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Article

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MANAGEMENT | REVIEW ARTICLE

Application of TQM to road races: Study on the sports involvement and willingness to re-participate

Wu Chao-Sen^{1*}

Abstract: This study mainly explored the application of total quality management (TQM) to road running competitions, as well as the correlation and influence between the involvement and willingness of re-participation of road runners. This study conducted questionnaire survey and regarded road runners as its subjects. Hence, the recovery rate was 86.91%. The results show that the involvement of road runners will enhance their willingness of re-participation. Furthermore, involvement has a positive and significant influence on TQM. TQM has a positive and significant influence on willingness of re-participation. Then, this study verified the correlation among involvement, TQM, and willingness of re-participation and concluded that TQM serves an intermediary role among the three variables. To sum up, strengthened quality management of competitions and the involvement of runners can attract the attention of the public, create positive value of road running, and improve the recognition of runners to road race. Through the creation of value of road running, road running competition organizers shall introduce the benefits of TQM, strengthen the quality of service, enhance the effectiveness of competitions, and prevent emergencies, which will increase the satisfaction of road runners and event participants with the overall events.

Subjects: Sport and Leisure Management; Sports Management; Leisure Management

Keywords: total quality management; involvement; willingness of re-participation



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PUBLIC INTEREST STATEMENT

The research explored the application of total quality management (TQM) to road running competitions, as well as the correlation and influence between the involvement and willingness of re-participation of road runners. Strengthened quality management of competitions and the involvement of runners can attract the attention of the public, create positive value of road running, and improve the recognition of runners to road race. Through the creation of value of road running, road running competition organizers shall introduce the benefits of TQM, strengthen the quality of service, enhance the effectiveness of competitions, and prevent emergencies, which will increase the satisfaction of road runners and event participants with the overall events.

1. Introduction

According to the Industrial Classification Standards of the Republic of China formulated by Directorate General of Budget, Accounting and Statistics, and Executive Yuan, art, sports, and leisure services are classified as the tertiary/service industry. Therefore, sport events, regardless of their type and scale, are considered as a part of the service industry (Liu, Huang, & Yang, 2014). Sports events are also one of the key driving forces to the sports industry, which can create much economic value and peripheral economic benefits (Su, 2015). Thus, service quality is a vital factor in the operation and management of sports and leisure service industry (Kao, 2013). Total quality management (TQM) is a systematic activity, centering on customer satisfaction, focusing on social responsibility and corporate governance, and stressing constant improvement and innovation (Lam, Lee, Ooi, & Lin, 2011). Wu and Leu (2008) argued that, total quality management means that, all the units and members of an organization continuously devote to the production and improvement of products, endeavor to offer products with high quality and services, meet customer requirements, and achieve sustainable operation of the organization. Hsu (2005) pointed out that, like enterprises, competitions should stress the basic dimension of product quality, because the satisfaction of customers and participants are conditions for the success of competitions. Wang (2005) stressed that customer orientation is an essential condition for the success of competitions. The most important idea to promote TQM is to improve constantly to improve the quality of service. Sports events are usually cyclical. Except that location, organizer, and some competition items are different, the organization process is almost the same. It is worthwhile probing into how to enhance the quality of sports events (Liu et al., 2014). Based on the above, this study applied TQM to road running competitions, which was one of the motives of this study.

Taiwan is creating a vision that everyone loves sports, can do exercise anywhere and anytime, and improve the health of himself/herself and his/her family members. National fitness has been changed from a concept of “welfare” to a concept of “right” in major countries. Sports, health, and living quality are basic rights of the public (Community Health Promotion Center, 2014). In accordance with Survey of Sports City of the Republic of China in 2012 by the Ministry of Education Sport Administration, jogging is ranked the second in terms of the number of participants in Taiwan, accounting for 23.1% of the whole population. Especially, road running is the most popular sports in Taiwan with surging participants (Liu, 2012). Chang, Lin, and Yu (2004) asserted that, road running becomes popular in recent years in Taiwan. The public become more aware of road running. More venues are available, making it one of the major leisure sports of Taiwanese (Lien, Tang, & Teng, 2015).

Shipway and Holloway (2010) found that road running is an easy and interesting recreational sports, which can improve personal prestige and health. Running can enrich our life. Runners become modest as they learn the spirit of running and benefit from running. They enjoy the fun of running and have some recreational benefits. Thus, besides walking, running is the most popular sports in Taiwan (Lien & Chen, 2015).

Sports are good for health. Participants can have the sense of happiness in sports (Wang, 2015). Venkatraman (1990b) assumed that, constant involvement in sports can turn to be strong and obsessive, then hobby, and lastly a firmly rooted habit. Road running is extremely popular in Taiwan with many participants (Wu, 2014). Mettal (1989) held that, involvement refers to the degree of psychological motive or concern to the things about which one is concerned. It is an attitude toward activities, and it can serve as a constant participation norm for participants. Wiley, Shaw, and Haviz (2000) thought that people with different involvement in sports have different behavioral results. Usually, those with high involvement will have richer and more diversified behavioral results. Thus, the development of persistent sports habit can not only improve one’s physical and mental health and achieve career goals but also improve living quality (Yang, Liu, & Tang, 2015).

Involvement is a significant concept that affects the willingness of re-participation of participants (Chen & Shao, 2006). Participants enjoy the excitement and joy brought about by continuous participation in activities. Higher involvement leads to more joy and higher sense of satisfaction

(Lin & Feng, 2015). Involvement is one's attitude toward activities, which can stimulate and exert a potential influence on the abilities of understanding and decision making (Josiam, Smeaton, & Clements, 1999). It can be used to learn the behavior and decision-making model of consumers (Assael, 1992). Therefore, participants with different involvement in sports will have different decision-making models and attitudes and different degree of willingness of re-participation when they select sports events (Chen & Shao, 2006).

In light of the above views of scholars in the past, this study holds that TQM can be applied to the main framework of competition, enhance the overall quality of road running activities, improve the satisfaction and willingness of re-participation of participants, and has adaptability, originality, and value. It is one of the objectives of this study to link involvement and willingness of re-participation of participants in sports.

2. Literature review and hypotheses

2.1. Literature review

2.1.1. Total quality management

Total quality management (TQM) is a systematic activity, centering on customer satisfaction, focusing on social responsibility and corporate governance, and stressing constant improvement and innovation (Lam et al., 2011). Saylor (1992) believed that the term TQM can be interpreted separately. "Total" means that, when an organization endeavors to make improvement, all its members participate in it. "Quality" refers to the expectations of all customers, including consumers and internal employees. "Management" means the leaders of an organization. Goetsch and Davis (1994) argued that TQM is a management approach that is customer oriented, adheres to quality, makes good use of scientific methods, and stresses long-term commitment to quality, continuous improvement, education and training, self-management, long-term and consistent goals, all staff participation, and autonomous right. Richardson (1997) assumed that, the spirit of TQM focuses on continuous improvement in quality and requires managers to constantly improve. Besterfield, Besterfield-Michna, Besterfield, and Besterfield-Sacre (2003) asserted that, the core values and concepts of TQM shall include vision leadership, customer-driven excellence, organization and personal learning, attention to employees and partners, sensitivity, concentration on the future, management for innovation, management based on facts, emphasis of results and creation of value, and systematic view. Lewis, Pun, and Lalla (2006) found that customer satisfaction, staffing, process control, education and training, management commitment, continuous improvement, leadership, strategic planning, performance evaluation, customer focus, professional team, and landscape Communication. It is important to implement the results of TQM. Bon and Mustafa (2013) hypothesized and conceptualized the relationship between TQM practices and innovation in a model made up of top management leadership, employee involvement, employee empowerment, customer focus, training, and information analysis. It is mainly to improve service quality and process efficiency to strengthen competitive advantage and innovation kinetic energy. Benavides-Velasco, Quintana-Garcia and Marchante-Lara (2014) argued that TQM is the continuous process improvement of the organization's internal leadership model, action strategy, employee training, partnership, and production and sales processes, which positively affects the quality of the entire organization management, providing superior added value and high-quality production kinetic energy. Bolatan, Gozlu, Alpkan and Zaim (2016) found that a positive and strong relationship was determined between total quality management and quality performance.

2.1.2. Sport involvement

Mittal (1983) suggested that involvement is a person's intention to certain goal or activity, and it reflects his (her) interest in goals or activities. Involvement has become a topic often explored in recreational recreation research (Chang & Gibson, 2011; Decloe, Kaczynski, & Havitz, 2009; Jun et al., 2012; Lu & Schuett, 2014; Smith & Smith, 2017). Zaichkowsky (1985) suggested that involvement is a person's perception of needs, values, interest, and things. Involvement is a deeper psychological state of activity or product (Tu, Chen, & Ho, 2017).

Mullin, Hardy, and Sutton (1993) indicated that sport involvement is consumers' frequency, intensity, and persistence of sport involvement or money, time, and energy spent on sport involvement. Meaghan (2001) suggested that sport involvement refers to consumers' intention to involve in specific recreational activities upon identification or stimulus. According to Schmitt (1999), event experiential indicates what consumers have encountered and experienced in the events. Leisure involvement refers to the participants' intrinsic positive and fun, interest and attention to favorite activities, and continuous participation. (Chang & Gibson, 2011). Pi, Huang, Chen, and Kuo (2017) believes that the involvement of leisure sports is the degree of participation in the walking exercise, which produces personal positivity, likes and fun and other internal psychological and external behavior. Thus, audiences are stimulated and have identification and thoughts. In other words, by sports events involvement and recognition, the consumers have new identification and views. Lee, Wu, and Wang (2012) indicated that sport involvement is defined as consumers are interested in, identified with and stimulated by sports, and are willing to involve in by spending time and money.

2.1.3. *Repurchase intention*

Parasuraman, Zeithmal, and Berry (1985) pointed out that in addition to an individual's willingness to purchase again, repurchase intention also means that the individual is willing to recommend products/services to others and spread positive word of mouth. Such ideas are supported by many scholars. Repurchase intention is defined as the willingness of "re-participation" and "referral to others" after one participates in an activity (Boulding, Kalra, Staelin, & Zeithaml, 1993; Yi & La, 2004). Revisit intention covers the satisfaction, impression, experience, familiarity, and understanding of value, safety, and culture of a destination of visitors, which makes visitors have positive memory and attitude toward the destination and affects their revisit intention (Jang & Feng, 2007; Kozak, 2001; Um, Chon, & Ro, 2006). Therefore, this study deems that re-participation intention means the willingness of participants to join others activities held in the place of sports competition and visit other tourist attractions in the place after they participate in a sports event. It becomes a vital goal for competition organizers to enhance the willingness of re-participation of consumers when the former hold or promote relevant sports. Such willingness is key to re-participation of such competitions (Chen & Shao, 2006).

2.2. *Hypothetical inferences*

2.2.1. *Correlation between sports involvement and willingness of re-participation*

Involvement is an important concept that affects the willingness of participation of participants (Chen & Shao, 2006). Wiley et al. (2000) believed that, people with different involvement in sports have different behavioral results. Usually, those with high involvement will have richer and more diversified behavioral results. Wang (2015) held that, through constant sports involvement, people can enjoy excitement and joy and alleviate pressure. Venkatraman (1990) argued that, constant involvement in sports can turn to be strong and obsessive, then hobby, and lastly a firmly rooted habit. The degree of involvement affects the participation in leisure activities and serves as a key factor influencing the constant participation in an activity (Dimanche, Havitz, & Howard, 1991). Additionally, Goodman, Fichman, and Lerch (2003) held that sports competition participants with a higher degree of involvement would have stronger willingness of participation than those with lower involvement. Chen and Shao (2006) thought that the degree of involvement has a positive correlation with willingness of re-participation of competition participants. Zaichkowsky (1985) asserted that, involvement refers to the degree of attention to target of an individual and the possibility of re-participation to activity. This study also intended to learn involvement and willingness of re-participation. Hence, it proposed hypothesis 1 (H1):

H1: Sports involvement of participants has a significant and positive impact on their willingness of re-participation.

2.2.2. Correlation among sports involvement correlation, TQM, and willingness of re-participation

Parasuraman et al. (1985) and Fry, Stoner, and Hattwick (2001) held that, for organizers, the quality of service refers to the ability to meet reasonable demands of participants. Only improving service and protecting the rights and interesting of participants can they improve the quality of competitions. Cunningham and Taylor (1995) deemed that, competitions with better quality and more adaptive to the market can have a stronger influence on consumers. Wang (2005) stressed the importance of customer-oriented service. Service orientation is a significant condition for the success of a competition. Thus, it is necessary to explore how to improve the service quality of a competition from the expectations of road runners to such quality (Liu, 2014). Liu et al. (2014) also believed that, the application of TQM can improve the quality of and satisfaction with competitions.

Dodds, Monroe, and Grewal (1991) argued that subjectively perceived value is a kind of exchange between product or service quality and monetary cost. After they have perceived value, consumers will further generate purchase intention. Hence, purchase intention depends on perceived benefits and value. Perceived value is regarded as an indicator of willingness of re-participation and basis of decision making during consumption of consumers (Parasuraman & Grewal, 2000). Wilson and Rodger (2004) assumed that, positive adjustment of sports behavior is associated with the intention to improve behavior. Thus, the development of persistent sports habit can not only improve one's physical and mental health and achieve career goals but also improve living quality (Yang et al., 2015). Involvement is one's attitude toward activities, which can stimulate and exert a potential influence on the abilities of understanding and decision making (Josiam et al., 1999). Hence, participants of sports events with different degrees of involvement have different standards to measure satisfaction and different considerations of participation intension (Chen & Shao, 2006). Liu, Lee, and Huang (2015) pointed out that, when consumers participate in sports, if they can have smooth and happy experience and high satisfaction, they probably will continue to participate. However, will participants still want to participate in such competitions again after involvement and the introduction of TQM? This is one of the key research points of this study. Thus, this study proposed H2:

H2: Sports involvement of participants will influence their willingness of re-participation through the intermediary role of TQM.

3. Methodology

3.1. Research framework

Based on the above motives, purposes, and literature review, research framework is constructed, as shown in Figure 1.

3.2. Measurement of research variables

This research analyzed the three variables, and the measurement of each variable is as follows. The survey was conducted by associations that held road racing events. The association held at least three years of activities. Before the event was held, the association explained that TQM is a continuous improvement of the quality of continuous improvement and requires managers to

Figure 1. Research framework.

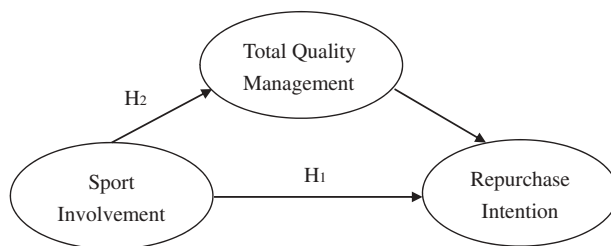


Table 1. Reliability coefficient scale

Variable Cronbach's α	
Sport involvement	0.86
Total Quality Management	0.92
Repurchase intention	0.96

continue to improve (Richardson, 1997). It is hoped that TQM will continue to improve the quality of the association's products and services.

3.2.1. TQM

The study scale is mainly based on the structure proposed by Yang (2005). It contains seven dimensions (including customer relationship management, personnel training, product design management, quality information, continuous improvement, and procedure management) and 24 questions to assess road runners after the introduction of TQM.

3.2.2. Sport involvement

It means consumers' involvement in watching sports events, participation, time, money, and energy spent on certain sport. The measurement is based on sport involvement scale of Shank and Beasle (1998), including cognition and effect of sport involvement. There are eight items.

3.2.3. Repurchase intention

This study analyzed the revisit intention scales of Lin, Lin, and Chang (2007) and Yang, Chen, Chen, and Huang (2012) and developed the re-participation intention scale based on the characteristics of this study that contains 21 questions.

3.3. Research scope and samples

This study regarded people who had participated in running race as its subjects. Limited by this way of survey, it required the high cooperation of consumers. Convenience sampling was adopted. With the consent of the subjects, the investigation was conducted from November 2016 to January 2017. It was expected to distribute 1,100 copies of questionnaire. Road races take recreational sports participants as the main research object. When the participants filled out the questionnaire, participants were asked to participate in the road run. The organizer was to introduce the TQM concept to plan the overall event.

3.4. Pretest questionnaire reliability analysis

The pre-test questionnaire sample collection was conducted on 12 October 2016, in Tainan City. A total of 50 pretest questionnaires were retrieved, and the reliability coefficient Cronbach's α value was used to measure the consistency of the questions about the three variables, shown in Table 1. According to DeVellis (1991), when the Cronbach's α coefficient is greater than 0.7, there is high reliability. Thus, the pretest reliability analysis of the questionnaire showed that the research variables had reliability coefficients over 0.7, and since the scales had related literature as the theoretical foundation, the content validity was good.

4. Results

4.1. Description of the sample structure

Convenience sampling was employed in this study. It had distributed 1,100 copies of questionnaire and collected 1,023 copies, wherein 67 copies were invalid, while 956 copies were valid. Hence, the recovery rate was 86.91%. It used the statistical software of SPSS12.0 to analyze sample structure. The basic data of samples covered five aspects, including gender, age, educational level, occupation, and average monthly income, whose distributions are described below in detail, shown in Table 2.

Table 2. Sample structure analysis table

Demographic variables		Time	Percentage
Gender	Males	532	55.7%
	Females	424	44.3%
Age	21-30 years old	257	26.9%
	31-40 years old	394	41.2%
	41-50 years old	182	19.0%
	51-60 years old	58	6.1%
	61-65 years old	52	5.4%
	Above 65 years old (inclusive)	13	1.4%
	Educational level	Senior (vocational) schools	73
Junior colleges		299	31.3%
Colleges and universities		369	38.6%
Post-graduate schools		215	22.5%
Occupation	Service industry	278	29.1%
	Business industry	196,	20.5%
	Financial industry	171	17.8%
	Electronic industry	167	17.5%
	Others	144	15.1%
Average monthly income	NTD20,001-NTD35,000	148	15.5%
	NTD35,001-NTD50,000	243	25.4%
	NTD50,001-NTD65,000	350	36.6%
	NTD65,001-NTD80,000	184	19.2%
	NTD80,001-NTD95,000	28	2.9%
	NTD95,001 (inclusive)	3	0.4%

4.2. Reliability and validity analysis

This study used AMOS statistical software to carry out confirmatory factor analysis and structural equation model analysis for the dimensions of the questionnaire. First, the measurement model constructed by this study underwent testing for model fitness, reliability, and validity. To verify the relationship between each dimension and item, this study focused on the sport involvement, Total Quality Management, and repurchase intention to engage in confirmatory factor analysis. According to Fornell and Larcker (1981), a composite reliability value (CR) over .6 and an average variance extracted (AVE) over .5, respectively, demonstrate that the research variable scale has good convergent validity and reliability. Hatcher (1994) proposed that the confidence values formed by covariance and standard error do not include 1, which indicates good discriminant validity between the dimensions.

This is calculated as follows:

$$CR = \frac{(\sum \lambda_i)^2}{[(\sum \lambda_i)^2 + \sum \theta_i]} \quad (1)$$

$$AVE = \frac{(\sum \lambda_i)^2}{[\sum \lambda_i^2 + \sum \theta_i]} \quad (2)$$

λ : Observe the normalized load of the variable in the potential variable

θ : Observe the measurement error of the variable

From the convergent validity and reliability of sport involvement, Total Quality Management, and repurchase intention shown in Tables 4–6, it was found that all of the completely standardized factor loadings in the scales were greater than 0.5. Each item also reached the level of significance, with the CRs between 0.801 and 0.952 and the AVEs between 0.606 and 0.769, which indicated that the three variables had good convergent validity and reliability. In addition, the potential construct discriminant validity analysis showed in Table 3. According to the analytical results, the dimensions of this study were obtained by weighting the factor loading of each item (the significance level of α was .05).

4.3. AMOS empirical analysis results of the research hypotheses

Based on the analysis results, it is found that the regression coefficient of sports involvement to willingness of re-participation is .320 $p < .05$, reaching a significant level. H1 is valid. Hence, sports involvement of road runners has a positive influence on willingness of re-participation. Besides, this study probed the application of TQM to road running competitions. It finds that, in terms of the two dimensions of sports involvement, road runners attach higher importance to “psychological factors (.940, $p < .05$)” of sports involvement. Among the six dimensions of TQM, road runners attach the highest importance to “customer relationship management, followed by “procedure management (.922, $p < .05$).” Among the four dimensions of willingness of re-participation, road runners attach the highest importance to “participation motive (.927, $p < .05$),” followed by “local attractions (.914, $p < .05$).”

Figure 2 implies that sports involvement has a positive influence on TQM and willingness of re-participation, respectively (.870;.320, $p < .05$). TQM has a positive influence on willingness of re-participation (.525, $p < .05$). Therefore, this study further examined the intermediary role of the above variables. According to Tyson (2008), when the direct effect among variables is less than the indirect effect, intermediary variables are influential and shall be stressed. It is found that the effect value of sports involvement on willingness of re-participation is .320. However, it is found that through TQM (regression coefficient, .870) and willingness of re-participation (regression coefficient, .525), the indirect effect value is equal to $.870 \times .525 = .457 > .320$. It can be seen that sports involvement has an intermediary role in the path of influence of TQM on willingness of re-participation. Therefore, H2 is valid. Sports involvement, through the intermediary role of TQM, affects willingness of re-participation.

5. Conclusion and suggestions

5.1. Conclusion

5.1.1. Influence of sports involvement on willingness of re-participation

According to the results of this study, sports involvement of road runners will increase their willingness of re-participation. In other words, when road runners have higher sports involvement, they will be more willing to participate in future sports events. Figure 2 demonstrates that, among the assessment dimensions of sports involvement, the effect of “psychological factors” is the most prominent. Among the assessment dimensions of willingness of re-participation, the effect of “participation motive” is the most obvious. Hence, road runners attach more importance to psychological dimensions than physical ones. The results of this study imply that, the improvement of sports involvement of participants, local attractions, and value and fun of events can enhance the recognition of road running races of the participants and deepen the professional quality of road running, especially, the factor of participation motive in the dimension of willingness of re-participation.

In addition to the participation of sports to improve physical and mental health, coupled with high local attractions, road runners participate in sports events because of not only participation motives but also sightseeing. In addition, the creation of value sharing of road running, and event planning and activity arrangements, road runners will resonate with road running. Participants who are enthusiastic about and interesting in road racing will be attracted, and the impression of and attitude toward road running of the public will be changed.

Table 3. Discriminant validity analysis table

Variable	Facet comparison	Confidence interval
Sport involvement	Psychological function <-> Physical function	0.370–0.466
Total Quality Management	Customer relationship management <-> Personnel training	0.457–0.581
	Customer relationship management <-> Product design management	0.472–0.566
	Customer relationship management <-> Quality information	0.626–0.750
	Customer relationship management <-> Continuous improvement	0.472–0.610
	Customer relationship management <-> Procedure management	0.745–0.827
	Personnel training <-> Product design management	0.738–0.860
	Personnel training <-> Quality information	0.661–0.829
	Personnel training <-> Continuous improvement	0.768–0.862
	Personnel training <-> Procedure management	0.765–0.832
	Product design management <-> Quality information	0.580–0.646
	Product design management <-> Continuous improvement	0.627–0.805,
	Product design management <-> Procedure management	0.580–0.641
	Quality information <-> Continuous improvement	0.414–0.506
	Quality information <-> Procedure management	0.590–0.682
	Continuous improvement <-> Procedure management	0.486–0.527
Repurchase intention	Participation motive <-> Local attractions	0.369–0.457
	Participation motive <-> Value sharing	0.368–0.456
	Participation motive <-> Professional quality	0.367–0.459
	Local attractions <-> Value sharing	0.380–0.486
	Local attractions <-> Professional quality	0.312–0.449
	Value sharing <-> Professional quality	0.370–0.458

5.1.2. Influence of sports involvement and TQM on willingness of re-participation

The results of this study indicate that, involvement has a positive and significant influence on TQM. TQM has a positive and significant influence on willingness of re-participation. Then, this study verified the correlation among involvement, TQM, and willingness of re-participation and concluded that TQM serves an intermediary role among the three variables. We can see that the

Table 4. Convergent validity and reliability analysis of sport involvement scale

Variable	Dimension	Item number	Standardized factor loading	Composite reliability	Extracted variance
Sport involvement	Psychological function	a1	.716*	.822	.606
		a2	.780*		
		a3	.834*		
		a4	.841*		
	Physical function	a5	.793*	.850	.637
		a6	.796*		
		a7	.861*		
		a8	.851*		

Note: * indicates $p < .05$ and it reveals significant difference;
 Fitness: RMR = .019; GFI = .96; AGFI = .92; NFI = .96; CFI = .96; RFI = 0.94; RMSEA = .094.

Table 5. Convergent validity and reliability analysis of total quality management scale

Variable	Dimension	Item number	Standardized factor loading	Composite reliability	Extracted variance
Total Quality Management	Customer relationship management	b1	.891*	.952	.769
		b2	.886*		
		b3	.882*		
		b4	.870*		
		b5	.868*		
		b6	.857*		
	Personnel training	b7	.803*	.843	.668
		b8	.788*		
		b9	.798*		
	Product design management	b10	.840*	.801	.670
		b11	.795*		
	Quality information	b12	.788*	.928	.716
		b13	.862*		
		b14	.903*		
		b15	.886*		
		b15	.860*		
	Continuous improvement	b16	.766*	.907	.676
		b17	.748*		
		b18	.882*		
		b19	.845*		
	Procedure management	b20	.826*	.836	.638
		b21	.921*		
		b22	.830*		
		b23	.833*		
b24		.718*			

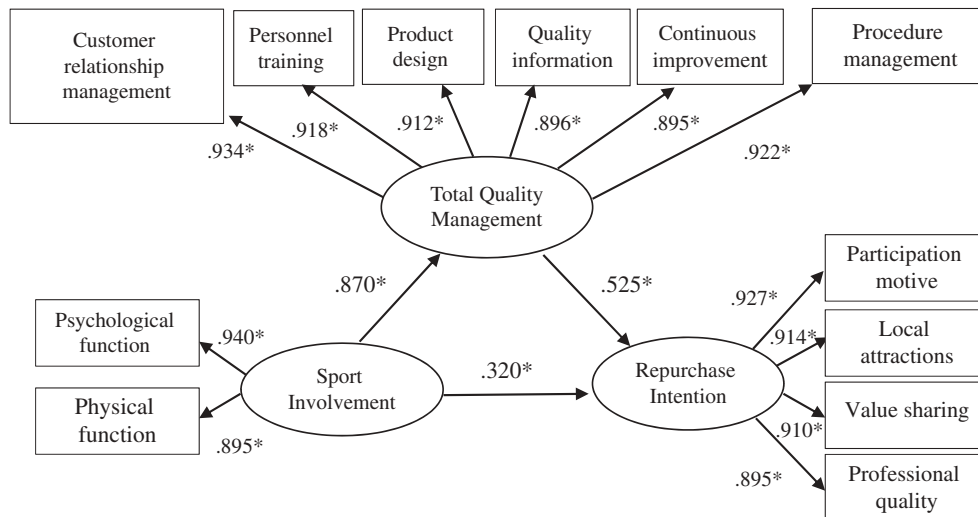
Note: * $p < .05$, which reached a significant level;
 Fitness: RMR = .017; GFI = .932; AGFI = .94; NFI = .96; CFI = .95; RFI = .93; RMSEA = .045.

Table 6. Convergent validity and reliability analysis of repurchase intention scale

Variable	Dimension	Item number	Standardized factor loading	Composite reliability	Extracted variance
Repurchase intention	Participation motive	c1	.864*	.851	.746
		c2	.860*		
		c3	.786*		
		c4	.776*		
	Local attractions	c7	.861*	.902	.766
		c8	.911*		
		c9	.848*		
		c10	.810*		
	Value sharing	c12	.807*	.841	.646
		c13	.803*		
		c14	.794*		
	Professional quality	c18	.840*	.805	.670
		c19	.795*		
		c20	.762*		
c21		.732*			

Note: * p < .05, which reached a significant level;
 Fitness: RMR = .013; GFI = .96; AGFI = .94; NFI = .97; CFI = .97; RFI = .96; RMSEA = .055.

Figure 2. Initial structural equation model.



important spirit of TQM is constant improvement of quality and service, meeting changeable demands of consumers anytime, and enhancing competitiveness of organization (Liu et al., 2014). Thus, road running competitions introduce TQM to enhance competition quality and willingness of re-participation of road runners.

Road running competitions can strengthen quality management of competitions and the involvement of runners, attract the attention of the public, create positive value of road running, and improve the recognition of runners to road race. Through the creation of value of road running, road running competition organizers shall introduce the benefits of TQM, strengthen the quality of service, enhance the effectiveness of competitions, and prevent emergencies, which will increase the satisfaction of road runners and event participants with the overall events.

5.2. Suggestions

First, with respect to TQM, road running competitions shall focus on customer relationship management and effectively control competition procedure management and personnel training in order to improve the satisfaction of sports participants. Second, road running competitions shall enhance the interaction with participants to learn their demands and establish correct standards for the quality of service of competitions. This study holds that, in terms of product design management at the beginning of competition design, the demands of participants shall be analyzed. Through customer relationship management system, activities and commodities in line shall be designed based on the characteristics and needs of different road running participants. With respect to personnel training, volunteers can be recruited. During sports events, quality information shall be provided. In the face of complaints of participants, professional knowledge and rapid response shall be leveraged on to address the problems raised by participants. When sports events end, for the purpose of continuous improvement, relevant communication shall be collected regularly via Facebook or relevant network communication software to serve as the basis for the improvement of quality of sports events.

Road runners stress psychological factors of sports involvement. The dimensions of willingness of re-participation include participation motive, local attractions, and value sharing. It is suggested that sports organizers can cooperate with surrounding enterprises engaged in sightseeing and leisure industry. The characteristics of sports events and tourist attractions shall be combined to market local features, develop sports tour package. When sports events end, deep leisure and travel activities can be arranged. In addition to exercise, participants can experience local customs and alleviate pressure.

To sum up, if they can conduct TQM or marketing manage well before providing service, sports organizers will definitely meet the demands of road runners, improve their perceived value, reduce the occurrence rate of service and quality gap, and enhance participants' satisfaction, loyalty, and willingness of re-participation.

5.3. Research limitations

First, this study adopted convenience sampling to select respondents of questionnaire. The demographic variables had not been evenly distributed. It is suggested that stratified sampling can be adopted for follow-up researches. Second, this study asked the respondents to fill in questionnaire. Affected by environment, emotion, attitude, subjective cognition, or external factors, they may have reservation in their answers. This study investigated participants of road running competitions. The applications of its results to other sports events are limited.

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