

IMPACT OF NETWORK CHANNEL ON ORGANIZATIONAL PERFORMANCE THROUGH RADIO FREQUENCY IDENTIFICATION: MEDIATING ROLE OF COMPETITION

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***Abstract.** Distribution concept was the origin of marketing. Every organization has realized that they can enhance their performance through strengthen their network channels and through the adaptation of new, Radio-frequency identification (RFID), technology. In this study, the relationship between network channel and organizational performance has been established. RFID technology is focused to strengthen network channel to gain competitive advantage, which will result to enhance organizational performance. The nature of this study is correlation based on deductive approach and quantitative nature through survey method based on the adoptive questionnaire. The population of this study is retail industry in China. The sample size is 100 with random sampling technique is used. The results from this study show that network channel affect organizational performance while the competition plays the mediating effect and radio-frequency identification technology play the moderated effect on the relationship between network channel and organizational performance. This study will improve organizational performance in retail industry and will reduce the cost of network channel, which will result to increase organizational performance.*

Key words: Network channel, Accessibility of location, Information, Competition, Radio frequency identification (RFID), Performance

Introduction

Globalization boosted the technology in all over the world. It revolves around organizational processes, customer's behaviors, competition intensity and innovation to increase the efficiency in every field. Today, the battle of

customer acquisition, retention and loyalty is the biggest issue in every organization due to hyper competition; electronic distribution and rapid information transformation create a tough situation for the survival of every organization. The war winning situation is the only guarantee to sustain them in the market (Betancourt, Chocarro, Cortiñas, Elorz, & Mugica, 2017; Tokman et al., 2011).

In recent years, many manufacturers have not the capability for direct marketing. They are not able to supply their products to their customers that is why the move towards the brokers of distribution channel. Even if they have sufficient financial facilities, use of these facilities in the main profession has more efficiency; therefore, advantage of using distribution channel is obvious (Kotler & Armstrong, 2010). On the other hand, according to marketing experts, distribution channel plays the important role in organizational performance. Because if organization has their own distribution channel, then they can satisfy their customers and reduce distribution cost (Haghighinasab, Ebrahimi, Sattari, & Roghanian, 2013).

The network channel has not only the distribution of products from manufacturer to customers. It has many other advantages like the interaction between customers and manufacturer, time saving, cost reduction, and develops the relationship between manufacturer and customers. In the literature of marketing network channels have specially highlighted the importance of customers and manufacturer relationship because marketing experts knows that organizations can sustain their customers only if they have strong relationship with their customers otherwise competitors acquire their customers (Skarmas, Katsikeas, Spyropoulou, & Salehi-Sangari, 2008).

Marketing network channel in retail industry has been distributed in many categories in marketing literature. Five most important network categories which are using in both online and offline retailing are accessibility of location, information, assortment, assurance of product delivery and ambiance are cited in literature (Kopalle et al., 2009). However, in this study only three of them categories have been focused. The focused dimensions of network channel are accessibility of location, information and assurance of delivery of products.

Marketing network channel getting more importance because the network channel will cause to save the cost. In retail, cost is very important. Different studies related to network channel has analyzed the cost function (Betancourt, 2004). Furthermore, network studies have to develop the relationship of cost and retailer; household and consumer demands are major consideration in network channel studies (Betancourt, 2004). The ultimate goal of the network channel is to reduce cost and increase customers, retailer and household demand. The accessibility of location is equally important for sensory and non-sensory goods

to enhance economic performance in marketing channels (Betancourt, Chocarro, Cortiñas, Elorz, & Mugica, 2016; Bucklin, 1966; Keh, 1997).

Information is playing the most important role in product purchasing decision. The purchasing decision of sensory and no sensory products are entirely different from each other. Sensory products are those products that can be analyzed through the basic human senses. These products can be smelled, touched and taste. Customers want to physically see these products before to purchase. So, these products require totally different information as compared to non-sensory products. People do not too much caring to physically see these products before to purchase. So, they require the different type of information during the purchasing decision of online and offline products (Betancourt et al., 2017).

Organizations should ensure their product delivery in online market channels. On-line purchasing took long time as compared to offline purchasing because it will require delivery time. Customers must have to be wait for a long time while in offline purchasing, customer can get products on real time. So, organizations must consider time, delivery and product handling factors during planning their network channel development for online purchasing (Bansal, McDougall, Dikolli, & Sedatole, 2004; Betancourt et al., 2016). Assurance of product delivery can enhance customer satisfaction, which will result from economic and operational performance of organizations. So, the assurance of product delivery is considered the most important dimension of network channel (Finn et al., 2009; Hung et al., 2014; Jaiswal, Niraj, & Venugopal, 2010; Kim et al., 2009).

Radio frequency identification technology was evolved from electronic product code. This technology is used in supply chain management to increase the efficiency and effectiveness of network channel work in organizations to enhance their performance(Shister, 2005). Radio frequency identification technology is the general in nature so this technology can be used in every industry and sector it is not specific with any organization. This unique feature of radio frequency identification technology gave the boost in supply chains equally important in all sectors (Shister, 2005).

Radio frequency identification technology minimized human interaction because this technology does not require the direct connection for operation like the traditional bar system (Dargan, Johnson, Panchalingam, & Stratis, 2004). Furthermore, RFID tags operated very fast they can respond in milliseconds. These tags can be readable virtually, and they cannot be effected through weather conditions. There are a lot of other advantages, in this technology product can be real time traced at any location along the supply chain channel.

Through this technology, products can communicate with each other. Furthermore, this technology enabled to handle inventory, even products can inform to replacement of products on their shelves (Dargan et al., 2004).

Competition is situation when organization feels someone other is offering the same products what they are offering. In the same manner, the competition intensity is the presence of numerous competitors in the same market. Every firm tries to achieve the competitive advantage which will reduce the growth opportunities for other organizations (Auh & Menguc, 2005). Competition intensity increased the social corporate responsibilities among organizations. In high competitive environment, organizations follow more corporate social responsibilities, and they provide more friendly services with care and hospitality to their customers (Zahra & Covin, 1995).

High competitive environment will boost organizational performance. In this situation, customers have free choice to change organization. This reality will result as highly customer's satisfaction and loyalty, which will lead to frequent sales and economic performance. So, the competition intensity is good for both organizations as well as customers, and both can enjoy high performance (Chan, He, Chan, & Wang, 2012).

Organizational performance was categorized into two major parts. The first is financial performance, which can be measured through profit and sales growth. On the other hand, non-financial factors can also be used to measure organizational performance. It is further divided into two major categories. The first is internal non-financial performance. It is based on the internal organizational performance factors like growth in productivity, efficiency in internal process or technological innovation. While the second is external non-financial performance factors it is based on external factors like customer satisfaction, customer loyalty and customer or supplier relationship management (Schoviah, 2012; Swanson & Ramiller, 2004).

Unified Theory of Acceptance and Use of Technology (UTAUT)

The unified theory of acceptance and use of technology (UTAUT) focuses on the acceptance, adoption and implementation of technology in organization. The main purpose of this theory is to educate people about technology and inform them the use of technology. Furthermore, inform them about the advantages of the use of technology. This information will effect on the behaviors of people and enhance their intention in the implementation of technology. This theory is based on four major constructs. The first construct is performance expectancy. The second construct is effort expectancy. Third is social influence and fourth is facilitating conditions. All constructs showed that the implementation of

technology will facilitate them in their work and enhance their performance (Venkatesh, Thong, & Xu, 2016; Venkatesh & Zhang, 2010).

In this study radio-frequency identification, technology is focused as the moderating variable in this study. The unified theory of acceptance and use of technology will support this variable. This study aims at developing awareness about RFID technology in organizations. The subject technology is environment friendly and that's why organizations and society will adopt this technology. By adopting this technology organizations are expected to enhance their performance.

Conceptual Framework

Based on in-depth literature review and theoretical frame work, following conceptual framework for study has been developed.

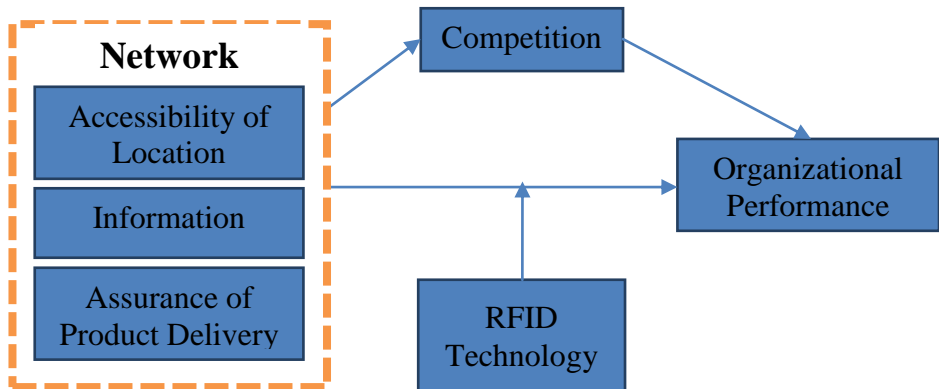


Figure 1. Conceptual framework

Hypotheses

Based on the conceptual framework, following hypotheses have been developed.

- H₁: Network Channel has the positive impact on organizational performance.
- H₂: Competition plays the mediating role between network Channel and organizational performance.
- H₃: Radio frequency identification technology plays the moderating role between network Channel and organizational performance.

Methodology

Methodology plays a vital role to conduct the study. It will describe the whole process and activities related to studying. The nature of current study is quantitative in nature. Because in this study quantitative techniques will be used to analyze data. All variables have the relationship with each other, which can be tested through statistical analysis. Furthermore, deductive research approach is used in this study because theories have been tested through data collection in this study. The population of this study is retail industry in China. Sample is the subset of population. In this study, three organizations should be taken as the sample. Sample will be collected through random sampling technique. The sample size will be 100 employees from Wall Marts. For data collection survey method, will be used based on the adoptive questionnaires from previous studies. The items regarding network channel based on accessibility of location, information and assurance of product delivery (Betancourt et al., 2017), items for RFID Technology (Tokman et al., 2011), items regarding competition and organizational performance (Chan et al., 2012), have been adopted from previous studies. Furthermore, data will be analyzed through different statistical tests by using SPSS software. Then their results will be interpreted by using MS Word.

Data Analysis and Results

Data have been analyzed through different statistical tests. First of all, the reliability of data has been tested through Cronbach Alpha test. If data is reliable and the values of reliability is greater than 0.6, then this data meets the minimum reliability value for further statistical tests and analysis (Sekaran & Bougie, 2013). After finding the reliability, mean, standard deviation and correlation of variables have been tested and results have been interpreted in the following table.

Table 1 Means, Standard Deviations, Correlations, and Reliabilities (N=76)

	Mean	S.D	N.C	RFID	Comp.	OP
Network Channel (N.C)	3.12	1.02	(.94)			
Radio frequency identification	2.86	1.02	0.76**	(.89)		
Competition	2.84	0.92	0.81**	0.90**	(0.88)	
Organizational Performance (OP)	2.69	0.93	0.67**	0.71**	0.78**	(0.81)

Note. **. Correlation is significant at the 0.01 level (2-tailed).
Reliability estimates in parentheses.

The mean values are the central tendency of respondents. In the above table mean value of research variables have been analyzed. The values in the table showed respondents have given the responses towards the neutral or agree behavior. While the standard deviation value shows the deviation from the mean point. The values of standard deviation of research variables are close to zero. It means most of the respondents have the tendency towards central or mean value. The correlation values show the correlation between research variables with each other. In the above table, the values showed positive correlation with all other research variables at the highly significant level. While the data reliability is shown in parentheses, and the value of Cronbach Alpha is greater than 0.6. So, data fulfill the requirements of reliability for further analysis.

Regression analysis shows the regressive effect of independent variable on dependent variable. The following table shows the regression results between network channel and organizational performance.

Table 2 *Regression between Network Channel and Organizational Performance (N= 76)*

Model	R²	β	t	Sig.
Network Channel	0.450	0.671	7.784	0.000

Note. Dependent Variable: Organizational Performance

Network channel is taken as the independent variable while organizational performance is taken as the dependent variable in the above table. The value of R2 shows the effect of independent variable on dependent variable. It is .450. It means the network channel is effecting on organizational performance 45%. While the β shows the standardized coefficient. The value of β in the above table is 0.671, which showed 67.1%. The value of t shows the difference and in the above table, the value is 7.784 at the highly significant level.

Moderated regression shows the moderated effect between the independent and dependent variables. In the following table network, channel is taken as independent variable, organizational performance is taken as dependent variable and radio frequency identification is taken as moderated variable. The results of moderated regression have been interpreted in the following table.

Table 3 *Moderated Regression among Network Channel, RFID and Organizational Performance (N= 76)*

Model	R²	β	t	Sig.
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Network Channel	0.45	0.67	7.78	0.00
Interaction (NC * RFID)	0.52	0.68	3.33	0.00

Note. Dependent Variable: Organizational Performance

In the moderated regression, first the direct effect of independent variable on dependent variable has been analyzed. Then in second model the indirect effect through moderated variable has been analyzed. It is calculated through the interaction term by multiplying independent variable and moderated variable. The change in both models shows the moderated effect of on dependent variable. In the above table, the value of R2 has changed from 0.450 to 0.523, which shows that the effect of moderated variable enhances the effect on performance. The values of β show standardized coefficient value. In the above table, the β values change from 0.671 to 0.683. The value of t is also changed from 7.784 to 3.332 at the highly significant level these values proved moderated effect.

Mediation effect between the independent and dependent variables can be analyzed through two steps the first step is to calculate the regression effect (direct and indirect through the interaction term) then Sobel test calculator is used to find the mediation effect.

Table 3 *Mediation among Network Channel, Competition and Organizational Performance (N= 76)*

Model	R²	β	t	Sig.
Network Channel	0.45	0.67	7.78	0.00
Interaction (NC * Compet)	0.59	1.09	4.91	0.00

Note. Dependent Variable: Organizational Performance

In the regression, first the direct effect of independent variable on dependent variable has been analyzed. Then in second model the indirect effect through interaction variable has been analyzed. The interaction term can be calculated by multiplying the independent variable and mediated variable. The change in both models shows the effect of on dependent variable. In the above table, the value of R2 has changed from 0.450 to 0.587. The values of β showed standardized coefficient value. In the above table, the β values change from 0.671 to 1.086. The value of t is also changed from 7.784 to 4.911 at the highly significant level. After calculating these values, Sobel's test is applied to find mediation effect. The value of Sobel's test is 4.15 at significant level 0.00. The results proved the mediation of competition between network channel and organizational performance.

Conclusion & Discussion

This study is correlational in which the relationship among variables had been developed. The first hypothesis of the study is that network channels have positive impact on organizational performance. This hypothesis was tested through regression analysis and results of the study support the hypothesis. The second hypothesis of this study is competition plays the mediating role between network channel and organizational performance. The results of the multiple regression analysis using Sobel's test proved that competition has been mediating effect between network channel and organizational performance. So, the mediation effect in the model was proved. The third hypothesis of this study is radio frequency identification technology plays the moderating role between network channel and organizational performance. This hypothesis is tested through moderated regression analysis, and the results from this test proved this hypothesis. The empirical data supported the whole model. So, if organizations want to increase their performance, they should be focused on their network channel. The performance of network channel is interlinked with radio frequency identification technology. Because this technology can trace products at real time and give a lot of information about product delivery. Competition also encourages organizations to strengthen their network channel through innovation, technological improvement and new methods to enhance organizational performance. The model of this study will also open new horizons for organizations and researchers in new dimensions.

Limitations and Future Directions

This study has some limitation, which can be minimized in future studies. This study is limited only four variables network channel, organizational performance, RFID technology and competition. All other variables have been ignored in this study. While in the future, some other variable can be considered like channel policies, customer satisfaction and organizational structure in future studies. The population of this study is limited to China only. While in future studies other geographical areas like Malaysia and Pakistan can be considered. This study is based on quantitative methodology while in future qualitative or mixed methodology can be focused. This study is limited only retail industry. In future studies, other industries like health, pharmaceutical, manufacturing and retailing industry can be considered.

References

Atkinson, W. (2004). Tagged: the risks and rewards of RFID technology. *Risk Management*, 51(7), 12-18.

- Auh, S., & Menguc, B. (2005). Balancing exploration and exploitation: The moderating role of competitive intensity. *Journal of Business Research*, 58(12), 1652-1661.
- Bansal, H. S., McDougall, G. H., Dikolli, S. S., & Sedatole, K. L. (2004). Relating e-satisfaction to behavioral outcomes: an empirical study. *Journal of Services Marketing*, 18(4), 290-302.
- Betancourt, R. R. (2004). *The Economics of Retailing and Distribution*. Cheltenham, UK: Edward Elgar.
- Betancourt, R. R., Chocarro, R., Cortiñas, M., Elorz, M., & Mugica, J. M. (2016). Channel Choice in the 21st Century: The Hidden Role of Distribution Services. *Journal of Interactive Marketing*, 33, 1-12.
- Betancourt, R. R., Chocarro, R., Cortiñas, M., Elorz, M., & Mugica, J. M. (2017). Private Sales Clubs: A 21st Century Distribution Channel. *Journal of Interactive Marketing*, 37, 44-56.
- Bose, I., & Pal, R. (2005). Auto-ID: managing anything, anywhere, anytime in the supply chain. *Communications of the ACM*, 48(8), 100-106.
- Bower, A. B., & Maxham III, J. G. (2012). Return shipping policies of online retailers: normative assumptions and the long-term consequences of fee and free returns. *Journal of Marketing*, 76(5), 110-124.
- Bucklin, L. P. (1966). *A theory of distribution channel structure*: University of California, Institute of Business and Economic Research.
- Cadogan, J. W., Cui, C. C., & Li, E. K. Y. (2003). Export market-oriented behavior and export performance: The moderating roles of competitive intensity and technological turbulence. *International marketing review*, 20(5), 493-513.
- Chan, R. Y., He, H., Chan, H. K., & Wang, W. Y. (2012). Environmental orientation and corporate performance: The mediation mechanism of green supply chain management and moderating effect of competitive intensity. *Industrial Marketing Management*, 41(4), 621-630.
- Chiu, C. M., Wang, E. T., Fang, Y. H., & Huang, H. Y. (2014). Understanding customers' repeat purchase intentions in B2C e-commerce: the roles of utilitarian value, hedonic value and perceived risk. *Information Systems Journal*, 24(1), 85-114.
- Dargan, G., Johnson, B., Panchalingam, M., & Stratis, C. (2004). The Use of Radio Frequency Identification as a Replacement for Traditional Barcoding. *Final Project*.

- Darke, P. R., Brady, M. K., Benedicktus, R. L., & Wilson, A. E. (2016). Feeling Close From Afar: The Role of Psychological Distance in Offsetting Distrust in Unfamiliar Online Retailers. *Journal of Retailing*, 92(3), 287-299.
- Finn, A., Wang, L., & Frank, T. (2009). Attribute perceptions, customer satisfaction and intention to recommend e-services. *Journal of Interactive Marketing*, 23(3), 209-220.
- Goh, J. W. (2003). The resource advantage theory of competition: Implications for higher educational institutions in Singapore. *Educational Research for Policy and Practice*, 2(2), 93-106.
- Haghighinasab, M., Ebrahimi, M., Sattari, B., & Roghanian, P. (2013). The Effect of Channel Function Performance on Relationship Quality with Organizational Buyers.
- Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of management review*, 20(4), 986-1014.
- Hung, S.-Y., Chen, C. C., & Huang, N.-H. (2014). An Integrative approach to understanding customer satisfaction with e-service of online stores. *Journal of Electronic Commerce Research*, 15(1), 40.
- Hunt, S. D. (2011). Developing successful theories in marketing: insights from resource-advantage theory. *AMS review*, 1(2), 72-84.
- Jaiswal, A. K., Niraj, R., & Venugopal, P. (2010). Context-general and context-specific determinants of online satisfaction and loyalty for commerce and content sites. *Journal of Interactive Marketing*, 24(3), 222-238.
- Keh, H. T. (1997). The classification of distribution channel output: a review. *The International Review of Retail, Distribution and Consumer Research*, 7(2), 145-156.
- Kim, J., Jin, B., & Swinney, J. L. (2009). The role of etail quality, e-satisfaction and e-trust in online loyalty development process. *Journal of retailing and Consumer services*, 16(4), 239-247.
- Kopalle, P., Biswas, D., Chintagunta, P. K., Jia Fan, K., Pauwels, B. T. R., & Sills, J. A. (2009). Retailer Pricing and Competitive Effects. *Journal of Retailing*, 85, 56-70.
- Kotler, P., & Armstrong, G. (2010). *Principles of marketing*: pearson education.
- Lewis, M., Singh, V., & Fay, S. (2006). An empirical study of the impact of nonlinear shipping and handling fees on purchase incidence and expenditure decisions. *Marketing Science*, 25(1), 51-64.
- Luckett, D. (2004). The supply chain. *BT Technology Journal*, 22(3), 50-55.

- Mahoney, J. T., & Pandian, J. R. (1992). The resource- based view within the conversation of strategic management. *Strategic management journal*, 13(5), 363-380.
- Schoviah, A. (2012). *The effect of marketing distribution channel strategies on a firm's performance among commercial banks in Kenya*. University of Nairobi, Kenya.
- Sekaran, U., & Bougie, R. (2013). *Research methods for business: A skill-building approach* .[e-book]: Wiley & Sons. <http://www.wiley.com/college>.
- Shister, N. (2005). RFID: Taking stock of the wal-mart pilot. *World Trade*, 18(8), 38.
- Skarmeas, D., Katsikeas, C. S., Spyropoulou, S., & Salehi-Sangari, E. (2008). Market and supplier characteristics driving distributor relationship quality in international marketing channels of industrial products. *Industrial Marketing Management*, 37(1), 23-36.
- Swanson, E. B., & Ramiller, N. C. (2004). Innovating mindfully with information technology. *MIS quarterly*, 553-583.
- Tokman, M., Beitelspacher, L. S., Kros, J. F., Glenn Richey Jr, R., Chen, H., & Nadler, S. S. (2011). Technology emergence between mandate and acceptance: an exploratory examination of RFID. *International Journal of Physical Distribution & Logistics Management*, 41(7), 697-716.
- Van Loo, J., De Grip, A., & De Steur, M. (2001). Skills obsolescence: causes and cures. *International Journal of Manpower*, 22(1/2), 121-138.
- Venkatesh, V., Thong, J. Y., & Xu, X. (2016). Unified theory of acceptance and use of technology: a synthesis and the road ahead.
- Venkatesh, V., & Zhang, X. (2010). Unified theory of acceptance and use of technology: US vs. China. *Journal of Global Information Technology Management*, 13(1), 5-27.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal*, 5(2), 171-180.
- Zahra, S. A., & Covin, J. G. (1995). Contextual influences on the corporate entrepreneurship-performance relationship: A longitudinal analysis. *Journal of business venturing*, 10(1), 43-58.