memory than low levels (H_2). This is due to the deeper levels of elaborative processing brought on by the unexpected nature of a low-fit brand combination. The results of the study provide support for both of these hypotheses. Yet, only partial support is given for the interactive effects of the product fit and brand fit conditions on the memory variables as noted in the previous section.

Similar to key published research on cooperative promotions (Samu *et al*, 1999, Simonin and Ruth, 1998, and Varadarajan, 1986), this research examines brand alliances composed of two-items, each representing distinct brands and product categories. Future research should expanding the study of this promotional strategy to include multiple elements in order to reveal new knowledge. It is specifically thought that the

number of brands included in a single promotion alone would create differences in the establishment of a promotional theme and the relation of each brand to that theme. In addition, the number of items in a promotion may affect the significance of establishing a theme.

Finally, the knowledge gained from this research in the context of multi-brand cooperative promotions can be expanded to other contexts. Future research should explore non-profit involvement in event sponsorships or the use of branded products as part of a service. One area that would provide a rich field of study is online and mobile promotions. With developments of advertising in these media, there are extensive examples of the crossing over of brands and products. Apps and commercial sites contain various types of ads, including links to other sites. In such instances, the distinction between standard advertising space and cooperative advertising is blurry. This medium, therefore, provides a unique context in which to study multi-brand promotions.

REFERENCES

Alba, J. W., J. W. Hutchinson, and J. G. Lynch Jr. (1991) "Memory and Decision Making." In *The Handbook of Consumer Behavior,* T. Robertson and H. Kassarjian, Englewood Cliffs, NJ: Prentice-Hall.

Arnett D.B., Laverie, D.A., and J.B. Wilcox (2010) "A Longitudinal Examination of the Effects of Retailer-Manufacturer Brand Alliances: The Role of Perceived Fit," *Journal of Marketing Management*, 26, 5-27.

Bendik, S. (2015) "The Multiple Roles Of Fit Between Brand Alliance Partners In Alliance Attitude Formation," *Marketing Letters*, vol. 26(4) p. 619-629.

Beth, M., Wi-Suk, K., and F. Sandra (2013) "Creating Successful Cause-Brand Alliances: The Role Of Cause Involvement, Perceived Brand Motivations And Cause-Brand Alliance Attitude," *Journal of Brand Management*, vol. 20(3), p. 205-217.

Bigné, E., R. Currás-Pérez, and J. Aldás-Manzano (2012) "Dual Nature of Cause-Brand Fit: Influence On Corporate Social Responsibility Consumer Perception," *European Journal of Marketing,* vol. 46(3/4), p. 575-594.

Bransford, J. D. and J. J. Franks (1971) "The Abstraction of Linguistic Ideas," *Cognitive Psychology* 2(4), p. 331-350.

Calder, B.J., Phillips, L.W., and A.M. Tybout (1981) "Designing Research For Application," *Journal of Consumer Research*, 8(September)), p. 197-207.

Eysenck, M. W. (1971) "Depth, Elaboration, and Distinctiveness," In *Levels of Processing in Human Memory,* L. S. Cermack and F. I. M. Craik, eds. Hillsdale, NJ: Erlbaum.

Fiske, S. T. and M. A. Pavelchak (1986) "Category-Based Versus Piecemeal-Based Affective Responses: Developments in Schema-Triggered Affect," *The Handbook of Motivation and Cognition: Foundations of Social Behavior,* R. M. Sorrentino and E. T. Higgins, eds. New York: Guilford.

Friedman, A. (1979) "Framing Pictures: The Role of Knowledge in Automatized Encoding and Memory for Gist," *Journal of Experimental Psychology: General,* 108(3), p. 316-355.

Gammoh, B.S., Voss, K.E. and Chakraborty, G. (2006) "Consumer Evaluation of Brand Alliance Signals, *Psychology and Marketing,* 23(6), p. 465-486.

Goodman, G. S. (1980) "Picture Memory: How the Action Schema Affects Retention," *Cognitive Psychology* 12(4), p. 473-495.

Hastie, R. (1980) "Picture Memory: How the Action Schema Affects Retention," *Cognition Psychology* 12(4), p. 473-495.

Hastie, R. (1981) "Schematic Principles in Human Memory," in *Social Cognition: The Ontario Symposium,* Vol. 1, E. Tory Higgins ed. Hillsdale, HJ: Erlbaum.

Hayes-Roth, B. (1977) "Evolution of Cognitive Structures and Processes," *Psychological Review* 84(May), p. 260-278.

Heckler, S. E. and T. L. Childers (1992) "The Role of Expectancy and Relevancy in Memory for Verbal and Visual Information: What Is Congruency?" *Journal of Consumer Research* 18(March), p. 475-492.

Hao, W. (2015) "Reexamination Of Brand Alliance Evaluation Model: The Effects Of The Overall Fit Between Partner Brands On Consumer Brand Alliance Evaluation," *Academy of Marketing Studies Journal* 19(1), p. 11-23.

Hunt, R. R. and M. A. McDaniel (1993) "The Enigma of Organization and Distinctiveness," *Journal of Memory and Language*, 32(4), p. 421-445.

James, D. (2005) "Guilty Through Association: Brand Association Transfer To Brand Alliances," *Journal of Consumer Marketing* 22(1), p. 14-24.

Keller, K. L. (1993) "Conceptualizing, Measuring, and Managing Customer-Based Brand Equity," *Journal of Marketing* 57(1) p. 1-22.

Lanseng, E.J. and L.E. Olsen (2008) "Evaluation of Brand Alliances: Product Fit and the Moderating Role of Brand Concept Consistency," *Advances in Consumer Research*, A. Y. Lee and D. Soman, eds.: Association For Consumer Research.

Lee, Y. H. and C. Mason (1999) "Responses to Information Incongruency in Advertising: The Role of Expectancy, Relevancy, and Humor," *Journal of Consumer Research* 26(2) p. 156-169.

Levin, I.P. and A.M. Levin (2000) "Modeling the Role of Brand Alliances in the Assimilation of Product Evaluations," *Journal of Consumer Psychology* 9(1), p. 43-52.

Lynch, J. G. Jr., H. Marmorstein, and M. F. Weigold (1988) "Choices from Sets Including Remembered Brands: Use of Recalled Attributes and Prior Overall Evaluations," *Journal of Consumer Research* 15(3), p. 225-233.

"Co-Branded Cards: Using the Power of Partnership." *Mastercard* Website, http://www.mastercard.us/merchants/cobrand-cards.html, accessed on October 29, 2012.

Mervis, C. B. and E. Rosch (1981) "Categorization of Natural Objects," *Annual Review of Psychology* 32(1), p. 89-115.

Meyers-Levy, J. (1991) "Elaborating on Elaboration: The Distinction Between Relational and Item-Specific Elaboration," *Journal of Consumer Research* 18(4), p. 358-367.

Meyers-Levy, J. and A. M. Tybout (1989) "Schema Congruity as a Basis for Product Evaluation," *Journal of Consumer Research* 16(1), p. 39-54.

Rao A.R., L.,Qu and R.W. Ruekert (1999) "Signaling Unobservable Product Quality Through a Brand Ally," *Journal of Marketing Research* 36(3), p. 258-268.

Rao, A. and R. Ruekert (1994) "Brand Alliances as Signals of Product Quality," *Sloan Management Review* 36(1), p. 87-97.

Rosch, E. (1978) "Principles of Categorization," In *Cognition and Categorization,* E. Rosch and B. B. Lloyd, eds. Hillsdale, NJ: Eribaum.

Salgado-Montejo, A., Velasco, C., Olier J. S., Alvarado, J., and C. Spence (2014) "Love For Logos: Evaluating The Congruency Between Brand Symbols And Typefaces And Their Relation To Emotional Words," *Journal Of Brand Management*, 21(7/8), p. 635-649.

Samu, S., H. S. Krishnan, and R. E. Smith (1999) "Using Advertising Alliances for New Product Introduction: Interactions Between Product Complementarity and Promotional Strategies," *Journal of Marketing* 63(1), p. 57-74.

Simonin, B. L. and J. A. Ruth (1998) "Is a Company Known By the Company It Keeps? Assessing the Spillover Effects of Brand Alliances on Consumer Brand Attitudes," *Journal of Marketing Research* 35(1), p. 30-42.

Srull, T. K. (1981) "Person Memory: Some Tests of Associative Storage and Retrieval Models," *Journal of Experimental Psychology: Human Learning and Memory* 7(6), p. 440-463.

Srull, T. K., M. Lichtenstein, and M. Rothbart (1985) "Associative Storage and Retrieval Processes in Person Memory," *Journal of Experimental Psychology: Learning, Memory, and Cognition* 11(2), p. 316-345.

Subhadip, R., Guha, A., and A. Biswa (2015) "Celebrity Endorsements And Women Consumers In India: How Generation-Cohort Affiliation And Celebrity-Product Congruency Moderate The Benefits Of Chronological Age Congruency," *Marketing Letters* 26(3), p. 363-376.

Sujan, M., J. R. Bettman, and H. Sujan (1986) "Effects of Consumer Expectations on Information Processing in Selling Encounters," *Journal of Marketing Research* 23(4), p. 346-353.

Thorndyke, P. (1977) "Cognitive Structures in Comprehension and Memory of Narrative Discourse," *Cognitive Psychology* 9(1), p. 77-110.

Turner, J. C. (1987) *Rediscovering the Social Group*, Oxford: Basil Blackwell,.

Varadarajan, P. R. (1986) "Horizontal Cooperative Sales Promotion: A Framework for Classification and Additional Perspectives," *Journal of Marketing* 50(2), p. 61-73.

Voss, K. E., Gammoh, B. S. and Fang, X. (2012) "How Does a Brand Ally Affect Consumer Evaluations of a Focal Brand?" *Psychology and Marketing* 29(12), p. 929-940.

Walchli, S.B. (2007) "The Effects of Between-Partner Congruity on Consumer Evaluation of Co-Branded Products," *Psychology and Marketing* 24(11), p. 947-973.

BIOGRAPHY

Dr. Andrew Norman is an Associate Professor of Marketing at Drake University where he has served since 2003. With degrees from the University of Arizona (PhD in Marketing), Brigham Young University (MBA), and Arizona State University (BA in Communication), Dr. Norman's work in marketing alliances and entertainment consumption has been published in top marketing journals, including the *Journal of Consumer Research* and the *Journal of Retailing*. Dr. Norman also contributes research and content to Kotler and Armstrong's *Principles of Marketing* and Armstrong and Kotler's *Marketing: An Introduction*. His experience also extends to executive education courses for major corporations.

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THE INTERACTIVE EFFECTS OF SELF-EFFICACY AND INFORMAL ACCOUNTABILITY FOR OTHERS ON CAREER ENGAGEMENT

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ABSTRACT

This research examines the relationship between self-efficacy, informal accountability for others (IAFO) and career engagement. Our study enhances organizational research by demonstrating the moderating effect of IAFO on the self-efficacy and career engagement relationship. We test hypotheses using data collected in a convenience sample of 299 working adults. Findings indicate that IAFO moderates the self-efficacy – career engagement relationship such that career engagement decreased when we consider both factors together. The paper concludes with probable managerial and theoretical implications as well as the study's relevant strengths, limitations and directions for future research.

JEL: M10, M12

KEYWORDS: Self-Efficacy, Informal Accountability for Others, Career Engagement

INTRODUCTION

For many decades now, a large American chocolatier has produced a popular confection comprised of a combination of peanut butter coated in chocolate. This candy bar popularly connotes, "two great tastes that taste great together." As early as 1989, William James called for extending research based on "grounded theory" (Edie, 1987). Ultimately, that means findings must appeal to our primary sense data (i.e., touch, taste, smell, hearing and sight). This research is a modest attempt to investigate the joint effects of two organizationally desirable attributes: self-efficacy and informal accountability for others (IAFO) and their joint influences on career engagement. Metaphorically, we wanted to know if these two attributes are better together.

Globalization has precipitated numerous large-scale downsizings, outsourcings and associated losses of job security. This condition led to fundamental shifts in our models of careers and what it means to be engaged in them (Baruch, 2004, Sullivan & Baruch, 2009, Royle, 2015). These changes lead us away from long-term psychological contracts about our work towards more short-term transactional contracts. A transactional contract alters the relationship between the employee and employer drastically (Herriot & Pemberton, 1966, Rousseau, 1989). Rather than exchanging development opportunities and employment security with a single (or small number of) firm, contemporary career engagement requires that employees maintain flexibility and continuously develop their skills in order to satisfy both the needs of their current employers as well as those of future employers (Herriot & Pemberton, 1966, Baruch, 2004). This has fundamentally reshaped what it means to be career engaged, and this research intends to help illustrate some of those changes.

Prior research demonstrated the impact of accountability and self-efficacy on both individuals' organizational citizenship and political behaviors (Royle, Hall, Hochwarter, Perrewe, & Ferris, 2005). The field accepted that ownership of one's actions (Schlenker, Britt, Pennington, Murphy, & Doherty, 1994), being rewarded or punished for behaviors and feeling capable of overcoming obstacles, promotes desirable outcomes for both firms and individuals (Bandura, 1977, 1997, Cummings & Anton, 1990, Royle et al., 2005). Our research seeks to further science by demonstrating the interactions between constructs related to, but distinct from, the work done by Royle et al., 2005. Of salient interest is the question of what happens when individuals feel accountable for others' behaviors given their own self-efficacy (or lack thereof) and its impact on their engagement in their own careers in a changing environment.

In this research, we propose the following layout: first, we will review the current state of the literature relevant to our study variables. Next, we will discuss our data, the chosen methods of analysis and the results generated. We conclude with a discussion of our finding's implications for theory and practice, potential limitations, directions for future research and a recapitulation of the research's major findings.

LITERATURE REVIEW

The Foundations of Learning Theory

According to Tolman (1951, Klein & Mowrer, 1989), individuals carefully deliberate their actions and the possible outcomes (both positive and negative). As such, individuals make a mental calculus of what they believe is in their best interests and engage behaviors they believe are most likely to have desired consequences. Conversely, they avoid behaviors with negative consequences. In other words, what individuals expect to come from specific behaviors motivates them (Tolman, 1951, Vroom, 1964). This is the basic nature of expectancies (Vroom, 1964). Tolman (1951) proposed that all higher-level biological organisms (e.g., working individuals in this study) are aware of their situations and enact behaviors on past learning history/experience. With respect to employees, he contended that behaviors result from beliefs about the best way to achieve desired goals, although these beliefs work in conjunction with a demonstrated history of associated reward. Management theory prominently groups these relationships (Vroom, 1964, Luthans & Kreitner, 1985, Latham & Huber, 1992, Klein & Mowrer, 1989).

Bandura's (1977, 1997) concept of self-efficacy is an extension of Tolman's (1951) expectancy principle. Bandura's (1977, 1997) social cognitive is one of the most prominent of the learning theories. It proposes that although people can learn through direct experience, they also learn by observing the consequences of the behaviors of others and via symbolic modeling. From both direct and vicarious experiences, individuals learn abstract rules (e.g., "the Golden Rule" – 'do unto others as you would have them do unto you') that, once internalized, generalize to many different, novel, contexts.

Self-Efficacy

Self-efficacy is one's belief that he/she can (or cannot) organize capabilities necessary to achieve desirable outcomes in specific organizational contexts (Bandura, 1977). Accordingly, one's self-efficacy strongly influences how one approaches tasks or goals (Bandura, 1977, 1997, Weiner, 2012). For example, if individuals feel strongly that they can learn a foreign language, they will be more likely to enroll in formal language courses or, perhaps, to accept and complete an expatriate managerial assignment (Eisenberger, Conti-D'Antoni, & Betrando, 2005, Kealey, Protheroe, MacDonald, & Vulpe, 2005). Indeed, self-efficacy can be specific to a situation. Although self-efficacy relates to a single situational context, Bandura (1977,1997) also contended that individuals possess "coping" self-efficacy; a global, generalized, set of beliefs related to capability. Individuals with higher levels of coping self-efficacy are persistent across time and contexts even under difficult circumstances because they believe their accumulated, prior experiences

instruct them about dealing with initial failure. Additionally, they believe such setbacks are only temporary (Bandura, 1977, 1997, Weiner, 2012).

Bandura (1977, 1997, Weiner, 2012) suggested that efficacy expectations differ in magnitude, strength and generality and that each of these has substantial motivational consequences. Magnitude connotes that individuals' efficacy expectations result from the level of a task's difficulty. Essentially, successes on complex tasks have stronger implications for enhancing individuals' levels of efficacy (Bandura, 1977, 1997). The strength of perceived efficacies also varies. Individuals who believe more strongly that they will master a challenge persevere longer than those with weaker expectations. Finally, individuals' expectations of success differ in generality. Some experiences (e.g., successfully coping with spousal death/divorce or finding further employment after a lay-off) create a generalized sense of enhanced efficacy whereas others (e.g., trouble shooting a personal computer problem) are limited to specific situations (Bandura, 1977, 1997, Weiner, 2012).

Of Bandura's (1997) three dimensions, generality sparked considerable debate in field-relevant literature. According to Bandura (1997), self-efficacy primarily relates to task achievement. According to Bandura (1977, 1997), individuals' senses of content mastery promote self-efficacy. Therefore, the experience of having successfully acquired a skill is likely to foster beliefs that similar learning and, subsequent mastery/success, will occur again in the future. Therefore, in order to predict successful behaviors, self-efficacy measurement must relate to task measurement and definition (Weigand & Stockham, 2000). Self-efficacy then changes, to varying degrees, with both task and environment. Weigand and Stockham (2000) contended that relatively little, by way of efficacy expectations, carries over between tasks. Conversely, other scholars proposed that self-efficacy is a relatively stable, measureable, trait-like feature that predicts individuals' responses across contexts and over extended periods of time (Chen, Gully, Whiteman, & Kilcullen, 2000, Chen, Gully, & Eden, 2001). Given the time parameters of engagement and sheer breadth of contemporary careers, our research focuses mostly on the broader concept of "coping" self-efficacy.

As noted above, interacting with and observing others can also bolster self-efficacy (Bandura, 1977, 1997, Weiner, 2012). This contention has long been a critical driver of social learning theory (Blau, 1964, Thompson, 2010). Seeing others successfully complete tasks promotes individuals' beliefs that they can also learn to do the task (Weiss, 1990, Blau, 1964, Thompson, 2010). Another source of acquiring self-efficacy comes from others' verbal encouragements or discouragements (Weiss, 1990). When individuals have no experience at a particular task receive feedback from others about whether or not they can perform a task, they tend to believe it, for better or worse. Thus, individuals develop commensurate, corresponding, higher or lower levels of self-efficacy (Merton, 1968, Darley & Gross, 2000). These notions form the crux of the self-fulfilling prophecy (Merton, 1968).

Informal Accountability for Others

Informal accountability for others (IAFO) is an observable set of behaviors (e.g., speaking up for a coworker) that indicate individuals' feelings of answerability for the attitudes and behaviors of others in their organizations irrespective of formal position within the firm, rank, or mandate (Royle, Hochwarter, & Hall, 2008, Royle, Fox, & Hochwarter, 2009, Royle & Fox, 2011, Royle & Hall, 2012).

Morrison and Phelps (1999) noted that individuals generally feel personally obligated to enhance the situations of both themselves and others by instigating constructive change. This, either directly or indirectly, influences all relevant constituencies. Another aspect of the IAFO construct comes from Lerner and Tetlock (1992) who defined accountability as the implicit or explicit expectation that individuals might be called on to justify their beliefs, feelings, or actions to others. Both Zimbardo (1970) and Ferris, Mitchell, Canavan, Frink and Hopper (1995), informed this construct by demonstrating that accountability is influenced by whether or not individuals are observed by others with reward/sanctioning power and the

extent to which valued outcomes/sanctions are commensurate with these evaluations. Certainly with respect to traditional views of careers (i.e., work that is stable and predictable), the outcomes associated with accountability (i.e., performance evaluations that assign pay raises, promotions or terminations) strongly predicted career mobility and, thus, engagement (Greenhaus, Callanan & Godshalk, 2010).

Risk and uncertainty avoidance are major theoretical drivers of IAFO. There will always be future unforeseen and uncontrollable events regardless of the individual. Epstein (1999) defined uncertainty aversion as a broad class of preferences that contain future information too imprecise to gauge but that is, nonetheless, perceived to be inevitable. Nevertheless, researchers (e.g., Epstein, 1999, Hofstede, 1980) contended that individuals wish to hedge those risks. People engage in behaviors that they anticipate will reduce future uncertainties to help offset their trepidations. Furthermore, at both the individual and aggregate levels of analyses, both Epstein (1999) and Hofstede (1980) contended that cultures and individuals vary with respect to levels of uncertainty aversion.

Epstein (1999) explained that the notion of risk is similar to uncertainty aversion. However, risk intones that individuals have a more precise idea of the probability of some future event (e.g., a 60/40 chance of success, etc.). In this research, we assume that individuals have only a vague notion of risk given the often discontinuous, churning nature of contemporary employment and career trajectories (Capelli & Neumark, 2002). However, we contend that IAFO can be a way to manage uncertainty and reduce individuals' perceptions of risk.

IAFO is a condition that individuals both feel and, to an extent, choose (Royle et al., 2008). When individuals become informally accountable for others, those others are usually aware of it (Royle et al., 2008). When one speaks up for another, he/she does not do so in a vacuum. Given the norm of reciprocity (Gouldner, 1960, Meyer & Allen, 1997), individuals see that the informally accountable party (e.g., the person advising them or speaking on their behalf) extended a benefit to them and usually feel obligated to align their attitudes or behaviors in order to repay their obligations (Royle et al., 2008). Individuals who are cognizant that another person has been helpful will reciprocate by ensuring that they meet relevant goals or take measures to correct performance decrements. It is reasonable then that IAFO relates to self-efficacy because individuals both observe and interact. Furthermore, informally accountable parties are likely to impart feedback based on how they think others are performing.

Prior research indicated that IAFO promotes positive changes to individuals' contextual performance (Royle et al., 2008). For example, informally accountable parties may enhance their social prestige or be promoted to a position with more formal, objective, authority (Royle et al., 2008). At a minimum, those known to be informally accountable for others enjoy a status differential that enhances their standing in organizations and helps them engage more thoroughly in their careers.

Career Engagement

Contemporary literature on careers strongly emphasizes the need for employees to be self-directed in the management of their careers (Arnold & Jackson, 1997, Norman, Gardner, & Pierce, 2015). We define career engagement as the forward-looking behaviors of employees to find and maintain jobs, occupations and careers that are fulfilling and satisfying (Cox, Rasmussen, & Conrad 2007, Greenhaus, et al, 2010). This connotes a lifelong process that shapes work and, subsequently, careers due to the discretionary actions of individuals (Hirschi & Freund, 2014). Consequentially, proactive career engagement behaviors (e.g., planning, networking and independent exploration) are critical components of engagement and, ultimately, success (Zikic & Klehe, 2006). As such, career engagement (i.e., the degree to which employees proactively exhibit different career behaviors in order to enhance the quality of development of their careers) is of practical, theoretical and organizational importance (Hirschi & Freund, 2014). Fleshing out what its antecedent and moderating conditions are is, thus, useful to science.

Career engagement becomes more important within the broader practice of counseling (Greenhaus et al., 2010). Career counseling, the act of imparting political, practical, step-wise information that individuals use to direct their occupational efforts, is increasingly concerned with stake-holder (e.g., oneself and other employees) enhancement and career management (Greenhaus et al., 2010). We posit that feeling informally accountable for others bolsters counseling and, thus, enhances career engagement. Concomitantly, self-efficacy enhances career engagement because, based on prior successes, individuals feel empowered to make proactive choices, take risks and (hopefully) flourish (Norman et al., 2015).

Also germane to this research is the current prominence of the protean career model. Hall (1976) contended that in modern organizations individuals, rather than firms, manage careers. Thus, their career paths reflect internal drivers aimed at achieving self-fulfillment (Hall, 1976). This career conceptualization transformed the employment relationship from a relational to a transactional psychological contract (Arthur & Rousseau, 1996, Peiperl & Baruch, 1997). This ideological lens accentuates the psychological challenges that confront those who want to remain career engaged in an increasingly unstructured employment environment (Hall, 1976).

Similarly, the boundaryless career construct (Arthur & Rousseau, 1996, Greenhaus et al., 2010) proposed that employees were driven by a yearning for self-fulfillment even if it meant career promotion within a single employer by means of lateral or non-traditional functional avenues of advancement (e.g., becoming CEO from HR instead of sales). Conceptually, both the protean and boundaryless notions of careers are useful in analyzing career engagement because they reflect changes in the employment relationships and underscore the need for those engaged in their careers to take control in an increasingly unstructured environment (Chay & Ayree, 1999). Theoretically, then, those who are well connected and have a sense of accomplishment are more likely to involve themselves in career building activities than those who wait to be given opportunities.

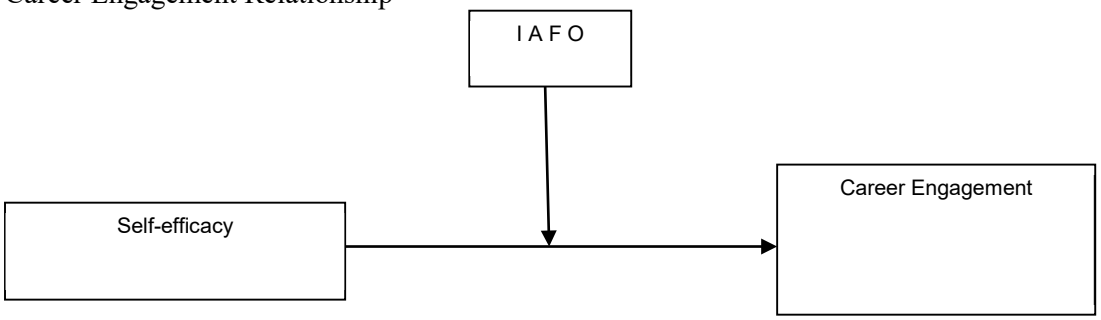
Arthur and Rousseau (1996) as well as Seibert, Kraimer, Holtom and Pierotti (2013) noted that extrinsic and objective measures of career success are not the potent drivers of employee behaviors that they were forty or fifty years ago. Objective career success denotes the presence of quantifiable aspects of employment, such as increases in pay and the number of promotions. Historically, this was the dominant metric of success across countries (Nicholson, 2000). However, the contemporary focus of career advancement comes from perceptions of psychological success (Hall & Foster, 1977, Greenhaus et al., 2010). This view emphasizes the subjective nature of careers and, thus, largely discounts any single measure of achievement. Effectively, when the field broadens its notions of success, concomitantly, it expands the variety of activities necessary for career engagement. Because these engaged activities lay the foundations for eventual success, or lack thereof, a better understanding of the expanded number of antecedent behaviors to career engagement is necessary.

In order to predict success in the protean/boundaryless environment, DeFillippi and Arthur (1994) contended employees utilize three distinct groups of competencies. These career competencies consist of career motivation and identification (knowing-why), marketability (knowing-how) and career-related networking (knowing-whom). When employees in this boundaryless system maintain a high degree of flexibility and are career engaged based on their value systems, they are likely to succeed (Arthur, Hall, & Lawrence, 1996, Gubler, Arnold, & Coombs, 2014). Our research contends that higher levels of self-efficacy promote knowing-how, and that higher levels of IAFO promote knowing-whom and knowing-why, thus, enhancing career engagement.

Although the practical and theoretical dimensions of career engagement exist in current literature, the underlying drivers of career engagement are not yet fully clear (Hirschi & Freund, 2014). Rogers, Creed and Glendon (2008) noted that intra-personal, stable, dimensions like, emotional stability (e.g., Barrick & Mount, 1993) related to decision-making self-efficacy, which along with environmental factors (e.g.,

perceived barriers to entry) impact (positively or negatively) individuals' career investigation behaviors. Furthermore, extant research provides many answers regarding career opportunities, but there remain more questions. Hirschi and Freund (2014) contended that some individuals lend more social support than others do. Thus, they are more engaged in their careers because they act as career counselors. As noted above, those high in IAFO, due to the support they receive from others, are therefore more engaged in their careers. An overview of the conceptual framework and model we tested appears in Figure 1.

Figure 1: The Moderating Effect of Informal Accountability for Others (IAFO) on the Self-Efficacy and Career Engagement Relationship



This is the model of self-efficacy, informal accountability for others and career engagement tested in this research. The driving force for this academic inquiry is the contention that those who expect to achieve on the job are inclined to seek conditions of informal accountability for others in order to promote their careers. However, the magnitude of their career engagement is moderated by the degree to which they feel informally answerable for the behaviors of others at work.

Therefore, by way of synopsis, we submit the following research hypotheses:

Hypothesis 1: Informal accountability for others (IAFO) promotes career engagement.

Hypothesis 2: Self-efficacy promotes career engagement.

Hypothesis 3: Informal accountability for others (IAFO) moderates the relationship between self-efficacy and career engagement such that the impact that IAFO has on career engagement increases as self-efficacy increases.

DATA AND METHODOLOGY

We collected this data set in early 2015. It is a convenience sample gathered from individuals working full time with at least three years of experience. Naturally, we cannot rule out the potentially contaminating effects of comparing multiple organizational contexts and cultures (Schwab, 1999). However, the fluid, unpredictable nature of careers common to our contemporary labor markets (e.g., multiple employers and potential lay-offs) might make our conclusions more applicable to a broad cross section of employees (Baruch, 2004, Greenhaus et al., 2010).

Participants and Procedures

Our data come from a collection effort conducted by the lead researcher between January and June of 2015. Students enrolled in courses in organizational behavior, career development and human resource management received extra credit for their participation. Students meeting our criteria (i.e. adults working full time with three years of experience) could answer questionnaires for themselves. Otherwise, students asked qualified friends or family members to submit responses on their behalves. We used the online analytics software Qualtrics to collect the raw data and for preliminary analyses.

Using this software, we generated a web address that they we then sent to students to disseminate. As might be expected, not all students participated presumably, because they either lacked interest in our research aims or did not need or want the extra credit enough to endure the costs associated with our survey. We collected the names, addresses (both mailing and IP), contact phone numbers and places of employment for all respondents in order to ensure that those participating legitimately met the above criteria (e.g., not students faking answers for extra credit). We reserved the right to contact any respondent if we suspected that their submission was not a good faith effort. Initially, 379 individuals began the survey. Of those, 303 (80%) completed it. Of those 303 submissions, four surveys were not entirely competed so we "list-wise" deleted those responses in subsequent analyses. Therefore, the sample consisted of 299 working individuals. There were 182 female respondents (61%), the average age was 37 and the average organizational tenure was 7.4 years. Typical occupations included nurses, project managers, bankers and sales professionals. The majority of respondents came from Georgia, Florida and Tennessee.

Measures

We conducted confirmatory factor analysis (CFA) on our scales prior to reporting any findings. We measured the degree to which survey items loaded on their expected factors. CFA helps ensure the number of factors and the loadings of measured (indicator) variables are consistent with prior research (Pallant, 2004). Performing CFA also helps address concerns of discriminate validity related to multicollinearity (Schmitt & Sass, 2011, Tabachnik & Fidell, 1996, Schwab, 1999). We performed CFA using an oblique rotation and retained factors using the Kaiser criterion (i.e. keeping only those components with eigenvalues over 1.0) (Schmitt & Sass, 2011, Tabachnik & Fidell, 1996, Kaiser, 1974). We used the direct "oblimin" (oblique) rotation because we believe, theoretically, that these research constructs are related. This study's correlation results, noted below, support that assumption. Our scales demonstrated their appropriate dimensionality. Analyses indicated a uni-dimensional factor structure for career engagement (eigenvalue = 4.62, proportion of explained variance = 0.58), IAFO (eigenvalue = 3.30, proportion of explained variance = 0.66) and self-efficacy (eigenvalue = 2.51, proportion of explained variance = 0.50). Table 1 presents this consolidated information and lists the scales' original authors.

Table 1: Scales, Sources, Reliabilities and Factor Analyses

Variable Name	Scale Author	Coefficient α	Eigenvalue of the 1st Factor	Variance Explained by 1st Factor
Career Engagement	Hirschi, Freund, & Hermann (2014)	0.71	4.92	0.58
Self-Efficacy	Schwarzer & Jerusalem (1995)	0.73	2.51	0.50
Informal Accountability for Others	Royle, Hochwarter, & Hall (2008)	0.85	3.30	0.66

This table contains information about the study's variables and the creators of the scales used to measure them. In addition, it reports the coefficient alpha values of each scale in both samples as well as the Eigenvalue of the first extracted factor and the amount of variance that it accounts for. We measured all scales with a five-point Likert-type response format anchored by "strongly disagree" and "strongly agree".

Control variables. We include several control variables to help reduce spurious effects and strengthen our conclusions. We controlled for age, gender, ethnicity, level of education, income and organizational tenure due to their demonstrated effects in both the contemporary behavioral science and career studies literatures (Podsakoff & MacKenzie, & Podsakoff, 2012, Sheridan & Vredenburgh, 1978, Greenhaus et al., 2010).

RESULTS AND DISCUSSION

Table 2 provides the means, standard deviations and correlations between study variables. The single largest correlation between variables in the sample is between age and organizational tenure ($r = 0.63$, $p < 0.001$). We expected this considering that individuals gain tenure in an organization as they age. Other correlations between study variables are consistent with extant research. None of our study's correlations indicated a problem of multicollinearity. With the exception of age and organizational tenure, no correlation exceeds the 0.60 threshold established by Cohen, Cohen, West and Aiken (2003).

Table 2: Means, Standard Deviations, and Correlations between Study Variables

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1. Age	36.51	13.42	---									
2. Gender	---	---	**-0.12**	---								
3. Ethnicity	---	---	**-0.19**	0.08	---							
4. Tenure	7.37	8.02	**0.63**	-0.06	**-0.20**	---						
5. Promotions	1.85	0.83	**0.26**	**-0.14**	-0.11	**0.49**	---					
6. Income	4.42	2.23	**0.57**	**-0.29**	**-0.13**	**0.38**	**0.28**	---				
7. Education	3.54	0.73	**0.24**	**-0.12**	-0.05	0.06	0.01	**0.46**	---			
8. IAFO	3.69	1.08	0.04	-0.09	-0.07	0.07	**0.19**	**0.18**	0.03	---		
9. Career Engage	3.71	0.82	0.03	-0.08	0.08	-0.07	-0.01	**0.21**	**0.27**	**0.35**	---	
10. Self-Efficacy	3.86	1.02	-0.74	-0.03	0.06	-0.03	-0.03	**0.14**	**0.12**	**0.24**	**0.36**	---

**All bolded correlations indicate significance levels of $p < 0.05$ or stronger. $N = 299$. The means for income and education correspond to an average of approximately 38,000 USD/year and an associate's degree (2.2 years of education beyond high school) respectively.*

We used hierarchical moderated regression to analyze the hypothesized career engagement-IAFO-self-efficacy relationship. In the first step, age, gender, organizational tenure, ethnicity, number of promotions and level of education were included as control variables. We entered the IAFO and self-efficacy main effects terms in the second step, followed by the interactive term (IAFO x self-efficacy) in the third step.

Thus, we used the following hierarchical moderated regression equation to estimate career engagement:

$$\textit{Career Engagement} = \beta_1(\textit{Age}) + \beta_2(\textit{Gender}) + \beta_3(\textit{Org. tenure}) + \beta_4(\textit{Ethnicity}) + \beta_5(\textit{Number of promotions}) + \beta_6(\textit{Education}) + \beta_7(\textit{IAFO}) + \beta_8(\textit{self- efficacy}) + \beta_9(\textit{IAFO x self-efficacy})$$

Table 3 describes the stepwise regression results. The results indicated that the IAFO x self-efficacy interaction term predicted career engagement ($b = -0.34$, $p < .05$; $\Delta R^2 = 0.02$). A moderating interaction term that explains this amount of variance is both empirically significant and worthy of further explanation (Diekmann, Blickle, Hafner, & Peters, 2015, Champoux & Peters, 1987).

Per the calculations for slope coefficients, low self-efficacy was statistically significant ($t = 4.04$, $p>0.001$). The slope for those high in self-efficacy was significant ($t = 6.09$, $p<0.001$).

As indicated in Table 3, the direct effects of both IAFO ($b = .51$, $p < 0.001$) and self-efficacy ($b = 0.43$, $p < 0.001$) are statistically significant predictors of career engagement. Self-efficacy and IAFO represent 0.23 of the total variance in the model and constitute an increase of 0.15 in the variance explained beyond the control variables. These results supported hypotheses 1 and 2.

Our research partially corroborates our third hypothesis regarding the influence of the interaction term IAFO x self-efficacy. The interaction with a -0.168 coefficient (explains 16.8% of the variance) indicates that the extent to which IAFO or self-efficacy aids in career engagement decreases when both factors are considered. However, combining them is a net positive effect as witnessed by the 4.61 out of 5 average score for career engagement when an employee possesses both factors. The results further indicate that self-efficacy (32.8%) has a slightly stronger impact on career engagement than IAFO (21.5%). Our results suggest that higher self-efficacy decreases engagement given higher informal accountability for others. The more individuals feel universally capable, the less attractive being informally accountable for others becomes.

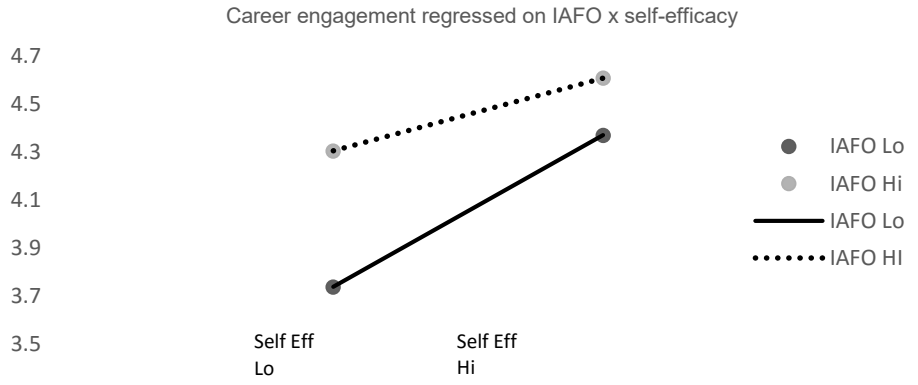
Table 3: Hierarchical Moderated Regression Results Testing the Effects of Independent Variables on Informal Career Engagement

Step and Variable	β	ΔR^2	Adj R^2
Step 1:			
Age	0.01		
Gender	-0.05		
Organizational Tenure	-0.78		
Ethnicity	0.08		
Number of promotions	-0.08		
Education	0.21***	0.08	0.08
Step 2:			
IAFO	0.51***		
Self-efficacy	0.43***	0.15	0.23
Step 3:			
IAFO x Self-efficacy	-0.34*	0.02	0.25

*N = 299. Significance levels are as follow: *p < 0.05, **p < 0.01, ***p < 0.001. All results include age, gender and organizational tenure as control variables. We estimated the regression equation as follows: Career Engagement = β_1(Age) + β_2(Gender) + β_3(Org. tenure) + β_4(Ethnicity) +β_5(Number of promotions) + β_6(Education) + β_7(IAFO) + β_8 (self- efficacy) + β_9(IAFO x self-efficacy) *Note- All beta weights are standardized*

Commensurate with Stone and Hollenbeck (1989) and Cohen et al. (2003), we plotted high and low levels (i.e., levels one standard deviation above and below the mean) of IAFO across a range of self-efficacy scores. Figure 2 illustrates the significant interactive relationship generated from our data (i.e., self-efficacy x IAFO).

Figure 2: Plotted Interaction Slopes



Commensurate with Stone and Hollenbeck (1989), we plotted both levels of the interactions (i.e., levels one standard deviation above and below the mean) in order to assess the significance of the slopes in the moderating conditions.

Theoretical Implications

This work helps broaden and develop the construct of informal accountability for others. Heretofore, no research that we know of has investigated whether feeling answerable for the behaviors of others enhances engagement in careers. Our findings indicated that, indeed, IAFO promoted career engagement. Extant research on IAFO (Royle, 2010) was limited with respect to its demonstrated influence on only half of the self-concept (i.e. organization-based self-esteem). The self-concept is the view individuals hold of themselves on social, physical and spiritual levels. It has two distinct parts; self-esteem and self-efficacy (Brockner, 1988, Hattie, 1992). As such, showing IAFO's relationship to self-efficacy, the other component of Brockner's (1988) and Hattie's (1992) construct of the self-concept, is both novel and informative.

This research also augments the literature on the global dimensions of self-efficacy. The data suggest that not only did self-efficacy enhance career engagement per Kim, Jang, Jung, Lee, Puig and Lee's (2012) suggestion but it also interacted with IAFO. The combination of these two variables on career engagement suggested that, individually, both of these variables enhanced career engagement, but together it seems that there is an added effect of having both. However, the amount of extra influence from having both self-efficacy and IAFO decreases as the amounts of either one increase. Essentially, those high in self-efficacy find answering for others less attractive than navigating the organization's political realities on their own. We must note that those high in IAFO and self-efficacy are still the most career engaged.

Managerial Implications

Our results are relevant to individuals across occupations. Specifically, the findings reaffirm the influence of self-efficacy as a driver of proactive work-related actions (e.g., Bandura, 1997, Weiner, 2012) and, as such, it further engages individuals in their careers. Our findings, augment choice theory (Glasser, 1998) which suggested that assessing employee abilities, finding avenues to tap them, and building upon them is more useful in enhancing employment potential than relying on external manipulations (e.g., coercion or pay). Thus, unsurprisingly, assessing what one finds most interesting and is best at, instead of simply directing him/her to perform a given set of tasks, promotes career engagement. This is particularly important in the Protean and boundaryless employment sense because individuals are very likely to follow their interests across functional distinctions or employers and throughout their careers (Arthur & Rousseau, 1996, Greenhaus et al., 2010). For those long-time employees of a single organization our findings help validate the assumption of Kim et al. (2012), which is that placing those high in self-efficacy in occupational counseling services and career camps enhances their engagement and development.

In terms of IAFO, the emphasis on proactivity is noteworthy. The demonstrated mechanisms of IAFO (e.g., Royle et al., 2008) in our data suggested that those high in it are more engaged in their careers than those who are not. Given our prior discussion of the changing nature of work stability, the "manager" of most interest in this sense is the individual. In other words, our data indicated that if individuals feel accountable for others they will likely engage them professionally, if not socially, in order to affect (ostensibly positively) others' work behaviors. If others see this intervention as helpful, they are likely to comply with suggestions/directives. Therefore, because this reflects well upon the informally accountable party, it bolsters his/her career engagement as well as promotes that of the target party. Specifically, if informally accountable individuals see others underperforming in the organization (e.g., struggling to complete tasks or engaging in counterproductive work behaviors), it is helpful to both parties if they speak up and suggest corrective actions.

Despite what reciprocating benefits IAFO can offer to answerable others, the interaction of IAFO and self-efficacy presents some difficult managerial issues. For example, managers want efficacious employees as well as those who feel answerable for others. Nevertheless, putting them together reduces the degree to

which IAFO seems attractive to those with high self-efficacy. A possible remedy for this may be for individuals to work in groups and teams where they are required to both interact with others closely and answer for the collective contribution of the group.

Limitations and Future Research

The pressure to publish from the doctoral student level forth creates a multitude of researchers and, thus, more competition for data sets (Steelman, Hammer, & Limayem, 2014). A common solution to this conundrum is to recruit student participants (Steelman et al., 2014). However, Gordon, Slade and Schmitt (1986) noted that as of the date of their publication nearly three quarters of publications in social psychology consisted of student samples. The "ecological" validity (i.e., the lack of generalizability due to utilized student samples being meaningfully different from the population at large) of these studies is, thus, always in question (Campbell & Stanley, 1963). We do have student respondents in our data set. Fortunately, the role of students in our data collection was such that they were rarely the actual survey respondents, which helps obviate the problem. Nevertheless, some of those effects might persist.

Our data do not indicate the degree to which respondents worked collectively or independently at their jobs. Bandura (1977, 1997, Weiner, 2012) distinguished between personal efficacy and collective efficacy. Personal efficacy, as noted above, referred to individuals' beliefs about the probability of success based on their own actions. Collective efficacy referred to a group's belief in the potency of its actions. Accordingly, research indicated that group success depends on high collective efficacy (Britner, 2012). As organizations continue to reduce levels of hierarchy and move towards more group/team efforts (Baruch, 2004, Greenhaus et al., 2010) future researchers might examine collective efficacy's impact on career engagement. If in the future we work more in groups, then collective efficacy becomes more crucial to both team and individual success. Would feeling more informally accountable for others become more attractive in that case because individuals would work more communally? If so, would higher levels of IAFO interact with collective efficacy to enhance career engagement? Clearly, a study of employees working extensively (or exclusively) in teams, rather than in more individually oriented jobs, is necessary to answer those questions.

Research also suggested that self-efficacy might operate differently in traditionally collectivist cultures (e.g., Japan) as opposed to individualistic ones (e.g., the USA) (Heine, Lehman, Leung, Kitayama, Takata, & Matsumoto, 2001, Hofstede, 1980). Collectivist cultures are those that value group interests over those of individuals (Hofstede, 1980). Heine et al. (2001) noted that Japanese subjects who failed at a task persist much more than those who had succeeded at the same task. That is unsurprising because those who succeed can move on to other things. However, those who failed in the authors' North American sample (i.e., Canadian and American respondents) spent less time trying to overcome the performance decrements relative to those who successfully completed the task and substantially less time trying to catch up than their Japanese counterparts. Heine et al. (2001) suggested that North Americans selectively attended to the positive aspects of themselves and worked hard to accentuate them. The Japanese selectively attended to the negative aspects of their performances and work hard to improve those. Given these different perceptions, future research should further explain how self-efficacy operates in different cultures. Specifically, the field would benefit from knowing if collectivists, who focus on correcting past mistakes are more or less career engaged than individualists who minimize the importance of failure and attempt to parlay successes into other opportunities.

CONCLUDING COMMENTS

Our study used a convenience sample of 299 full time employees comprised largely of respondents from the southeastern United States. There were 182 female respondents (61%); the average age was 37 and the average tenure in their current positions with their current employers was 7.4 years. Common respondent occupations included nurses, project managers, bankers and sales professionals. The sample included some

students but only those that met the minimal criteria for inclusion (i.e., currently working full time with at three years of employment).

Naturally, there are limitations to our findings. For example, measuring self-efficacy at an individual level as opposed to the collective level might mask important differences in terms of career engagement in the unfolding global economy. Further, IAFO and self-efficacy might interact differently among individuals in collectivistic societies, as opposed to in individualistic cultures like that of the United States. Future research should attempt to determine what those boundary conditions are.

The objective of our research was to examine the interaction of self-efficacy, informal accountability for others and career engagement. There are important theoretical and managerial implications to consider in this work. Our results suggested both self-efficacy and IAFO predicted higher levels of career engagement. In addition, the results suggested that although both self-efficacy and IAFO predicted higher levels of career engagement, the interaction of the two had a somewhat deleterious effect. In essence, those who had high levels of self-efficacy believed that feeling informally accountable for others was not as rewarding as going it alone when it comes to enhancing career engagement. With respect to career engagement, self-efficacy and informal accountability for others are both desirable attributes but are somewhat caustic when put together.

REFERENCES

Arnold, J., & Jackson, C. (1997). The new career: Issues and challenges. *British Journal of Guidance and Counseling*, 25, 427-434.

Arthur, M. B., Hall, D. T., & Lawrence, B. S. (1989). *Handbook of Career Theory.* New York: Cambridge University Press.

Arthur, M. B., & Rousseau, D. M. (1996). *The Boundaryless Career*. New York: Oxford University Press.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191-215.

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York: Freeman.

Bandura, A., Ross, D., & Ross, S. (1961). Transmission of aggression through imitation of aggressive models. *Journal of Abnormal and Social Psychology,* 63: 575–582.

Barrick, M. R., & Mount, M. K. (1993). The Big Five personality dimensions and job performance: A meta-analysis. *Personnel Psychology, 44,* 1-26.

Baruch, Y. (2004). *Managing careers: Theory and practice.* New York: Prentice-Hall.

Blau, P. (1964). *Exchange and power in social life*. New York: Wiley.

Britner, S. (2012). *Self-Efficacy in School and Community Settings*. New York: Nova Science.

Brockner, J. (1988). *Self-esteem at work.* Lexington, MA: Lexington Press.

Campbell, D. T., & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research.* Boston: Houghton-Mifflin.

Champoux, J., and Peters, W. (1987), Form, effect size, and power in moderated regression analysis. *Journal of Occupational Psychology*, 60, 243-255.

Chay, Y., & Ayree, S. (1999). Potential moderating influence of career growth opportunities on careerist orientation and work attitudes: Evidence of the protean career era in Singapore. *Journal of Organizational Behavior, 20,* 613-623.

Chen, G., Gully, S.M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods, 4*, 62-83.

Chen, G., Gully, S.M., Whiteman, J. A., & Kilcullen, R. N. (2000). Examination of relationships among trait-like individual differences, state-like individual differences, and learning performance. *Journal of Applied Psychology, 85,* 835-847.

Cohen, J., Cohen, P., West, S. G.,& Aiken, L. S. (2003), *Applied multiple regression for the behavioral sciences* (2nd ed). Mahwah, NJ: Lawrence Erlbaum.

Cox, D. W., Rasmussen, K. L., & Conrad, S. M. (2007). *Interventions designed to increase occupation engagement.* Paper presented at the annual convention of the American Psychological Association: San Francisco.

Cummings, L. L., & Anton, R. J. (1990). The logical and appreciative dimensions of accountability. In S. Sivastva, D. Cooperrider, & Associates (Eds.), *Appreciative management and leadership* (pp. 257-286). San Francisco: Jossey-Bass.

Darley, J. M., & Gross, P. H. (2000). A hypothesis-confirming bias in labeling effects. In C. Stangor (Ed.), *Stereotypes and prejudice: essential readings* (p. 212). New York: Psychology Press.

DeFillippi, R. J., & Arthur, M. B. (1994). The boundaryless career: A competency-based perspective. *Journal of Organizational Behavior, 15,* 307-324.

Diekmann, C., Blickle, G., Hafner, K., & Peters, L. (2015). Trick or trait? The combined effects of employee impression management modesty and trait modesty on supervisor evaluations. *Journal of Vocational Behavior, 89,* 120-129.

Edie, J. (1987). *William James and Phenomenology*, Indianapolis: Indiana University Press.

Ferris, G. R., Mitchell, T. R., Canavan, P. J., Frink, D. D., & Hopper, H. (1995). Accountability in human resource systems. In G. R. Ferris, S. D. Rosen, & D. T. Barnum (Eds.), *Handbook of human resource management* (pp.175-196). Oxford, U.K.: Blackwell Publishers.

Glasser, W. (1998). *Choice theory: A new psychology of personal freedom.* New York: Harper Collins.

Gordon, M. E., Slade, L. A., & Schmitt, N. (1986).The "science of the sophomore" revisited: From conjecture to empiricism. *Academy of Management Review, 11,* 191-207.

Gouldner, A. W. (1960) The norm of reciprocity: A preliminary statement, *American Sociological Review, 25*, 161-178.

Greenhaus, J. H., Callanan, G. A., & Godshalk, V. M. (2010). *Career management*. Thousand Oaks, CA: Sage.

Gubler, M., Arnold, J, & Coombs, C. (2014). Reassessing the protean career concept: Empirical findings, conceptual components, and measurement. *Journal of Organizational Behavior, 35,* 23-40.

Hall, D. (1976). *Careers in organizations.* Glenview, IL: Scott, Foresman.

Hall, D. T. & Foster. (1977). A psychological success cycle and goal setting: Goals, performance, and attitudes. *Academy of Management Journal, 20,* 282-290.

Hattie, J. (1992). *Self-Concept.* New York: Psychology Press.

Heine, S. J., Lehman, D. R., Leung, C., Kitayama, S., Takata, T., & Matsumoto, H. (2001). Divergent consequences of success and failure in Japan and North America: An investigation of self-improving motivation. *Journal of Personality and Social Psychology, 81,* 599–615.

Herriot, P., & Pemberton, C. (1966). Contracting careers. *Human Relations, 49,* 760.

Hirschi, A., & Freund, P. A. (2014). Career engagement: Investigating intra-individual predictors of weekly fluctuations in proactive career behaviors. *The Career Development Quarterly, 62,* 5-20.

Hirschi, A., Freund, P. A., & Hermann, A. (2014). The career engagement scale: Development and validation of measure of proactive career decisions. *Journal of Career Assessment, 22,* 575-594.

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Beverly Hills, CA: Sage Publications

Kaiser, H. (1974), An index of factorial simplicity. *Psychometrika*, 39, 31-36.

Kealey, D. J., Protheroe, D. R., & MacDonald, D., & Vulpe, T. (2005). Re-examining the role of training in contribution to international success: A literature review and an outline of a new model training program. *Journal of Inter-cultural Relations, 29,* 289-316.

Kim, B, Jang, S. H., Jung, S. H., Lee, B. H., Puig, A., & Lee, S. M. (2012). A moderated mediation model of planned happenstance skills, career engagement, career decision self-efficacy and career decision certainty. *Career Development Quarterly, 62,* 56-69.

Klein, S. B., & Mowrer, R. R. (1989). *Contemporary learning theories: Pavlovian conditioning and the status of traditional learning theory.* New York: Psychology Press.

Latham, G. P., & Huber, V. L. (1992). Schedules of reinforcement: Lessons from the past for the future. *Journal of Organizational Behavior Management, 13,* 43-59.

Lerner, J. S., & Tetlock, P. E. (1999). Accounting for the effects of accountability. *Psychological Bulletin, 125,* 255-275.

Luthans, F., & Kreitner, R. (1985). *Organizational behavior modification and beyond.* Glenview, IL: Scott.

Merton, R. K. (1968). *Social Theory and Social Structure.* New York: Free Press.

Meyer, J. P., & Allen, N. J. (1997). *Commitment in the workplace: Theory, research, and application*. Thousand Oaks, CA: Sage.

Morrison, E. W., & Phelps, C. C. (1994). Taking charge at work: Extra-role efforts to initiate workplace change. *Academy of Management Journal, 42,* 403-419.

Nicholson, N. (2000). Playing to win: Biological imperatives, self-regulation, and trade-offs in the game of career success. *Journal of Organizational Behavior, 26,* 137-154.

Norman, S. M., Gardner D. G., & Pierce, J. L. (2015). Leader roles, organization-based self-esteem, and employee outcomes. *Leadership & Organization Development Journal*, *36*, 253 – 270.

Pallant, J. (2004), *SPSS survival manual: A step-by-step guide to using SPSS.* New York: McGraw-Hill.

Peiperl, M., & Baruch, Y. (1997). Back to square zero: the post-corporate career. *Organizational Dynamics, 25,* 7-22.

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63,* 539-569.

Rogers, M. E., Creed, P. A., & Glendon, A. I. (2008). The role of personality in adolescent career planning and exploration: A social cognitive perspective. *Journal of Vocational Behavior, 73*, 132-142.

Rousseau, D. M. (1989). Psychological and implied contracts in organizations, *Employee Rights and Responsibilities Journal, 2*, 121-139.

Royle, M. T., Hall, A. T., Hochwarter, W. A., Perrewe, P. L., & Ferris, G. R. (2005). The interactive effects of accountability and job self-efficacy on organizational citizenship behavior and political behavior. *Organizational Analysis, 13,* 53-71.

Royle, M. T., Hochwarter, W. A., & Hall, A. T. (2008). The mediating effect of informal accountability for others. *International Journal of Management and Marketing Research, 1,* 1-22.

Royle, M. T., Fox, G., & Hochwarter, W. A. (2009). The relationships between select situational and dispositional constructs and informal accountability for others. *International Journal of Management and Marketing Research, 2*, 113-133.

Royle, M. T. (2010). An empirical investigation of the mediation role of organization-based self-esteem. *International Journal of Management and Marketing Research, 3,* 33-52.

Royle, M. T., & Fox, G. (2011). The relationships between psychological strain, self-regulation, and informal accountability for others. *International Journal of Management and Marketing Research, 4*, 1-18.

Royle, M. T., & Hall, A. T. (2012). The relationship between McClelland's theory of needs, feeling individual accountable, and informal accountability for others. *International Journal of Management and Marketing Research, 5,* 21-42.

Royle, M. T. (2015). Theoretical drivers of early career success for new market entrants. *International Journal of Management and Marketing Research, 8,* 31-56.

Schlenker, B. R., Britt, T. W., Pennington, J., Murphy, R., & Doherty, K. (1994). The triangle model of responsibility. *Psychological Review, 77,* 419-426.

Schmitt, T. A., & Sass, D. A. (2011). Rotation criteria and hypotheses testing for exploratory factor analysis: Implications for factor pattern loadings and inter-factor correlations. *Educational and Psychological Measurement, 71,* 95-113.

Schwab, D. P. (1999). *Research methods for organizational studies.* Mahwah, NJ: Lawrence Erlbaum Associates.

Seibert, S. E., Kraimer, M .L., Holtom, B. C., & Pierotti, A. J. (2013). Even the best laid plans sometimes go askew: Career self-management processes, career shocks, and the decision to pursue graduate education. *Journal of Applied Psychology, 98,* 169-182.

Sheridan, J. E.,& Vredenburgh, D. J. (1978), Usefulness of leader behavior and social power variables in predicting job tension, performance, and turnover of nursing employees. *Journal of Applied Psychology*, 63, 89-95.

Steelman, Z. R., Hammer, B. I., & Limayem, M. (2014). Data collection in the digital age: Alternatives to student samples. *MIS Quarterly, 38,* 355-378.

Stone, E. F., & Hollenbeck, J. R. (1989), Clarifying some controversial issues surrounding statistical procedures for detecting moderator variables: Empirical evidence and related matters. *Journal of Applied Psychology*, 74, 3-10.

Sullivan, S. E., & Baruch, Y. (2009). Academic careers: The limits of the 'boundaryless approach' and the power of promotion scripts. *Human Relations, 64,* 971-996.

Thompson, J. D. (2010). *Organizations in action: social science bases of administrative theory*. New Brunswick, NJ: Transaction Publishers.

Tolman, E. C. (1951). *Purposive Behavior in Animals and Man*. Berkeley, CA: University of California Press.

Vroom, V. H. (1964). *Work and Motivation*. New York: McGraw Hill.

Weigand, D.A., & Stockham, K.J. (2000). The importance of analyzing position-specific self-efficacy. *Journal of Sport Behavior, 23*, 61-69.

Weiner, B. (2012). *An attributional theory of motivation and emotion*. New York: Springer-Verlag.

Weiss, H. M. (1990). Learning theory and industrial and organizational psychology. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (pp.75-169). Palo Alto, CA: Consulting Psychologists Press.

Zikic, J., & Klehe, U.C. (2006). Job loss as a blessing in disguise: The role of career exploration and career planning in predicting reemployment quality. *Journal of Vocational Behavior, 69*, 391-409.

Zimbardo, P. G. (1970). The human choice: Individuation, reason, and order versus de-individuation, impulse, and chaos. In W. J. Arnold & D. Levine, (Eds.), *Nebraska Symposium on Motivation,* (pp. 237-307). Lincoln: University of Nebraska Press.

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MACRO-ECONOMIC FACTORS INFLUENCING THE FINANCING OF BUILD-OPERATE-TRANSFER PROJECTS: EVIDENCE FROM A RAILWAY PROJECT IN KENYA

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ABSTRACT

The Government of Kenya entered in a concessional agreement with Rift Valley Railways (RVR) in 2006, under the build-operate-transfer financing arrangement, to boost economic growth. However, 10 years later, RVR's performance failed to meet performance targets, due to financing and technical capacity constraints, as per anecdotal reports. This article examined the influence selected macro-economic factors on the project's financing. We sourced primary data from 348 staff of key stakeholders. We applied Relative Importance Index to rank the factors based on their importance; besides, we applied Kendall's Coefficient of Concordance (W) to determine the degree of agreement among participants. Findings show that inflation rates ranked highest, scoring an index of 0.8; followed by interest rates (0.7), debt ratio (0.6) and taxation burden (0.6). The study obtained a strong level of concordance in perceptions regarding influence of macro-economic factors on the project's financing, which was also statistically significant at 0.01 error margin ($W = 0.833$, $\chi^2 = 41.8223$, $df = 3$ & ρ-value $= 0.000$). Besides financial and technical capacity, stakeholders should consider macro-economic environments, when evaluating RVR's performance. The study suggests the need for appropriate adjustments of the monetary, fiscal, taxation and domestic borrowing policies, among other interventions.

JEL: O16

KEYWORDS: Macro-economic, Financing, Build-Operates-Transfer, Railways Project

INTRODUCTION

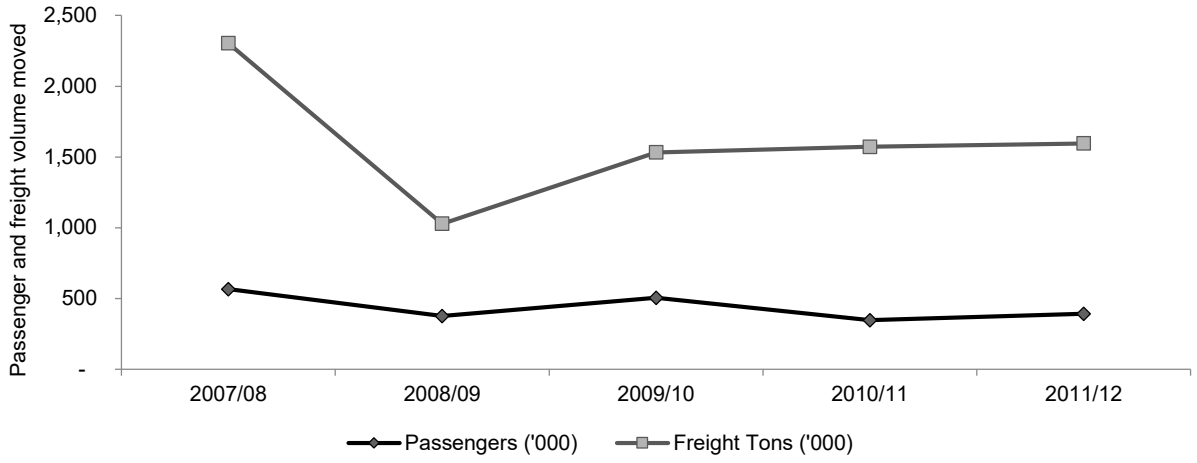
Kenya's economy has relied on railways transport for more than a century, providing freight and passenger services within and between major urban centres, as well as to the neighboring Uganda. Railways transport is the second most important provider of transport services after roads. Currently, the railways network consists of 2,778 kilometers, including 1,083 kilometers of the mainline, 346 kilometers of principle lines, 490 kilometers of branch lines and 859 kilometers of private lines (Ministry of Transport, 2014). Established in 1978 through an Act of Parliament (Cap 397), Kenya Railways Corporation (KRC) is the authority mandated to manage and coordinate an integrated system within Kenya of rail and inland waterways transport services. At its peak in 1983, the railways system moved some 4.3 million tons of freight, before a precipitous decline to 1.9 million tons by the end of 2005 (Mwiti, 2013). Reduction in business volume started in the mid 1980s, through to early 2000. The period saw a significant reduction in net returns and financial stability, which threatened system's very survival (Institute of Economic Affairs, 2014). The resulting inefficiency pushed away cargo transporters and passengers to use road transport services, albeit at a higher cost.

In response to declining performance, the Government of Kenya (GoK) and Government of Uganda (GoU) made a strategic decision in 2003 to jointly concession railways transport services. The decision arose from

the recognition of historical links between Kenya Railways and Uganda Railways, mutual dependency of the two systems, as well as the potential benefits that the two countries would derive from a joint concession (African Development Bank, 2011). In November 2006, the two Governments entered into a concessional agreement with Rift Valley Railways (RVR) under a build-operate-transfer (BOT) financing framework. The purpose of the concession was to inject new capital, and technical skills, as well as improve management of the railways systems; thereby, enhance efficiency in the delivery of commuter, passenger and freight services (Ministry of Transport, 2014). Consequently, RVR (the concessionaire) committed to provide freight services for a period of twenty five (25) years and passenger services in Kenya for five (5) years (Institute of Economic Affairs, 2014). Under the agreement, RVR bore the obligation of rehabilitating and maintaining rail networks to enhance safety of trains, as well as improve the management, operation and financial performance. RVR further agreed to upgrade and modernize the locomotive fleet; rehabilitate the rolling stock, purchase new locomotives and wagons; renovate buildings, workshops and machinery as well as install new information technology systems. On their part, the GoK and GoU remained owners of the railways infrastructure and facilities (African Development Bank, 2011). The concession agreement obligated RVR to pay the two governments for use of conceded assets a one-off entry fee of US $3 million to the GoK and US $2 million to the GoU. In addition, RVR committed to pay an annual concession fee of 11.1% of gross freight revenues to the two governments. Regarding passenger business in Kenya, the concessionaire agreed to pay GoK a flat annual fee of US $1 million. A third requirement was to invest up at least US $40 million in the infrastructure development and rolling stock over the first five years.

However, nearly ten years after concession's onset, RVR was unable to meet performance and investment targets as well as concessional obligations, due to what stakeholders perceived as underperformance. Available data on annual freight and passenger volumes suggested that the concessionaire was underperforming (Institute of Economic Affairs, 2014). Figure 1, which presents data from the 2014 Economic Survey, shows that both freight and passenger volumes dropped by 30.7% between 2007/08 and 2011/12 financial years (Kenya National Bureau of Statistics, 2014).

Figure 1: Passenger and Freight Volumes Moved by RVR (2007-2011)



The Figure shows the annual passenger and freight volumes moved by Rift Valley Railways between 2007/08 and 2011/12 financial years. In each case, the results show that performance of the railway system dropped by about one-third. The Figure further that the concession has a higher potential for freight services than passenger services.

A recent performance update report confirms that RVR handles an average of 1.5 million tons of goods annually, down from 2.4 million tons in 2007/08 financial year (Kenya Railways Corporation, 2012). The report indicates that the number of functional wagons dropped from 3,200 at the concession's onset to less than 1,000 in 2012. Besides, passenger services registered poor performance. In this regard, the total

kilometers that RVR covered dropped from 389 million in 2009 to 365 million kilometers in 2012. Passenger traffic also fell by 30% from about 600,000 in 2007/08 to about 400,000 in 2011/2012. This resulted to a drop in revenue from passenger services; thereby, leading to backlogs of unpaid concession fees and under-investment in the development of infrastructural facilities, as articulated in the concession agreement contributed (Kenya Railways Corporation, 2012; Mwiti, 2013). Anecdotal reports show that stakeholders linked RVR's underperformance to lack of financial capacity and technical expertise on the part of the lead investor – Sheltam Rail of South Africa (Mwiti, 2013), which may not be the only factors at play. Notably though, no academic process had ever examined and provided a comprehensive picture of factors influencing the project's financing and underperformance. Even though the study examined various factors influencing the project's financing, including macro-economic, concessional, financial, legal and environmental, in Kenya; this article focuses on the influence of macro-economic factors. It comprises of four sections, including literature review, data and methodology, results as well as discussions and conclusions.

LITERATURE REVIEW

Public-Private Partnership (PPP) initiatives describe a range of possible relationships between public and private sector entities to develop infrastructural facilities and deliver essential services, such as energy, communication, transport, as well as water and sanitation, among others (Asian Development Bank, 2010). In many developing countries, governments face the challenge of meeting the growing demand for essential services, including transport and energy, among others. However, due to limited financial resources and institutional capacity gaps, governments have found that partnership with the private sector is an attractive alternative route to increase and improve the supply of such essential services. Consequently, governments worldwide are increasingly turning to the private sector to provide infrastructural services, which traditionally, fall within the public sectors' domain (United Nations, 2011).

Similarly, Edwards, Rosensweig and Salt (1993) note that the involvement of private sector operators in the provision of public services has been growing over the past two decades, particularly due to inherent benefits such as commercial skills, experience, financial resources, and technology. Railways transport is one of the services in which many governments have involved private sector operators in delivery, through PPP initiatives. A strong PPP system should allocate tasks, obligations, and risks among public and private partners in an optimal way. Whereas, public partners include government entities, such as ministries, departments, municipalities, or state-owned enterprises, private partners include local or international businesses with technical as well as financial expertise relevant to particular project priorities (Asian Development Bank, 2010). However, PPPs may also include nongovernmental organizations (NGOs) and/or community-based organizations (CBOs), as representatives of stakeholders directly affected by the project (Asian Development Bank, 2010).

Furthermore, threes factors motivate that establishment of PPP initiatives: attract private capital investments to improve service delivery; increase efficiency and effectiveness in the use of available of resources in project delivery, operation, and management; access advanced technological innovation; as well as accomplish sectoral reforms through reallocation of roles, incentives, and accountability (Asian Development Bank, 2010). According to Philippe and Izaguirre (2006), governments prefer PPP initiatives because they promise better project design, choice of technology, construction, operation, and service delivery. Resource limitation has been the main factor driving governments to consider PPP options for project delivery (United Nations, 2011). However, Quiggin (2004) notes that cost factors, such as the cost of borrowing, as well as administrative and transaction costs motivate government decisions favoring PPPs. In most cases, PPP options for project delivery become sensible when efficiency gains can outweigh such cost factors, including borrowing, transactional, and administrative costs (Philippe & Izaguirre, 2006).

As noted by Farlam (2005), complementary advantages of the public and private sectors provide the basis and need for effective PPPs. In this regard, a government's contribution to a PPP initiative may be in the form of capital for investment, transfer of assets, or in-kind contributions. Governments may also mobilize political support as well as provide social responsibility, environmental awareness, and knowledge (Farlam, 2005). On its part, the private sector injects its expertise in commerce, management, operations, and innovation in running joint business efficiently. Again, depending on the PPP model adopted, the private sector operator may also contribute investment capital (United Nations, 2011).

A review of literature reveals that PPP options range along a spectrum - at one end are those in which the government retains full responsibility for operations, maintenance, capital investment, financing, and commercial risk; while at the other, are those in which the private sector takes on much of this responsibility (World Bank, 1997). Based on this premise, PPP options fall under five broad categories, namely, service contracts, management contracts, leases, concessions and divestitures. In concessions, governments define and grant specific rights to a private operator (concessionaire) to build and operates a facility for a fixed period (United Nations, 2011). Concessions can assume two models, viz. Build-Operates-Transfer (BOT) of Build-Operates-Own (BOO) (Walker, 1993). Although the public authority owns facilities, the private operator has wide-ranging powers over the operation and finances of the system. The success of concession bids depends on the financial competency of bidders. In this regard, the bidder that proposes to operate project facilities and meets investment targets wins the contract. Concessions thrive by contracts, which set out performance targets, including service coverage, quality, standards, arrangements for capital investment, mechanisms for adjusting tariffs, as well as arbitration over disputes (World Bank, 1997).

Furthermore, concessions make private operators responsible for full delivery of services in a specified area, including operation, maintenance, collection, management, as well as construction and rehabilitation of project facilities (Asian Development Bank, 2010). Quite important is that the concessionaire assumes full responsibility for all capital investments required to build, upgrade, or expand facilities, and for financing those investments out of own resources. In addition, the concessionaire is responsible for working capital. In rare cases, do public authorities provide financing support to enable concessionaires fund their capital expenditures. The public authority is responsible for establishing performance standards and ensuring that the concessionaire meets them. At the end of the contract period, the public authority assumes ownership of project facilities and can opt to assume operating responsibility too, renew the operator's contract, or award a new contract to a new concessionaire (Asian Development Bank, 2010). The concessionaire collects tariffs directly from service users. Concession contracts often establish tariffs, including provisions for adjustments in response to social, political or macro-economic changes.

Payments can take place both ways: concessionaire paying the authority for concession rights or the authority paying the concessionaire, based on target achievements (Asian Development Bank, 2010). Payments by the government may be necessary to make projects commercially viable and/or reduce the level of commercial risk taken by the concessionaire, particularly in a developing PPP markets (United Nations, 2011). Typical concession periods range between 25 to 30 years, which provide sufficient time for the concessionaire to recover the capital invested and earn an appropriate return over the life of the concession. The model permits a high level of private investments and has a high potential for efficiency gains in all phases of project development (United Nations, 2011). In this regard, the model provides incentives for the concessionaire to achieve improved levels of efficiency, which translate into increased returns. More still, concessions are an effective way to attract private finance required to fund new project facilities or rehabilitate existing ones (Asian Development Bank, 2010). The transfer of the full package of operating and financing responsibilities enables concessionaires to prioritize and innovate, with a view to increasing returns on investments (Farlam, 2005).

The model may be highly complex to implement and administer, particularly in developing PPP markets, while negotiation and contractual processes often delay due to prediction of risks that may occur beyond

20 years. As part of prerequisites for adoption, the model requires governments to upgrade their regulatory capacity in relation to tariffs and performance monitoring. Public authorities require the capacity to balance between tariffs, demand, purchasing power, and returns. A difficulty usually arises where the demand and community purchasing power are over-estimated (Farlam, 2005). Furthermore, due to long-term contractual periods, concessional arrangements may be vulnerable to political influence, particularly in developing countries.

A review of existing literature reveals that various macro-economic factors influence the frequency and magnitude of private sector investments, particularly in developing countries. In Kenya, for instance, African Development Bank (2013) indicates that macro-economic volatility has been a key challenge to private sector investment and economic growth; affecting the cost of debt and equity capital, as well as inflation, foreign exchange and interest rates. Nyamita, Garbharran and Dorasamy (2014) points out that inflation rate is one of the key indicators of a country's financial stability. An increase in inflation rate causes uncertainty in economic conditions, which in turn, discourages private sector involvement in capital-intensive projects, such as construction of infrastructural facilities (Baltaci & Ayaydin, 2014). Rising inflation rates causes proportionate increase in operation costs, which reduces revenues and returns on capital, as well as diminishes the spectrum of equity and debt financing options. Hence, private sector investors often consider macro-economic profiles of potential markets before making investment decisions and inflation rates is one of the factors that they usually consider. Markets with perpetually high inflation rates are less likely to attract private sector investors and foreign direct investments; but are more likely to cause capital flight into other countries with more stable macro-economic indicators (Gungoraydinoglu & Öztekin, 2011).

According to Baltaci and Ayaydin (2014), inflation rate can either motivate or de-motivate private sector investment, particularly in capital-intensive projects, depending on the level. In situations where private sector investors finance infrastructural projects using foreign debts, high inflation rates can lead to a situation of currency risk, where investors use weakened currencies to service external debts in stronger foreign currencies, which inevitably, may lead to low revenues and losses (Drobetz, Gounopoulos, Merikas & Schröder, 2013). Similarly, Kapila and Hendrickson (2001) observed that high inflation rates might cause a significant decline in exchange rates, which in turn, might affect the level of equity and debt investment in infrastructural projects. Greater volatility in exchange rates acts as a disincentive for private sector participation in the financing of public infrastructural facilities (Kirkpatrick, Parker and Zhang, 2006). Studies by Frank and Goyal (2009), Gungoraydinoglu and Öztekin (2011), as well as Baltaci and Ayaydin (2014) revealed significant relationships between inflation rates and debt financing of infrastructural projects in developing countries. This implies that as inflation increases, the benefits of debt and equity financing decrease due to high operational costs, as well as exchange and interests rates.

Interest rate is the price that a lender charges on borrowed funds; Mishikin (2010) calls it the cost of credit. Undoubtedly, though, debt is a critical source of financing for investments, both in the public and private sectors; thus, prevailing interest rate is often a critical concern to private sector investors. Changes in interest rates may have significant influence on capital accumulation, appetite for credit, investment decisions and participation of private sector investors in PPP projects, especially where debt financing is obtained when interest rates are low and repayments made when interests are high (Nyamita, Garbharran & Dorasamy, 2014). The study reported a significant positive relationship between interest rates and debt financing of infrastructural projects in developing economies. In their study, Ng'etich and Wanjau (2011) observed that whereas low interest rates reduce the cost of doing business, increase demand for debt financing, and stimulate private sector investments, high interest rates increase the cost of borrowing, reduce business profits, limit the level of private sector investment and slow down economic growth. Contrastingly, Mokhova and Zinecker (2014) found a negative correlation between interest rates and debt financing of private sector investments in European countries.

Public debt is important for all countries to achieve their economic growth and development aspirations. In view of this, a reasonable level of borrowing is necessary to spur economic growth, particularly in developing countries (King'wara, 2014). Public debt includes domestic and external debts, or both. Besides, public debt can be productive, when it finances development of infrastructural facilities or dead weight, when it finances current expenditures (Chowdhury, 2001). Public debt can have both positive and negative effects on an economy, especially in relation investment in infrastructural facilities. Whereas, debt financing is a key ingredient for higher economic growth, stronger capacity for debt repayment, and a lighter debt burden for the citizenry; public debt can easily cripple private sector investment and economic growth, particularly where a greater proportion of such debt finances recurrent expenditure or previous external debt (Osei, 2000; King'wara, 2014).

In this regard, King'wara (2014) reported that a high level of domestic borrowing negatively affected private sector investments in Kenya. In this regard, debt servicing costs 'crowded out' investment expenditure; thereby, reducing total investment. However, 'debt overhang' seemed to be having a relatively greater effect on financing of private sector investments and slowing down of economic growth, particularly in developing countries (Karagol, 2002). Metwally and Tamaschke (1994) revealed similar findings in a study that assessed foreign debt problems in North African countries. The study found a negative relationship between debt service and economic growth through its adverse effect on investment and export multiplier in all the targeted countries. In their study, Checherita and Rother (2010) found that changes in the level of government debt negatively affected economic growth by affecting private savings, private investment as well as total factor productivity, while Osei (2000) noted that servicing debt consumed a considerable proportion of national budgets in developing countries, which constrained domestic investments. The main source of revenue for governments is taxation; however, high levels of taxation can stifle private sector investments rather than spur growth to enable governments generate the much-needed revenue for economic development (Njuru, Ombuki, Wawire & Okeri, 2013). As noted by (Norgah, 1998), heavy taxes negatively affects the cost of production, profit margins and resources which investors can plough back, which is a disincentive for private sector investments. Hence, a heavy taxation burden on the private sector can easily trigger mass capital flight to countries having relatively fewer and lighter taxes. It is imperative for governments to formulate taxation policies that allow optimal revenues, while attracting and enabling private sector to grow. In relation to this, Njuru, Ombuki, Wawire and Okeri (2013) asserted that appropriate taxation policies such as periodical tax holidays, tax exemptions and remissions, can promote private sector investments in particular sectors or regions.

Furthermore, heavy taxation is one of the factors influencing the growth of private sector in Kenya, including investment in capital-intensive projects (African Development Bank, 2013). In their study, Djankov, Ganser and Ramalho (2009) found that effective corporate tax rates had a large and significant adverse effect on corporate investment as well as on entrepreneurship. More particularly, an increase in corporate income tax significantly associated with lower investment in manufacturing, and greater reliance on debt rather than equity financing. In another study, Karumba (2009) examined the extent to which institutional factors affected private sector investment. The findings showed that tax administration was the most important institutional factor influencing investment decisions among private sector operators. Panagiota (2009) reported similar findings, in a study that assessed effects of taxation incentives on investment. More specifically, the study indicated that availability of taxation incentives significantly associated with the amount of capital invested by private investors in development projects (Panagiota, 2009). The study conducted by Kirkpatrick, Parker and Zhang (2006) also reported a significant relationship between perceived level of taxation burden and intention to invest in infrastructural facilities among equity investors.

DATA AND METHODOLOGY

The study adopted a causal-comparative design, which permitted the application of quantitative approaches in data collection, processing and analysis. Causal-comparative designs employ natural selection principles, rather than manipulation of independent variables to predict relationships (Oso & Onen, 2005). We issued self-administered questionnaires to staff of the stakeholders, including KRC, RVR, Ministry of Finance (MOF) and Ministry of Transport (MOT). The questionnaires sourced data on macro-economic factors influencing financing of the concession, including interest rates, inflation rates, taxation burden and debt ratio. Secondary data sourced from the project archives supplemented primary data. The study targeted senior operational, managerial, technical, monitoring and evaluation, as well as advisory staff, affiliated to all key stakeholders, including KRC, RVR, MOF and MOT. We prepared sampling frames for each category of participants using staff inventories of each stakeholder. The process identified 402 eligible participants, who were all included in the sample to avoid the risk of sampling error. Self-administered questionnaires were most appropriate, particularly because they provided flexibility that targeted participants would require, considering their busy daily schedules. The approach enabled participants to provide requisite data at their convenience. We applied one module of the instrument across the board to permit comparison of perspectives from different stakeholders. The instrument, which had both closed-ended and open-ended questions, captured information on macro-economic factors perceived to be influencing the financing and performance of the railway. We collected primary data in May 2015 after obtaining necessary approval from University of Nairobi, National Council of Science and Technology, as well as KRC. We delivered questionnaires to targeted participants and made follow-ups through e-mails and telephone calls. Of the 402 targeted participants, 348 (86.6%) successfully completed and returned the questionnaires. Table 1 shows the questionnaire return rates for each category of participants.

Table 1: Questionnaire Return Rates

Stakeholder	Targeted	Actual	Return Rates (%)
Kenya Railways Corporation	164	134	81.7
Rift Valley Railways	195	179	91.8
Ministry of Finance	27	23	85.2
Ministry of Transport	16	12	75.0
Total	**402**	**348**	**86.6**

Table 1 shows that the study targeted 402 participants from the key stakeholders, including Kenya Railways Corporation, Rift Valley Railways, Ministry of Finance and Ministry of Transport. The second column shows the number of participants that we targeted, while the third column shows the number that successfully completed and return questionnaires. The fourth column indicates the return rates for each stakeholder and the average for the entire sample.

The analysis involved listing coding, digitalizing and cleaning data for logical inconsistencies and misplaced codes. The methods used included descriptive, Chi square tests, one-way analysis of variance (ANOVA) as well as Relative Importance Index (RII) analyses. One may compute RII using the formula.

$$\text{RII} = \frac{\Sigma W}{A*N} \quad (1)$$

Where W is the weighting of each response on a scale of 1 to 5 corresponding with lowest to highest, A is the highest weight, and N is the total number of participants. RII yields values in the range of $0 < x \geq 1$, the higher the value of RII the more important the factor (Kometa, Oloimolaiye & Harris, 1994). RII is a non- probabilistic rank statistic derived from ordinal data; hence, its accuracy is non-dependent on sample size or the population. Furthermore, we applied Kendall's Coefficient of Concordance to determine the degree of agreement among the four categories of participants with respect to their ranking. The Coefficient states that W gives the degree of agreement on a 0 to 1 scale, such that:

$$W = \frac{12U-3m^2n(n-1)^2}{m^2n(n-1)} \text{ ; Where } \quad U = \Sigma_{j=1\ldots n}\,(\Sigma R)^2 \quad (2)$$

Where *n* is the number of factors; *m* is the number of groups; *j* represent the factors *1, 2, 3 ... n.* Kendall's Coefficient of Concordance is strong on both probabilistic and non-probabilistic distributions because it is not sensitive to sampling error (Frimpong, Olowoye & Crawford, 2003). We performed all quantitative analyses using the Statistical Package for Social Sciences (SPSS) and Microsoft Excel. In addition, qualitative analysis involved organizing data under thematic areas, followed by description and thematic analysis to identify emerging themes and patterns.

RESULTS

The study sourced primary data from 348 participants, of whom 134 (38.5%) were staff of Kenya Railways Corporation (KRC); 179 (51.4%) were staff of Rift Valley Railways (RVR); 12 (3.4%) were officers of the Ministry of Finance (MOF) and 23 (6.6%) served at the Ministry of Transport (MOT). By cadre, Table 2 shows that 109 (31.3%) were operational staff, while 39 (11.2%) were managerial staff. Besides, 174 (50.0%) were technical staff, monitoring and evaluation staff were 12 (3.4%) while 14 (4.0%) participants served as policy advisory staff at the ministries. The analysis revealed up to 99% chance that the institutions varied significantly in terms of the cadre of staff who participated in the study ($\chi^2 = 251.091$, df = 12 and ρ-value = 0.000).

Table 2: Distribution of Participants by Cadre and Gender

Attributes	**Krc**		**Rvr**		**Mof**		**Mot**		**Total**	
	Freq	Pct	Freq	Pct	Freq	Pct	Freq	Pct	Freq	Pct
Cadre										
Operational	41	30.6	68	38.0	0	0.0	0	0.0	109	31.3
Managerial	11	8.2	23	12.8	0	0.0	5	21.7	39	11.2
Technical	80	59.7	88	49.2	0	0.0	6	26.1	174	50.0
M&E	2	1.5	0	0.0	5	41.7	5	21.7	12	3.4
Advisory	0	0.0	0	0.0	7	58.3	7	30.4	14	4.0
Total	134	100.0	179	100.0	12	100.0	23	100.0	348	100.0
Gender										
Male	91	67.9	115	64.2	7	58.3	17	73.9	230	66.1
Female	43	32.1	64	35.8	5	41.7	6	26.1	118	33.9
Total	134	100.0	179	100.0	12	100.0	23	100.0	348	100.0

Table 2 shows the distribution of participants based on cadres and gender. The columns show the distribution across the various institutions that were involved. Cross-tabulation analysis shows that the institutions varied significantly in terms of participants' distribution based on cadre. Regarding gender, the analysis shows lack of a significant variation between the institutions in terms participants' gender. Notably though, more than two-thirds of the participants were men.

Furthermore, participants included 230 (66.1%) men and 118 (33.9%) women. However, the analysis revealed that the institutions did not vary significantly in terms participants' distribution based on gender ($\chi^2 = 1.420$, df = 3 and ρ-value = 0.701). The results in Table 3 show that participants were aged between 22 and 54 years. The mean age for the entire group was 38.7 (≈39) years. Besides, participants from RVR reported the lowest mean age (38.1 years), while those from MOF reported the highest mean age (43.5 years). Even though results suggest that RVR staff may have been the youngest, one-way analysis of variance (ANOVA) revealed that there was no significant variation among staff of various stakeholders regarding age ($F_{(3, 344)} = 1.627$ & ρ = 0.183).

The study captured information regarding years of professional experience. In this regard, the results in Table 4 show that participants reported a mean of 16.41 (≈16 years), with the lowest being 1 year and the highest 35 years. Whereas staff of RVR reported the lowest duration of professional experience (15.8 years), the results suggest that the staff of the MOF were the most experience (22.2 years). Based on this, the ANOVA results show lack of a significant variation among staff of various stakeholders in terms of years of professional experience ($F_{(3, 344)} = 2.255$ & ρ-value = 0.102).

Table 3: Distribution of Participants by Age

Attributes	**N**	**Mean**	**Sd**	**Se**	**95% Ci for Mean**		**Min.**	**Max.**
					Lower Bound	Upper Bound		
Age								
KRC	134	38.47	7.928	0.685	37.12	39.82	22	54
RVR	179	38.09	6.345	1.323	35.34	40.83	26	48
MOF	12	43.50	7.167	2.069	38.95	48.05	28	54
MOT	23	38.53	7.891	0.590	37.37	39.69	22	54
Total	**348**	**38.65**	**7.814**	**0.419**	**37.83**	**39.47**	**22**	**54**
					ANOVA			
				Sum of Squares	df	Mean Square	F	Sig.
Between Groups				296.442	3	98.814	1.627	0.183
Within Groups				20892.788	344	60.735		
Total				**21189.230**	**347**			

Table 3 shows the distribution of participants based on reported age across the institutions. The Table also shows descriptive statistics, including sample size (N), mean score, standard deviation from the mean (SD) and standard error associated with the mean (SE). The Table also indicates the confidence interval and the range of reported data, that is, the minimum (MIN.) and maximum (MAX.). The lower panel shows ANOVA results, where the computed F statistic is not significant; thus, suggesting lack of a significant variation among the institutions regarding participants' age.

Table 4: Participants' Distribution Based on Years of Experience

Attributes	**N**	**Mean**	**Sd**	**Se**	**95% Ci for Mean**		**Min.**	**Max.**
					Lower Bound	Upper Bound		
Years experience								
KRC	134	16.07	7.869	0.680	14.73	17.42	1	33
RVR	179	15.83	6.534	1.362	13.00	18.65	4	28
MOF	12	22.17	7.371	2.128	17.48	26.85	7	32
MOT	23	16.34	8.094	0.605	15.15	17.53	2	35
Total	348	16.41	7.936	0.425	15.57	17.24	1	35
					ANOVA			
				Sum of Squares	df	Mean Square	F	Sig.
Between Groups				421.434	3	140.478	2.255	0.102
Within Groups				21432.437	344	62.304		
Total				**21853.871**	**347**			

Table 4 shows participants' distribution based on years of professional experience across the institutions. The Table also shows descriptive statistics, including sample size (N), mean score, standard deviation from the mean (SD) and standard error associated with the mean (SE). The Table also indicates the confidence interval and the minimum (MIN.) and maximum (MAX.) years of experience. The lower panel shows ANOVA results, where the computed F statistic is not significant; thus, suggesting lack of a significant variation among the institutions in terms of professional years of experience.

The results show that there was no significant variation between participants involved in this study in terms of gender, age and years of professional experience. Based on this, further analyses, including ranking of macro-economic factors, which participants perceived to be influencing the project's financing as well as determination of the coefficient of concordance, assumed that participants were homogenous in terms of most background attributes. This assumption was important for offsetting the risk of invalidity.

Macro-Economic Factors Influencing Financing of the Concession

The study captured participants' perspectives regarding the extent to which four macro-economic factors influenced financing of the concession project, viz. inflation rates, interest rates, debt ratio and taxation burden. The results in Table 5 show that of the 348 participants, 146 (42.0%) believed that the influence of inflation rates on the project's financing was 'very strong', while 72 (20.6%) felt that the influence of inflation rates was 'strong'. Contrastingly, 56 (16.1%) participants described the influence inflation rates as 'very weak', while 26 (7.5%) indicated that the indicator's influence was 'weak'. Cumulatively, 218 (62.6%) participants believed that the influence of inflation rates on financing of the concession project was above average, while 82 (23.6%) felt that the indicator's influence was below average. However, the

analysis revealed lack of a significant variation in perceptions regarding inflation rate's influence on financing of the concession project ($\chi^2 = 8.024$, df = 12 & ρ-value = 0.115).

Table 5: Perceived Extent to Which Macro-Economic Factors Influence the Project's Financing

Macro-Economic	**Krc**		**Rvr**		**Mof**		**Mot**		**Total**		**Chi Square Tests**		
Factors	Freq	Pct	Freq	Pct	Freq	Pct	Freq	Pct	Freq	Pct	χ^2	df	ρ-value
Inflation													
Very strong	70	52.2	64	35.8	5	41.6	7	30.4	146	42.0			
Strong	17	12.7	47	26.3	2	16.7	6	26.1	72	20.6			
Average	16	11.9	27	15.1	3	25.0	2	8.7	48	13.8	8.024	12	0.115
Weak	9	6.8	15	8.3	0	0.0	2	8.7	26	7.5			
Very weak	22	16.4	26	14.5	2	16.7	6	26.1	56	16.1			
Total	134	100.0	179	100.0	12	100.0	23	100.0	348	100.0			
Interest rates													
Very strong	45	33.5	57	31.8	4	33.3	7	30.4	113	32.5			
Strong	40	29.9	49	27.4	2	16.7	5	21.8	96	27.6			
Average	13	9.7	26	14.5	4	33.3	6	26.1	49	14.1	3.120	12	0.360
Weak	19	14.2	16	8.9	0	0.0	2	8.7	37	10.6			
Very weak	17	12.7	31	17.4	2	16.7	3	13.0	53	15.2			
Total	134	100.0	179	100.0	12	100.0	23	100.0	348	100.0			
Debt ratio													
Very strong	39	29.1	32	17.9	3	25.0	8	34.8	82	23.6			
Strong	53	39.6	73	40.7	6	50.0	7	30.4	139	39.9			
Average	19	14.1	42	23.5	1	8.3	3	13.0	65	18.7	7.592	12	0.129
Weak	15	11.2	14	7.8	0	0.0	4	17.4	33	9.5			
Very weak	8	6.0	18	10.1	2	16.7	1	4.4	29	8.3			
Total	134	100.0	179	100.0	12	100.0	23	100.0	348	100.0			
Taxation burden													
Very strong	64	47.8	88	49.2	7	58.3	7	30.4	166	47.8			
Strong	37	27.6	60	33.5	4	33.4	10	43.5	111	31.9			
Average	20	14.9	17	9.5	1	8.3	6	26.1	44	12.6	13.499	12	0.334
Weak	6	4.5	9	5.0	0	0.0	0	0.0	15	4.3			
Very weak	7	5.2	5	2.8	0	0.0	0	0.0	12	3.4			
Total	134	100.0	179	100.0	12	100.0	23	100.0	348	100.0			

Table 5 presents participants' perceptions regarding the extent to which various macro-economic factors influenced financing of the concession project. The participants rated their perceptions on a five-point Likert scale, ranging from 'very strong' to 'very weak'. Under each institution, the Table shows frequency distributions (Freq) and accompanying percentages (Pct).

The results in Table 5 further show that 113 (32.5%) participants believed that the influence of interest rates on financing of the concession project was 'very strong', while 96 (27.6%) felt that the indicator had a 'strong' influence on the project's financing. However, 53 (15.2%) participants perceived that the influence of interest rates was 'very weak', while 37 (10.6%) believed that the indicator's influence was 'weak'. Cumulative results show that 209 (60.1%) participants described the influence of interest rates on the project's financing as above average, while 90 (25.8%) felt that the indicator had 'a-below-average' influence on the project's financing. Based on this, the analysis revealed lack of a significant variation in perceptions regarding the influence of interest rates on the project's financing ($\chi^2 = 3.120$, df = 12 & ρ-value = 0.360). Regarding debt ratio, the results show that 82 (23.6%) participants reported that the indicator had a 'very strong' influence on the project's financing, while 139 (39.9%) described the indicators' influence as 'strong'. Contrastingly, 29 (8.3%) participants stated that the debt ratio had a 'very weak' influence, while 33 (9.5%) felt that the indicator's influence on the project's financing was 'weak'. More still, cumulative results show that more than two-thirds of participants, 221 (63.5%), perceived that the influence of debt ratio on the project's financing was above average, while 62 (17.8%) felt that the indicator's influence was below average. Again, the analysis revealed lack of a significant variation in perceptions regarding the influence of debt ratio on the project's financing ($\chi^2 = 7.592$, df = 12 & ρ-value = 0.129).

In addition, nearly one-half of participants, 166 (47.8%) described the influence of taxation burden on the project's financing as 'very strong', while 111 (31.9%) felt that the indicator had a 'strong' influence on.

However, 12 (3.4%) participants perceived that the influence of taxation burden was 'very weak', while 15 (4.3%) felt that the indicator had a 'weak' influence on the project's financing. Besides, cumulative results show that whereas 277 (79.7%) participants perceived the influence of taxation burden as 'above average', those who felt that the indicator's influence was below average were only 27 (7.7%). Based on this, the results show lack of a significant variation in perceptions regarding the influence of taxation burden on financing of the concession project ($\chi^2 = 13.499$, df = 12 & ρ-value = 0.334).

Relative Importance of Macro-Economic Factors Influencing the Project's Financing

Table 6 presents results obtained from RII analysis. Notably, the results show that inflation rate was the most important macro-economic factor influencing financing of the concession project. The indicator scored a relative importance index of 0.774 (≈0.8). In this regard, participants asserted that inflation is usually a challenge when its rate rises above 2%. In Kenya, inflation rates averaged 7.8% during the concession period (2007 to 2014). The economy experienced the lowest rates of 4.8% in 2007, while the highest rates (14.3%) occurred in 2012 (Kenya National Bureau of Statistics, 2015). Participants noted that high inflation influenced the project's financing by increasing the cost of essential supplies such as fuel, electricity, water and labour. Reportedly, RVR coped with the situation by adjusting its tariffs upwards, hoping to pass the effect to service consumers. However, the initiative worked negatively by discouraging consumers from utilizing freight and passenger services, leading to a drop in the volume of goods and passengers by about 30% between 2007/08 and 2011/12 financial years.

Some participants associated high inflation rates with a high cost of hiring and maintaining technical labour. Due to high inflation rates, the concessionaire experienced increasing demands for higher wages from its workers to keep-up with escalating consumer prices. In this regard, an increase in the unit cost of labour inflated RVR's wage bill, which ate into revenues. Not only did the challenge undermine RVR's ability to meet its concessional obligations, but also transmitted negative signals to external financiers. As a result, RVR failed to mobilize additional financing in time to meet contractual terms, as financiers paused to study status of the economy, vis-à-vis measures taken by the Government to manage inflation trends and to stabilize the market. In addition, participants reported that high inflation rates weakened the confidence of existing and potential financiers. In this regard, financiers often cited various risks, including higher tariffs, which discouraged appetite for freight and passenger services; as well as rising overhead costs, resulting from increasing cost of essential services and supplies. The situation prevented RVR from meeting its performance targets as well as concessional obligations.

Table 6: Relative Importance Index of Macro-Economic Factors

Inter-Item Correlation Matrix					**Relative Importance**		
Macro-economic factors	Inflation rates	Interest rates	Debt ratio	Taxation burden	β	General dominance weights	Relative weights
Inflation rates	1.000	0.444	0. 538	0.418	0.205	0.774	0.774
Interest rates	0.444	1.000	0.414	0.789	0.200	0.701	0.701
Debt ratio	0.538	0.414	1.000	0.552	0.136	0.582	0.582
Taxation burden	0.418	0.789	0.552	1.000	0.117	0.556	0.556

Table 6 presents the Relative Importance Index associated with each of the macro-economic factors perceived to be influencing financing of the concession project. The first five columns show the correlation matrix of the factors, while the last three columns show the relative importance of each macro-economic factor, in terms of partial regression co-efficients (β), dominance weights and relative weights.

Next in the order of importance was interest rate (0.7). Participants noted that the rising interest rates affected the project's financing. A review of Central Bank of Kenya (CBK) data reveals that commercial banks' lending interest rates averaged at 15.6% between 2007 and 2014. Besides, lending interest rates increased from a low of 13.3% in 2007 to a high of 19.6% in 2012 (Central Bank of Kenya, 2015a). Participants pointed out that the escalating interest rates ate into revenues, which constrained the ability of

RVR partners plough back sufficient resources, as per their financing share. Besides, rising interest rates made local credit too expensive for partners focusing on the local market; thus, discouraging or delaying further borrowing to meet investment targets as per contractual agreement. Participants also noted that RVR transmitted high interest rates to consumers through higher tariffs. However, like in the case of inflation rates, the market responded negatively, leading to a drastic drop in freight and passenger volumes. Participants further noted that government borrowing from the domestic market was a key factor fuelling interest rates. Local borrowing made the state a competitor for scarce local resources, thus, triggering interest rates to increase rapidly.

Ranking third was debt ratio, with an RII of 0.6. Over the concession period Kenya's debt to Gross Domestic Products (GDP) ratio average at 46.2%. The debt ratio increased from a low of 42.8 in 2008 to a high of 49.5% in 2014 (Central Bank of Kenya, 2015b). In view of this, participants indicated that high debt ratio indirectly influenced the project's financing, by triggering domestic borrowing by the Government, thereby, heightening the risk of inflation and high interest rates. Both factors prevented RVR partners from accessing funds from the local market. As reported by Checherita and Rother (2010), a unit increase in public debt ratio inversely causes a proportionate change in private sector capital investment; thus, stagnating economic growth. Based on this argument, rising debt ratio interrupted the financial market, making lending terms too expensive for RVR partners. This caused a delay in the project's financing, which in turn, affected efficiency of the railways system.

Taxation burden also scored an RII of 0.6. Participants reported that taxation burden negatively influenced the project's financing by increasing overhead costs as well as reducing revenues and the ability of RVR partners to meet their investment targets. Of the greatest concern to participants was the fuel levy tax, which RVR paid through the purchase of diesel to power locomotive engines. However, the government use fuel levy to maintain roads and not to improve railway tracks. Consequently, participants felt that fuel levy disadvantaged RVR economically, while favoring competitors - road transporters. Fuel levy is one of the factors that rendered RVR's tariffs uncompetitive, thereby, preventing the concessionaire from meeting investment and performance targets, as well as timely payment of concessional fees. In addition, import duty and excise tax on imported hardware affected the project's financing by increasing the burden and reducing revenues. Participants suggested the need for tax incentives to RVR, since it was already paying monthly concession fees.

Concordance of Perceptions on the Influence of Macro-Economic Factors on the Project's Financing

The results in Table 7 confirms show the mean rank of each macro-economic factor, where inflation rates ranked first, with a mean rank of 2.68; interest rates scored a mean rank of 2.64, followed by debt ratio with 2.53 and taxation burden with 2.16. Furthermore, the analysis obtained a strong level of concordance in the ranking of macro-economic factors influencing the project's financing, which was also statistically significant at 0.01 error margin ($W = 0.833$, $\chi^2 = 41.8223$, $df = 3$ & ρ-value = 0.000).

Table 7: Concordance of Perceptions the Influence of Macro-Economic Factors

Ranks		**Test Statistics**	
Factors	Mean Rank	N	348
Inflation rates	2.68	Kendall's W	0.833
Interest rates	2.64	Chi-Square	41.822
Debt ratio	2.53	df	3
Taxation burden	2.16	Asymp. Sig.	0.000***

Table 7 shows the ranking of macro-economic factors, based on the strength of perceived influence on the financing of the concession project, where inflation rates ranked first, with a mean rank of 2.68; interest rates scored a mean rank of 2.64, followed by debt ratio with 2.53 and taxation burden with 2.16. The last two columns show Kendall's test statistics for the concordance of perceptions. Notably, the concordance is strong and statistically significant., **, *** shows significance at 10, 5 and 1 percent, respectively.*

The results imply up to 99% chance that participants were concordant and that the identified macro-economic factors had a strong influence on the project's financing. Consequently, regulating inflation and interest rates, as well as managing the level of public debt and waiving fuel levy are crucial interventions that stakeholders may consider to improve the macro-economic environment, as well as cushion the concessionaire against commercial risks.

CONCLUSIONS

The purpose of this study was to determine factors influencing financing of the railways concession project in Kenya. More specifically, the study ranked a set of macro-economic factors, based on their relative strength in influencing the project's financing. The study reveals that all the four factors examined were strong predictors of the project's financing, with inflation rates ranking highest (0.8), followed by interest rates (0.7), debt ratio (0.6) and taxation burden (0.6). In addition, the study obtained a strong level of concordance in the ranking of macro-economic factors vis-à-vis their influence on the project's financing, which was also statistically significant at a high level of precision. Based on the findings, stakeholders should recognize the role of macro-economic factors on the financing and performance of the concession project. Similarly, stakeholders need to recognize that they have a crucial role of regulating the macro-economic environment to create a supportive and fair play ground for the concessionaire. It is unfair for stakeholders to continue judging the concessionaire by focusing on internal weaknesses related to financial and technical capacity, while ignoring the macro-economic environment in which the concessionaire operates. There is no doubt that the concession can meet contractual expectation when the Government plays its supportive role by formulating appropriate and/or adjusting existing monetary, fiscal, taxation, and domestic borrowing policies, not only for the concession project, but also for other private enterprises.

Besides, the need to for a supportive policy environment, the Government should also consider appropriate measures to cushion the concessionaire when need arises. More specifically, the concessionaire requires cushion against inflation rates caused by global market dynamics by subsidizing essential supplies such as electricity, fuel, and water to provide room for the concessionaire to meet revenue targets; as well as waiver of fuel levy, which advantages road transporters, while disadvantaging the concessionaire. Doing so will enable the concessionaire to come up with more competitive tariffs, which is likely to make services more attractive to consumers.

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REFERENCES

African Development Bank (2011). *Rift Valley Railways Project: Environmental and Social Assessment*. Addis Ababa: African Development Bank Group.

African Development Bank (2013). *The State of Kenya's Private Sector: Recommendations for Government, Development Partners and the Private Sector*. Tunis Belvédère: African Development Bank Group.

Asian Development Bank (2010). *Public Private Partnership Handbook*. Manila: AsDB.

Baltacı, N. and Ayaydın, H. (2014). "Firm, Country and Macroeconomic Determinants of Capital Structure: Evidence from Turkish Banking Sector," *EMAJ: Emerging Markets Journal*, Vol. 3, No. 3, p. 47-58.

Central Bank of Kenya (2015a). *Commercial Banks' Weighted Average Interest Rates 1991-2015*. Nairobi: CBK.

Central Bank of Kenya (2015b). *Kenya Government Debt to GDP 1998-2015*. Nairobi: CBK.

Checherita, C. and Rother, P., (2010). *The Impact Of High and Growing Government Debt on Economic Growth: An Empirical Investigation for the Euro Area*. Working Paper Series, No. 1237, August 2010.

Chowdhury, A. R. (2001). "External Debt and Growth in Developing Countries: A Sensitivity and Causal Analysis. Dicussion Paper No.2001/95.

Djankov, T., Ganser, C. M., and Ramalho, R. (2009). "The Effect of Corporate Taxes on Investment and Entrepreneurship." *American Economic Journal: Macroeconomics*, Vol. 2, No. 3, p. 31- 64.

Drobetz, W., Gounopoulos, D., Merikas, A. and Schröder, H. (2013). "Capital Structure Decisions Of Globally-Listed Shipping Companies," *Logistics and Transportation Review*, Vol. 52, p. 49-76.

Edwards, D.B., Rosensweig, F. and Salt, E. (1993). *WASH Technical Report No. 89: Designing and Implementing Decentralization Programs in the Water and Sanitation Sector.* Office of Health, Bureau for Research and Development, USAID, under WASH Task No. 256.

Farlam, P. (2005). *Assessing Public–Private Partnerships in Africa: NEPAD Policy Focus Series*. Durban: The South African Institute of International Affairs.

Frank, M.Z. and Goyal, V.K. (2009). "Capital structure Decisions: Which Factors Are Reliably Important?" *Financial Management*, Vol. 38, No. 1, p. 1-37.

Frimpong, Y., Olowoye, J. and Crawford, L. (2003). "Causes of Delay and Cost Overruns in Construction of Ground Water Projects in Developing Countries: Ghana as a Case Study," *International Journal of Management*, Vol. 21 (1), p. 321-326.

Gungoraydinoglu, A. and Öztekin, Ö. (2011). "Firm- and Country-Level Determinants of Corporate Leverage: Some New International Evidence," *Journal of Corporate Finance*, Vol. 17, No. 5, p. 1457-1474.

Institute of Economic Affairs Kenya (2014). *Railway Transportation Policy in Kenya: State of Play and Policy Challenges. Public Forum on Kenya's Railways Transportation Policy 2014*. Nairobi: IEA-Kenya.

Kapila, P. and Hendrickson, C. (2001). "Exchange Rate Risk Management in International Construction Ventures," *Journal of Management in Engineering*, Vol. 17, No. 4, p. 186-191.

Karagol, E. (2002). "The Casuality Analysis of External Debt Servirce and Gross National Product: The Case of Turkey," Central Bank of Turkey Review, p. 39-64.

Karumba, M.M. (2009). "The Impact of Institutional Factors and Liberalization Policies on Private Investment in Kenya, 1965-2007." Unpublished Master's Thesis, Kenyatta University, Nairobi, Kenya.

Kenya National Bureau of Statistics (2014). *Economic Survey 2014*. Nairobi: KNBS.

Kenya National Bureau of Statistics (2015). *Economic Survey 2015*. Nairobi: KNBS.

Kenya Railways Corporation (2012). *Annual Review Report*. Nairobi: KRC.

King'wara, R. (2014). "The Impact of Domestic Public Debt on Private Investment in Kenya," *Developing Country Studies*, Vol.4, No.22, p. 88-96.

Kirkpatrick, C., Parker, D. and Zhang, Y. (2006). "Foreign Direct Investment in Infrastructure in Developing Countries: Does Regulationmake a Difference?" *Transnational Corporations*,Vol. 15, No. 1.

Kometa, S.T., Oloimolaiye, P.O. and Harris, F.C. (1994). "Attributes of UK Construction Clients Influencing Project Consultants' Performance," *Construction Management Economics,* Vol. 12, p. 433-443.

Metwally, M.M. and Tamaschke, R. (1994). "The Foreign Debt Problem of North African Countries," *African Review of Money, Finance and Banking*, Vol.1, No.2, p.109-121.

Ministry of Transport (2014). "Standard Gauge Railway: Forging New Frontier in Railway Development in Kenya and the Region," *Uchukuzi*, Issue 1, June 2014.

Mishkin, S.F. (2010). *The Economies of Money, Banking and Financial Markets* 9th Edition. New York: Addisson Wesley.

Mokhova, N. and Zinecker, M. (2014). "Macroeconomic Factors and Corporate Capital Structure," *Social and Behavioral Sciences*, Vol. 110, p. 530-540.

Mwiti, L. (2013). *RVR Fights to Keep Concession on Track amid Rising Criticism, Business daily Africa*. Wednesday, July 31, 2013.

Ng'etich, J.C. and Wanjau, K. (2011). "The Effects of Interest Rate Spread on the Level of Non-performing Assets: A Case of Commercial Banks in Kenya," *International Journal of Business and Public Management*, Vol. 1, No. 1, p. 58-65.

Njuru, S.G., Ombuki, C., Wawire, N. and Okeri, S. (2013). "Taxation and Private Investment: Evidence for Kenya," *International Journal of Economics and Management Sciences,* Vol. 2, No. 11, p. 78-93.

Norgah, J. H. (1998). "Tax Policy and Foreign Direct Investment in Ghana." MBA Long essay, University of Ghana, Legon.

Nyamita. M.O., Garbharran, H.L., Dorasamy, N. (2014). "Factors Influencing Debt Financing Decisions of Corporations-Theoretical and Empirical Literature Review," *Problems and Perspectives in Management*, Vol.12, No. 4.

Osei, B. (2000). "Ghana: The Burden of Debt Service Payment under Structural Adjustment", African Economic Research Consortium Paper 33. Nairobi: Initiative Publishers.

Oso, W.Y. and Onen, D. (2005). *General Guide to Writing Research Proposal and Report: A Handbook for Beginning Researchers.* Kisumu, Kenya: Options Printers and Publishers.

Panagiota, B. (2009). "The Effect of Tax Incentives on Investment - Decisions of Transnational Enterprises (TNEs) in an Integrated World," A Literature Review, University of Patras.

Philippe, M. and Izaguirre, A.K. (2006). "Private Participation in Water Toward a New Generation of projects," *Gridlines Note* No. 14. September. Washington, DC: PPIAF. Available at http://info.worldbank.org/etools/docs/library/24 0096.pdf

Quiggin, J. (2004). "Risks, PPPs and the Public Sector Comparator," *Australian Accounting Review*, Vol. 14 (2), p. 51-62. Available: www.uq.edu.au/rsmg/docs/quigginausaccrev04.pdf

United Nations (2011). *A Guidebook on Public-Private Partnership in Infrastructure*. Bangkok: UNESCAP.

Walker, J. (1993). *Preparing for Private Sector Participation in the Provision of Water Supply and Sanitation Services*: WASH Technical Report No. 84. Office of Health, Bureau for Research and Development, USAID.

World Bank (1997). *Selecting an Option for Private Sector Participation*. Washington DC: The International Bank for Reconstruction and Development/ the World Bank.

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A MATHEMATICAL MODEL FOR OPTIMAL CORPORATE ALLIANCES: EVIDENCE FROM JAPAN

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ABSTRACT

In this paper, we are proposing a new mathematical model for choosing business partners in corporate alliances. We have used the real corporate data of 152 Japanese companies graded on eight characteristics. These characteristics include sales force, technical ability, capital resources, human resources, production capacity and other items that represent management resources. These characteristics can be described using a one-dimensional matrix. The subtraction of two such one-dimensional matrices results in a bipolar vector shows the relationship of the corporate alliance between two companies. The strength of a mutually complementary relationship is mathematically represented as the distance from the maximum point. The proposed model was implemented in the Python programming language. We have analyzed 152 Japanese companies and the computed results of the mutually complementary strength coefficient. Based on this, we have verified the functionality of the model. By using the proposed model, we can determine which candidate(s) from multiple potential companies form the best-suited alliance.

JEL: C63

KEYWORDS: Mathematical Model, Corporate Alliance, Mutually Complementary Relationship, Management Resources, Python Programming Language, Japanese Companies

INTRODUCTION

The first author of this paper consulted 152 Japanese companies between May 2008 and March 2015, particularly for the arrangement of corporate alliances for the purpose of business development and increasing sales. The first author is the president of a consulting firm that specializes in the arrangement of corporate alliances. This paper defines a corporate alliance as an exchange of management resources, namely complementarity of strengths and weaknesses between two companies in order to create new business and increase sales revenue of their current businesses, regardless of the presence or absence of a binding contract or capital relationship, by continued cooperation, to share the results. These definitions are originally from Yoshino and Rangan (1995), which is the first comprehensive study on the different types, classes and definition of alliances. Although most of the research on corporate alliances was mainly conducted after potential alliance partners had been found and selected, in this paper we will focus on the matching phase of a corporate alliance, which involves the finding and selection of potential alliance partners. In prior research on corporate alliances, there has been no mathematical model to express the relationship of two companies in the establishment of a corporate alliance during the matching phase. Based on this, we propose a new mathematical model to express the mechanism of the formation of corporate alliances by expanding the RBV theoretical framework.

In this study, we consider a corporate alliance is successful when the mutually complementary relationship between two companies, which is when the balance of strengths and weaknesses of each company, is strong. In the construction of the mathematical model in this paper, we represent the strengths and weaknesses of a company with a one-dimensional matrix and bipolar vector. We mathematically define the strength of the relationship between two companies as the distance from the maximum point of a mutually complementary

relationship. We have succeeded in constructing a mathematical model to calculate the mutually complementary strength coefficient as a numerical value. By using this model, we can select which company is the optimal alliance partner when there are multiple potential alliance partners when there are alternative options in the formation of a corporate alliance.

This proposed model has been implemented in the open source programming language Python. We have used the real empirical data of 152 consulted companies in Japan graded on eight different characteristics, mainly representing management resources, to evaluate successful and unsuccessful pairs of corporate alliances. This proposed model is flexible, so users can freely change the number of characteristics and grading method as well as experiment with different company data. The proposed model in this paper can help to accelerate corporate alliance activity and encourage corporate alliances between companies in Japan as well as corporate alliances between companies in Japan and companies outside Japan. In this paper, we conducted research on companies within Japan, so we will also explain the current situation and trends of corporate alliances in Japan.

LITERATURE REVIEW

In prior research on corporate alliances, the theoretical background on the establishment of corporate alliances was prepared by Yasuda (2003, 2006, 2010) and Ushimaru (2007). The establishment of corporate alliances relies primarily on the Resource-Based View (RBV), originally started by Wernerfelt (1984) and Barney (1991) and expanded to research of corporate alliances by Das and Teng (1998, 2000), Lavie (2006) and Yasuda (2003, 2006, 2010). In this paper, we will use the RBV as it applies to the hypothetical establishment of a corporate alliance between two companies as it pertains to matters such as the necessary management resources for business deployment and the mutual complement to each company's strengths and weaknesses.In regards to the research on strategic management, Barney (1991) has presented a Resource-Based View (RBV), in which the firm resources for generating sustained competitive advantage is analyzed using the four empirical indicators of the potential of firm resources to generate sustained competitive advantage: value, rareness, imitability and substitutability.

Firstly, in the application of RBV for research on corporate alliances, Das and Teng (1998) considers the cooperative adjustment of financial, technological, physical and management resources and two types of risk: relational risk and performance risk. Additionally, Das and Teng (2000) considers the systematic application of RBV to strategic alliances. The theory covers four major aspects of strategic alliances: rationale, formation, structural preferences and performance. In certain resource characteristics such as imperfect mobility, imitability and substitutability, there are two dimensions of resource similarity and utilization, resulting in the four types of alignment: supplementary, surplus, complementary and wasteful. In this way, RBV has expanded to corporate alliance research. Moreover, Yasuda (2003, 2006, 2010) proposed the perspective of exchange of management resources as a new analytical approach for strategic alliances. Yasuda (2003, 2006, 2010) simplified the types and nature of firm resources down to five categories of management resources: 1. Technological resources, 2. Human resources, 3. Production resources, 4. Sales resources, 5. Financial resources. Yasuda (2003, 2006, 2010) concluded that corporate alliances are an exchange of management resources. This paper furthers this concept and framework, and we have applied this concept as a theoretical base for our research.

In the mathematical model proposed in this paper, the main concept has been printed in Japan in Tomita and Takefuji (2015). In this paper as well, using Tomita and Takefuji (2015) as a base, we expand upon the research in which a mathematical model was constructed with four characteristics. In this paper, we expand the number to eight characteristics and apply this to select the optimal corporate alliance partner from multiple potential partners. In Lavie (2006), the RBV is extended in the research of network resources of interconnected firms to conclude that after reassessing the heterogeneity, imperfect mobility, imitability, and substitutability conditions, the nature of relationships may matter more than the nature of resources in

networked environments. In our research as well, we put emphasis on the relationship itself between two companies. One other theory introduced in corporate alliance research by Yasuda (2003, 2006, 2010) and Ushimaru (2007) is the Transaction Cost Theory. It proposes that in the event of lower costs relative to normal market transactions, it is better to form a corporate alliance with an external company rather than to internalize practices. However, even though there is mention of corporate alliances as a phenomenon of corporate behavior, this does not explain how to select business partners in a corporate alliance. For this reason, we do not use this theory in our research.

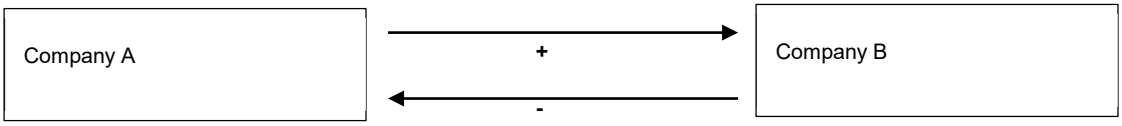
In Game Theory, alliance partners are already established since the theory analyzes the behavior and relationships of a fixed number of companies already in an alliance. As such, in this paper the author has determined this is not suitable as a theoretical background during the matching phase of an alliance when a company is searching for candidate partners. Additionally, as in Das and Teng (2002), for companies in an alliance, there are exchanges of non-economic resources as per social exchange theory, but in this paper we are concerned with economic resource exchange since we are looking to study the economic benefits in an alliance, and not view this as merely a theoretical background. In the data breakdown section of this paper, there were many small sized companies included, as the study of alliance strategies of small firms by Gomes-Casseres (1997), though no mathematical model used for that study was presented. In Mitsuhashi and Greve (2009), although there was research conducted into an alliance matching model, the concepts and the research focused on ideological issues of partner companies within the shipping industry and no mathematical model was presented. In terms of weighted analysis of corporate alliances by statistical methods, there have been many studies. Thus, although the study of quantitative analysis is present in the other studies on alliances, because there is no mathematical model or mechanism that represents whether the companies in an alliance are successful or not, I have not been able to numerically calculate any values to express the relationship between two companies in a corporate alliance.

Mathematical Model Development

Comprehending Mutual Complementarity and Application of the Physical Model

As we construct a mathematical model that shows the mechanism of the establishment of corporate alliances, we devise a theory based on the physical spin glass magnetic force model, which is the theory that the N and S poles attract each other. In the idea of a mutually complementary alliance model, the strengths of company A will complement the weaknesses of company B, and vice versa. It then becomes fundamental for the strengths of company B to complement the weaknesses of company A. If the complements from one of the companies or both are small, the mutually complementary strength will also be small. Conversely, if the complements from one company or both are large, the mutually complementary strength will be large. That is, the mutually complementary relationship in a corporate alliance is a bipolar model based on the mutually attracting forces between two companies.

Figure 1: The Bilateral Appeal between Two Companies in Corporate Alliances



In a corporate alliance, it is fundamentally important that the bilateral appeal between two companies exists and is strong. The stronger the bilateral appeal is, the most likely an established corporate alliance will be successful.

Expressing the Strengths and Weaknesses of a Company as a One-Dimensional Matrix

The strengths and weaknesses of companies A and B can be expressed as a one-dimensional matrix of eight characteristics representing management resources, each graded with values between 1 and 5. The eight characteristics are mainly based on the Resource-Based View (RBV) as explained previously. Also, the integer values represent the score evaluating the strength and weakness of these characteristics for each company.

As an example, consider the two following companies,

Company A a = (1, 3, 4, 2, 5, 1, 3, 1) (1)
Company B b = (4, 1, 1, 3, 1, 5, 3, 1) (2)

From the above, the result "c" can be shown by subtracting the values of each of the characteristics of Company B from Company A in order to get a directional bipolar vector with values for each characteristic ranging from 0 to 4 (positive or negative). That is to say, we can express the mutually complementary relationship between two companies as a bipolar vector.

Company A – Company B

c = a-b = (-3, 2, 3, -1, 4, -4, 0, 0) (3)

Note that in this particular case, when calculated using the programming model described later, the mutually complementary strength is 11.997 and the related coefficient is 0.530 by making the calculation as explained in the section of "Mutually complementary strength and the related coefficient".

How to Determine the Maximum Mutually Complimentary Relationship as a Value

The strengths of the mutually complimentary distance are expressed by measuring the distance from the largest mutually complimentary point of strength.
-
Namely, in regards to the bipolar vector of the length from 0 to 4 of the eight characteristics, the maximum mutually complementary value determined from taking two sets of half the number of characteristics (4) with a maximum length of 4 for each, which is the longest possible bipolar vector bilaterally.

(8 characteristics / 2) * Maximum length of 4 = (16,-16) (4)

The distance (d) between two points is calculated as follows:

$$d = \sqrt{(a_1 - a_2)^2 + (b_1 - b_2)^2} \quad (5)$$

The maximum value of the mutually complementary strength of (16,-16) is shown as the distance from (0, -0) to (16, -16), which becomes

$$\sqrt{(16 - 0)^2 + (-16 + 0)^2} = 22.63 \quad (6)$$

The mutually complementary strength is a value between 0 and 11.3, with a large value representing a large mutually complementary strength.

When the distance from the maximum value of (16,-16) is small, it indicates that the mutually complementary strength is strong. Since it is simpler to subtract from larger numbers, we have inverted the magnitudes of the values.

Summation of Positive and Negative Integers

As an example, in companies A and B mentioned previously, the value expressing the provided strengths from company A to company B is the summation of positive integers (plus' bipolar vector):

$$2 + 3 + 4 = 9 \quad (7)$$

This number (9) shows the strengths of company A that complement the weaknesses of company B.

Conversely, taking the summation of negative integers (minus' bipolar vector):

$$-3 + (-1) + (-4) = -8 \quad (8)$$

This number (-8) shows the strengths of company B that complement the weaknesses of company A.

The two numbers (9, -8) show the mutually complementary relationship between company A and company B.

The Strength Expressed as the Distance from the Maximum Point

Based on the construction of this mathematical model, we express the mutually complimentary strength by measuring the distance from the strongest mutually complimentary point, namely the maximum point.

For example, with a mutually complementary strength of (9,-8) for companies A and B, it is possible to calculate the distance from (16,-16) by means of subtraction from the maximum value.

$$\sqrt{(16-0)^2+(-16+0)^2} - \sqrt{(16-9)^2+(-16-(-8))^2} = 11.99 \quad (9)$$

Mutually Complementary Strength and the Related Coefficient

Up until this point, the eight characteristics have been described as a mutually complementary bipolar vector. Here is the general equation used to express this.

The mutually complementary strength derived and explained above, can be expressed by the following formula:

$$\sqrt{2 \times \left(\frac{4 \times len(c)}{2}\right)^2} - \sqrt{\left(\frac{4 \times len(c)}{2} - plus\right)^2 + \left(\frac{-4 \times len(c)}{2} - minus\right)^2} \quad (10)$$

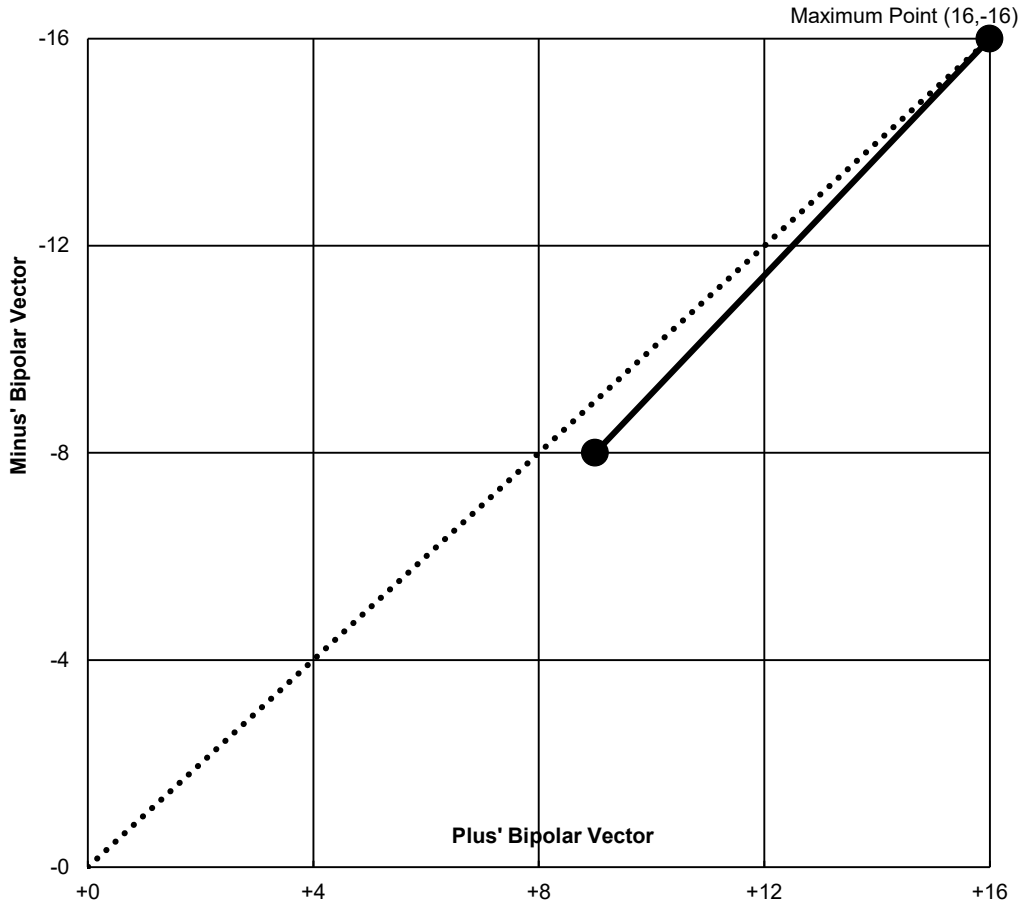
In the above formula, len(c) is the number of characteristics, plus=Σ (positive integers), and minus=Σ (negative integers).

When this value is normalized to a value between zero and one it becomes easier to handle. The relative mutually complementary strength can be calculated from the following formula, and is here forth defined as the mutually complementary strength coefficient.

$$1-\frac{\sqrt{\left(\frac{4\times len(c)}{2}-plus\right)^2+\left(\frac{-4\times len(c)}{2}-minus\right)^2}}{\sqrt{2\times\left(\frac{4\times len(c)}{2}\right)^2}} \tag{11}$$

In the above formula, len(c) is the number of characteristics, plus=Σ (positive integers), and minus=Σ (negative integers).

Figure 2: The Bipolar Model of Mutual Complementarity for Alliances



This figure shows the example representing the mutually complementary strength of 2 companies by the distance from the maximum value of the mutually complementary strength. In case of 8 characteristics, the maximum value of the mutually complementary strength is (16,-16) and the point presenting the mutually complementary strength of Company A and Company B is (9,-8).

Limitations of this Mathematical Model

We have already noticed that the model has several limitations, as described below. In the model, the maximum point is calculated from the maximum length of half the number of characteristics. In the event the number of characteristics is an odd number, of course we are unable to divide by 2, so for that reason we must introduce a dummy characteristic. In another way, if the number of characteristics is odd, in order

to apply the model, we understand there will actually be two maximum points. In this case, despite the fact the point does not actually exist, we calculate the midpoint of the line connecting the two maximum points on the assumption this is a linear equation and consider this the maximum point. Although this is not described in detail in this paper, this is considered content for a future paper.

Regarding the seven types of corporate alliances shown in Tomita (2014), corporate alliances between companies in different business areas have not been included in the proposed model in this paper, because this type of a corporate alliance is a calculation of addition, it is not complementary. Since this is an "addition model" which is, we plan to add this to the mutually complementary model. Also, regarding alliance formation, motivation from each of the companies is an important factor, but that has not been included in this model. Since this is a "synergistic model", in the same way it is planned for addition to the mutually complementary model. These will be content for a future paper, for which the contents have already been submitted in Japanese in a separate academic paper.

DATA AND METHODOLOGY

How the Data of 152 Companies Was Constructed?

The author of this work consulted 152 Japanese companies between May 2008 and March 2015 regarding new business development and increasing sales. In the enterprise data used in this study acquired from the author over a span of seven years, one feature is that it contains some general private, informal information that has not been published by these companies. The data used in this paper was collected from the materials submitted by the consulting companies and advice obtained in meetings (with managers and employees). Information obtained from partners of referral agreements was also incorporated into this data. Rather than a superficial examination of data from surveys, the authors themselves become a participant in the analysis of business activities. It should be noted that in previous studies of a number of alliances, research was conducted on major companies such as those listed on the stock market. For example, Doz and Hamel (1998) and Yasuda (2003, 2006, 2010) target large companies, but one feature of this paper is that small and medium-sized companies are also of interest.

Table 1: Breakdown of the Data from 152 Companies

Location	**Tokyo (All 23 Wards)**	**Metropolitan**	**Non-Metropolitan**	
	71%	13%	16%	
Size	Listed (Inc. subsidiaries)	Small-mid sized with long longevity	Early Stage Startup	
	13%	40%	47%	
Industry	In-house Manufacturing	Contract Manufacturing	Sales/Marketing	**Pro/Consulting**
	17%	35%	30%	11%
IT/Non-IT-Related	IT Related	Non-IT Related		
	40%	60%		
Sales	< 1 Billion Yen	Between 1~10 Billion Yen	Over 10 Billion Yen	
	78%	15%	7%	
Employee Size	< 20	20~100	**> 100**	
	56%	32%	13%	

This Table shows the data from 152 consulted companies in Japan from 05/2008 to 03/2015. Data is broken down into region, size, industry, IT/Non-IT relation, sales and number of employees.

Grading of the Eight Characteristics

In regards to the strengths and weaknesses, the eight characteristics used in this study are: 1. Sales Force, 2. Technical Ability, 3. Creativity of Ideas, 4. Capital Resources, 5. Human Resources, 6. Production Capacity, 7. Branding and Reliability, 8. Flexibility of Organization. Note that for the 152 consulted companies, the author graded each of the eight characteristics from 1 to 5, with 5 being the largest value.

In order to address the issue of subjectivity when grading the characteristics, each characteristic was comprised of four criteria in the grading process. Additionally, another consultant graded the characteristics using the same method. In business studies, in order to ensure the validity of the research results, the accuracy of the materials and data is of the utmost importance, so objectivity is required. For the data used in this study from 152 consulted companies graded on eight characteristics, we become the focus of the grading of the strengths and weaknesses of each company. In other words, the problem of subjectivity with those conducting the evaluation remains. In order to eliminate the subjectivity of the evaluator, we have taken the following two measures.

In the evaluation process for the eight characteristics, these characteristics are further divided into four factors for each, and based on the summary of the results of these four factors, the value of the characteristic is evaluated as a final step. For example, when evaluating the sales force of each company, there are factors to consider such as if the number of salesmen is large and if the salesman are active. For capital resources, there are criteria to determine the state of the financial figures. For more information on the exact factors used in evaluating each of the eight characteristics, please refer to Appendix A. Regarding the eight graded characteristics of strengths and weaknesses, each characteristic has four set factors. The grading is performed based on these factors. Grading was conducted by not only one person, but rather another consultant as well, with the averaged results of both used to determine the final grade. In this manner, the usage of a second consultant to grade the eight characteristics of strengths and weaknesses of each company from at least two consultations as well as the grading of four factors for each characteristic to determine the final grade, we have reduced the subjectivity of the study as much as possible.

However, note that the purpose of this paper is to propose a mathematical model for alliances. The data sample and grading methods used here are but a single application of this model and should not be considered representative of all typical data from Japan. Since the mutually complementary strength and its coefficients are calculated based on the grading of each characteristic, the graded values may change depending on the rules for grading, so the mutually complementary strength and the coefficient will also be affected. Future grading system changes will be needed to improve accuracy. The purpose and significance of this study is to express and evaluate the matching phase of an alliance between companies mathematically, and to implement the model in an open source programming language. In order to achieve this, we verified the functionality of the model with a sample of 152 consulted companies. However, ultimately this is only one data sample.

Consulted Companies and Outside Consulted Companies

From the almost 4,000 potential alliance partners with which the first author has relations, even though there exist companies outside of the introduced 152 companies, there are numerous other companies that cannot be sufficiently evaluated based on the eight characteristics. In the introduction of the consulted companies by the author, there exist companies outside of those consulted that were matched and have established a successful alliance. Because the available information on some companies is incomplete, we cannot accurately apply the proposed model without distorting the data, and thus and we limit our study to the 152 consulted companies as to whether or not an alliance was successful or unsuccessful. In this data set of the empirical data from the consulted companies, the study was conducted between May 2008 and March 2015, and the companies had been consulted at the time of the survey from a minimum of two months to a maximum of three years. During the consultation, which is to say the period of arranging alliances, there may be small gaps, but in the evaluation, all consulted companies have been graded.

Tallying the Successful and Unsuccessful Alliances

In the data of the 152 consulted companies, there were 121 successful alliance combinations and 30 unsuccessful ones. Additionally, we also examine all possible alliance combinations from within the 152 consulted companies, a maximum possible total of 11,476 combinations (152 x 152 - 152).

Table 2: Number of Successful and Unsuccessful Alliance Pairs

Category	Number
Successful Alliance Pairs	121
Unsuccessful Alliance Pairs	20
Total Number of Possible Pairs	11,476 (152 x 152 - 152)

In the above table, from the 152 consulted companies, we can see the number of alliances that were successful, unsuccessful, and the total number of possible pairs.

This paper proposes a mathematical model to express the mechanism during the matching phase of corporate alliances. For this reason, in verification of this research, we define a successful alliance as, after the introduction of two companies to each other, forward progress in the development of new business or expansion of their businesses. Conversely, we define an unsuccessful alliance as, after the introduction of two companies to each other, no forward progress for either company in any business development or expansion of their businesses. Also, in Japan the establishment and promotion of alliances is not necessarily limited to contracts. Rather than a verbal agreement, some alliances are formed at the time when agreements and invoices are sent, at which time referral fees or margin payments are incurred. Since Japanese business culture considers such methods for forming alliances, it is not a requirement for companies to have a formal contract when forming an alliance.

Demonstration and Analysis using the Python Language

The calculation of the mutually complementary strength coefficient was executed from a script written in the open-source programming language “Python”. Although the proposed model did not have to be implemented specifically in Python, as an open source programming language Python is convenient, allows a high degree of freedom, and has been increasingly popular in recent years. For these reasons we have decided on the Python language as an implementation tool in this research. With the freedom of this open source language, we have constructed a mathematical model through trial and error and proposed the mathematical model as a flexible model. Recently in business administration academia, although it has been common to make use of statistics software such as Stata, interest in the Python programming language is growing. We can say this paper is one of the pioneers of this research.

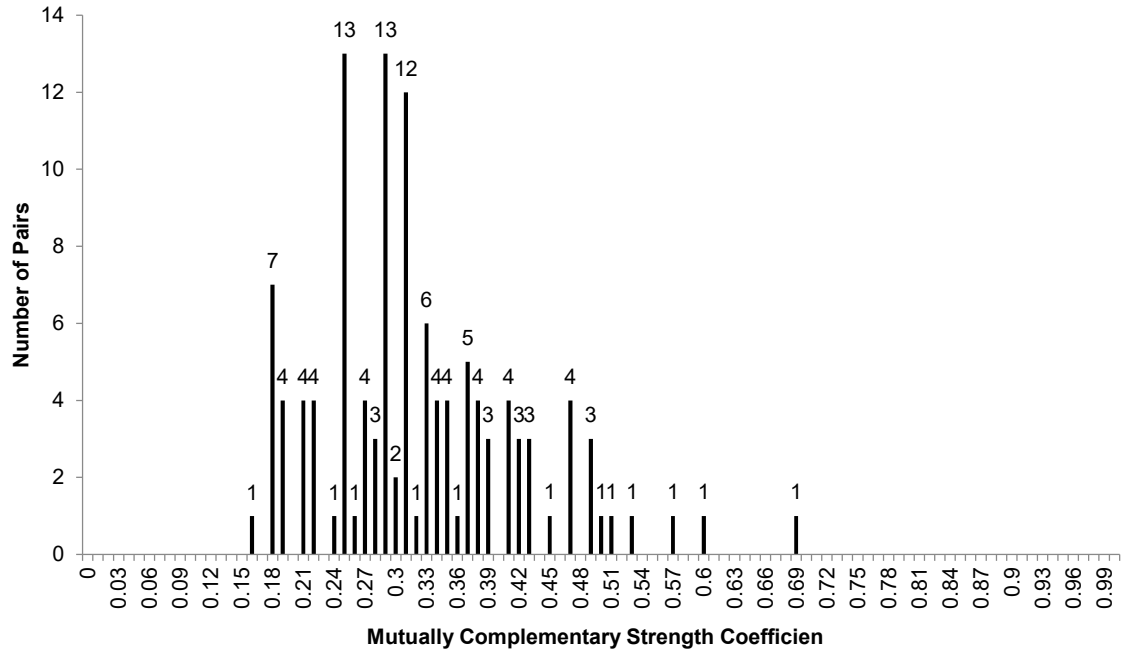
RESULTS

Distribution of the Mutually Complementary Strength Coefficients for Successful, Unsuccessful and All Alliances

In the successful alliances (121 pairs) shown in Figure 3, the distribution of the mutually complementary strength coefficients is shown in increments of 0.05. Likewise, in the unsuccessful alliances (30 pairs) shown in Figure 4, the distribution of the mutually complementary strength coefficient is shown in increments of 0.05. In addition, in the successful, unsuccessful alliances, and total number of possible pairs (11,476 pairs) referred to as "All Possible", the distribution of the mutually complementary strength coefficient is also 0.05 (though not explicitly indicated) as shown in Figure 5. These superimposed results of the distribution of mutually complementary strength coefficients for all possible combinations of alliances between the total number of possible pairs are shown in Figure 5. In the distribution over the combination of all alliance combination possibilities, the shape closely resembles a normal distribution

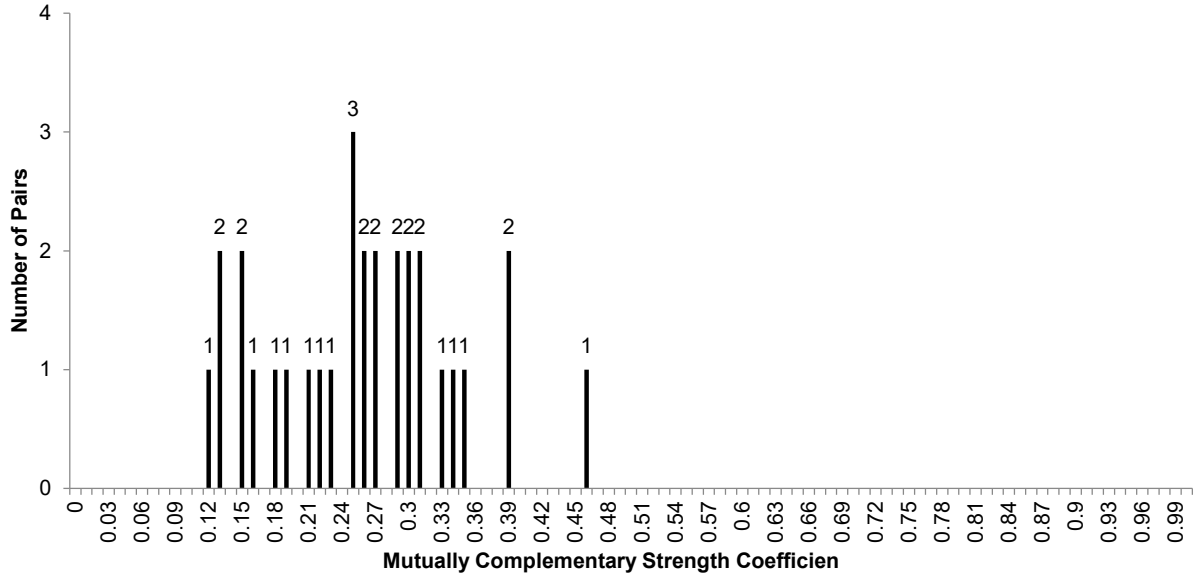
shape, which allows us to estimate an average of the mutually complementary strength coefficients. From all combinations of alliances, the coefficient for successful alliances can be seen in the larger values, while for unsuccessful alliances, there is a trend towards the lower coefficient values.

Figure 3: Distribution Graph of the Mutual Complementary Coefficient for Successful Alliances



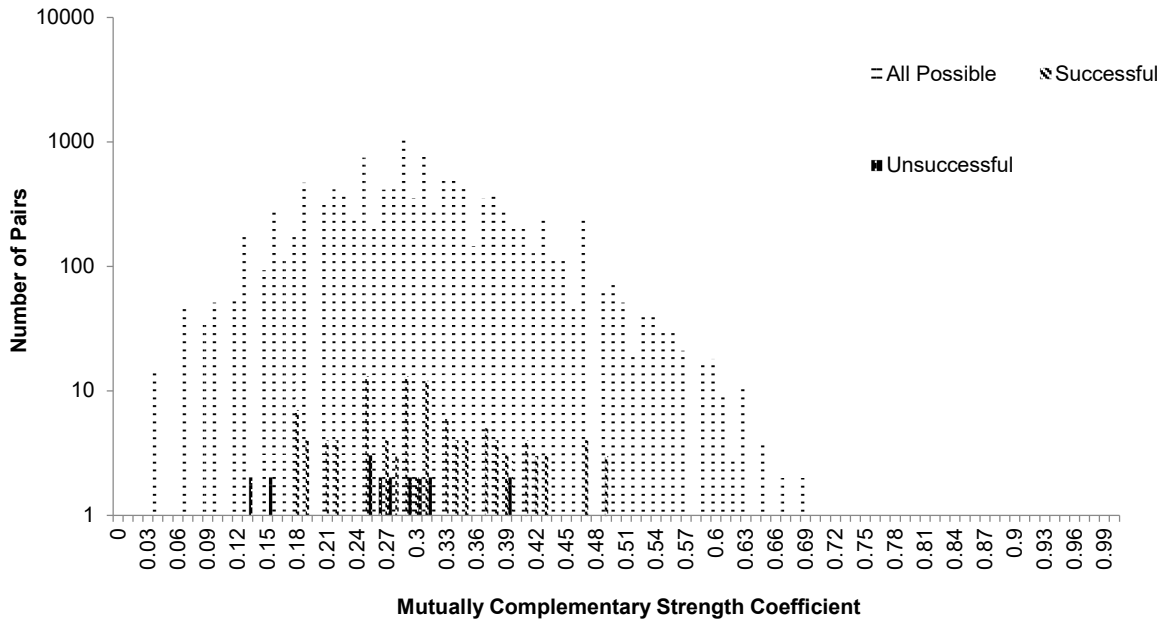
This Figure shows the distribution of the mutually complementary strength coefficients for successful corporate alliances.

Figure 4: Distribution Graph of the Mutual Complementary Coefficient for Unsuccessful Alliances



This Figure shows the distribution of the mutually complementary strength coefficients for unsuccessful corporate alliances.

Figure 5: Distribution Graph of the Mutual Complementary Coefficient for all Possible Alliance Combinations



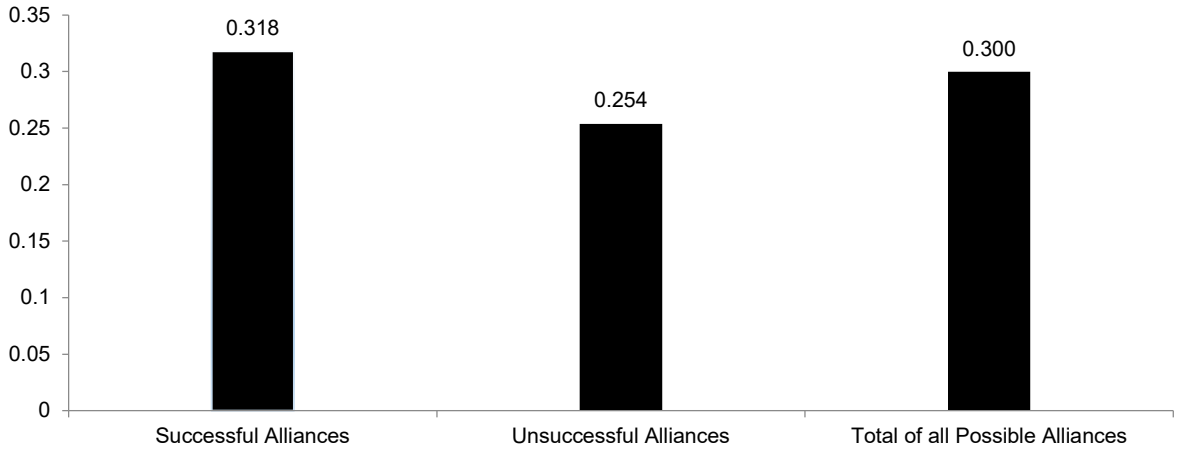
This Figure shows the distribution of the mutually complementary strength coefficients for all possible corporate alliances.

In the distribution graphs of the mutually complementary strength coefficients for successful and unsuccessful alliances (Figures 3, 4), even when an alliance is unsuccessful, it has a large mutually complementary strength coefficient. When the mutually complementary relationship is strong, which is to say, when the mutually complementary strength coefficient is large, the hypothesis that the alliance is likely to be successful still holds.

The Average of Mutually Complementary Strengths Coefficient for Successful, Unsuccessful and All Alliances

As a result of calculating the mutually complementary strength coefficient programmatically, for 121 pairs of successfully allied companies, the average coefficient was 0.318, whereas for 30 company pairs for which the corporate alliance was not successful, the average coefficient was 0.238. This indicates that the complimentary strength coefficient is higher for two companies in a corporate alliance. Regarding why the coefficient value does not differ much for companies in a corporate alliance versus those not in one, we begin by stating that we think there is a mutual complement between two companies, which is why they are drawn together. It should be noted that the average coefficient overall for the 152 company alliances was 0.300. Figure 2 shows the result of tallying the coefficients for all 152 company alliances. Hence, this mathematical model of the bipolar mutual complement constructed from the actual company data confirms the function as valid. Take note that values have been rounded to the nearest thousandth. As for the results, in Figure 3, there are 121 cases of successful alliances, with an average mutually complementary strength coefficient of 0.318. There are 30 cases of unsuccessful alliances, with an average mutually complementary strength coefficient of 0.254. As you can see in the figure, the average mutually complementary strength coefficient for a successful alliance between two companies is higher than the average over all possible company pairs.

Figure 6: Average of Mutually Complementary Strength Coefficient for Successful, Unsuccessful and Total Possible Alliances



In this chart, we can see the average of mutually complementary strength coefficients for successful and unsuccessful alliances as well as for all possible pairings of the 152 consulted companies. This is also illustrated in the accompanying graph. Values were rounded to the nearest thousandth.

As we can see from the distribution in the above graph, the coefficient for successful alliances is larger than the value for all possible alliance combinations. Similarly, the average value for unsuccessful alliances is a smaller value than that for all possible alliance combinations. Therefore, we have shown that successful alliances will have a larger coefficient value which indicates that the mutual complementary relationship is strong. In this manner, the mutually complementary strength coefficient was calculated using the proposed mathematical model in this paper by a Python script and the model was verified to function in practice.

Application of this Model for Selection of an Optimal Partner from Multiple Potential Partners

Making use of this model, let us find the best-suited alliance partner in the case of multiple potential alliance partners. Using the results from the Python script we wrote to implement this model, let us apply what we have proposed. Using the proposed model, we can determine which pairs of companies will best form a corporate alliance based on which pair has a stronger mutually complementary relationship when there are multiple possible combinations of companies for a corporate alliance. By calculating the mutually complementary strengths and related coefficients for all pairs, it becomes possible to select the optimal corporate alliance. For example, consider the simple case of the following three companies, (I, J, K) for which they are attributed values from 1 to 5 for each of their 8 characteristics as represented in the following one-dimensional matrices.

i = (1, 3, 4, 2, 5, 1, 3, 1)
j = (4, 1, 1, 3, 1, 5, 3, 1)
k = (3, 5, 2, 4, 2, 3, 5, 4)

From these three companies, by subtracting the one-dimensional matrices associated with each possible pair of companies, we can determine the mutually complementary relationship between companies I and J, I and K, and J and K. These relationships are represented here with the following equations.

$$x=i-j \quad (12)$$
$$y=i-k \quad (13)$$
$$z=j-k \quad (14)$$

Based on the results from our Python script, the mutually complementary strength and the related coefficients for x, y, and z are shown below:

Strength of x (=i-j) =11.99
Strength Coefficient of x (=i-j) =0.530

Strength of y (=i-k) =11.22
Strength Coefficient of y (=i-k) =0.496

Strength of z (=j-k) =9.025
Strength Coefficient of z (=j-k) =0.398

According to these values, when company I has to choose between companies J and K, we can see "x" is larger than "y", therefore company J is determined to be the most suitable partner for company I.

$x > y > z$

In the same way, when company J has to choose between companies I and K, we can see that "x" is larger than "z" when we compare them, so from the viewpoint of company J, company I is the most suitable partner. As well, when company K has to choose between companies I and J, we can see that "y" is larger than "z", so company I becomes the most suitable partner for company K. Furthermore, when determining the optimal selection from these three companies, we see that "x" is larger than "y" and "y" is larger than "z". Therefore, from companies I, J and K, The pair of company I and company J is the best-suited pairing from among these three potential partners. By extension of the methods in this proposed model, from a number "m" of companies, we can determine the best-suited partner from a number "n" of potential alliance partners, which is to say, a total of $\binom{m}{n}$ possible alliance pairings.

The Current Situation and Trends of Corporate Alliances in Japan

In this paper, by making use of the empirical data from 152 consulted companies in Japan, we have calculated the mutually complementary strength coefficient using the proposed mathematical model in Python. Although this data cannot be said to be representative of all typical Japanese corporate data, the analysis was conducted on corporate alliances in Japan. Since the subtitle to this paper is "Evidence from Japan", I would like to explain the situation of corporate alliances in Japan. As mentioned in Hamel, Doz, and Prahalad (1989) based on corporate alliances between Japanese and Western companies in the 1980s, even though Japanese companies were actively seeking alliances with Western companies for acquisition of skills and technology, basically Japanese companies are not particularly accustomed to alliances, and tend to be an inward-thinking culture and closed innovation, which is the limited focus of research and development to only inside the company, also known as NIH syndrome (Not Invented Here Syndrome).

As noted in Yasuda (2003, 2006, 2010), when looking at the "alliance matrix", which divides corporate alliances into four types through two axes, of which the axes represent (1) Alliances in the same industry or different industries (2) Exchange of the same or different management resources. We can see that in Japanese companies, corporate alliances are formed in order to avoid excessive competition and to make their business more effective, so corporate alliances in the same industry and of the same management resources were the most numerous cases. For example, in the semiconductor industry, Hitachi Corporation, Mitsubishi Electric, and NEC Corporation formed a strategic alliance, and as a joint venture (JV), operated as Renesas Electronics Corporation, and is the largest typical case. Additionally, even though it is not a

corporate alliance and has only progressed to mergers, in the steel industry there is Nippon Steel & Sumitomo Metal Corporation (Integration of Nippon Steel and Sumitomo Metal), and in the trust banking industry there is Sumitomo Mitsui Trust Bank, Limited (Merger of Sumitomo Trust & Banking and Mitsui Chuo Trust). In these examples, these are companies in the same industry, exchanging the same management resources. In this way, we can see that with past corporate alliances in Japan, alliances in the same industry of the same management resources are the most common.

However, in the current situation of corporate alliances in Japan, seeing as the Japanese market tends to shrink as it matures, companies began to more actively seek corporate alliances in order to acquire new revenue. On the first trend of the current situation of corporate alliances in Japan, there are corporate alliances not only in the same industry, but a growing number of corporate alliances have been established between companies in different industries or exchange different management resources as well. To list a few examples, Gakken Holdings Co., Ltd., a leading enterprise of kindergarten and elementary school education made a corporate alliance with Kawai Musical Instruments Mfg. Co., Ltd., the second largest piano manufacturer in Japan to create a new business development for children to expand their existing business. The second largest chemical wrapping sheet manufacturer Kureha Corporation also made a corporate alliance with Toppan Printing Company Ltd., one of the largest printing companies in Japan, to develop new kitchen supplies. In the power industry, Kansai Electric made a corporate alliance with the telecommunications company KDDI Corporation for the sale of electric power, cellular phones and optical fiber lines in a single package in accordance with the deregulation of the Japanese government's rules on electric power. Finally, one of the largest supermarket chains Inageya Co., Ltd. made a corporate alliance with the low cost apparel store chain Shimamura Co., Ltd. to cooperatively open new stores since they share the same consumer target.

Next, on the second trend of the current situation of corporate alliances in Japan, the number of alliances between large companies and start-up companies is rapidly increasing. For example, the startup company Qrio, Inc. in the field of IoT (Internet of Things) received investment from Sony Corporation and launched a corporate alliance with Sony, which within a year completed the development of new products and then acquired new sales revenue. In Fintech's field (the combination of finance and technology), the start-up Money Forward which produced a personal accounting book as a mobile app received an investment from one of the largest credit card companies Credit Saison Co., Ltd. which in turn became a corporate alliance in order to promote their business development. In the field of artificial intelligence, auto manufacturer Toyota Motor Corporation invested in the startup Preferred Network, Inc., innovator of new algorithms of artificial intelligence, which in turn formed a corporate alliance for the purpose of developing automatic operation technology. These are some of the cases of corporate alliances between large companies and startups classified as activities of open innovation, noted by Chesbrough (2003) as viewed from the perspective of the larger company, namely companies listed in the first section of the Tokyo Stock Exchange. Furthermore, the third trend of the current situation of corporate alliances in Japan includes international alliances (corporate alliances between companies in Japan and companies outside Japan), which is not limited only to between manufacturers for product development, but also other fields, especially internet related services. There is an increase in the number of companies outside Japan seeking corporate alliances with Japanese companies to expand into the Japanese market.

For example, in order for the movie and television drama distributor Netflix, Inc., listed on US Nasdaq, to expand into Japan, they made a corporate alliance with Softbank Corp. (one of the largest telecommunications companies in Japan), Fuji Television Network, Inc. (Major television network), and Bic Camera Inc. (one of the largest home electronics retail chains). From this corporate alliance, Netflix has taken the strategy of making corporate alliances with companies that provide the greatest chance of success, and from the perspective of the Japanese companies, this creates a new business opportunity. Apart from this, the high quality Internet Service Provider Internap Corporation, listed on US Nasdaq, in order to expand into Japan with a high expectancy of success, they made a corporate alliance with Japan's largest

telecommunication company NTT (Nippon Telegraph and Telephone Corporation) Group, and as a Joint Venture, formed Internap Japan Co., Ltd., which is currently operating in Japan. In the future, the number of these types of international alliances is expected to increase.

Continuing to the fourth trend of the current situation of corporate alliances in Japan, In America, corporate alliances between large companies are conducted and researched, but in Japan, even though there are cases of this, the corporate alliances between SMEs (Small and Mid-size Enterprises) appear to be a rapidly increasing type of corporate alliance. As for why this is so, there is a tendency of lack of management resources in SMEs. For this reason, it is important for these SMEs to form a corporate alliance to compensate for the strengths and weaknesses of the company in order to create new business and expand their business. Without using separate examples, by making use of the empirical data of 152 consulted companies in this paper we can express this trend. Of the 152 consulted companies, 40% of the companies are small to mid-sized with long longevity and 47% are startup companies, indicating that 87% of the data are SMEs. For this reason, even in the 121 pairs of successful corporate alliances, there are cases of one or both of the companies being SMEs included.

Lastly, as for the fifth trend of the current situation of corporate alliances in Japan, even in Japan, the number of businesses exchange meetings and business matching has been increasing. For example, there are regular gatherings and conferences for business matching. Some examples of this are Friend Link business meeting operated by Axel Media Co., Ltd., First Village business meeting managed by First Village Corporation, and Venture Alliance FES, operated by DYM Co., Ltd. Local governments and the Chamber of Commerce also hold various types of business meetings in order to stimulate business matching. There are also business matching and corporate alliance arrangement companies such as TC Consulting Co., Ltd., Ikashiaitai Co., Ltd., and NineSigma Japan, Inc. This shows an ever growing interest and need to promote corporate alliances with external companies. In this way, we have shown that business matching and corporate alliances are active in Japan currently, as stated above with the four trends of corporate alliances. Using the mathematical model proposed in this paper to calculate the values of the mutually complementary relationship between two companies in a corporate alliance, and we can accelerate corporate alliance activity in Japan. The reason why is that if we use the model, we can determine which company is the best suitable alliance partner. In this same way, the author believes that we can apply this model to companies outside of Japan in order to promote international corporate alliances between companies in Japan and companies outside Japan.

CONCLUDING COMMENTS

In this paper, we have proposed a mathematical model representing the mechanism behind the establishment of corporate alliances between two companies. By using this proposed model, we can calculate mutually complementary relationship between companies in a corporate alliance as a value. In the proposed model we have mathematically expressed the mutually complementary relationship between two companies as a one-dimensional matrix, bipolar vector, and the distance from the maximum point. Based on this, we can calculate the value of the relationship between two companies in a corporate alliance. We named this value the mutually complementary strength coefficient. Thus, it has been made possible to mathematically capture and express the mutually complementary relationship between two companies, and is possible to determine the complementary strength coefficient. This mathematical model was implemented in the open source programming language Python and confirmed to function based on the actual empirical data from 152 companies in Japan. From the grading of the eight characteristics representing management resources with values ranging from 1 to 5, the mutually complementary strength coefficient was calculated by a Python script that confirmed the functionality of the model.

Furthermore, when there are multiple possible candidates as an alliance partner, we can choose the best suited alliance partner by the comparison of the mutually complementary strength coefficient of each pair

using the mathematical model proposed in this paper. That is to say, among three corporate candidates, we can use this mathematical model to calculate the coefficient to determine if a corporate alliance between two companies is best mutually for both companies when there are alternative alliance options.The proposed model in this paper is a flexible model, so the number of parameters, weighting and the way of grading can be freely modified by users to apply the model to other various corporate data. We have released the Python script to implement the model on the Internet. I hope that many users freely adjust the number and types of parameters to conduct tests that produce results that more accurately represents actual real world situations using various corporate data. As such, this proposed model is considered a base for further development. Currently in Japan, the importance and needs of corporate alliances for new business development and increasing sales has become greater.

The trends and types of corporate alliance have diversified to become more cross-industry. There is also an increasing trend for corporate alliances between large companies and startups or between small to mid-sized enterprises. (SMEs). Also, there is a trend of an increasingly active number of business matching gatherings and consulting firms specialized in corporate alliances and business matching to accelerate activity of corporate alliances in Japan. This proposed mathematical model for corporate alliances can be used to stimulate such trends to promote activity of corporate alliances in Japan as well as encourage corporate alliances between companies in Japan and companies outside Japan. Our research deals with the problems behind corporate alliances between companies. However, this proposed model is also applicable to alliances between people, namely human relationships if there is an importance for mutual complementarity in human relationships. For example, an applicable case in human relationships is how to establish business teams or to make marriage pairings. Additionally, we can even expand the usage of this model to alliances between countries in the past, present or future.

APPENDIX

The Four Factors for Each of the Eight Characteristics of Strengths and Weaknesses (Graded Out of 5) Used for Grading

Regarding the eight graded characteristics of strengths and weaknesses, each characteristic has four set factors. The grading is performed based on these factors. For the factors requiring a numerical evaluation, numerical criteria was provided.

1. Sales Force	**2. Technical Ability**
1. Salesman is active	1. Possesses a unique technology
2. Can perform sales management	2. High quality technicians
3. Number of salesmen is large/small	3. Have spent a long time in the field
4. The president has sales force capability	4. Research and Development sectors are substantial
3. Creativity of Ideas	**4. Capital Resources**
1. Environment to freely develop new ideas	1. Has plenty of funds available
2. Many/few people with good ideas	2. High capital adequacy ratio
3. Constant development of business, ideas, or tech.	3. Presence of a fund-raising force
4. Presence of mechanism for new ideas	4. High capital efficiency and profit margins
5. Human Resources	**6. Production Capacity**
1. Number of employees is great	1. Large factory capacity (machinery, space)
2. Sense of surplus of employees	2. Have a lot of factory workers (blue collar)
3. High recruiting force	3. Know-how of production management and quality control
4. Has a license for dispatch workers	4. Does not operate on a fabless policy
7. Branding and Reliability	**8. Flexibility of Organization**
1. Is a listed company or listed company subsidiary	1. Is corporate culture to tackle new tasks
2. Long industry history	2. Ideas are not just for discussion; put into practice
3. Large sales	3. Respect for youth opinions, low degree of sectionalism
4. Focused on branding	4. Corresponds to not only own, but external and foreign principles

REFERENCES

Barney, Jay (1991). "Firm Resources and Sustained Competitive Advantage," Journal of Management, Vol.17,No.1,pp.99-120.

Chesbrough, Henry (2003). "Open Innovation", Harvard Business School Press

Das,T.K.,and Bing-Sheng Teng (1998). "Resource and Risk Management in the Strategic Alliance Making Process," Journal of Management, Vol.24,No.1,pp.21-42.

Das,T.K.,and Bing-Sheng Teng (2000). "A Resource-Based Theory of Strategic Alliances," *Journal of Management*,Vol.26,No.1,pp.31-61.

Das, T.K.,and Bing-Sheng Teng (2002). Alliance Constellations: A Social Exchange Perspective. Academy of Management Review. 2002 Vol.27, No.3, 445-456

Doz, Yves and Gary Hamel (1998). "Alliance Advantage -The Art of Creating Value through Partnering," Harvard Business School Press.

Gomes-Casseres, Benjamin (1997). "Alliance Strategies of Small Firms," Small Business Economics, Vol.9, pp.33-44

Hamel, Gary, C.K. Prahalad and Yves Doz (1989). "Collaborate with Your Competitors – and Win," Harvard Business Review, 1989 Jan-Feb.

Lavie, Dovev (2006). "The Competitive Advantage of Interconnected Firms An Extension of the Resource-Based View," Academy of Management Review, Vol.31, No.3, pp.638-658

Mitsuhashi, Hitoshi and Henrich R. Greve (2009). "A Matching Theory of Alliance Formation and Organizational Success: Complementarity and Compatibility," Academy of Management Journal, 52 (5): 975-995.

Tomita, Satoshi (2014). "Textbook for A New Business Development: The most powerful skills a business leader should have," *Sogo Horei Publishing*.

Tomita, Satoshi and Yoshiyasu Takefuji (2015). "Mathematical Complementarity Modeling and Empirical Analysis of Corporate Alliances: - Making Use of Data for the Activities for 152 Consulted Companies," *Journal of Japan Society for Management Accounting,* Vol.20 No.1.

Ushimaru, Hajime (2007). "Theory and Empirical Analysis of Interfirm Alliances", *Tongwen Guan*.

Wernerfelt, Birger (1984). "A Resource-Based View of the Firm," *Strategic Management Journal,* 5: 171-180

Yasuda, Hiroshi (2003). "New Analytical Approach for Strategic Alliances from the Perspective of Exchange of Management Resources," *Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy, Graduate School of Decision Science and Technology*, *Tokyo Institute of Technology*.

Yasuda, Hiroshi (2006). "Strategic Alliance in a Competitive Environment: Theory and Practice," *NTT Publishing*.

Yasuda, Hiroshi (2010). "Alliance Strategy," *NTT Publishing*.

Yoshino, Michael and U. Srinivasa Rangan (1995). "Strategic Alliances: An Entrepreneurial Approach to Globalization," Harvard Business School Press.

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DO CONSUMERS RECALL PRODUCTS' WARNING LABELS? A META-ANALYSIS

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ABSTRACT

Meta-analysis is a statistical technique that allows one to combine the results from multiple studies to glean inferences on the overall importance of a certain phenomenon. This study employs a substantive meta-analysis approach to quantitatively summarize the results of empirical studies of the direct impact of products' warning labels on consumers' recall. When all the available estimates are combined and averaged, there seems to be a genuine and positive effect of warning labels on consumers' recall (average effect size = 0.34, aggregate n = 1882). The findings of this study significantly refine the body of knowledge concerning the impact of products' warning labels on consumers' recall, and thereby offer an improved conceptual framework for marketers and warning label designers.

JEL: M30, M31, M37

KEYWORDS: Warning Labels, Consumer Recall, Meta-Analysis

INTRODUCTION

The proliferation of warning labels has become a defining characteristic of modern marketplace. Cigarettes, alcoholic beverages, appliances, saccharine, cosmetics and other personal care products are among consumer products that carry warnings. Various service products also carry warning labels. Examples include investment and insurance services. The presence of warning labels is not restricted to product packaging and package inserts; they also appear in the advertising of various products and services and in places where products are sold (Stewart and Martin, 1994). Warning labels serve two major aims. The first aim is consumer awareness, that is, education about potential problems associated with excessive or inappropriate consumption. The second aim is the prevention and/or modification of harmful consumer behaviour ensuing from education (Stockley, 2001). Warning labels have been consistently proposed as a cost-effective prevention strategy to communicate risks associated with certain products. For example, alcoholic warning labels have been shown to receive the highest public support among a variety of alcohol control policies, including policies on availability, educational programmes, and higher taxes (Kaskutas, 1993).

For products that are potentially hazardous to consumers, warning labels are potentially important communication tools that are available for both marketers and public policy agencies. Such warning labels can inform consumers about the risks and potential dangers related to product usage (Lepkowska-White and Parsons, 2001). Persuasion literature indicates that message recall affects consume attitudes towards the message, which in turn may influence subsequent behavior (Ajzen, 1991). Curiously, given the importance of the relationship between warning labels and consumers' recall, no systematic review has been conducted to synthesize the results of previous research. By sifting through previous research we fill this research gap by answering the following question: "Does the exposure to warning labels affect the consumers' recall of their contents?"

Thus, in this research we conduct a meta-analysis to synthesize and validate the impact of warning labels on consumers' recall and memory by analyzing the empirical results of various studies over a period spanning around 25 years. Synthesizing existing research has an impact beyond its utility for informing policy and practice as systematic reviews enable knowledge to be accumulated in a manageable way (Harden and Thomas, 2005). This research is organized as follows: The next section briefly reviews previous literature. The methodology section describes the methodology used to conduct the analysis. The results section provides the results of the quantitative analysis. This is followed by the conclusions section, which concludes the paper by providing the implications of the results and exploring avenues for future research and practice.

LITERATURE REVIEW

Lehto and Miller (1986) argue that the major purpose of warning labels is to alert consumers to a potential hazard and trigger the processing of additional information in memory, within the warning itself or elsewhere. Across several studies, effects of warning labels have been reported on awareness, exposure, and recall (e.g. Hankin et al., 1998). Warning effects on memory and recall are important because they are measures of the effectiveness of the warning. Recall and memory are also important because changes in these cognitive measures may ultimately lead to reductions in product-related problems (MacKinnon et al., 2000). Previous research on recall of warning labels has been sporadic and limited (Morris, Gilpin, Lenos & Hobbs, 2011). A stream of research has focused on warning labels' visibility and consumers' awareness (Fox, Krugman, Fletcher, & Fischer, 1998, Krugman, Fox, Fletcher, Fischer, & Rohs, 1994, Marin, 1997). Extended exposure to products' warning labels has been found to increase both awareness and control behaviors (Muggli, Pollay, Lew, & Joseph, 2002). Warning label wording has also been found to affect the effectiveness of such labels (Heaps & Henley, 1999). For example, the effectiveness of the warning "Smoking causes lung cancer, heart disease, emphysema, and may complicate pregnancy" was rated as more effective compared to the label "Tobacco smoke harms the health of individuals near the smoker" (Malouff, Schutte, Frohardt, Deming, & Mentelli, 1992). Similar results have been reported by Andrews, Netemeyer, & Durvasula (1991), Beltramini (1988), and Loken and Howard-Pitney (1988).

Previous marketing research has also investigated consumers' compliance behavior with warning labels. Mixed results have been reported showing varying rates of behavioral compliance. For example, Orwin, Schucker, & Stokes (1984) found that a saccharin label warning label against elevated cancer risk reduced diet soft drink by around 4 % below predicted levels. In a similar vein, Goyal, Rajan, Essien, and Sansgiry (2012) found that organ-specific warning labels improve consumers' risk perception of liver damage and increase the intention to perform protective behaviors regarding over-the-counter acetaminophen products. Borland et al. (2009) found that cigarettes' warning labels help increase quit-related cognitive responses. Miller, Hill, Quester, & Hiller (2009) also found that warning labels associated with graphic fear appeals result in an increase in the number of calls to quit lines. Hammond, Fong, McDonald, Brown, and Cameron (2004) found that around 45% of the respondents reported either benefiting from warning labels by quiting or by staying abstinent. However, in a qualitative investigation spanning four countries, Haines-Saah, Bel, and Dennis (2015) found that cigarettes' warning labels might have potential unintended consequences on consumers by obscuring the social and embodied contexts of the smoking experience.

Yong et al. (2014) used structural equation modeling (SEM) to investigate the impact of warning labels on smoking behavior. The authors found that warning labels influence thoughts about risk of smoking, increase worry about negative outcomes, and are also strong predictors of subsequent quit attempts. In a stated preference choice experiment, Lacanilao, Cash, and Adamowicz (2011) asked respondents to choose between high-fat snakes, some displaying a warning label, and some healthier snakes. The authors found that one class of respondents heeds warning labels, another class cares only for price but not warning labels, yet a third class avoids less healthy snacks and cares about price only when a warning label is present. However, using eye-tracking techniques, Crespo, Cabestrero, Grizb, and Quiros (2007) found that using

graphic images along with warning labels decrease the effectiveness of warning labels compared to using the traditional "general surgeon" warning labels. Ruiter and Kok (2005) found that verbal warning labels were only deemed to be effective when consumers were directed to "engage with the text". This is particularly true when the wear-out effect of warning labels is present.

Studies reporting alcohol warning labels recall found that there was an increase from 3.8% to 28.5% between 1989 and 1994 (Mazis, Morris, & Swasy, 1995). The drink driving text warning was recalled by around 25% of adults in the US (Tam & Greenfield, 2010). However, some studies found that such text warnings had virtually no impact on behavioral change (Scholes-Balog, Heerde, & Hemphill. 2012, Wilkinson & Room, 2009). Some studies found that alcohol drinkers were unable to recall the language of alcohol warnings (MacKinnon et al. 2001, Malouff et al. 1993). Barlow and Wogalter (1993) found that alcohol warnings in print ads were recalled more when the warning was highly conspicuous. Other studies have reported that text-only warnings were forgettable and ineffective compared to graphic pictorial warnings, which create negative effect toward smoking and increase willingness to quit (Bansal-Travers, Hammond, Smith, & Cummings, 2011, Moodie, MacKintosh, & Hammond, 2009, Peters et al. 2007, White, Webster, & Wakefield, 2008). However, Kees et al. (2010) found that gruesome pictorial warnings are less recalled because they interfere with the cognitive processing and comprehension of the warning message text. These findings contradict a recent survey conducted in Mexico, in which the authors reported a positive association between pictorial health warning labels and free recall in a sample of 1765 respondents (Thrasher et al. 2012).

DATA AND METHODOLOGY

Meta-analyses are being used more frequently for setting public policy, defining research agendas, and influencing practice. Meta–analysis is a statistical synthesis method that provides the opportunity to view the “whole picture” in a research context by combining and analyzing the quantitative results of many empirical studies (Glass, 1976). The aim is to take advantage of the large numbers resulting from the use of a number of samples to permit a better estimate of the population statistic. It is likely to prove particularly useful where the samples in individual studies are too small to yield valid conclusions or where there are many non-experimental studies with low statistical power (Petitti, 1994). Rosenthal and DiMatteo (2001, p. 62) argue that meta-analysis is more than a statistical method; it is a “methodology for systematically examining a body of research, carefully formulating hypotheses, conducting an exhaustive search, recording and statistically synthesizing and combining data and reporting results.”

The primary advantage of a meta-analysis is that findings from a multitude of studies can be effectively summarized using a standardized metric of effect (e.g., Cohen’s d) that is relatively easy to interpret. The effect size statistic ranges between positive 1 and negative 1 in the vast majority of cases. Although no standards exist for interpreting effect size estimates, Cohen (1977) suggests that when interpreting values of d, .20 would be indicative of a small effect, .50 a medium effect, and .80 a large effect.

Analogous to most meta-analysis, our study began with an examination of the known research on consumer recall of warning labels. This examination was conducted by searches of the standard computerized databases (e.g., ABI/Inform, EBSCO, Science Direct, Emerald etc.) From the relevant literature, citations and references were extracted and catalogued in an iterative process until nearly 40 articles, proceedings, book chapters, and dissertations were identified that in some fashion addressed the consumer recall of warning labels phenomenon. The first contribution was published in 1982. Articles were distributed across twenty-three journals, proceedings and dissertations. Studies excluded were (a) studies that made references to consumer recall of warning labels but did so in the context of brief conceptual discussion and thus was only tangentially related tour investigation, (b) studies that did employ some empirical analysis, but did not report Pearson correlation coefficients or other statistics capable of being converted to point-biserial

correlations, and (c) studies known to be drawn from the same data set as another study that has already been included in the analysis. This resulted in 14 studies in the meta-analysis (Table 1).

Table 1: Summary of Studies Included In Meta-Analysis

Author(S)	Research Design	Product	Location of Warning Label	N	R
Barlow and Wogalter (1991)	Experimental	Alcohol	Adverts	105	0.66
Bhalla and Lactovicka (1984)	Experimental	Cigarettes	Adverts	84	0.44
Desaulniers (1987)	Experimental	Chemicals	Product	50	0.20
Frantz (1992)	Experimental	Chemicals	Product	80	0.49
Gardner-Bonneau et al. (1989)	Experimental	Cigarettes	Paper	118	0.09
Goldhaber and deTurck (1988)	Experimental	Pool	Wall	328	0.28
Kalsher et al. (1991)	Experimental	Alcohol	Poster	134	0.31
Karnes and Leonard (1986)	Experimental	Chemicals	Product	40	0.35
*Nohre et al. (1999)	Survey	Alcohol	Product	6391	0.31
Otsubo, S. (1988)	Experimental	Saw	Product	125	0.20
Strawbridge (1986)	Experimental	Chemicals	Product	195	0.16
Wogalter et al – study 1 (1992)	Experimental	Chemicals	Sign	48	0.51
Wogalter et al – study 2 (1992)	Experimental	Chemicals	Sign	80	0.38
Young and Wogalter (1990)	Experimental	Electric Generator	Paper	531	0.30

**Note: Excluded from meta-analysis. This table shows all the studies included in our meta-analysis along with publication dates, sample size and correlation coefficient either reported or calculated from the studies data. As seen from the table, almost all warning labels fall in one of three major categories: cigarettes, alcohol, or chemical products. Correlation coefficients ranged between 0.09 and 0.66.*

Selected studies were coded for classifying study variables. The code book allowed for the collection of a large mount of information such as general study characteristics, design characteristics, demographic information pertaining to the study participants, psychometric properties of the study instruments, methods of statistical analysis and other characteristics.

Meta-analysis procedures suggested by Hunter and Schmidt (2004) were employed in this study. These methods can be outlined as: (a) calculation of effect sizes pertaining to the relationship between warning labels and consumers' recall, (b) analysis of outliers and missing data, (c) homogeneity analysis of effect sizes, and (d) testing for publication bias.

Data were the correlation coefficients from previous studies that described the relationship between warning labels and consumers' recall. Two approaches, namely a single finding per study or multiple findings per study, were often used in meta-analysis. According to Grewal et al. (1997), the advantage of extracting one finding per study is a guarantee of the independence of each finding. Following Palmatier et al (2006), we accumulated results and calculated the average effect within a study when a study gave separate reports for different findings but used the same subjects. For their relative convenience in analyzing a large number of variables, MetaWin version 2.0 (Rosenberg et al., 2000) and R software packages were used to conduct the analysis.

RESULTS

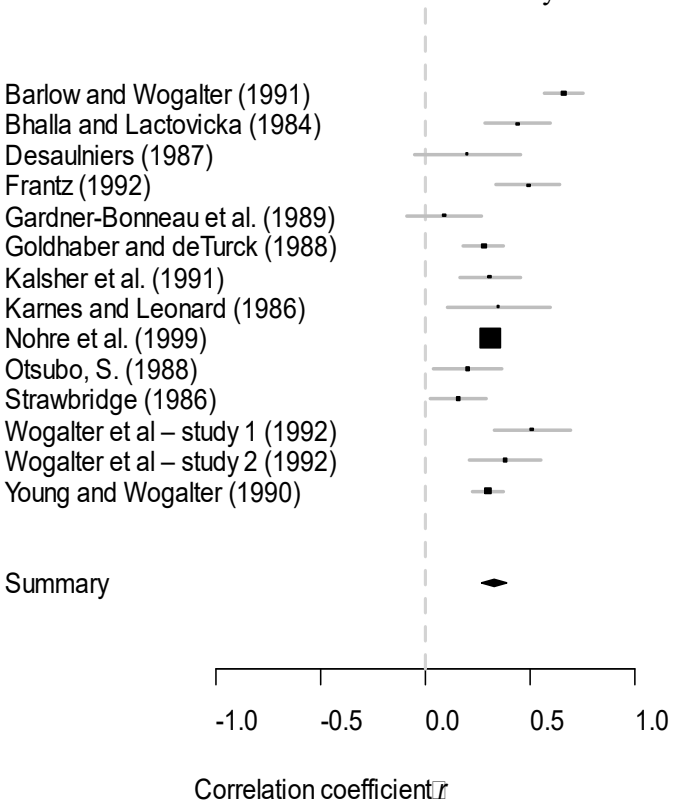
Effect Size

The term effect size refers to the sample estimate of the population effect regardless of the particular effect size indicator used (Fern and Monroe, 1996). Effect sizes were reported in the original papers in a variety of forms (e.g. t, F, P values). We converted these various test statistics to Hedge's d following the formulas suggested by Rosenthal (1991).

In meta-analysis, both fixed-effect models and random-effect models have been used to estimate effect size. fixed-effect models assume that samples within a study share a common true effect size, while random-effects models assume that studies have a common mean effect, but that there is also random variation in effect sizes within a study. Several researchers have used fixed-effect models (e.g. Moller and Thornhill, 1998), although random-effect models are probably more appropriate because there is no reason to assume that there is a single common true effect size across all studies (Gurevitch and Hedges, 1999). We took a random-effects perspective, which Hunter and Schmidt (2000) recommend for routine use in meta-analysis when calculating mean correlations. In this approach, the variability in findings across studies is treated as arising from both the sampling of studies, reflecting between-studies variance, and the sampling of individuals within studies, reflecting sampling error. According to Hunter and Schmidt (2000), the random-effect approach produces more generalizable results and is less subject to Type I errors when the assumptions of the fixed-effect model are not met. I fact, Chen and Peace (2013) argue that in practice most researchers "perform both a fixed-effects and a random-effects meta-analysis on the same set of studies - even if there is an 'a priori' basis for believing the fixed-effects model is appropriate." (p. 68).

The analysis of effect sizes adjusted for measurement error was indicative of a moderate relationship between consumers' exposure to product warning labels and recall (Pearson correlation r = 0.34). 95% Confidence interval for all effect sizes ranged from 0.25 to 0.42 for the random effects model. For comparative purposes, the confidence interval ranged from 0.27 to 0.35 for the fixed effects model. Figure 1 presents a "forest plot" of the estimates and their corresponding 95% confidence intervals for each study included in our meta-analysis, as well as the global summary or combined estimate.

Figure 1. Forest Plot of Studies Included in the Meta-Analysis

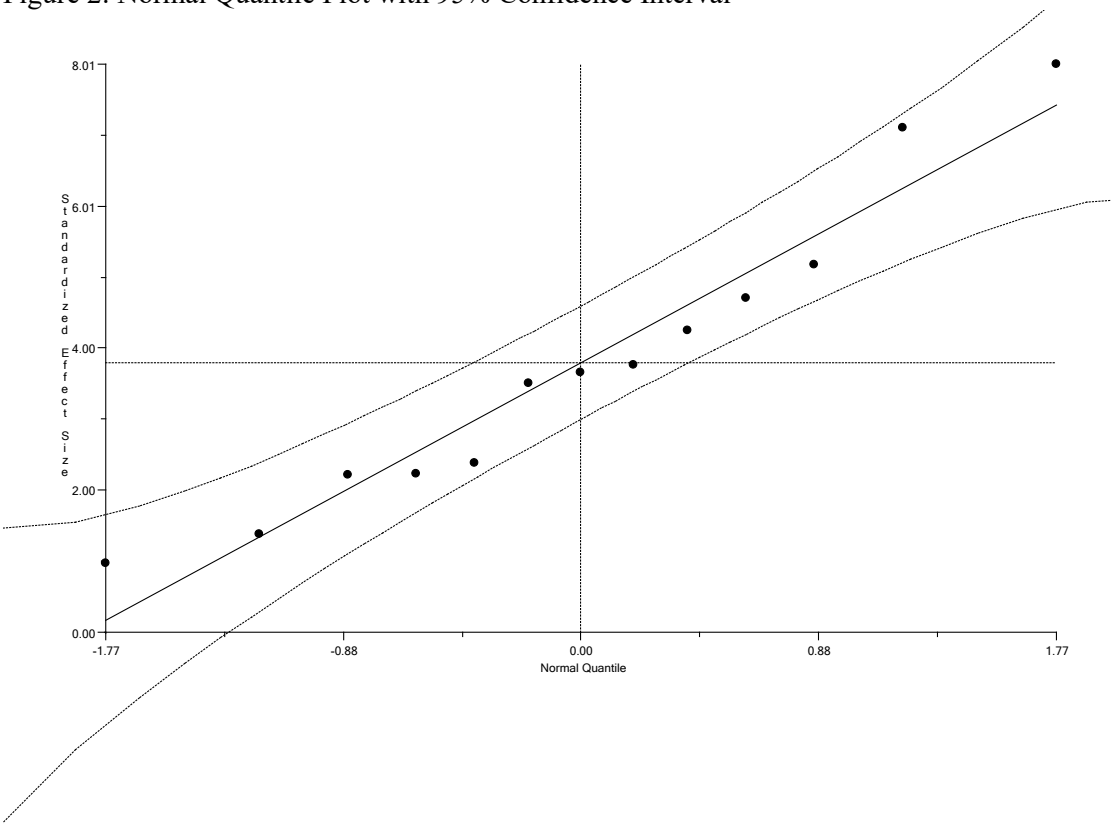


This figure shows a plot of the estimates and their corresponding 95% confidence intervals (CIs) for each study included in the meta-analysis. The figure also shows the global summary of combined estimate. The 95% CIs are represented by lines, while the squares in the middle represent the point estimates. The global estimate is represented by the diamond, whose its width is the associated 95% CI.

Detecting Outliers

Outliers' analysis is an essential step in any meta-analysis study as the presence of outliers is likely to distort the results (Davis and Rothstein, 2006). One simple strategy for handling outliers is to delete them from analysis if they are not believed to be representative of study findings. Analysis of the distribution of the effect sizes revealed one potential outlier that contributed to a skewed effect size distribution. This outlier was reported in Nohre et al.'s study (1999) in which a very big sample was used (n = 6391). After excluding this study, the distribution of standardized effect sizes approached normality as shown in Figure 2.

Figure 2: Normal Quantile Plot with 95% Confidence Interval



This figure shows the normal quantile on the x-axis and the standardized effect size on the y-axis. The normal quantile plot is generally used to detect potential outliers that may contribute to a skewed effect size distribution. After eliminating a potential outlier (Nohr et al. 1999 study), the distribution seems to be fairly normal.

Heterogeneity and Resampling Tests

Assessing heterogeneity means answering the question "How different are the results of these studies?" (Attia et al., 2003, p. 300). The most commonly used test for between-study heterogeneity in meta-analysis is the Q statistic (Fleiss, 1993). The Q statistic is defined as the sum of the weighted squared differences of the effect size of each study from the summary effect size obtained under fixed-effects assumption. Alternative tests have been proposed that usually, but not always, give very similar results (Ioannidis et al., 2006). However, bootstrapping validation suggests that the Q statistic is the most reliable of these tests (Takkouche et al., 1999). We used the Meta package in R to conduct the heterogeneity analysis, which resulted in a significant Q-value (Q = 44.28, df = 12, P = 0.0001), which suggests that the variances in the sample of effect sizes were not homogeneously distributed and could not be accounted for by sampling error alone.

The parametric model used in our study to derive the effect size d relies on the assumption that the observations are normally distributed for each study. In addition, the Q statistic used to assess the homogeneity of the effect sizes among studies is approximately chi-squared distributed when the normality condition is met. If this condition is violated, the conventional tests of homogeneity may be flawed (Hedges and Olkin, 1985).

Adams et al. (1997) recommend that resampling methods should be incorporated in meta-analysis studies to ascertain the robustness of estimates. resampling methods, preeminently the bootstrap technique, test the significance of a statistic by generating a distribution of that statistic by permuting the data many times, each time recalculating the statistic. By comparing the original statistic to this generated distribution, a significance level can be determined (Manly, 1991).

We first computed the bootstrap confidence limits for the mean effect sizes using the conventional method, the percentile bootstrap (Efron, 1979). One problem with percentile bootstrap confidence limits however, is that as sample sizes decrease, the lengths of percentile bootstrap confidence limits tend to become underestimated (Efron, 1987). Bias-corrected percentile bootstrap confidence limits have been suggested to correct for distributions when > 50% of the bootstrap replicates are larger or smaller than the observed value, which happens often with small samples (Efron, 1979). As our meta-analysis contained a small number of studies, we also calculated the Bias-corrected percentile bootstrap confidence limits. As recommended by Adams and Anthony (1996), 5000 replications were done to reduce variation around the significance levels. Results show that the percentile bootstrap confidence limits are quite similar to the parametric confidence limits, which ascertain the robustness of standard meta-analytic techniques.

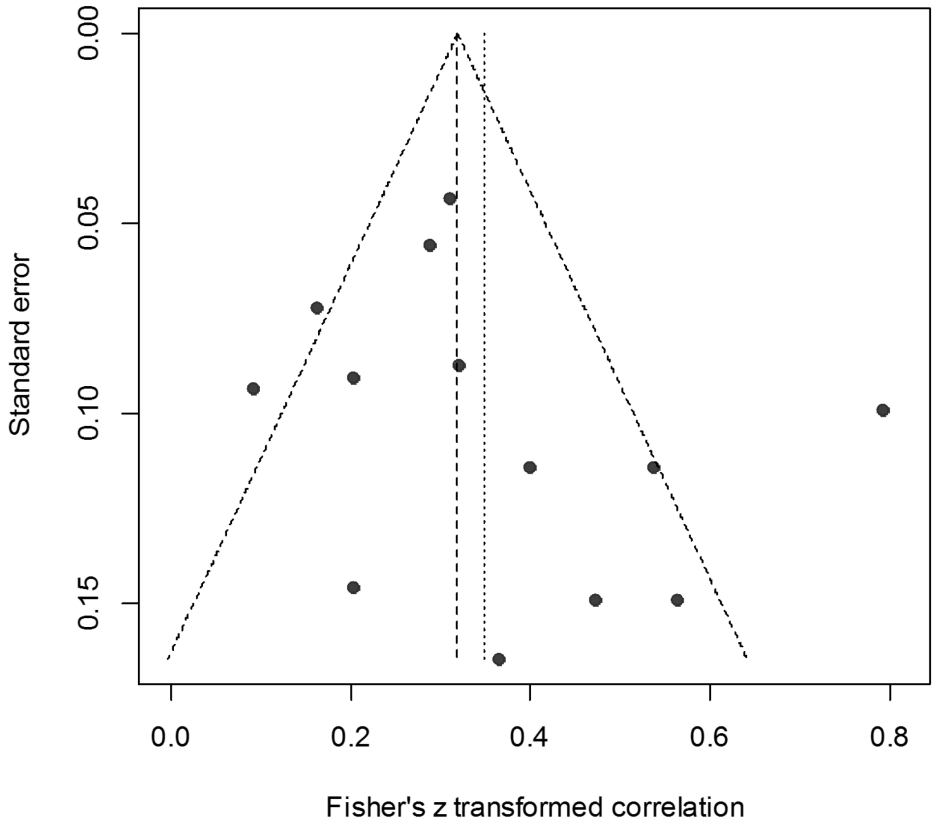
Publication Bias

Publication bias refers to the tendency to publish studies that show statistically significant results. Such "positive" studies are "therefore more likely to be located for and included in meta-analyses, which may introduce bias." (Sterne et al., 2000, p. 1119). A survey of studies reported in four psychological journal and three medical journals found high proportions of papers confirmed the experimental hypotheses being tested (Sterling et al., 1995). Gregoire et al. (1995) reported that 78% of identified meta-analyses of randomised trials had language of publication restrictions. Because of publication bias, studies included in a meta-analysis may not generally represent a random sample of all studies actually conducted (Hsu, 2002). Since all but three of the studies used in this meta-analysis were from published sources in English language, there is a possibility that publication bias is affecting results.

Several methods have been proposed to detect the existence of publication bias in meta-analyses. We used three methods for assessing the potential importance of publication bias. First, we used the funnel plot recommended as a graphical device for investigating the possibility of publication bias (Light and Pillemer, 1984). A common interpretation is that a symmetric, inverted funnel shape implies no publication bias, but if the funnel appears to be missing points in the lower corner of the plot, there is potential bias (Borenstein, 2005).

In Figure 3 a funnel plot was constructed with standardized correlations on the x-axis and standard error on the y-axis. As seen in Figure 3, the funnel plot appears to be relatively symmetric, although it is clearly not perfectly so, indicating little or no publication bias. However, Tang and Liu (2000) criticized the simplistic conclusion that a meta-analysis is biased based on the informal observation of an asymmetric funnel plot and suggested that one should interpret it as a 'precision-related' heterogeneity.

Figure 3. Funnel Plot



This figure represents a funnel plot used to informally check potential publication bias. In this figure the x-axis represents standardized correlations while the y-axis represents the standard errors. The funnel plot appears relatively symmetric, indicating the absence of potential publication bias.

Begg and Mazumdar (1994) proposed a test for publication bias based on assessing the significance of the correlation between the ranks of effect estimates and the ranks of their variances. The test involves standardizing the effect estimates to stabilize the variances and performing an adjusted rank correlation test based on Kendall's τ. We also applied the formal rank correlation test of Begg and Mazumdar to test statistically for publication bias. Results indicate that sample sizes are not significantly correlated with the standardized effect sizes (r = -0.245, P = 0.243, NS). This suggests that unpublished studies had similar relative effects to those of published studies.

Finally, a "fail-safe" number (Rosenthal, 1991) has been suggested to detect publication bias. This widely used technique estimates the number of studies having zero effect that would have to be published to reduce the overall mean effect size to non-significance. It has been suggested that a fail-safe number should be presented for all meta-analyses, as an aid in the assessment of the degree of confidence that can be placed in the results (Thornton and Lee, 2000). We used both Rosenthal (1991) and Orwin's (1983) formulas to determine the number of "missing" studies required to reduce the current man effect size (0.34) to a small one (0.10). Results indicated that 889 and 29 studies, respectively averaging a zero effect would have to be added to the results of the retrieved findings in order to change the conclusion regarding the magnitude of the effect from large to small (Cooper, 1998). This large fail-safe number indicates that results are robust because it seems unlikely that there would be that many non-significant unpublished studies in the file drawers (Rosenthal, 1991). Thus, the results indicate that new or unpublished studies not included in our meta-analysis do not represent serious threats to the validity of the findings for the bivariate relationship between warning labels and consumers' recall.

More recently, Duval and Tweedie (2000) proposed a trim-and-fill method to estimate the number of "missing" studies due to publication bias. The method is reliant on the symmetric distribution of effect sizes around the "true" effect size if there is no publication bias, and the simple assumption that the most extreme results have not been published. However, simulation studies have found that the trim-and-fill method detects "missing" studies in a substantial proportion of meta-analysis, even in the absence of bias (Sterne et al., 2001).

In conclusion, we can state that despite small differences in characteristics of published and unpublished studies, the unpublished studies reported in our meta-analysis did not differ in terms of effect size from all previous studies. Thus, there was no direct evidence of publication bias. This conclusion, however, is based on only a small number of unpublished studies. Therefore, it is possible that the unpublished results we obtained are not representative of unpublished studies in this research area.

CONCLUSIONS

In this research we conduct a meta-analysis to synthesize and validate the impact of warning labels on consumers' recall and memory by analyzing the empirical results of various studies over a period spanning around 25 years. The results of our meta-analysis indicate that warning labels moderately influence recall. This finding should emphasize to warning label designers that it is imperative to use vivid-enhancing characteristics in designing warning labels if they hope to achieve high levels of recall. Previous research has found that overexposure or "wear-out" is a major problem for any warning label message that consumers are exposed to repeatedly over time (e.g., Strahan et al., 2002). Pictorial warning labels may reduce the wear out effect and enhance recall. For example, it might be easier for a consumer to avoid reading a text message than to avoid seeing a picture of cancerous lungs that covers half of the front of a cigarette pack.

Although our meta-analysis results indicate that consumers moderately remember warning labels, warning label designers may enhance consumers' recall through the design of simple warning messages where the importance of information is made explicit rather than left to the inferences of the consumer. Limiting the number of inferences consumers must make is especially critical because some researchers have found that older consumers have difficulty making appropriate inferences from warning label texts (e.g., Hasher et al., 1987). Previous research indicates also that the presence of difficult words in warning labels may negatively affect recall of warnings by some consumer groups (e.g., Lepkowska-White and Parsons, 2001). Thus, warning labels are supposed to be designed so that a majority of consumers can comprehend them well and use products more safely.

Meta-analyses have several strengths, but thy also suffer from some inherent limitations. First, it must be noted that, though meta-analyses are more generalizable than any one study because the resulting effect size represents a greater variety of primary sample characteristics than can be achieved through a single primary study, by its nature, meta-analysis contains an inherent sampling bias towards quantitative studies that report effect sizes. Thus our research should be considered a summary of the available quantitative research on the effects of warning labels on consumer recall. Second, because of the limited number of studies included in our meta-analysis (n = 14), the study may have a limited statistical power. Using a Monte Carlo simulation, Field (2001) found that a meta-analysis should include at least 15 studies, otherwise the Type I error (accepting a false null hypothesis) could be severely inflated. As we were limited by the availability of research studying the relationship between warning labels and consumer recall, future researchers may include more studies that focus on this area. The more studies that are included, the more creditable are the results at representing this investigated domain. Third, some concerns has recently been voiced over the liberal inclusion criteria of some meta-analyses. It has been suggested that when studies suffering major methodological flaws are included in a meta-analysis, the internal validity of the review is jeopardized (Fitzgerald and Rumrill, 2003). Although journal editors want to ensure published studies are

those conducted with scientific rigor, future researchers should address this concern as it relates to meta-analytic reviews. Finally, while our meta-analysis shows that consumers can moderately recall information presented in a warning label (r = 0.35, N = 1882), moderating factors have not been analysed in this study. Future research should explore the influence of moderator factors, such as vividness-enhancing characteristics, familiarity with the product, placement of the warning label, the use of color and pictorial features, and the format of warning label information on consumers' recall of its contents.

Appendix: Sample R codes used to conduct the meta-analysis

```
install.packages("metafor")
install.packages("metacor")
install.packages("meta")
library(metafor)
library(metacor)
library(meta)
data.recall <- read.delim("[path location]/recall.txt", header = T, sep = "\t")
data.recall
nbsp.DSL.metacor=metacor.DSL(data.recall$r, data.recall$N, data.recall$Label)
nbsp.DSL.metacor
nbsp.OP.metacor=metacor.OP(data.recall$r, data.recall$N, data.recall$Lbel)
nbsp.OP.metacor
#  Tests of heterogeneity
nbsp.DSLfromMeta=metacor(cor=r, n=N, studlab=Label, data=data.recall)
summary(nbsp.DSLfromMeta)
```

REFERENCES

(References marked with an asterisk indicate studies included in the meta-analysis)

Adams, D., Anthony, C. (1996). Using randomisation techniques to analyse behavioural data. *Animal Behaviour*, 51, 733-738.

Adams, D., Gurevitch, J., & Rosenberg, M. (1997). Resampling tests for meta-analysis of ecological data. *Ecology*, 8, 1277-1283.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.

Andrews, J., Netemeyer, R., & Durvasula, S. (1991). Effects of consumption frequency on believability and attitudes toward alcohol warning labels. *Journal of Consumer Affairs*, 25, 323-338.

Attia, J., Thakkinstian, A., & D'Este, C. (2003). Meta-analyses of molecular association studies: methodologic lessons for genetic epidemiology. *Journal of Clinical Epidemiology*, 56, 297-303.

Bansal-Travers, M., Hammond, D., Smith, P., & Cummings, K. (2011). The impact of cigarette pack design, descriptors, and warning labels on risk perception in the U.S. *American Journal of Preventive Medicine*, 40, 674-682.

*Barlow, T. & Wogalter, M. (1991). Alcohol beverage warning labels in print advertisements. in *Proceedings of the Human Factors Society 35th Annual Meeting*, Santa Monica, CA, 451-455.

Begg, C., & Mazumdar, M. (1994). Operating characteristics of a rank correlation test for publication bias. *Biometrics*, 50, 1088-1101.

Beltrmini, R. (1988). Perceived believability of warning label information presented in cigarette advertising. *Journal of Advertising*, 17, 26-32.

*Bhalla, G., & Lactovicka, L. (1984). The impact of changing cigarette warning message content and format. in *Proceedings of the Human Factors Society 29th Annual Meeting*, Santa Monica, CA, 305-310.

Borenstein, M. (2005). Software for publication bias. in Rothstein, H., Sutton, A., & Borenstein, M. (Eds.), *Publication Bias in Meta-analysis: Prevention, Assessment and Adjustments*. John Wiley & Sons Ltd, New York.

Borland, R., Wilson, N., Fong, G., Hammond, D., Cummings, K.., & Yong, H. (2009). Impact of graphic and text warnings on cigarette packs: Findings from four countries over five years. *Tobacco Control*, 18, 358-364.

Chen, D., & Peace, K. (2013). Applied meta-analysis with R. CRC Press. Boca Raton, FL.

Cohen, J. (1977). *Statistical Power Analysis for the Behavioral Sciences*. Academic Press, New York.

Cooper, H. (1998). *Synthesizing Research*, 3rd ed. Sage Publication, Thousand Oaks, CA.

Crespo, A., Cabestrero, R., Grizb, G., & Quiros, P. (2007). Visual attention to health warnings in cigarette advertisements An eye-tracking research between smokers and non-smokers. *Studia Psychologica*, 49, 39-351.

Davis, A. & Rothstein, H. (2006). The effects of the perceived behavioural integrity of managers on employee attitudes: a meta-analysis. *Journal of Business Ethics*, 67, 407-419.

*Desaulniers, D. (1987). Layout, organization, and the effectiveness of consumer product warnings. in *Proceedings of the Human Factors Society 31st Annual Meeting*, Santa Monica, CA, 56-60.

Duval, S., & Tweedie, R. (2000). A non-parametric 'trim and fill' method of assessing publication bias in meta-analysis. *Journal of the American Statistical Association*, 95, 89-98

Efron, B. (1987). Better bootstrap confidence intervals (with discussion). *Journal of the American Statistical Association*, 82, 171-200.

Efron, B. (1979). Bootstrap methods: another look at the jacknife. *Annual Statistician*, 7, 1-26.

Fern, E., & Monroe, K. (1996). Effect size estimates: issues and problems in interpretation. *Journal of Consumer Research*, 23, 89-115.

Field, A. (2001). Meta-analysis of correlation coefficients: a Monte Carlo comparison of fixed- and random-effects methods. *Psychological Methods*, 6, 161-180.

Fitzgerald, S., & Rumrill, P. (2003). Meta-analysis as a tool for understanding existing research literature. *Work*, 21, 97-103.

Fleiss, J. (1993). The statistical basis of meta-analysis. *Statistical Methods in Medical Research*, 2, 121-145.

Fox, R., Krugman, D., Fletcher, J., & Fischer, P.(1998). Adolescents' attention to beer and cigarette print ads and associated product warnings. *Journal of Advertising*, 27, 57-68.

*Frantz, J. (1992). *Effect of location, procedural explicitness, and presentation format on user processing of and compliance with product warnings and instructions*. Unpublished Doctoral Dissertation, Department of Industrial and Operations Engineering. University of Michigan.

*Gardner-Bonneau, D., Kabbara, F., Hwang, M., Bean, H., Gantt, M., Hartshorn, K., Howell, J., & Spence, R. (1989). Cigarette warnings: recall of content as a function of gender message content, smoking habits and time. in *Proceedings of the Human Factors Society 33rd Annual Meeting*, Santa Monica, CA, 928-930.

Glass, G. (1976). Primary, secondary, and meta-analysis of research. *Review of Research in Education*, 5, 351-379.

*Goldhaber, G., & deTurck, M. (1988). Effectiveness of warning signs: gender and familiarity effects. *Journal of Products Liability*, 11, 271-284.

Goyal, M., Rajan, S, Essien, E., & Sansgiry, S. (2012). Effectiveness of FDA's new over-the-counter acetaminophen warning label in improving consumer risk perception of liver damage. *Journal of Clinical Pharmacy and Therapeutics*, 37, 681-685.

Gregoire, G., Derderian, F., & LeLorier, J. (1995). Selecting the language of the publications included in meta-analysis: is there a tower of babel bias? *Journal of Clinical Epidemiology*, 48, 195-163.

Grewal, D., Kavanoor, S., Fern, E., Costley, C., & Barnes, J. (1997). Comparative versus non-comparative advertising: a meta-analysis. *Journal of Marketing*, 61, 1-15.

Gurevitch, J., & Hedges, L. (1999). Statistical issues in ecological meta-analysis. *Ecology*, 80, 1142-1149.

Haines-Saah, R., Bell, K., & Dennis, S. (2015). A qualitative contenet analysis of cigarette health warning labels in Australia, Canada, the United Kingdom, and the United States. *American Journal of Public Health*, 105, 61-69.

Hammond, D., McDonald, P., Fong, G., Brown, K., & Cameron, R. (2004). The impact of cigarette warning labels and smoke-free bylaws on smoking cessation: Evidence from former smokers. *Canadian Journal of Public Health*, 95, 201-204.

Hankin, J., Sloan, J., & Sokol, R. (1998). The modest impact of the alcohol beverage warning label on drinking pregnancy among a sample of African-American. *Journal of Public Policy & Marketing*, 17, 61-69.

Harden, A., & Thomas, J. (2005). Methodological issues in combining diverse study types in systematic reviews. *International Journal of Social Research Methodology*, 8, 257-271.

Hasher, R., Zacks, L., Doren, B., Hamm, V., & Attig, M. (1987). Encoding and memory of explicit and implicit information. *Journal of Gerontology*, 42, 418-422.

Hedges, L., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Academic Press, San Diego, CA.

Hsu, L. (2002). Fail-safe Ns for one- versus two-tailed tests lead to different conclusions about publication bias. *Understanding Statistics*, 1, 85-100.

Hunter, J., & Schmidt, F. (2004). *Methods of meta-analysis: Correcting Error and Bias in Research Findings*, 2nd ed., Sage, Thousand Oaks, CA.

Hunter, J., & Schmidt, F. (2000). Fixed effects vs. random effects meta-analysis models: implications for cumulative research knowledge. *International Journal of Selection and Assessment*, 8, 275-292.

Ioannidis, J., Trikalinos, T., & Zintzaras, E. (2006). Extreme between-study homogeneity in meta-analyses could offer useful insights. *Journal of Clinical Epidemiology*, 59, 1023-1032.

*Kalsher, M., Clarke, S., & Wogalter, M. (1991). Posted warning placard: effects on college students' knowledge of alcohol facts and hazards. in *Proceedings of the Human Factors Society 35th Annual Meeting*, Santa Monica, CA, 456-460.

*Karnes, E., & Leonard, S. (1986). Consumer product warnings: reception and understanding of warning information by final users. in *Trends in Ergonomics/Human Factors III*, W. Karwowski (Ed.). Elsevier Science Publishers, North Holland, 995-1003.

Kaskutas, L. (1993). Changes in public attitudes toward alcohol control policies since the warning label mandate of 1988. *Journal of Public Policy & Marketing*, 12, 30-37.

Kees, J., Burton, S., Andrews, C., & Kozup, J. (2010). Understanding how graphic pictorial warnings work on cigarette packaging. *Journal of Public Policy & Marketing*, 29, 265-276.

Krugman, D., Fox, R., Fletcher, J., Fischer, P., & Rohas, T. (1994). Do adolescents attend to warnings in cigarette advertising? An eye-tracking approach. *Journal of Advertising Research,* 34, 39-52.

Lacanilao, R., Cash, S., & Adamowicz, W. (2011). Heterogeneous consumer responses to snack food taxes and warning labels. *Journal of Consumer Affairs*, 45, 108-122.

Lehto, M. & Miller, J. (1986). *Warnings: Fundamentals, Design, and Evaluation Methodologies*. Fuller Technical Publications, Ann Arbor, MI.

Lepkowska-White, E., & Parsons, A. (2001). Comprehension of warning and resulting attitudes. *Journal of Consumer Affairs*, 35, 278-294.

Light, R., & Pillemer, D. (1984). *Summing Up: The Science of Reviewing Research*. Harvard University Press, Cambridge, MA.

Loken, B., & Howard-Pitney, B. (1988). Effectiveness of cigarette advertisements on women: An experimental study. *Journal of Applied Psychology*, 73, 378-382.

MacKinnon, D., Nohre, L., Pentz, M., & Stacey, A. (2000). The alcohol warning and adolescents: 5-year effects. *American Journal of Public Health*, 90, 1589-1594.

MacKinnon, D., Nohre, L., Cheong, J., Stacey, A., & Pentz, M. (2000). Longitudinal relationship between the alcohol warning and alcohol consumption. *Journal of Studies on Alcohol*, 62, 221-226.

Manly, B. (1991). *Randomization and Monte Carlo Methods in Biology*. Chapman & Hall. New York.

Marin, G. (1997). Changes across 3 years in self-reported awareness of product warning messages in a Hispanic community. *Health Education Research*, 12, 103-116.

Mazis, M., Morris, L., & Swasy, J. (1996). Longitudinal study of awareness, recall, and acceptance of alcohol warning labels. *Applied Behavioral Science Review*, 4, 111-120.

Miller, C., Hill, D., Quester, P., & Hiller, J. (2009). Impact on the Australian Quitline of new graphic cigarette pack warnings including the Quitline number. Tobacco Control, 18, 235-237.

Moller, A., & Thornhill, R. (1998). Bilateral symmetry and sexual selection: a meta-analysis. *American Naturalist*, 151, 174-192.

Moodie, C., MacKintosh, A., & Hammond, D. (2009). Adolescents' response to text-only tobacco health warnings: Results from the 2008 UK Youth Tobacco Policy Survey. *European Journal of Public Health*, 20, 463-469.

Morris, N., Gilpiin, D., Lenos, M., & Hobbs, R. (2011). Interpretations of cigarette advertising warning labels by Philadelphia Puerto Ricans, *Journal of Health Communications*, 16, 908-922.

Muggli, M., Pollay, R., Lew, R., & Joseph, A. (2002). Targeting of Asian Americans and Pacific Islanders by tobacco industry: Results from the Minnesota Tobacco Document Depository. *Tobacco Control*, 11, 201-209.

*Nohre, L., MacKinnon, D., Stacey, A., & Pentz, M. (1999). The association between adolescents' receiver characteristics and exposure to the alcohol warning label. *Psychology & Marketing*, 16, 245-259.

Orwin, R. (1983). A fail-safe N for effect size in meta-analysis. *Journal of Educational Statistic*s, 8, 157-159.

Orwin, R., Schucker, R., & Stokes, R. (1984). Evaluating the life cycle of a product warning: Saccharin and diet soft drinks. *Evaluation Review*, 801-822.

*Otsubo, S. (1988). *Effectiveness of warning signs on consumer products*. Unpublished Masters Thesis. Department of Psychology. California State University at Northridge.

Palmatier, R., Dant, R., Grewal, D., & Evans, K. (2006). Factors influencing the effectiveness of relationship marketing: a meta-analysis. *Journal of Marketing*, 70, 136-153.

Petera, E., Romer, D., Slovic, P., Jamieson, K., Wharfield, L., Mertz, C., & Carpenter, S. (2007). The impact and acceptability of Canadian-style cigarette warning labels among U.S. smokers and non-smokers. *Nicotine & Tobacco Research*, 9, 473-481.

Petitti, D. (1994). *Meta-analysis, Decision Analysis, and Cost-Effectiveness Analysis*. Oxford University Press, New York.

Rosenberg, M., Adams, D., & Gurevitch, J. (2000). *MetaWin: Statistical Software for Meta-analysis, Version 2.0.* Sinauer, Sunderland, MA.

Rosenthal, R. (1991). *Meta-analytic procedures for Social Research*. Russell Sage Foundation, New York.

Rosenthal, R., & DiMatteo, M. (2001). Meta-analysis: recent developments in quantitative methods for literature reviews. *Annual Review of Psychology*, 52, 59-82.

Ruiter, R., & Kok, G. (2005). Saying is not (always) doing: Cigarette warning labels are useless. *European Journal of Public Health*, 15, 329-336.

Scholes-Balog, K., Heerde, J., & Hemphill, S. (2012). Alcohol warning labels: Unlikely to affect alcohol-related beliefs and behaviors in adolescents. *Australia and New Zealand Journal of Public Health*, 6, 524-529.

Sterling, T., Rosenbaum, W., & Weinkam, J. (1995). Publication decisions revisited: the effect of outcome of statistical tests on the decision to publish and vice versa. *American Statistician*, 4, 108-112.

Sterne, J., Egger, M., & Davey, G. (2001). Investigating and dealing with publication and other biases in meta-analysis. *British Medical Journal*, 323 (July, 14), 101-105.

Sterne, J., Gavaghan, D., & Egger, M. (2000). Publication and related bias in meta-analysis: power of statistical tests and prevalence in the literature. *Journal of Clinical Epidemiology*, 53, 1119-1129.

Stewart, D., & Martin, I. (1994). Intended and unintended consequences of warning messages: a review and synthesis of empirical research. *Journal of Public Policy & Marketing*, 13, 1-19.

Stockley, C. (2001). The effectiveness of strategies such as health warning labels to reduce alcohol-related harms: an Australian perspective. *International Journal of Drug Policy*, 12, 153-166.

Strahan, E., White, K., Fong, G., Fabrigar, L., Zanna, M., & Cameron, R. (2002). Enhancing the effectiveness of tobacco package warning labels: a social psychological perspective. *Tobacco Control*, 11, 183-190.

*Strawbridge, J. (1986). *The influence of position, highlighting, and embedding on warning effectiveness*. Unpublished Masters Thesis. Department of Industrial and Systems Engineering, California State University at Northridge.

Takkouche, B., Cadarso-Suarez, C. & Spiegelman, D. (1999). Evolution of old and new tests of heterogeneity in epidemiologic meta-analysis. *American Journal of Epidemiology*, 150, 206-21.

Tam, T., & Greenfield, T. (2010). Do alcohol warning labels influence men's and women's attempts to deter others from driving when intoxicated? *Human Factors and Ergonomics in Manufacturing & Service Industries*, 20, 538-546.

Tang, J., & Liu J. (2000). Misleading funnel plot for detection of bias in meta-analysis. *Journal of Clinical Epidemiology*, 53, 477-484.

Thornton, A., & Lee, P. (2000). Publication bias in meta-analysis: its causes and consequences. *Journal of Clinical Epidemiology*, 53, 207-218.

Thrasher, J., Pérez-Hernández, R., Arillo-Santillán, E., & Barrientos-Gutiérrez, I. (2012). Impacto de las advertencias con pictogramas en las cajetillas de cigarrillos en México: Resultados de una encuesta en fumadores de Guadalajara. *Salud Pública de México*, 54, 254-263.

White, V., Webster, B., & Wakefield, M. (2008). Do graphic health warning labels have an impact on adolescents' smoking-related beliefs and behaviors? *Addiction*, 103, 1562-1571.

Wilkinson, C., &Room, R. (2009). Warnings on alcohol containers and advertisements: International experience and evidence on effects. *Drug and Alcohol Review*, 28, 426-443.

*Wogalter, M., Kalsher, M., & Racicot, B.(1992). The influence of location and pictorials on behavioural compliance to warnings. in *Proceedings of the Human Factors Society 36th Annual Meeting*, Santa Monica, CA, 1029-1033.

Yong, H., Borland, R., Thompson, M., Fong, G., Thrasher, J., Nagelhout, G. & Hammond, D. (2014). Mediational pathways of the impact of cigarette warning labels on quit attempts. *Health Psychology*, 33, 1410-1420.

*Young, S., & Wogalter, M. (1990). Comprehension and memory of instruction manual warnings: conspicuous print and pictorial icons. *Human Factors*, 32, 637-649.

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