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AN APPROXIMATION OF TRADE SHOW EXHIBITORS' BEHAVIORAL INTENTIONS IN FUZZY ENVIRONMENT

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Abstract: The study has two objectives mainly to estimate exhibitors' satisfaction with self-performance, the organizers, and visitors to a trade show, which determines the behavioral intentions of exhibitors, thus providing the organizers with feedback on the perceptions and behavioral intentions of exhibitors and to use the fuzzy Likert scale method to overcome the shortcomings of the Likert scale and enhance its use in the social sciences. The sample included 396 managers who had participated in international trade shows. Fuzzy logic was adopted using linguistic terms to evaluate the satisfaction and intentions of the exhibitors to construct the regression model. Variables relating to satisfaction with self-performance, the organizers, and visitors were found to have a positive effect on the behavioral intentions of the exhibitors. Using fuzzy logic, the discrete ordinal variable was transformed into a continuous variable and its semantic meaning was preserved.

Keywords: fuzzy Likert scale, multiple regression method, exhibitors, trade show

1. Introduction

Trade shows are a cost-effective marketing and communication tool compared to other promotional elements, and impact on potentially relevant customer segments with a high volume of customer traffic because of the reversed relationship between salespeople and customers (Gofman et al., 2011; Smith et al., 2003; Whitfield et al., 2012). There are three primary parties involved in a trade show; exhibitors, organizers, and visitors (Tafesse, 2014; Tafesse and Skallerud, 2015; Jung, 2005; Friedman, 2009). Exhibitors who utilize trade shows effectively and efficiently can transmit the right message about the right products at the right time within the sales cycle (Bellizzi and Lipps, 1984). However, the success and sustainability of a trade show depends on the number of exhibitors who participate (Lee et al., 2012; Whitfield and Weber, 2011; Tafesse, 2014). Further, the future of the trade show depends on the satisfaction and behavioral intentions of the exhibitors (George, 2012; Jung, 2005; Tanner et al., 2001). If the organizers cannot satisfy the exhibitors, they will not be able to ensure the participation of those exhibitors in future trade shows and facilitate positive word-of-mouth communication (Hutchinson et al., 2011; Gofman et al., 2011). Organizers need to accurately and fully determine the needs of exhibitors and then meet their needs and expectations (Lin et al., 2015). By doing so, they can gain both strategic and competitive advantages, and can implement sustainable and profitable strategies in a competitive market by using their resources effectively and efficiently (Fenich, 2012; Lee et al., 2012). However, there are very few studies that have examined the causal relationship between exhibitors' satisfaction with trade shows and their behavioral intentions, and the precursors to this relationship (Lin, 2016; Gottlieb et al., 2011). In most of the existing studies, the satisfaction and behavior intention of the exhibitors was investigated based on their assessment of their self-performance without considering the perspectives of other stakeholders (Berne and Garcia-Uceda, 2008; Bruhn and Hadwich, 2005; Jin and Weber, 2013). However, as Barabasi (2003: 14) emphasized, the view that "nothing happens in isolation" prevails today, and thus mean 'trade shows are viewed as a network of relationships (Gummesson and Polese, 2009: 338). The performance of each of the parties involved in trade shows affects the performance of the other parties, and at the same time depends on the performance of each of the others (Rosson and Seringhaus, 1995; Lin, 2016). Thus, a co-creation process in which all parties are involved is observed.

Service performance has several intangible properties that are difficult to measure (Lin et al., 2009; Tzeng et al., 2002), and expressions of satisfaction with the service offered are

linguistic in nature. Besides, linguistic evaluation of service performance is better suited to individual thinking than methods that use crisp numbers (Liou and Chen, 2006; Wu, Hsiao, and Kuo, 2004). Also, the data obtained in relation to satisfaction are vague, ambiguous, and imprecise. As Zimmer (1983) emphasized, individuals are less successful in making quantitative estimates than in making qualitative estimates. In addition, the subjective attitudes and behavior of the individual contain mostly immeasurable complexities and vagueness (Symeonaki and Kazani, 2001; Al-Najjar and Alsyouf, 2003; Herrera et al., 2000; Lin, 2010). Further, since the diversity in individual perceptions and personalities results in the reflection of different perceptions using the same expressions, flexibility and robustness are essential for evaluators (Tzeng et al., 2002; Hsieh et al., 2005). The use of fuzzy logic is a successful approach to solve mentioned problems and model qualitative information (Zadeh 1975). Qualitative parts are stated as linguistic labels by using linguistic variables. Values of linguistic variables are determined by words and sentences in natural or artificial languages rather than by numbers (Herrera et al., 2000; Herrera and Herrera-Viedma, 2000; Zadeh and Kacprzyk, 1999).

Zadeh (1965) proposed the fuzzy logic, introducing approximation instead of precision in evaluation (Ragin, 2000). The fuzzy numbers used in fuzzy logic are a fuzzy subset of real numbers, and represent an expansion of the concept of the confidence interval (Dubois and Prade, 1979). A fuzzy set provides a researcher with a "powerful mathematical model that retains the substantial latent constructs without losing analytic rigor" (Li, 2013: 1612). However, fuzzy logic, which is frequently used in engineering fields, is rarely used in the social sciences, especially in the service industry (Li, 2013; Ragin, 2000; Bilsel et al., 2006; Tsaur et al., 2002; Tseng, 2009a, 2009b). Service industry studies have largely opted for classical likert scales based on crisp numbers to measure the satisfaction of participants (Benitez et al., 2007; Chan et al., 2000; Behara et al., 2002; Rauyruen and Miller, 2007). Subjectivity, complexity, and intangibility in individuals' evaluations lead to inadequate crisp values in Likert scales, which are inherently ordinal (Hodge and Gillespie, 2003; Pett, 1997) and fail to account for approximate intervals in ordinal data (Russell and Bobko, 1992). Ordinal scales, when measuring the order of responses, fail to measure the intervals between the responses, and all of the intervals are considered equal. In other words, the degree of difference is not clear, because ordinal scales specify the relative position instead of the magnitude of the differences between the preferences. This leads to both loss and distortion of information (Li, 2013). However, fuzzy Likert scales (FLSs) are more accurate to predict

consensus and linguistic agreements and disagreements when measuring expectations and perceptions of consumers because they can reflect the smallest difference in measurement compared with traditional likert scales (Li, 2013; Hsieh, 2013; Tzeng and Hwang, 2014; Kacprzyk and Fedrizzi, 1989; Herrera et al., 2000).

The present study has two main objectives. The first is to estimate trade show exhibitors' satisfaction with self-performance, the organizers, and visitors, which determines their behavioral intentions, thus providing the organizers with feedback on the perceptions and intentions of the exhibitors. The second objective is to use the FLS method to avoid the shortcomings of the likert scale and empower its utilization in the social sciences. Because studies using FLS in social sciences are very limited (eg. Tsaur et al., 1997). Furthermore, the likert scale cannot be applied to classical regression. Thus, in the present study, the Likert scale is defined as an FLS and has a continuous data structure. This is used to check whether classical statistical regression assumptions are met and a suitable prediction model is obtained using the multiple regression method (Malhotra, 1999; Kumar et al., 2012). Thus, using fuzzy logic, the discrete ordinal variable is transformed into a continuous variable and its semantic meaning is preserved (Ragin, 2000). To the best knowledge of the authors, this is the first study that uses data obtained from FLS in regression model.

The rest of the paper is organized as follows. The second section includes literature review. The third section includes theoretical framework and hypothesis. The fourth section gives information about the research method chosen; fuzzy logic and especially discusses the FLS also the survey instrument and sample chosen. In the following section, the application of the FLS and regression analysis are demonstrated. The sixth section presents the results and discussion, describe the limitations of the study, and provide recommendations for future research. The final section is the conclusion part.

2. Literature review

"Self-performance of exhibitors" is the most commonly used variance when measuring trade show performance (Tafesse and Korneliussen, 2011; Gottlieb et al., 2014). Also self-performance is emphasized in most studies as a significant determinant, which forms behavioral intention of the exhibitors regarding trade show (Li, 2007). Essentially, selling and non-selling factors are emphasized in studies relating trade performance of the exhibitors (Kerin and Cron, 1987; Shoham, 1992). Shipley et al. (1993) associated trade show performance expectations of the exhibitors with short-term sales, long-term sales, and non-

selling performance expectations. Gopalakrishna et al. (1995) and Seringhaus and Rosson (2001) took sales-related performance into consideration. Dekimpe et al. (1997) measured trade show performance of the exhibitors by "attraction effectiveness index", whereas, Tanner (2012) drew attention to selling and promotional performance expectations. Hansen (2004) discussed trade show performance of the exhibitors in terms of sales-related, relationship building, image building, information gathering, and motivation boosting. On the other hand, Lee and Kim (2008) ignored motivation-boosting dimension and measured trade show performance of exhibitors by considering other four dimensions in Hansen's study (2004).

Performance of trade show organizers forms a significant component in terms of evaluation of trade show or satisfaction and behavioral intention towards trade show (Tafesse, 2014 Boshoff and Gray, 2004; Jung, 2005). In terms of success and sustainability of the trade shows, organizers should focus on needs of the exhibitors regarding the quality of service offered in trade shows (Lee et al., 2010; Wan and Siu, 2012 Rinallo et al., 2010 Jin et al., 2012). In several studies, trade show service that to be focused on are classified. Gopalakrishna and Lilien (1995) and Gopalakrishna et al. (1995) classified factors effective on trade show performance of organizers under the headings of pre-show promotion, booth space, use of attention-getting techniques, competition, training, and booth salespeople. Friedman (2001) pointed out designing booths with appropriate signage, videos, product displays, direct mail, postcards, multi-piece mailings, giveaways, sales literature, a comfortable booth layout, and suitable conference areas for discussion factors. Jung (2005) mentioned about six dimensions: booth management, content, registration, access, booth location, and booth attractiveness. Chen and Mo (2012) suggested that content, booth management, access, registration, booth layout and function, and exhibition and booth attractiveness, which are properties of exhibition, are found important by exhibitors. In classification of Whitfield et al. (2014), components of trade show were sorted out as incentive travel, convention, exhibition (MICE) facilities, accommodation, accessibility, recreational and professional opportunities, and destination attributes. In general, exhibitors, evaluating the service quality offered by organizers to exhibitors, forms product service quality regarding perception of contents of the booth and the exhibition, whereas, service delivery quality forms booth management, employees of the exhibitors, and interaction with other attendees. As for service environment, it is associated with exhibition and booth accessibility, support amenities and facilities, and booth and exhibition attractiveness (Jung, 2005; Bitner et al., 2008).

"Satisfaction with visitors" shaping with the number and quality of visitors attending trade show forms a significant factor, which is considered by the exhibitors while evaluating trade, shows (Seringhaus and Rosson, 2001). Trade shows forms significant factors for gathering visitors and exhibitors and starting business relations, and improving existing relations (Munuera and Ruiz, 1999; Cox, 1983; Blythe, 2002). Success and sustainability of trade shows are affected directly from interaction performance of visitors and exhibitors (Jin & Weber, 2013). Berne and García-Uceda (2008) are suggested that reasons of visitors and exhibitors for attending trade shows are majorly similar

Behavioral intentions of exhibitors towards trade show reveals exhibitors' intention of attendance to the same trade show; moreover, it reveals the intention of suggestions to other firms considering attending to trade show (Kang and Schrier 2011). Future of trade show depends on satisfaction and positive behavioral intention of exhibitors (Rosson and Seringhaus, 1995). Zhang et al. (2010) and Lin (2016) pointed out positive relation between satisfaction of attendees and behavioral intention. Also, it is crucial that trade show organizers focus on positive word of mouth to reach new exhibitors (Yoo and Chon, 2008).

3. Theoretical framework and hypotheses

When trade shows taken into consideration, we face with a structure that has three main parts. Satisfaction and behavioral intention of exhibitors relating trade show depend on fulfilling exhibitors' expectations of performance, sufficiency of services offered by fair organizers and visitor satisfaction. This study proposes that *satisfaction with self-performance, organizers and visitors* can all affect the *behavior intention* of the exhibitors as the literature reviewed above suggests. Based on the theoretical model outlined above, we propose three testable hypotheses with respect to exhibitor satisfaction and behavioral intentions in relation to trade shows.

H_1: *Satisfaction with self-performance* has a significant positive effect on exhibitors' behavioral intention.

H_2: *Satisfaction with organizers* has a significant positive effect on exhibitors' behavioral intention.

H_3: *Satisfaction with visitors* at a trade show has a significant positive effect on exhibitors' behavioral intention.

4. Research method and sample

4.1 Fuzzy logic

In the present study, fuzzy logic approximation was adopted using linguistic terms to evaluate trade show exhibitors' satisfaction and behavioral intentions. The term "fuzzy," which was introduced by Zadeh in 1962, became famous following the publication of a paper entitled *Fuzzy Sets* in 1965. The fuzzy set theory is mainly used to improve the robustness and flexibility of simplified models to solve complex real-world problems involving human perceptions. Fuzzy set theory involves fuzzy arithmetic operations and fuzzy logic. A crisp set is defined as a collection of elements $x \in X$ that can be countable, over countable, or finite (Zimmermann, 1983). Fuzzy set theory uses membership functions varying between zero and one that allow various degrees of membership for the elements of a given set (Klir and Yuan, 1995).

Definition 1: Let X denote a universal set. Then, a fuzzy subset $\tilde{A}$ of X is defined by its membership function

$\mu_{\tilde{A}} = X \rightarrow [0,1]$,

which assigns a real number $\mu_{\tilde{A}}(x)$ in the interval $[0,1]$ to each element $x \in X$, where $\mu_{\tilde{A}}(x)$ represents the grade of membership of x in $\tilde{A}$.

A fuzzy subset $\tilde{A}$ can be characterized as a set of ordered pairs of element x and its grade $\mu_{\tilde{A}}(x)$, and is often written as

$$\tilde{A} = \{(x, \mu_{\tilde{A}}(x))\ \ x \in X\}.$$

Definition 2: Triangular fuzzy numbers can be denoted as $A = (a_1, a_2, a_3)$, where a_2 is the central value and a_1 and a_3 are the left and right spreads, respectively. The triangular membership function is shown as

$$\mu_{\tilde{A}}(x) = \begin{cases} 0, & x \leq a_1 \\ (x - a_1)/(a_2 - a_1), & a_1 \leq x \leq a_2 \\ (a_3 - x)/(a_3 - a_2), & a_2 \leq x \leq a_3 \\ 0, & x \geq a_3 \end{cases} .$$

4.2 Fuzzy Likert Scale

Researchers in social sciences suggested different solutions to resolve problems relating to Likert scale mentioned above. Chang (1994) and (Russell & Bobko, 1992) claimed that increasing scale points in Likert scale was an effective solution to loss of information. On the other hand, Chan (1991), Chang (1994), Ray (1990) and Brown (2000) suggested that more scale point caused increase of measurement error and one became unwilling to answer questions when faced with more options. This situation increases tendency of individuals to mark the first option they see on the scale, and tendency to mark neutral option and same options for every question (Chan, 1991). Albaum (1997) aimed to measure whether individual agrees in first stage, and in what extend individual agrees or disagrees by forming Likert scale with two stages. Although this scale decreases the tendency to mark neutral option, there are doubts about providing sufficient information relating to individual's attendance. Hodge and Gillespie (2003) developed a "sentence completion" Likert scale, and asked individuals to complete existing expressions on a scale of 0 to 10. Although it is possible to obtain more detailed information with this Likert scale method, it poses problems when individuals confuse while facing with many options and get bored while completing statements (Chang, 1994).

Discussion of fuzzy Likert scale in field of social sciences started when Smithson (1987) mentioned about fuzzy sets theory in social sciences. Fourali (1997) developed fuzzy rating scale to measure success of education, yet didn't do any empirical research to put forward superiority of this scale to classic scale. Tsaur et al. (1997) measured tourists' risk in epistemology perspectives by using FLS. Lalla et al. (2004) didn't come to a decision whether fuzzy Likert scale was an alternative measurement tool compared to classic Likert, because fuzzy measurement scale which was developed to measure educational success gave complicated results. Chang and Yeh (2002) and Kurtulmusoglu et al. (2016) developed fuzzy multi-criteria analysis model to measure service quality of websites of airline companies and Hu (2009) developed to measure service quality of travel websites. Hsu et al. (2007) evaluated suppliers in supply chain by using fuzzy scale. Lin and Lee (2009) adjusted fuzzy assessment method for field of marketing research.

Symeonaki and Kazani (2011) used fuzzy Likert scale to measure xenophobia. Deng (2008) identified critical service attributes by applying fuzzy importance performance. In the vast majority of studies, discussions were made through conceptual or hypothetical models. In the light of these evaluations, fuzzy Likert scales in the social sciences, unlike science and

engineering, are met with very limited interest and their advantages over the classic Likert scale are not sufficiently discussed and used (Symeonaki, & Kazani, 2011).

4.3 Survey instrument and sample

The questionnaire included two sections. The questions in the first section were related to the demographic characteristics of the firms participating in the survey. The questions in the second section measured trade show exhibitors' self-assessed performance, satisfaction with organizers and visitors, and behavioral intentions. Self-performance was measured with the scale used by Seringhaus and Rosson (2001), satisfaction with the trade show organizers and exhibitors' behavioral intentions were measured with the scale used by Lee et al. (2015), and satisfaction with visitors was measured with the scale used by Lin (2010). Satisfaction with self-performance and satisfaction with the organizers were each measured using seven items, satisfaction with visitors was measured using four items, and behavioral intention was measured using two items (see Table A1 in the Appendix). We consulted a trade show organizer and two researchers working on trade shows to check reliability and validity and it was confirmed that all the scales used were reliable and valid. Then, a pilot study was conducted and 30 questions were directed to exhibitors, following which the questionnaire was revised after reviewing incomprehensible or repeated questions. Based on the pilot study results, the Cronbach alpha values of the three dimensions were all higher than 0.85 (0.86 for first dimension, 0.87 for second dimension, 0.88 for third dimension).

In the second part in the questionnaire, participants were asked to 'respond to questions by selecting the appropriate range for each linguistic variable included in the response options. The researchers employed five linguistic variables as very unsatisfied, unsatisfied, fair, satisfied, and very satisfied to evaluate the satisfaction and behavioral intention of trade show exhibitors. The values of the scale range from 0-100, with larger scale values demonstrating more satisfaction and vice versa. The linguistic variable used in responses and the corresponding triangular fuzzy numbers are presented in Table 1. The linguistic variables namely very unsatisfied, unsatisfied, fair, satisfied, and very satisfied, respectively represent the triplets (0, 0, 25), (0, 25, 50), (25, 50, 75), (50, 75, 100), and (75, 100, 100) (see Fig. 1) (Tsaur et al., 2002). We aggregated participants' opinions regarding specific linguistic terms by calculating the average triangular fuzzy number for all participants. The average triangular fuzzy number for each linguistic term was then used for the subsequent assignment of a triangular fuzzy number showing participants' perceptions (Tsaur et al., 2002). Because in triangular fuzzy numbers, there is central value which

represents linguistic variable and membership degree is at the highest level. Also, triangular membership functions eliminated instability that may occur while choosing linguistic variable since they are defined one within the other

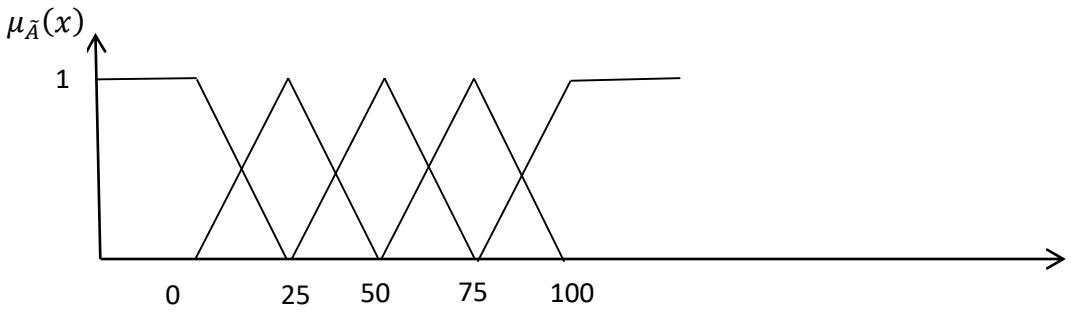


Figure 1: Triangular fuzzy number

Table 1. Triangular fuzzy numbers representing a Likert scale

Linguistic terms	Triangular fuzzy numbers
Very unsatisfied	(0, 0, 25)
Unsatisfied	(0, 25, 50)
Fair	(25, 50, 75)
Satisfied	(50, 75, 100)
Very satisfied	(75, 100, 100)

The questionnaire was mailed to firms that had participated in international trade shows during the preceding 3 months with the request that it be completed by the highest-ranking manager who had participated in the trade show. Firms were advised that the study was for academic research purposes and that the results would be made available upon request. A reminder was sent to companies that had not responded after 2 weeks. A total of 1200 questionnaires were mailed out and 425 responses were received. Questionnaires with missing responses were eliminated, leaving 396 valid responses. In the final outcome, a clear factor structure matrix is obtained. The statistical analysis was performed using SPSS 17.0 for the experimental survey. The Cronbach's alpha coefficient was calculated to determine the reliability of the data. Cronbach's alphas are 0.89, 0.91, 0.87 for three dimensions respectively and 0.90 for all three dimensions together, which confirmed that the scales could be used to successfully measure the constructs described in this study. The responses of 396 responses were found to be adequate based on 95% confidence level and 5% error margin, as presented in DeVaus' (2000) study. The participants' profile information is summarized in Table 2.

Table 2. Profile information on survey participants

		Frequency ($n = 396$)	Percentage (%)
Respondent's position	Owner/general manager	210	53.03
	Marketing manager	60	15.15
	Trade show coordinator	52	13.13
	Purchasing manager	74	18.69
Number of booth staff	1–4	180	45.45
	5–8	178	44.95
	9–12	16	4.04
	10–12	11	2.78
	13–15	9	2.27
	>15	2	0.51
Firm size	0–49 employees	20	5.05
	50–99 employees	21	5.30
	100–149 employees	45	11.36
	150–199 employees	50	12.63
	>199 employees	260	65.66
No. of trade shows exhibited at in the last three years	1–4	96	24.24
	5–8	99	25.00
	>8	201	50.76
Sectors	Manufacturing firms	200	50.5
	Consulting firms	85	21.4
	Telecommunication and energy firms	51	12.8
	Media, marketing, advertising firms	60	15.3
Location	Turkey	396	100

5. Application of the fuzzy Likert scale and regression analysis

The triangular fuzzy numbers for the responses to questions regarding satisfaction with self-performance (X_1), *Satisfaction with organizers* (X_2), *Satisfaction with visitors* (X_3), *Behavioral intention* (Y) were computed and the triangular fuzzy numbers for first dimension "satisfaction with self-performance" (X_1) was exemplified to represent the methodology in Table 3.

Table 3. Triangular fuzzy numbers related to satisfaction with self-performance (X_1)

	Self-performance satisfaction (X_1) (Dimension 1) ($k = 1$)							
i	X_{11} ($p = 1$) $(a^i_{111}, a^i_{112}, a^i_{113})$	X_{12} ($p = 2$) $(a^i_{121}, a^i_{122}, a^i_{123})$	X_{13} ($p = 3$) $(a^i_{131}, a^i_{132}, a^i_{123})$	X_{14} ($p = 4$) $(a^i_{141}, a^i_{142}, a^i_{143})$	X_{15} ($p = 5$) $(a^i_{151}, a^i_{152}, a^i_{153})$	X_{16} ($p = 6$) $(a^i_{161}, a^i_{162}, a^i_{163})$	X_{17} ($p = 7$) $(a^i_{171}, a^i_{172}, a^i_{173})$	$\tilde{A}^i_1$
1	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(50,75,100)	(64.29,89.29,96.43)
2	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25.00,50.00,75.00)
3	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25.00,50.00,75.00)
4	(25,50,75)	(75,100,100)	(0,25,50)	(0,25,50)	(0,25,50)	(0,0,25)	(25,50,75)	(17.86,39.29,60.71)
5	(25,50,75)	(0,25,50)	(0,25,50)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(17.86,42.86,67.86)
6	(50,75,100)	(50,75,100)	(50,75,100)	(50,75,100)	(50,75,100)	(50,75,100)	(50,75,100)	(50.00,75.00,100.00)
7	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(75.00,100.00,100.00)
8	(0,25,50)	(0,25,50)	(25,50,75)	(0,25,50)	(25,50,75)	(0,25,50)	(25,50,75)	(10.71,35.71,60.71)
9	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(0,25,50)	(0,25,50)	(25,50,75)	(17.86,42.86,67.86)
10	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25.00,50.00,75.00)
11	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25,50,75)	(25.00,50.00,75.00)
12	(0,25,50)	(0,25,50)	(75,100,100)	(25,50,75)	(25,50,75)	(50,75,100)	(25,50,75)	(28.57,53.57,75.00)
13	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(75.00,100.00,100.00)
14	(25,50,75)	(75,100,100)	(75,100,100)	(75,100,100)	(25,50,75)	(50,75,100)	(75,100,100)	(57.14,82.14,92.86)
15	(25,50,75)	(0,25,50)	(25,50,75)	(0,25,50)	(0,25,50)	(50,75,100)	(75,100,100)	(25.00,50.00,71.43)
16	(25,50,75)	(50,75,100)	(25,50,75)	(0,25,50)	(0,25,50)	(0,25,50)	(25,50,75)	(17.86,42.86,67.86)
17	(0,25,50)	(0,25,50)	(0,0,25)	(0,25,50)	(0,25,50)	(0,0,25)	(0,25,50)	(0.00,17.86,42.86)
18	(0,25,50)	(75,100,100)	(50,75,100)	(0,25,50)	(0,25,50)	(50,75,100)	(0,25,50)	(25.00,50.00,71.43)
19	(50,75,100)	(75,100,100)	(25,50,75)	(25,50,75)	(25,50,75)	(75,100,100)	(50,75,100)	(46.43,71.43,89.29)
20	(50,75,100)	(75,100,100)	(75,100,100)	(75,100,100)	(25,50,75)	(50,75,100)	(50,75,100)	(57.14,82.14,96.43)
21	(50,75,100)	(75,100,100)	(75,100,100)	(75,100,100)	(25,50,75)	(75,100,100)	(75,100,100)	(64.29,89.29,96.43)
22	(75,100,100)	(75,100,100)	(25,50,75)	(25,50,75)	(25,50,75)	(0,25,50)	(75,100,100)	(42.86,67.86,82.14)
23	(0,25,50)	(0,25,50)	(0,25,50)	(0,25,50)	(0,25,50)	(0,25,50)	(0,25,50)	(0.00,25.00,50.00)
24	(50,75,100)	(75,100,100)	(25,50,75)	(50,75,100)	(50,75,100)	(0,0,25)	(50,75,100)	(42.86,64.29,85.71)
25	(0,0,25)	(0,25,50)	(0,25,50)	(0,25,50)	(0,0,25)	(0,0,25)	(0,0,25)	(0.00,10.71,35.71)
26	(25,50,75)	(0,25,50)	(25,50,75)	(0,0,25)	(0,0,25)	(0,0,25)	(25,50,75)	(10.71,25.00,50.00)
27	(75,100,100)	(75,100,100)	(75,100,100)	(75,100,100)	(0,25,50)	(50,75,100)	(50,75,100)	(57.14,82.14,92.86)
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
396	(75,100,100)	(50,75,100)	(50,75,100)	(50,75,100)	(0,0,25)	(25,50,75)	(25,50,75)	(39.29,60.71,82.71)

For each respondent, the triangular fuzzy numbers for each sub-dimension of the three dimensions were calculated using Eq. (1), and are shown in Table 4:

$$\tilde{A}^i_k = \left(a^i_{k1}, a^i_{k2}, a^i_{k3}\right) = \frac{\sum_{p=1}^{t}\left(a^i_{kp1}, a^i_{kp2}, a^i_{kp3}\right)}{t} \qquad (k = 1,2,\dots,m),\ (i = 1,2,\dots,n), \qquad (1)$$

where $(i = 1,2,\dots,n)$ is the number of respondents, $(k = 1,2,\dots,m)$ is the number of dimensions (dependent variable and independent variables), and $(p = 1,2,\dots,t)$ is the number of questions included in the dimension.

Table 4. Defuzzification results

	X_1		X_2		X_3		Y	
i	$\tilde{A}_1^i$	$defA_1^i$	$\tilde{A}_2^i$	$defA_2^i$	$\tilde{A}_3^i$	$defA_3^i$	$\tilde{A}_4^i$	$defA_4^i$
1	(64.29,89.29,96.43)	84,82	(28.57, 53.57, 75.00)	52,68	(37.50, 62.50, 81.25)	60,94	(62.50, 87.50, 100.00)	84,38
2	(25.00,50.00,75.00)	50,00	(25.00,50.00,75.00)	50,00	(37.50, 62.50, 81.25)	60,94	(50.00, 75.00, 100.00)	75,00
3	(25.00,50.00,75.00)	50,00	(32.14,53.57,71.43)	52,68	(12.50, 37.50, 62.50)	37,50	(75.00, 100.00, 100.00)	93,75
4	(17.86,39.29,60.71)	39,29	(53.57,78.57,92.86)	75,89	(50.00, 75.00, 93.75)	73,44	(62.50,87.50, 100.00)	84,38
5	(17.86,42.86,67.86)	42,86	(35.71,60.71,82.14)	59,82	(31.25, 56.25, 75.00)	54,69	(50.00, 75.00, 87.50)	71,88
6	(50.00,75.00,100.00)	75,00	(75.00,100.00,100.00)	93,75	(56.25, 81.25, 87.50)	76,56	(25.00,50.00,75.00)	50,00
7	(75.00,100.00,100.00)	93,75	(17.86,42.86,67.86)	42,86	(31.25, 56.25, 75.00)	54,69	(50.00,75.00,87.50)	71,88
8	(10.71,35.71,60.71)	35,71	(32.14,57.14,78.57)	56,25	(31.25, 56.25, 75.00)	54,69	(50.00,75.00,87.50)	71,88
9	(17.86,42.86,67.86)	42,86	(17.86,35.71,60.71)	37,50	(25.00, 43.75, 62.50)	43,75	(62.50,87.50,100.00)	84,38
10	(25.00,50.00,75.00)	50,00	(46.43,67.86,85.71)	66,96	(18.75, 43.75, 68.75)	43,75	(62.50,87.50,100.00)	84,38
11	(25.00,50.00,75.00)	50,00	(28.57,53.57,78.57)	53,57	(6.25, 25.00, 50.00)	26,56	(50.00,75.00,87.50)	71,88
12	(28.57,53.57,75.00)	52,68	(25.00,50.00,75.00)	50,00	(25.00, 50.00, 75.00)	50,00	(62.50,87.50,100.00)	84,38
13	(75.00,100.00,100.00)	93,75	(28.57,53.57,78.57)	53,57	(18.75, 43.75, 68.75)	43,75	(50.00, 75.00, 100.00)	75,00
14	(57.14,82.14,92.86)	78,57	(53.57,78.57,89.29)	75,00	(25.00, 37.50, 56.25)	39,06	(75.00, 100.00, 100.00)	93,75
15	(25.00,50.00,71.43)	49,11	(25.00,50.00,75.00)	50,00	(31.25, 56.25, 81.25)	56,25	(62.50,87.50,100.00)	84,38
16	(17.86,42.86,67.86)	42,86	(35.71,60.71,82.14)	59,82	(12.50, 31.25, 56.25)	32,81	(75.00, 100.00, 100.00)	93,75
17	(0.00,17.86,42.86)	19,64	(75.00,100.00,100.00)	93,75	(18.75, 31.25, 50.00)	32,81	(50.00, 75.00, 87.50)	71,88
18	(25.00,50.00,71.43)	49,11	(42.86,67.86,92.86)	67,86	(43.75, 68.75, 93.75)	68,75	(50.00, 75.00, 87.50)	71,88
19	(46.43,71.43,89.29)	69,64	(64.29,89.29,100.00)	85,71	(62.50, 87.50, 93.75)	82,81	(75.00, 100.00, 100.00)	93,75
20	(57.14,82.14,96.43)	79,46	(50.00,75.00,92.86)	73,21	(37.50, 62.50, 87.50)	62,50	(75.00, 100.00, 100.00)	93,75
21	(64.29,89.29,96.43)	84,82	(64.29,89.29,96.43)	84,82	(50.00, 75.00, 93.75)	73,44	(75.00, 100.00, 100.00)	93,75
22	(42.86,67.86,82.14)	65,18	(14.29,32.14,57.14)	33,93	(31.25, 56.25, 81.25)	56,25	(75.00, 100.00, 100.00)	93,75
23	(0.00,25.00,50.00)	25,00	(28.57,50.00,75.00)	50,89	(37.50, 62.50, 81.25)	60,94	(62.50,87.50,100.00)	84,38
24	(42.86,64.29,85.71)	64,29	(21.43,46.43,71.43)	46,43	(37.50, 62.50, 81.25)	60,94	(37.50, 62.50, 87.50)	62,50
25	(0.00,10.71,35.71)	14,29	(42.86,64.29,78.57)	62,50	(25.00, 37.50, 62.50)	40,63	(62.50,87.50,100.00)	84,38
26	(10.71,25.00,50.00)	27,68	(46.43,71.43,96.43)	71,43	(31.25, 56.25, 81.25)	56,25	(62.50,87.50,100.00)	84,38
27	(57.14,82.14,92.86)	78,57	(21.43,46.43,71.43)	46,43	(31.25, 56.25, 81.25)	56,25	(75.00, 100.00, 100.00)	93,75
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
396	(39.29,60.71,82.71)	60.71	(28.57,53.57,78.57)	53.57	(37.50, 56.25, ,75.00)	56.25	(75.00, 100.00, 100.00)	93,75

Regression models servers for the same purpose with structural equation models (SEM) (Xuan, 2013). Complex mathematical structure of claims, relations and process of estimation made compulsory usage of ready software, such as AMOS, EQS, and LISREL in SEM (Raykov and Marcoulides, 2006). These software works with crisp value (Xuan, 2013). Because triangular fuzzy numbers corresponding to linguistic variables were used in this study, the structure of the data set do not allow to the usage of these software. Considering size of the data set and data set in fuzzy nature, it is not possible to apply SEM without any software.

To generate a statistical regression model for the $\tilde{A}_k^i$ values obtained as triangular fuzzy numbers, the fuzzy numbers were translated into crisp numbers using the defuzzification method. The defuzzification of each value of $\tilde{A}_k^i$ $(i = 1,2, \dots, n)$, $(k = 1,2, \dots, m)$ obtained as a triangular fuzzy number was achieved using Eq. (2):

$$defA_k^i = \frac{a_{k1}^i + 2a_{k2}^i + a_{k3}^i}{4} \qquad (k = 1,2,\dots,m),\ (i = 1,2,\dots,n). \tag{2}$$

The multilinear regression model relating to the proposed model was established using $defA_k^i$ values. The multiple linear regression model is shown in Eq. (3):

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots \beta_n X_n + \varepsilon, \tag{3}$$

where Y is the independent variable, X_k $(k = 1,2,\dots,n)$ are dependent variables, and ε is the random error and $\beta_0, \beta_1, \dots, \beta_n$ are the regression coefficients. The error term ε is assumed to be a normal random variable with mean zero and variance σ^2 (Chatterjee and Hadi, 2015).
In the model represented by Eq. (3), satisfaction with self-performance (X_1), the organizers (X_2), and visitors (X_3) are the independent variables and behavioral intention (Y) is the dependent variable. First, we needed to check whether the proposed regression model met the assumptions. Accordingly, the agreement of the data with a normal distribution for each variable was checked using the Kolmogorov–Smirnov test. It was concluded that the dependent and independent variables were normally distributed (p>0.05). To determine multicollinearity, the main diagonal elements of the inverse of the correlation matrix, called the variance inflation factor (VIF), were calculated. The VIF values were determined to be 3.964, 7.327, and 4.751, for satisfaction with self-performance, the organizers, and visitors, respectively. For all independent variables, the VIF was less than 10 and there were no multiple connections.

The Durbin–Watson statistic (d) is the basis of a test of autocorrelation in regression analysis. The value of d was found to be 1.82. With n = 396, three predictor variables, and a significance level of 0.05, $d_L = 1.61$ and $d_u = 1.74$. Thus, there was no autocorrelation.

The multivariate regression model is given by Eq. (4):

$$\hat{y} = 51.121 + 0.122x_1 + 0.184x_2 + 0.217x_3. \tag{4}$$

ANOVA statistics and the results of the regression analysis are presented in Table 5 and Table 6, respectively.

Table 5. ANOVA statistics

Model	Sum of squares	df	Mean squares	F	P
Regression	13790.685	3	4596.895	300.802	0.000
Residual	5990.600	392	15.282		
Total	19781.285	395			

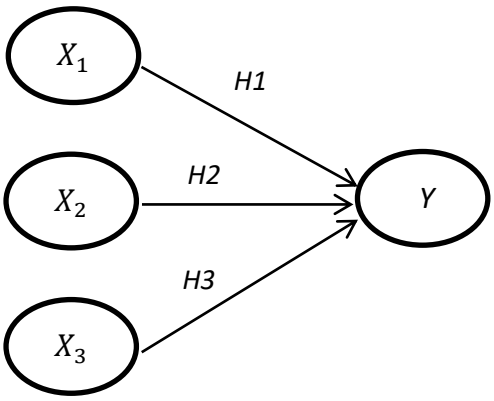
Predictors: Constant, X_1, X_2, X_3
Dependent variable: Y

The model had a determination coefficient of R^2 = 0.70. This finding confirmed the validity of the model and data set. At this point in the analysis, we should investigate the pattern of residuals to check the model specifications.

Table 6. Regression coefficients and confidence intervals for independent variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	P	95% Confidence Interval for B		Collinearity Statistics
	B	Std. error	Beta			Lower Bound	Upper Bound	VIF
Constant	51.121	1.203		42.488	0.000	48.755	53.486	
X_1	0.122	0.031	0.219	3.949	0.000	0.061	0.183	3.964
X_2	0.184	0.046	0.299	3.979	0.000	0.093	0. 275	7.327
X_3	0.217	0.036	0.362	5.972	0.000	0.146	0.288	4.751

Because the coefficient of X_1 is 0.122, a unit increase in satisfaction with self-performance increases the behavioral intention of exhibitors by 0.122 units. Similarly, as the coefficient of X_2 is 0.184, an increase in satisfaction with organizers increases the behavioral intention of exhibitors by 0.184 units. Finally, as the coefficient of X_3 is 0.217, a unit increase in satisfaction with visitors increases the exhibitors' behavioral intention by 0.217 units. Therefore, H_1, H_2, H_3 were accepted according these results.



X_1: Satisfaction with self-performance
X_2: Satisfaction with organizers
X_3: Satisfaction with visitors
Y: Behavioral intention

Figure 2 : The empirical model

6. Results and Discussion

The most significant factor affecting the behavioral intentions of exhibitors is satisfaction with visitors. Thus, organizers wanting to obtain a competitive advantage should create an atmosphere that increases the interaction between visitors and exhibitors (Lin et al., 2015; Gopalakrishna et al., 2010). At different stages of the trade show, it is necessary to facilitate the relationship-building process between visitors and exhibitors (Jin and Weber, 2013). Similar to the findings of previous studies, the results of the present study demonstrated that both the quality and quantity of visitors have a significant effect on exhibitors' evaluation of trade shows (Dickson and Faria, 1985; Browning and Adams, 1988; Kijewski et al., 1993; Seringhaus and Rosson, 2004; Bello, 1992; Bello and Lohtia, 1993). Supporting this finding, Gopalakrishna et al. (2010) pointed that organizers wanting to gain competitive advantage must create an effective and successful interaction between the visitors and the exhibitors. Also, it is related with to what extent the intention of the visitors to attend trade show support the relation established and improved by organizers during trade shows between exhibitors and visitors (Geigenmuller & Bettis-Outland, 2012). Strategies of organizers increasing

satisfaction of exhibitors to visitors attending the trade show boost the attendance of visitors to trade show, and organizers will create contribution with two aspects for sustainability and success of trade shows. At this point, it is important that organizers determine the exhibitors' expectations regarding visitors' satisfaction for trade show and generate marketing strategies considering these expectations. The number of visitors creating added value is important for the exhibitors as for the number of visitors participating in the total trade show.

In parallel with the results of previous studies (Lee and Beeler, 2009; Jin and Weber, 2013; Jung, 2005), satisfaction with the trade show organizers was found to have a positive effect on the behavioral intentions of exhibitors. This suggests that the organizers must pay attention to the diversity and quality of the services they provide for exhibitors. No matter how many sales contracts the exhibitors sign, if they are not satisfied with the services offered by the organizers, they will not choose the same trade show next time (Seringhaus and Rosson, 2004). It is necessary and important for the organizers to shape the services and the quality of service they offer to exhibitors in the direction of their expectations. Especially, layout plan in trade shows should be shaped by considering self-performance of the firms, and alternatives should be presented before trade show.

It was also found that exhibitors' satisfaction with self-performance affected behavioral intentions. Thus, trade show organizers need to provide services and shape the participant profile to support the exhibitors' self-performance. Accordingly, it is also important for organizers to analyze properties of target markets, current and potential customers, and marketing strategies and expectations and purposes of the firms in trade show before the trade show takes place, and determine steps that will increase performance of firms in trade show. Other firms that firms want to establish partnership with or visitors that firms want to initiate or develop relationships should also be tried to be included in the trade show. Performance objectives of firms about trade show should be asked before the show and some improving work should be done in this direction.

This study examines four key aspects of a trade show; exhibitors' satisfaction with self-performance, organizers, and visitors, and their behavioral intentions. The findings of the study are significant because they enable trade show organizers to evaluate trade shows interactively in a holistic manner considering the needs of all stakeholders, providing a roadmap with which they can plan and manage future trade shows proactively and effectively.

The results relating to the effects of satisfaction with trade show organizers and visitors on behavioral intentions, in addition to the effects of satisfaction with self-performance, support

the view that when these two aspects are not considered, information on the behavioral intentions of the exhibitors is inadequate (Jin et al., 2012). In other words, active, effective, sustainable trade shows are co-produced by organizers, exhibitors, and visitors (Bitner et al., 2008). That is, exhibitors can only achieve a high level of trade show performance if they connect with the right customers using proper communication techniques and if there are adequate trade-show services and facilities (Dekimpe et al., 1997). Thus, exhibitors prefer trade shows that are well organized and visited by high-quality customers (Lin et al., 2015). Berne and García-Uceda (2008) pointed that intention of visitors and exhibitors are majorly similar with each other in their study. Consequences of this study can be guiding for organizers who want to increase satisfaction of visitors relating trade show and to create positive behavioral intentions.

International trade shows can serve to revitalize regional economies, while at the same time improving the international image of the host country and related industries (Huang, 2016). Satisfaction and positive behavioral intention of exhibitors create positive effect to improve international image of the host country and related industries (Tanford, Montgomery, & Nelson, 2012; Zhang et al., 2010).

Furthermore, in terms of destination marketing, they represent a significant marketing element that must be considered in terms of accommodation, food, beverage, transportation, and entertainment expenditure (Busche, 2005; Munuera and Ruiz, 1999). Thus, the results of the present study are important for the hospitality, travel, and tourism industries, as well as for the organizers of trade shows. Furthermore, trade shows are aimed at industrial consumers (Zhang et al., 2010), who are normally less price sensitive, and are less affected by seasonality, one of the most important constraints of the tourism industry (Chon and Weber, 2002).

Following the evaluation using the FLS, it was possible to obtain an assessment that reflected the various views of the participants who completed the questionnaire. The results obtained from the responders were not evaluated using crisp numbers, allowing their responses to be included in the analysis by allowing a certain spread. When the shortcomings of traditional Likert-scale measurements are considered, the method used in the present study constitutes a significantly improved analytical approach. The method proposed in this study can also be used in other studies where assessment is inherently subjective or verbal. An important contribution of the present study is to enable fuzzy set theory to be used in relation to service performance measurement because loss or misinterpretation of information was

reduced to a minimum. Further, instead of the triangular fuzzy numbers used in the FLS, different types of fuzzy numbers can be developed using different membership functions.

In this study, deficiencies due to instability of exhibitors are eliminated by using fuzzy likert scale, so loss of information is minimized. The application of FLS in this study enables us to consider the nature of exhibitor perceptions. It is thought that this method, by definition, minimized the tendencies of marking the first option exhibitors see, marking the same option for every question, and marking neutral option. Because, exhibitors face with linguistic variables rather than number while they are answering questionnaire; furthermore, using triangular membership function allows interaction between given answer and answers that are closed to it. In this circumstance, fuzzy Likert scale can be use in social sciences successfully. Superiority of classic Likert scale comes from its easiness to replace and form. In this perspective, fuzzy Likert scale is a quite sufficient scale. Numerical measurement results of Likert scale can be used directly for statistical inference (Symeonaki, & Kazani, 2011). Fuzzy Likert scale can be also used in various regression models as it can be seen in the results of this study. Fuzzy Likert scale used in this study showed reliability and validity as classic Likert scale as it is stated in results. In this study, large amount of data were collected and analysed as in classic Likert scale.

7. Limitations and Further Studies

One of the limitations of the study is that 'exhibitors' stated behavioral intentions could not be transformed into actual behavior for various reasons including budget and time constraints and changes in strategy. Therefore, future studies should consider the addition of a variable predicting the effects of these factors'. In future studies, expectations of visitors and exhibitors before trade show and perception of them after the show can be measured simultaneously and discussed. Moreover, comparisons can be made in terms of firms, which are in different sectors or have difference marketing strategies. Whether perception about country and city in which trade show takes place or about host culture change with the experiment of trade show can be questioned.

In terms of methodology, in response to the possibility that the data set obtained using the FLS might not meet the regression criteria, the fuzzy regression method should be used in future studies. Furthermore, the modeled structure should be linear in relation to both structural equation modeling and linear regression analysis. However, instances where the relationship is unclear, there may be other factors affecting the independent variable. In this case, the proposed model would exhibit a nonlinear structure. We plan to examine nonlinear

model structures in future studies. Fuzzy quality function deployment method can be preferred in future studies to measure expectations and perceptions of organizers and exhibitors simultaneously and to determine the expectations that should be met mostly by organizers.

8. Conclusion

Using the FLS method, the present study provides a tool for trade show organizers to estimate the behavioral intentions of exhibitors using a model that provides accurate, realistic, and thus meaningful results. Based on the co-production perspective, which currently dominates the paradigm, particularly in the industrial markets, the present study scrutinizes exhibitors' satisfaction with all of the parties involved in trade shows, which is the determinant of their behavioral intentions.

References

Albaum, G. (1997). The Likert scale revisited: An alternate version.Journal of the Market Research Society, 39 , 331–349

Al-Najjar, B. and Alsyouf, I. (2003), "Selecting the most efficient maintenance approach using fuzzy multiple criteria decision making", *International Journal of Production Economics*, Vol. 84 No.1, pp. 85-100.

Barabasi, A.L. (2003), "The new science of networks", *Physics Today*, Vol. 6 No. 5 , 12-18.

Behara, R.S., Fisher, W.W. and Lemmink, J.G.A.M. (2002), "Modelling and evaluating service quality measurement using neural networks", *International Journal of Operations & Production Management*, Vol. 22 No. 10, pp. 1162-1185.

Belizzi, J.A. and Lipps, D.J. (1984), "Managerial guidelines for trade show effectiveness", *Industrial Marketing Management*, Vol. 13, pp. 49-52.

Bello, D.C. (1992), "Industrial buyer behavior at trade shows: implications for selling effectiveness", *Journal of Business Research*, Vol. 25 No. 1, pp. 59-80.

Bello, D.C. and Lohtia, R. (1993), "Improving trade show effectiveness by analyzing attendees", *Industrial Marketing Management*, Vol. 22 No. 4, pp. 311-318.

Benitez, J.M., Martin, J.C. and Roman, C. (2007), "Using fuzzy number for measuring quality of service in hotel industry", *Tourism Management*, Vol. 28, pp. 544-555.

Berne, C. and Garcia-Uceda, M. (2008), "Criteria involved in evaluation of trade shows to Visit", *Industrial Marketing Management*, Vol. 37, pp. 565-579.

Bilsel, R.U., Buyukozkan, G. and Ruan, D. (2006), "Fuzzy preference-ranking model for a quality evaluation of hospital web sites", *International Journal of Intelligent Systems*, Vol. 21, pp. 1181-1197.

Bitner, M.J., Ostrom, A.L. and Morgan, F.N. (2008), working paper, "Service blueprinting: a practical technique for service innovation", Center for Services Leadership, Arizona State University.

Blythe, J. (2002), "Using trade fairs in key account management", *Industrial Marketing Management*, Vol. 31 No. 7, pp. 627-635.

Boshoff, C. and Gray, B. (2004), "The relationships between service quality, customer satisfaction and buying intentions in the private hospital industry", *South African Journal of Business Management*, Vol. 35 No. 4, pp. 27-37.

Brown, J. D. (2000). Using surveys in language programs. Cambridge: Cambridge University Press.

Browning, J. and Adams, R. (1988), "An effective promotional tool for the small industrial business", *Journal of Small Business Management*, Vol. 26 No. 4, pp. 31-36.

Bruhn, M. and Hadwich, K. (2005), "Managing the service quality of trade fairs", in Kirchgeorg, M. (Ed.), *Trade Show Management: Planning, Implementing and Controlling of Trade Shows, Conventions and Events*, Gabler Verlag, Berlin, pp. 787-821.

Busche, M. (2005), "The role of associations and institutions in the trade fair industry", in

Kirchgeorg, M., Dornscheidt, W.M., Geise, W. and Stoeck, N. (Eds), *Trade Show*

Management, Gabler, Wiesbaden, pp. 99-115.

Chan, F.T.S., Jiang, B. and Tang, N.K.H. (2000), "The development of intelligent decision support tools to aid the design of flexible manufacturing systems", *International Journal of*

Production Economics, Vol. 65 No. 1, pp. 73-84.

Chan, J. C. (1991). Response-order effect in Likert-type scales.Educational Psychology Measurements, 51, 531–540

Chang, L. (1994). A psychometric evaluation of 4-poing and 6-point Likert-type scales in relation to reliability and validity.Applied Psychological Measurement, 18 , 205–215.

Chang, Y. H., & Yeh, C. H. (2002). A survey analysis of service quality for domestic airlines. European Journal of Operational Research, 139, 166–177.

Chatterjee, S. and Hadi, A.S. (2015), *Regression Analysis by Example*, John Wiley & Sons.New York.

Chen, Y. and Mo, H. (2012), "Attendees' perspectives on the service quality of an exhibition organizer: a case study of a tourism exhibition", *Tourism Management Perspectives*, Vol. 1, pp. 28-33.

Chon, K. and Weber, K. (2002), *Convention Tourism: International Research and*

Industry Perspectives, Taylor & Francis, Inc., Oxford, UK.

Cox, J.M. (1993), "How effective is your exhibit?", *Successful Meetings*, 3,1 pp. 59-61.

Dekimpe, M.G., Francois, P., Gopalakrishna, S., Lilien, G.L. and van den Bulte, C. (1997), "Generalizing about trade show effectiveness: a cross-national comparison", *Journal of Marketing*, Vol. 61 No. 4, pp. 55-64.

Deng, W. J. (2008). Fuzzy importance-performance analysis for determining critical service attributes. *International Journal of Service Industry Management*, *19*(2), 252-270.

DeVaus, D.A. (2000). Surveys in social research. London: Routledge

Dickson, J. R. and Faria, A.J. (1985), "Firms with large market shares, product lines rate shows highly", *Marketing News*, Vol. 10, pp. 10-14.

Dubois, D. and Prade, H. (1979), "Fuzzy real algebra: some results", *Fuzzy Sets and Systems*, Vol. 2, pp. 327-348.

Fenich, G.G. (2012), *Meetings, Expositions, Events, and Conventions: An Introduction to the Industry* (3rd ed.), Pearson/Prentice Hall, Upper Saddle River, NJ.

Fourali, C. (1997). Using fuzzy logic in educational measurement: The case of portfolio assessment.Evaluation and Research in Education, 11, 129–148

Friedman, S. (2009), "Sponsorship: a key to powerful marketing", available at: www. newjournalarticles.org/Sponsorship_A_Key_to_Powerful_Marketing,11257/ (accessed 10 November 2014).

Geigenmüller, A. and Bettis-Outland, H. (2012), "Brand equity in B2B services and consequences for the trade show industry", *Journal of Business & Industrial Marketing*, Vol. 27 No. 6, pp. 428-435.

George, K. (2012), "A model for assessing consumer perceptions of quality", *International Journal of Quality and Service Sciences*, Vol. 4 No. 1, pp. 175-188.

Gofman, A., Moskowitz, H. and Mets, T. (2011), "Marketing museums and exhibitions: what drives the interest of young people", *Journal of Hospitality Marketing & Management*, Vol. 20 No. 5/6, pp. 601-618.

Gopalakrishna, S. and Lilien, G.L. (1995), "A three-stage model of industrial trade show performance", *Marketing Science*, Vol. 14 No. 1, pp. 22-42.

Gopalakrishna, S., Lilien, G.L., Williams, J.D. and Seqeuira, I.K. (1995), "Do trade shows pay off?", *Journal of Marketing*, Vol. 59 No. 3, pp. 75-83.

Gopalakrishna, S., Lilien, G.L., Williams, J.D. and Seqeuira, I.K. (1995), "Do trade shows pay off?", *Journal of Marketing*, Vol. 59 No. 3, pp. 75-83.

Gopalakrishna, S., Roster, C.A. and Sridhar, S. (2010), "An exploratory study of attendee activities at a business trade show", *Journal of Business & Industrial Marketing*, Vol. 25 No. 4, pp. 241-248.

Gottlieb, U.R., Brown, M.R. and Drennan, J. (2011), "The influence of service quality and trade show effectiveness on post-show purchase intention", *European Journal of Marketing*, Vol. 45 No. 11, pp. 1642-1659.

Gottlieb, U.R., Brown, M.R. and Ferrier, L. (2014), "Consumer perceptions of trade show effectiveness: scale development and validation within a B2C context", *European Journal of Marketing*, Vol. 48 No. 1/2, pp. 89-107.

Gummesson, E. and Polese, F. (2009), "B2B is not an island", *Journal of Business & Industrial Marketing*, Vol. 24 No. 5/6, pp. 337-350.

Hansen, K. (2004), "Measuring performance at trade shows: Scale development and validation", *Journal of Business Research*, Vol. 57, pp. 1-13.

Herrera, F., Herrera-Viedma, E. and Martinez, L. (2000), "A fusion approach for

managing multi-granularity linguistic term sets in decision making", *Fuzzy Sets and Systems*, Vol. 114, pp. 43-58.

Herrera F. E. Herrera-Viedma (2000) Linguistic decision analysis: steps for solving decision problems under linguistic information Fuzzy Sets and Systems 115 67-82

Herrera, F. Herrera-Viedma, E. Martinez Luis (2000) Fuzzy Sets and Systems A fusion approach for managing multi-granularity linguistic term sets in decision making 114 43–58

Hodge, D.R. and Gillespie, D. (2003), "Phrase completions: an alternative to Likert

scales", *Social Work Research*, Vol. 27, pp. 45-55.

Hsieh, C.H. (2013), "Patent value assessment and commercialization strategy", *Technological Forecasting and Social Change*, Vol. 80, pp. 307-319.

Hsieh, Y.-C., Chiu, H.-C. and Chiang, M.-Y. (2005), "Maintaining a committed online customer: a study across search-experience-credence products", *Journal of Retailing*, Vol. 81 No. 1, pp. 75-82.

Hsu, C.F., Chang, B., Hung, H.F. (2007). Applying SVM to build supplier evaluation model – Comparing Likert scale and fuzzy scale. Paper presented at the 2007 IEEE Industrial Engineering and Engineering Management, Singapore.

Hu, Y. C. (2009). Fuzzy multiple-criteria decision making in the determination of critical criteria for assessing service quality of travel websites. Expert Systems with Application, 36, 6439–6445.

Huang, H.C. (2016), "How does meetings, incentives, conventions, and exhibitions industry attract exhibitors?", *Asia Pacific Journal of Tourism Research*, Vol. 21 No. 1, pp. 73-93.

Hutchinson, D., Wellington, W.J., Saad, M. and Cox, P. (2011), "Refining value-based

differentiation in business relationships: a study of the higher order relationship building blocks that influence behavioral intentions", *Industrial Marketing Management*, Vol. 40 No. 3, pp. 465-478.

Jin, X., Weber, K. and Bauer, T. (2012), "Relationship quality between exhibitors and organizers: a perspective from Mainland China's exhibition industry", *International Journal of Hospitality Management*, Vol. 31 No. 4, pp. 1222-1234.

Jin, X., Weber, K. and Bauer, T. (2013), "Dimensions and perceptional differences of exhibition destination attractiveness: the case of China", *Journal of Hospitality & Tourism Research*, Vol. 37 No. 4, pp. 447-469.

Jung, M. (2005), "Determinants of exhibition service quality as perceived by attendees", *Journal of Convention and Event Tourism*, Vol. 7 No. 3/4, pp. 85-98.

Kacprzyk, J. and Fedrizzi, M. (1989), "A 'human-consistent' degree of consensus based

on fuzzy logic with linguistic quantifiers", *Mathematical Social Sciences*, Vol. 18, pp. 275-290.

Kang, J. and Schrier, T. (2011), "The decision-making process of tradeshow exhibitors:

the effects of social value, company size, and prior experience on satisfaction and behavioral intentions", *Journal of Convention & Event Tourism*, Vol. 12 No. 2, pp. 65-85.

Kerin, R.A. and Cron, W.L. (1987), "Assessing trade show functions and performance: an exploratory study", *Journal of Marketing*, Vol. 51 No. 3, pp. 87-94.

Kijewski, V., Yoon, E. and Young, G. (1993), "How exhibitors select trade shows", *Industrial Marketing Management,* Vol. 22 No. 4, pp. 287-298.

Klir, G.J. and Yuan, B. (1995), *Fuzzy Sets and Fuzzy Logic Theory and Applications*, 1st edn. Prentice Hall, New York.

Kumar, R., Indrayan, A. and Chhabra, P. (2012), "Reporting quality of multivariable logistic regression in selected Indian medical journals", *Journal of Postgraduate Medicine*, Vol. 58, pp. 123-126.

Kurtulmuşoğlu, F. B., Pakdil, F., & Atalay, K. D. (2016). Quality improvement strategies of highway bus service based on a fuzzy quality function deployment approach. *Transportmetrica A: Transport Science*, *12*(2), 175-202.

Lalla, M., Facchinetti G., and Mastroleo, G. (2005).Ordinal scales and fuzzy set systems to measure agreement: An application to the evaluation of teaching activity, Quality and Quantity, 38, 577-601

Lee, C.H. and Kim, S.Y. (2008), "Differential effects of determinants of multi-dimensions of trade show performance: by three stage of pre-show, at-show and post-show activities",

Industrial Marketing Management, Vol. 37, pp. 784-796.

Lee, J. and Beeler, C. (2009), "An investigation of predictors of satisfaction and future intention: links to motivation, involvement, and service quality in a local festival", *Event*

Management, Vol. 13 No. 1, pp. 17-29.

Lee, M., Yeung, S. and Dewald, B. (2010), "An exploratory study examining the determinants of attendance motivations as perceived by attendees at Hong Kong exhibitions", *Journal of Convention & Event Tourism,* Vol. 11 No. 3, pp. 195-208.

Lee, M., Seo, J. and Yeung, S. (2012), "Comparing the motives for exhibition participation:

visitors' versus exhibitors' perspectives", *International Journal of Tourism Science,* Vol. 12 No. 3, pp. 1-19.

Lee, M.J., Lee, S. and Joo, Y.M. (2015), "The effects of exhibition service quality on exhibitor satisfaction and behavioral intentions", *Journal of Hospitality Marketing & Management,* Vol. 24 No. 7, pp. 683-707.

Li, L-Y. (2007), "The effects of firm resources on trade show performance: how do trade show marketing processes matter?", *Journal of Business & Industrial Marketing*, Vol. 23 No. 1, pp. 35-47.

Li, Q. (2013), "A novel Likert scale based on fuzzy sets theory", *Expert Systems with Applications,* Vol. 40, pp. 1609-1618.

Lin, H.-T. (2010), "Fuzzy application in service quality analysis: an empirical study",

Expert Systems with Applications, Vol. 37, pp. 517-526.

Lin, C.T., Lee, C. and Chen, W.Y. (2009), "Using fuzzy analytic hierarchy process to evaluate service performance of a travel intermediary", *The Service Industries Journal*, Vol. 29 No. 3, pp. 281-296.

Lin, Y. (2016), "An examination of determinants of trade show exhibitors' behavioral intention: a stakeholder perspective", *International Journal of Contemporary Hospitality Management*, Vol. 28 No.12, pp. 2630-2653.

Lin, L., & Lee, H. M. (2009). Fuzzy assessment method on sampling survey analysis. Expert Systems with Applications, 36, 5955–5961

Lin, Y., Jiang, J. and Kerstetter, D. (2015), "A three-component framework for trade show performance evaluation", *Journal of Hospitality & Tourism Research*, 3,6 pp. 1-25.

Liou, T.S. and Chen, C.W. (2006), "Subjective appraisal of service quality using fuzzy linguistic assessment", *International Journal of Quality & Reliability Management*, Vol. 23 No. 8, pp. 928-943.

Malhotra, N.K. (1999), *Marketing Research: An Applied Orientation*, 3rd ed., Prentice Hall, Upper Saddle River, NJ.

Munuera, J.L. and Ruiz, S. (1999), "Trade fairs as services: a look at visitors' objectives in Spain", *Journal of Business Research*, Vol. 44 No. 1, pp. 17-24.

Pett, M.A. (1997), *Nonparametric Statistics for Health Care Research: Statistics for Small Samples and Unusual Distribution*, SAGE Publications, London.

Ragin, C.C. (2000), *Fuzzy-set Social Science*, The University of Chicago Press, Chicago, USA.

Rauyruen, P. and Miller, K.E. (2007), "Relationship quality as a predictor of B2B customer loyalty", *Journal of Business Research*, Vol. 60 No. 1, pp. 21-31.

Ray, J. J. (1990). Acquiescence and problems with forced-choice scale. Journal of Social Psychology, 130, 397–399.

Raykov, T., & Marcoulides, G. A. (2006). On multilevel model reliability estimation from the perspective of structural equation modeling. *Structural Equation Modeling*, *13*(1), 130-141.

Rinallo, D., Borghini, S. and Golfetto, F. (2010), "Exploring visitor experiences at trade shows", *Journal of Business & Industrial Marketing*, Vol. 25 No. 4, pp. 249-258.

Rosson, P. and Seringhaus, F. (1995), "Visitor and exhibitor interaction at industrial trade fairs", *Journal of Business Research*, Vol. 32 No. 1, pp. 81-90.

Russell, C. J. and Bobko, P. (1992), "Moderated regression analysis and Likert scales: too coarse for comfort", *Journal of Applied Psychology*, Vol. 77, pp. 336-342.

Seringhaus, F.H.R. and Rosson, P.J. (2001), "Firm experience and international trade fairs", *Journal of Marketing Management*, Vol. 17 No. 7/8, pp. 877-901.

Seringhaus, F.H.R. and Rosson, P.J. (2004), "An analysis model for performance measurement of international trade fair exhibitors", available at http://citt .management. dal.ca/Files/ pdf's/DP-198.pdf.

Shipley, D., Egan, C. and Wong, K. (1993), "Dimensions of trade show exhibiting management", *Journal of Marketing Management*, Vol. 9, pp. 55-63.

Shoham, A. (1999), "Performance in trade shows and exhibitions: a synthesis and directions for future research", *Journal of Global Marketing*, Vol. 12 No. 3, pp. 41-57.

Smith, T.M., Hama, K. and Smith, P. (2003), "The effect of successful trade show attendance on future show interest: exploring Japanese attendee perspectives of domestic and offshore international events", *Journal of Business & Industrial Marketing*, Vol. 18 No. 4/5, pp. 403-418.

Smithson, M. J. (1987). Fuzzy set analysis for the behavioral and social sciences (Recent Research in Psychology). New York: Springer-Verlag

Symeonaki, M. and Kazani, A. (2011), *Developing a Fuzzy Likert Scale for Measuring Xenophobia in Greece*, ASMDA, Rome.

Tafesse, W. (2014). "Understanding how resource deployment strategies influence trade show organizers' performance effectiveness", *European Journal of Marketing*, Vol. 48 No. 5/6, pp. 1009-1025.

Tafesse, W. and Skallerud, K. (2015), "Towards an exchange view of trade fairs", *Journal of Business & Industrial Marketing*, Vol. 30 No. 7, pp. 795-804.

Tafesse, W. and Korneliussen, T. (2011), "The dimensionality of trade show performance in an emerging market", *International Journal of Emerging Markets*, Vol. 6 No. 1, pp. 38-49.

Tanford, S., Montgomery, R., & Nelson, K. B. (2012, October). Factors that influence attendance, satisfaction, and loyalty for conventions. In *Journal of Convention & Event Tourism* (Vol. 13, No. 4, pp. 290-318). Taylor & Francis Group.

Tanner, J.F., Chonko, L.B. and Ponzurick, T.V. (2001), "A learning model of trade exhibition attendance", *Journal of Convention and Exhibition Management*, Vol. 3 No. 3, pp. 3-26.

Tanner, J.F. Jr (2002), "Leveling the playing field: factors influencing trade show success for small companies", *Industrial Marketing Management*, Vol. 31, pp. 229-239.

Tsaur, S.H., Chang, T.Y. and Yen, C.H. (2002), "The evaluation of airline service quality by fuzzy MCDM", *Tourism Management*, Vol. 23 No. 2, pp. 107-115.

Tsaur, Sheng-Hshiung, Tzeng Gwo-Hshiung, Wang Kuo-Ching (1997) Evaluating Tourist Risks From Fuzzy Perspectives *Annals of Tourism Research***,** Vol. 24, No. 4, pp. 796812,

Tseng, M.-L. (2009a), "A causal and effect decision making model of service quality expectation using grey-fuzzy DEMATEL approach", *Expert Systems with Applications*, Vol. 36, pp. 7738-7748.

Tseng, M.-L. (2009b), "Using the extension of DEMATEL to integrate hotel service quality perceptions into a cause–effect model in uncertainty", *Expert Systems with Applications*, Vol. 36, pp. 9015-9023.

Tzeng, G.H. and Hwang, C.L. (2014), *Fuzzy Multiple Objective Decision Making*, CRC Press, Boca Raton, USA.

Tzeng, G.H., Jen, W. and Hu, K.C. (2002), "Fuzzy factor analysis for selecting service quality factors – a case of the service quality of city bus service", *International Journal of Fuzzy Systems*, Vol. 4 No. 1, pp. 911-921.

Wan, P. and Siu, N. (2012), "The impact of the servicescape on the desire to stay in convention and exhibition centers: the case of Macao", *International Journal of Hospitality Management*, Vol. 31 No. 1, pp. 236-246.

Wendorf Craig A. (2002) Comparisons of Structural Equation Modeling and Hierarchical Linear Modeling Approaches to Couples' Data, Structural Equation Modeling: A Multidisciplinary Journal, 9:1, 126-140

Whitfield, J., Dioko, L., Webber, D. and Zhang, L. (2012), "Attracting convention and exhibition attendance to complex MICE venues: emerging data from Macao", *International Journal of Tourism Research,* Vol. 16 No. 2, pp. 169-179.

Whitfield, J. and Webber, D.J. (2011), "Which exhibition attributes create repeat visitation?", *International Journal of Hospitality Management*, Vol. 30, pp. 439-447.

Whitfield, J., Dioko, L.A.N., Webber, D. and Zhang, L. (2014), "Attracting convention and exhibition attendance to complex MICE venues: emerging data from Macao", *International Journal of Tourism Research*, Vol. 16, pp. 169-179.

Wu, W. Y., Hsiao, S. W., & Kuo, H. P. (2004). Fuzzy set theory based decision model for determining market position and developing strategy for hospital service quality. *Total Quality Management & Business Excellence*, *15*(4), 439-456.

Xuan, Xiao (2013) Structural Equation Modeling Compared with Ordinary Least Squares in Simulations and Life Insurers' Data Report Presented to the Faculty of the GraduateSchool of The University of Texas at Austin in Partial Fulfillment of the Requirements for the Degree of Master of Science in Statistics The University of Texas at Austin

Yoo, J. and Chon, K. (2008), "Factors affecting convention participation decision-making: developing a measurement scale", *Journal of Travel Research*, Vol. 47 No. 3, pp. 113-122.

Zadeh, L.A. (1965), "Fuzzy sets", *Information and Control*, Vol. 8 No. 3, pp. 338-353.

Zadeh, L.A. (1975) The concept of a linguistic variable and its applications to approximate reasoning. Part I, Inform. Sci. 8 199–249, Part II, Inform. Sci. 8 301–357

Zadeh, L.A., Kacprzyk, J. (1999) Computing with Words in Information/Intelligent Systems 2. Applications. Studies in Fuzziness and Soft Computing, Vol. 33. Physica-Verlag (Springer-Verlag),Heidelberg and New York.

Zhang, L., Qu, H. and Ma, J. (2010), "Examining the relationship of exhibition attendees' satisfaction and expenditure: the case of two major exhibitions in China", *Journal of Convention & Event Tourism,* Vol. 11 No. 2, pp. 100-118.

Zimmer, A.C. (1983), *Verbal versus Numerical Processing in Individual Decision Making Under Uncertainty*, R. Scholz Amsterdam, North Holland.

Zimmermann, H.J. (1983), "Using fuzzy sets in operational research", *European Journal of Operational Research,* Vol. 13, pp. 201-216.

Table A1. Survey items

Construct	Survey items	References
Satisfaction with self-performance (X_1)	Making contacts (X_{11}) Reaching target customers (X_{12}) Publicity and exposure (X_{13}) Firm image (X_{14}) Learning about markets and competition (X_{15}) Gaining export experience (X_{16}) Key competitors at trade show (X_{17})	Seringhaus and Rosson 2001
Satisfaction with organizers (X_2)	The layout of your booth and exhibit hall (X_{21}) Ease of getting your materials to the exhibition and having storage space (X_{22}) Having a listing in the exhibition directory (X_{23}) Availability of venue services (X_{24}) Availability of microphone and audio-visual equipment (X_{25}) The fee for exhibiting/space rental and method of assigning space to exhibitors (X_{26}) Having the opportunity to meet with other exhibitors (X_{27})	Lee et al. 2015
Satisfaction with visitors (X_3)	Overall quality of visitors(X_{31}) Job level(X_{32}) Purchasing authority(X_{33}) Job function (X_{34})	Lin 2010
Behavioral intention (Y)	I am likely to return to the same trade show next time (Y_1) I am likely to recommend the trade show to other companies (Y_2)	Lee et al., 2015