



**VERIFYING IMPACTS OF B2B SERVICE QUALITY
ON PURCHASER-SELLER RELATIONSHIP PERFORMANCE
IN PUBLIC ORGANIZATIONS BY CONSIDERING MEDIATOR
ROLE OF SATISFACTION WITH BRAND RELATIONSHIPS AND
PERFORMANCE - CASE STUDY: MEDICAL EQUIPMENT INDUSTRY**

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Abstract:

The goal of this research is reviewing impacts of B2B service quality on relationship satisfaction and performance by considering mediator role of brand performance in B2B environment. The population is all CEOs of medical and treatment equipment industry; 147 persons have been selected by random sampling. The results showed that there is a positive and significant relationship between B2B service quality and brand performance, satisfaction with purchaser-seller relationship and relationship performance. Also, brand performance plays a significant mediator role in B2B service quality and relationship performance. And finally, customer-seller relationship satisfaction had a significant mediator impact on brand performance and relationship performance. Also, the pattern of B2B service quality influence on relationship satisfaction, brand performance and relationship performance has proper and acceptable fitting.

Keywords: B2B brand performance, B2B service quality, relationship performance, relationship satisfaction, medical and treatment equipment

1. Introduction

Companies which are competing for taking market power always seek methods to beat rivals. Successful management of customer relationship is one of the major competitive advantages which could be exploited by companies to prevent switching of customers to other companies (Kimiloglu, 2009: 226). A company could have more opportunities to provide more services and products for customers to some extent that could effectively connect its customers. Whereas companies more or less solved their

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problems about their one-dimensional functions by using planning systems of company's resources, now by choosing customer relationship management systems they focus on promoting their multi-dimensional functions along with increasing the value they provide for customers (businessmen and consumers) (Kovork and Vrachopoulos, 2009: 48). But the important point is that this matter seems more fundamental in B2B organization as these organizations provide several and different businesses as well as this is practically impossible for them to traditionally marketing according to diversity in type of performance and geographical position and impose great expenses to company.

B2B services have been expanded to different contexts such as communication services, engineering services, consulting, publicity and MRO (maintenance and repair operations). On the other hand, because of plan, features and function of main systems such as medical equipment systems they could considers as a shape of B2B services with most supporting service distribution by industrial products distribution system. Not just logistic services such as transportation but professional services such as consulting and participating in financial and accounting services are included in B2B services.

In B2B marketing, major scientific arguments about brands confirm that organizational purchasers have also feelings and passions, because they are human too and their feelings affect their economic decisions (Jung JH and Kim IG., 2015). In other words, affective cognitive experiments are used to facilitate making decisions and prevent negative evaluation in company. Furthermore, it is believed that companies with stronger brand shall have better financial performances (Park, WK., 2013).

In B2B marketing, parties are so important in relationship between industrial purchaser and seller and in effects of service quality on behavior of industrial purchaser. It is useful for both purchaser and seller to expand their relationship along with their commitments. Industrial seller could use customers as idea making and invention resource and gain market information as well as conform its products and services with customer's needs. Purchaser also could be sure about supplying own needs for long time, has a better economic purchasing, manage own expenses structure and increase own productivity and efficiency (Leonidou L., Palihawadana D., Theodosiou M.; 2007). In industrial markets, sellers will be success just when could perfectly percept purchasing behavior of customers. Relational approach shall have more value for both purchaser and seller in industrial markets and also have mutual benefits (Leonidas L., 2004). Most of industrial marketers try to improve their relationships with customers to could make value in business relationships to sell their products (Eggert A. & Ulaga W., 2006).

IMP group researches also contributed growth of relationship marketing. The main results of their work put business transaction within a bigger network which includes interactional long-term relationships (Hankson, 1982). Reinartz, Krafft and Hoyer (2004) support the relationship between market tendency and management of

relationships with customers as well as confirm that communication power is a key factor in successfully performing it.

Wu and Kenyo (2005) reported that inter-organizational compromise is important as it strengthens relationship with others through certain investment relationship and continuity in special investments. 6 levels (product/service exchange, social exchange, financial exchange, cooperation, exchange of information, agreement) show an extended spectrum of interactions between supplier and purchaser, so in this research and according to former studies about B2B, among components of IMP interaction model four levels are used for service quality in B2B, i.e. social exchange, financial exchange, product/service exchange and cooperation.

But making long-term relationship between suppliers and customers or relationship marketing is the main goal of B2B researches (Tellefsen and Thomas, 2005; Cater and Cater, 2010). Making constructive connection between purchaser and supplier in industrial markets means all marketing activities towards creating, developing and maintaining successful relationship (Morgan and Hunt, 1994). Companies are always more successful by making long-term and supporting relationship with customers. Relationship performance is divided to three categories: maintain relationship, customer's loyalty and promote relationship. Maintaining relationship tries to reach mutual goals of purchasers and suppliers by mutual or complementary cooperation as well as focuses on keeping interactional relationship between companies. B2B service quality could be resulted in positive valuation of purchasers. According to the researches, B2B services could cause high satisfaction of customer (Wu, Kenio, 2005; Kong and Ames, 2004; Carceres and Papariodami, 1967) or keeping customer (Ventis and Ganori, 1967). So it can be said that the importance of a brand could be certainly increased by B2B services (Li and Yu, 2016).

Prior researches have showed that trademark programs are so important for performance of big companies and could offer advantages of cash flow and increasing network power as products of an industrial trademark while both increasing companies' reputation and enhancing barriers to entry. Rauyruen & Miller (2007) reported that in B2B services, brand forms reliability in relationship with customers. Furthermore, it can provide more opportunities for purchasing products. Brand of strong services has several advantages such as service quality, service exhibitor and informant of relationship between supplier and purchaser (Berry, 2000; Gordon et al., 1993; McDonald, Chernatony and Harris, 2001) and the results could convince customers about integrated and sustainable service quality (Berry, 2000) B2B service brands should try to offer superior experiences for customer and make their employees believe that they succeed to submit favor values and meet customers' expectations. All above interactions between companies B2B services and customers are underlying to build brand image (Davis, 2008).

So, we can see increasing competition in manufacturing and service areas all over the world. It is obvious in service fields such as medical equipment industry, etc.

This matter makes it difficult to save customers and increase their loyalty, so providing service quality in B2B is the main and further challenge of active companies in this field. Most of researches in this field relied on opinions of IT authorities and customers which their results have been measured in retailers and selling to final consumer levels. In the meantime, in B2B level it is an interesting and applied subject that opinions of companies' managers as determinant factor have been ignored and less considered in level of wholesaling transactions. In this research, the relationships of interactions between purchasers and suppliers have been applied in IMP model from the sight of inter-organizational network according to social interaction theory, transactions costs theory and resource dependency theory (Hakansson, 1982). IMP interaction model consists of 6 levels: product/service exchange, financial exchange, information exchange, social exchange, cooperation and adaptation (Woo and Ennew, 2005).

According to Metcalf, Frear, and Krishnan (1992), product/service exchange acts as a stimulus in interactions between purchaser and supplier and features of exchanged products affect their interactions. According to information exchange, strategies, development of common product and just-in-time (JIT) system, it is needed to widely and commercially exchange technical information to establish relationship between purchaser and supplier. Social exchange could be an important factor in facilitating communications through personal calling and solving problems (Campbell, 1985). According to research reports, personal calling is an important factor in forming long-term customer-supplier relationships. According to Cannon and Perreault, cooperation could be explained by factors such as participative solution for technical problems, pursuit of mutual profit and participating intend to change.

In companies of medical equipment industry, it is needed to exploit mutual commercial exchange advantages of inter-company interactions to remove countless problems of production management and distribution. So the necessity of this research is more comprehended to collect data from managers of this industry who have high executional experiences. In this matter, the required validity shall be gained by probable prediction of accepting or not-accepting by customers, reviewing the possibility of establishing and maintaining relationship with customers, brand performance and customers' satisfaction on the basis of supply chain management and its effects on JIT management together with analyzing managers' opinions in this industry. In the meantime, it seems that this research and searching in this topic is so important to explain and measure impressionability from efficient variables and influence of each one on research subject.

In spite of plenty of researches in B2B marketing service quality and also less studies which reviewed the relationship between B2B marketing service quality and customer's satisfaction, it has not been dealt with reviewing the relationship between B2B service quality and purchaser-seller relationship performance through mediator variable of satisfaction with brand relationship and performance, so the main issue of this research is reviewing the influence of B2B service quality on purchaser-seller relationship and relationship performance in medical equipment industry. In the

meantime, the relationship between B2B service quality and relationship satisfaction and relationship performance shall be reviewed by considering mediator role of brand performance and medical equipment companies are considered as case study as one of the most important manufacturing industries which is directly effective in developing hygiene and service system and indirectly in economic development.

1.1 Conceptual model

Conceptual model of this research has been designed according to Li and Yu (2016) model and reviews the influence of B2B service quality on relationship satisfaction and relationship performance by mediator of brand performance at one of the medical equipment companies in Tehran. In the meantime, B2B service quality includes four dimensions of product/service exchange, social exchange, financial exchange and cooperation as independent variable and brand performance as mediator variable and relationship satisfaction and performance as dependent variable. Fig. 1 shows the conceptual model of this research.

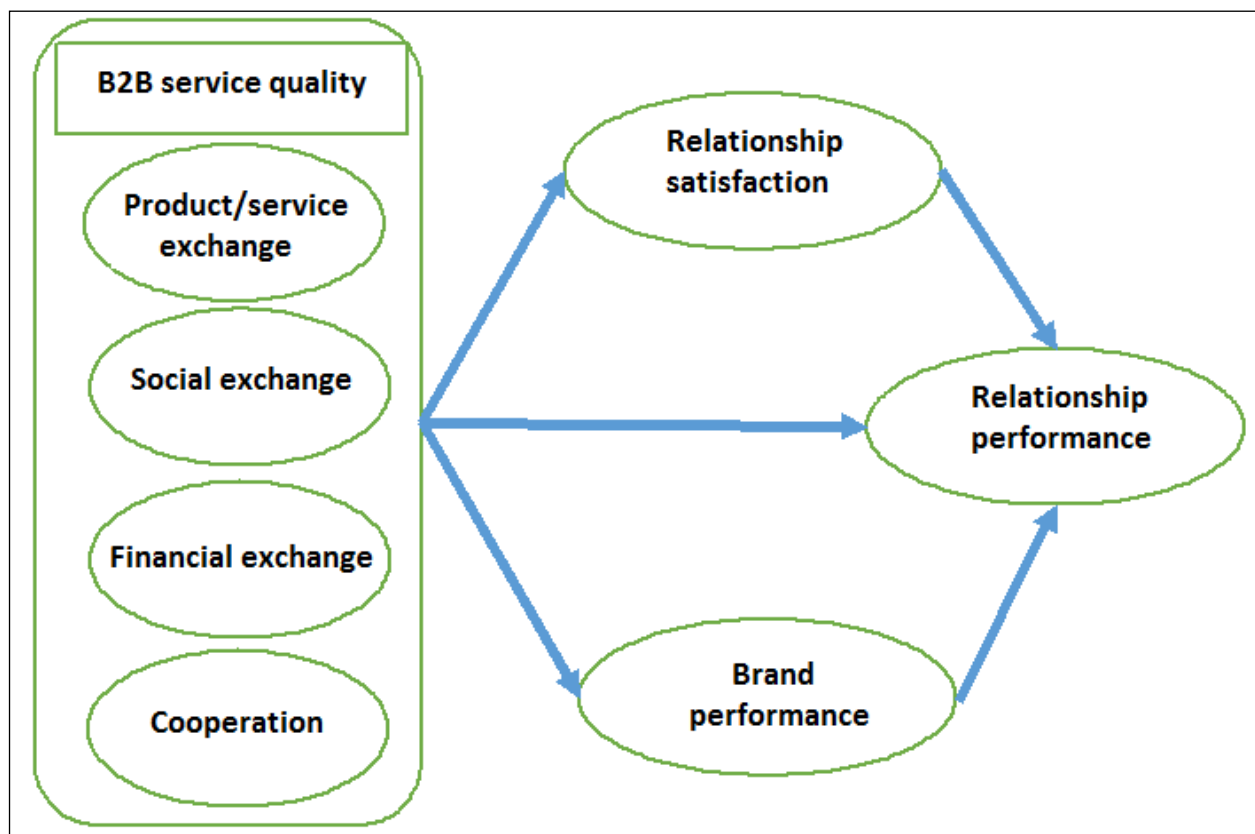


Figure 1: Conceptual model, adapted from Li and Yu (2016) model

1.2 Purpose and hypotheses

The purpose of this study is reviewing effects of B2B service quality on relationship satisfaction, brand performance and relationship performance in Supa medical and treatment equipment Company in Tehran. The following hypotheses have been

formulated to specify the effects of B2B service quality on purchaser-supplier relationship performance in B2B environment:

H1: B2B service quality affects purchaser-seller relationship performance.

H2: B2B service quality affects purchaser-seller satisfaction.

H3: Brand performance affects brand performance.

H4: B2B brand performance affects purchaser-seller relationship performance.

H5: Purchaser-seller relationship performance affects purchaser-seller relationship satisfaction.

H6: B2B service quality indirectly affects purchaser-seller relationship performance through purchaser-seller relationship satisfaction.

H7: B2B brand performance indirectly affects purchaser-seller relationship performance through purchaser-seller relationship satisfaction.

H8: B2B service quality indirectly affects purchaser-seller relationship satisfaction through B2B brand performance.

2. Research methodology

As in this research, it was tried to review and assess the effect of B2B service quality on relationship satisfaction, brand performance and relationship performance, so this research is an applied one in terms of goal and Survey-descriptive, correlation branch in terms of research methodology and Structural equation modeling. Population of this research is all managing directors of medical and treatment equipment companies in Tehran. A questionnaire based on Hakanson's questionnaire (1982) was applied to collect data for B2B service quality which assess all questions by Likert 5-point scale from strongly disagree to strongly agree. Validity of the questionnaire was confirmed by experts. The research reliability was also tested by Cronbach alpha. Alpha coefficient for all questionnaire was gained 0.773 and .776 in testing stage and final stage, respectively which shows the proper reliability of research tools. Structural equation modeling was also applied to inspect research hypotheses.

As it is difficult and relatively impossible to reach all mentioned people who are located in different locations and also there is not official statistics of their numbers, the number of population was assumed unknown. So to calculate sample volume in unknown population, function 2 was applied. From function 1, standard deviation δ is equal to 0.667 for 5-point Likert scale data (Momeni and Fa'al, Ghayoumi, 2010:219). According to function 2, sample volume is about 170 people.

$$\delta = \frac{\max(x_1) - \min(x_1)}{6} = \frac{5-1}{6} = 0.667 \quad (1)$$

$$n = \frac{Z^2 a / 2\delta^2}{\varepsilon^2} = \frac{(1.96)^2 (0.667)^2}{(0.01^2)} = 170 \quad (2)$$

Opinions were collected in person or through Internet. In this matter, the questionnaire was completed by referring managers of medical equipment Supa Company in Tehran. Also, a databank was created and 300 managers and personnel of medical and treatment equipment companies were asked to complete questionnaire which was designed by Google Form as well as if it is possible, send questionnaire to other experts in this industry. 111 questionnaires were completed in person and 36 ones by internet

Also, the reliability of the questionnaire was tested by Cronbach alpha. The results of Cronbach alpha coefficient in SPSS, version 22 show in table 1.

Table 1: Cronbach alpha of research questionnaires

Item	Questionnaire	Cronbach alpha
1	Relationship performance	0.809
2	Relationship satisfaction	0.752
3	B2B service quality	0.771
4	Brand performance	0.769

As you can see all above coefficients are lower than 0.1, so the questionnaire reliability is confirmed. It was also used structural equation technique by PLS Smart to test research hypotheses. Structural equation modeling reviews simultaneously a set of correlated relationships. Structural equation modeling analysis is used in researches which their goals is testing certain model of inter-variables relationships. SEM is desirable in different scientific fields as this method offer a direct way in facing simultaneous multiple relationships which also have statistical efficiency. Capability of this method in assessing multidimensional relationship also causes research shift from exploratory analysis to confirmatory analysis. This shift also causes more disciplinary and comprehensive attitude about problems (Hair et al., 2012).

2.1 Validity of the tools

B2B service quality questionnaire consists of 4 following components: product/service exchange (common value, description of product/service); information exchange: method of connection and conversation (power point, cell phone, podcasts, ...); financial exchange (online and offline payment systems, payment service for value in use, payment for using certain resources and services, ...); social exchange (human interaction traditionally and through online social networks, using social networks to deduct cultural differences). Exploratory factor analysis of independent variables (exogenous variables including product exchange, service exchange, financial exchange and social exchange) and dependent variables (endogenous variables including brand performance and relationship satisfaction) was carried out to test validity of the variables.

Table 2: Exploratory factor analysis and reliability test of exogenous variable
 (B2B service quality)

	Component			
	PE	SE	CO	FE
PE1	.752			
PE2	.747			
PE3	.876			
PE4	.671			
SE1		.811		
SE2		.639		
SE3		.525		
SE4		.765		
CO1			.532	
CO2			.670	
CO3			.790	
CO4			.821	
FE1				.793
FE2				.713
FE3				.718
EV	3.210	2.399	2.153	3.137
V%	20.016	22.919	25.000	27.388
AV%	38.787	53.788	66.707	76.722
K-M-O .835		Bartlett's χ^2 1474.845		Sig. <.001
Extraction Method: Principal Component Analysis.				
Rotation Method: Varimax with Kaiser Normalization				

PE: Product Exchange; SE: Social Exchange; CO: Collaboration; FE: Financial Exchange.

But before analyzing the model, it should be confirmed the fit of SEM with PLS-Smart in three parts of measurement model, structure model and general model to could rely on its results. Actually, the validity and reliability of the model should be proved. The matters of reviewing measurement model were explained at above section. To this purpose, confirmatory factor analysis was applied as the CFA of any indicator with its structures should be higher than 0.04. In this matter, the indicator has the required accuracy to measure that structure. In table 3, the values of CFA for all indicators of any structure are shown.

Table 3: Values of CFA for indicators of any structure in form of measurement model

Variables	Measure	B2B Service Quality	Brand Performance	Relationship Performance	Relationship Satisfaction	CR> 0.05	AVE > 0.05
B2B Service Quality	CO	0.744				0.798	0.500
	FE	0.678					
	PE	0.675					
	SE	0.812					
Relationship Performance	q10			0.930		0.816	0.690
	q11			0.837			
Brand	q5		0.879			0.878	0.782

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Performance	q6		0.780			
Relationship Satisfaction	q7				0.806	
	q8				0.776	0.839 0.635
	q9				0.808	

According to the results of above table, it is clear that indicators of any structure have the required matter of measurement as the factor loading is higher than 0.4, so the validity of structure which chosen to review accuracy and importance of indicators for measuring structures is confirmed which shows indicators provide proper factor structure to measure considered dimensions of the model.

After confirming the fit of measurement model, now its reliability should be confirmed in which two scales of coefficient of determination and Stone-Geisser Criterion are applied (table 4).

Table 4: Structural modelling fit

	SSO	SSE	Aston-Geisler < 0.15	Coefficient of determination < 0.19
B2B Service Quality	612.000	612.000	-	-
Brand Performance	306.000	215.240	0.297	0.455
Relationship Performance	306.000	157.037	0.487	0.673
Relationship Satisfaction	459.000	292.341	0.363	0.619

And finally, general fit of the model should be shown, it means the goodness-of-fit index is used in models based on PLS which should be more than 0.3. This index considers both measurement and structural model and is applied as a scale to measure general performance of the model. This index is calculated by average of coefficient of determination and average of communality as following and the result shows high utility of general model:

$$GOF = \sqrt{Communality \times R^2} = 0.471$$

Now after confirmation of model fit in three levels of structural equation which has been done by Smart PLS, the hypotheses of research are reviewed.

As you can see in Fig 2, path coefficient between B2B service quality and brand performance (0.675) is higher than other relationships and shows the necessity of verifications and suggestions. Next path coefficient is between B2B service quality and satisfaction (0.639) and finally the path coefficient between B2B service quality and relationship performance (0.433) and between brand performance and relationship satisfaction (0.343) are considerable.

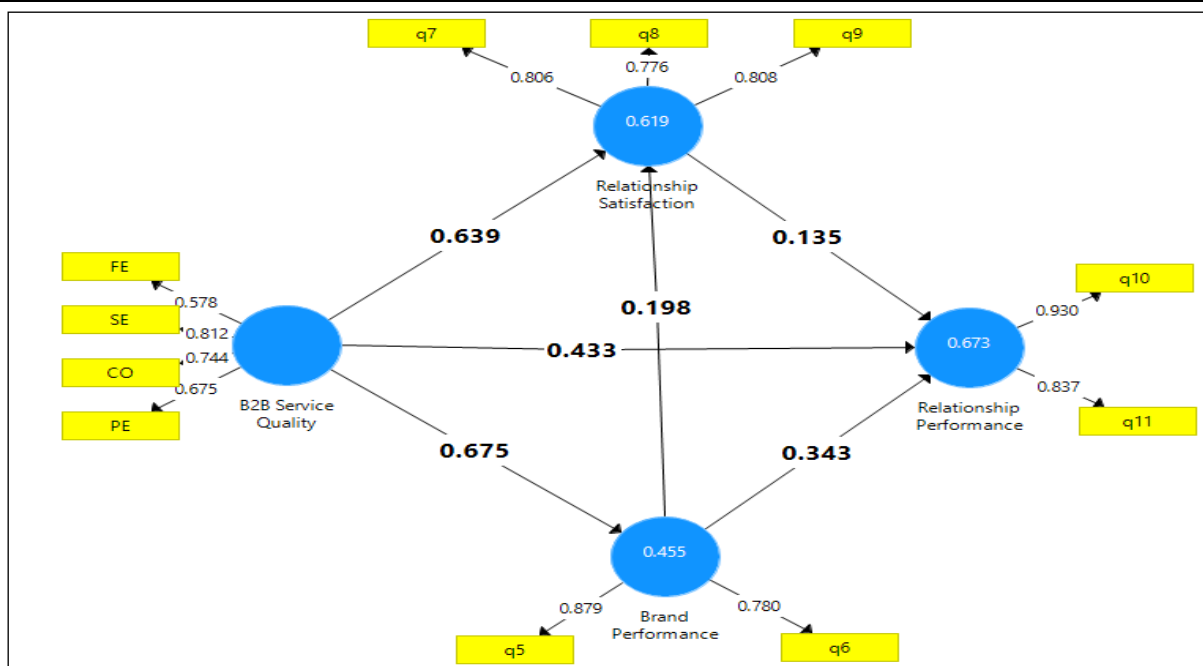


Figure 2: PSL technique of general pattern of research

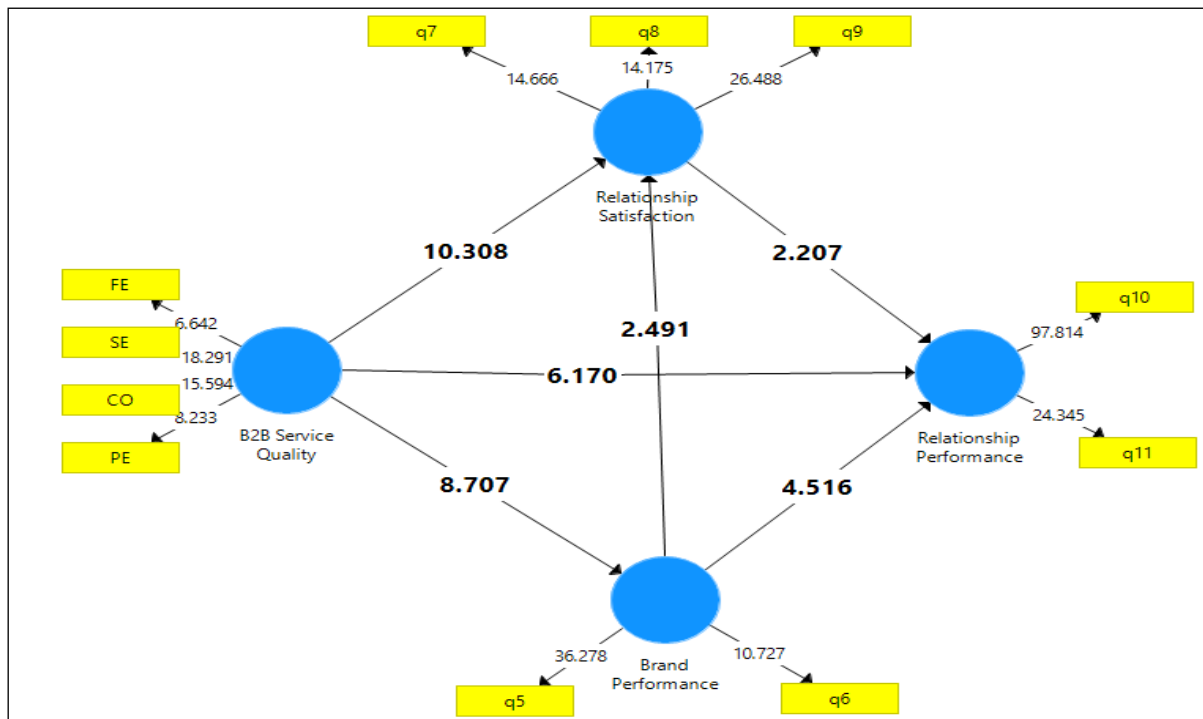


Figure 3: t-value of research general pattern

Table 5: Findings of testing research hypotheses

Path Analysis	β	STDEV	t-value	P Values	Result	R ²
Relationship Satisfaction -> Relationship Performance	0.675	0.078	8.707	0.000	Accept	0.673
B2B Service Quality -> Relationship Performance	0.433	0.070	6.170	0.000	Accept	
Brand Performance -> Relationship Performance	0.639	0.062	1.308	0.000	Accept	
B2B Service Quality -> Relationship Satisfaction	0.343	0.076	4.516	0.000	Accept	0.619
Brand Performance -> Relationship Satisfaction	0.198	0.079	2.491	0.013	Accept	
B2B Service Quality -> Brand Performance	0.135	0.061	2.207	0.028	Accept	0.455

As you can see in Fig 2 and table 5, in confidence level of 95% the results show that B2B service quality directly influence relationship satisfaction, relationship performance and brand performance. Direct effect of brand performance on relationship performance is confirmed. The effect of brand performance on relationship satisfaction and direct effects of relationship satisfaction on relationship performance are confirmed in confidence level of 95%.

2.2 Reviewing mediator role of relationship performance variable and brand performance

Besides mediator testing, VAF (the variance accounted for) statistics is used to determine indirect effect intensity through mediator variable which is between 0 and 1; the closer to 1, the stronger effect of mediator variable and is calculated by function 3:

$$\frac{a \times b}{(a \times b) + c} \quad (3)$$

Where a path coefficient between independent variable and mediator is variable, b is path coefficient between dependent variable and mediator variable and c is path coefficient between independent variable and dependent variable. The results of mediatory of relationship satisfaction and brand performance are shown in table 6.

Table 6: Mediatory effects of path coefficients of the model

Structure Path	Mediation Path	STDEV	t-value	P Values	VAF
B2B Service Quality -> Relationship Performance	0.336	0.061	5.539	0.000	0.347
B2B Service Quality -> Relationship Satisfaction	0.133	0.061	2.176	0.030	0.166
Brand Performance -> Relationship Performance	0.027	0.018	1.459	0.145	---

In reviewing mediator role of brand performance and relationship satisfaction on influence of B2B service quality on relationship performance, as the z-value is more than 1.96 it can be said that in confidence level of 95% this mediator role is significant. Also the mediator role of brand performance on influence of B2B service quality on relationship satisfaction is significant in confidence level of 95% as the z-value is more

than 1.96. Of course, VAF test value for brand performance and relationship satisfaction is equal to 0.347 and 0.166, respectively which not proved being powerful of this mediation effect. But mediator role of relationship satisfaction could not be significant in effect of brand performance on relationship performance as the t-value is 0.145.

3. Discussion and conclusion

The present study has the aim of B2B services as one of the most important consequences of organizational endeavors in the field of industrial marketing. This research tries to determine influence of B2B service quality on relationship satisfaction, brand performance and relationship performance. According to the results, information exchange is applied in different fields of the industry. The results conform the researches of Li and Yu (2016), Choi, Park (2007 and Kalafatis (2000).

According to the results, B2B service quality positively and significantly affects relationship satisfaction and relationship performance through brand performance which conform results of Li and Yu (2016) researches.

It is too expensive to have exchange and relationship marketing strategies in B2B marketing, so it is important for managers to precisely identify and choose their key customers and monitor them continues as well as show their extreme efforts to keep and maintain them. According to confirm first hypothesis and results from both purchaser and seller perspective, managers are suggested to attract more customer by investing in relationship assets of seller. As these assets cause dependency of purchaser to seller which also results in increasing power of seller and affecting customer's decision making process. The more expert and exclusive investments, the more interest for company. Customer service is a one sample of these investments which sometimes is more important than the own product in industrial marketing and makes more value for customer. For example, when there is a glut on the market and industrial products are similar and prices are competitive, great part of customer services shall be assigned to timely shipment and also provide technical services.

According to confirm second hypothesis from purchaser perspective, managers are recommended to encourage purchaser about such investments, as these investments which are done by purchaser to connect a seller primarily excluded just to that relationship and shall not be useful in other relationships. Consequently, purchaser shall be more committed because of costs of company replacement, such as costs of personnel training to have relationship with seller or costs of systems, processes, tools, equipment, etc.

3.1 Recommendations and limitations

The ultimate goal of all active companies in industrial markets is surviving and gaining long-term profit. According to the results, seller's profit shall be increased by favor purchasing attitude of purchaser. Applied recommendations are as follows:

Also by applying B2B service quality measurement tools, managers are capable to assess B2B service quality from the point of customers and finally improve service quality by true planning and modifying disorders. Centers also require to train their personnel about their needs and customers' expectations as well as effective meeting of these needs and expectations.

Managers and planners also could help B2B service quality by equipping centers with effective and modern tools, providing services during promised period and in shortest intervals, training personnel by new knowledge and skills to be capable to respond referrers, perceiving referrers' value and feelings to fill the gap between expectations.

The main result is about significant effect of applying interactional marketing model in B2B on timely delivery of goods in medical equipment industry. In this matter the results show that there is a relationship between more effectiveness of business process by timely delivery of product and relationship satisfaction. So active managers of this field are recommended to consider required conditions to enter this business.

Medical equipment managers and other industrial companies' managers are recommended to periodically receive customers' opinions and suggestions, measure their satisfaction and compare it with previous periods to increase relationship with customers and specify relationship strengths and weaknesses.

As there is a positive and significant relationship between B2B service quality and purchaser-seller relationship tendency, also there is a direct relationship between B2B service quality and relationship performance, so it could be concluded that the more investment in these services by seller, the more tendency to make relationship between purchaser and seller. This matter has some advantages for seller such as: relationship continuation, more precise planning to sell products and services, forecasting further purchases, deducting sale costs. Hence B2B companies are recommended to sufficient invest in these assets to effectively affect their customers. In B2B services, most of the times rendered services to customers is the distinction of suppliers who offer similar products.

The results have explicit recommendations and signs for executors of industrial marketing. Beyond integrated marketing strategies, they should focus on better relationship with customer to keep brand performance and relationship with customers based on supporting loyalty programs.

The role of trademark in forming and maintaining relationship with customers in this industry is taken from customer's perception. According to the results, manufacturers should try to form, orient and maintain a proper perception of trademark (brand) in customer's mind. In this matter they should improve those factors which make and strengthen customers' relationship and avoid those make it weak. Research model shows variables which directly and positively affect customers' loyalty. So industrial marketers should focus strengthen these factors in customers' mind, i.e. interaction with customer, information exchange, cooperation and product/service mutual exchange.

Researchers also could measure the role of different countries trademarks in customers' satisfaction and relationship performance in a certain industry by a comparative procedure in further researches. The results show the effect of trademark country's variable on customer's relationship performance.

The research results show that B2B interactive marketing factors affects relationship satisfaction, so it is needed to review this matter from more expanded dimensions. For example, it could be reviewed items such as purchaser-seller relationship assets, purchasers' knowledge, B2B supply chain and etc. in further researches.

Every research has limitations like limitations this research faces to, for example, population and statistical samples had not such a willingness to fill the questionnaire because of their work nature and lack of experiments in participating similar scientific researches and filled the questionnaire just in personal meeting. Personal refer caused interview to be enriched but took so much energy and time.

- By considering the mentioned industry of this research and special condition of medical equipment industry, so these results could not be generalized to other industries.
- One of the limitations of this study is that there is limitation to generalize the results as the case study is about medical equipment.
- The type of product or service, as an intervening variable, influences purchaser-seller relationship. It is possible to differ purchaser-seller relationship for products with high or low intervention but in this research this variable didn't be studied which could be modeled in further researches.
- The variable of relationship length is measured by years but it is not valid because it is possible for a relationship to be matured in months and another one still be in primary or growth process after years. Further researches could provide useful results by considering nature and maturity curve of relationship.
- Although there is a positive and significant relationship between B2B service quality and relationship performance but it is needed to study that which indices could be mediator between B2B service quality and relationship performance.

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