






“Customer satisfaction management: Exploring temporal changes in nonlinearities in satisfaction formation of skiers”

AUTHORS	Kurt Matzler  Josef Mazanec  Andreas Strobl  Karin Teichmann 
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Kurt Matzler, Dr., Professor,
Department Chair, Department of
Strategic Management, Marketing
and Tourism, Innsbruck University
School of Management, University
of Innsbruck, Innsbruck, Austria.
(Corresponding author)

Josef Mazanec, Dr., Professor,
Department of Tourism and Service
Management, Modul University
Vienna, Vienna, Austria.

Andreas Strobl, Dr., Senior Lecturer
in International Strategy, Department
of Entrepreneurship & Strategy,
Lancaster University Management
School, Lancaster University, Bailrigg,
Lancaster, United Kingdom.

Karin Teichmann, Dr., Assistant
Professor, Department of Strategic
Management, Marketing and Tourism,
Innsbruck University School of
Management, University of Innsbruck,
Innsbruck, Austria.



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Kurt Matzler (Austria), **Josef Mazanec** (Austria), **Andreas Strobl** (United Kingdom),
Karin Teichmann (Austria)

CUSTOMER SATISFACTION MANAGEMENT: EXPLORING TEMPORAL CHANGES IN NONLINEARITIES IN SATISFACTION FORMATION OF SKIERS

Abstract

Customer satisfaction is one of the most important success drivers. Managers need to understand how satisfaction is formed, which factors to focus on, and how to increase the performance. The Kano model offers useful guidance for managers to increase customer satisfaction. It assumes that there are three different factors, which influence overall satisfaction, and that the weight of these factors changes over time. This study adds to limited empirical evidence on temporal changes of nonlinear relationships between attribute performance and customer satisfaction. The data comprise two waves of a large-scale sample of more than 40,000 skiers in 55 Alpine ski resorts in 2012 and 2016. Applying nonlinear structural equation modeling, Ski Core and Value-for-Money were identified as basic factors (dissatisfiers) and Ski Peripherals as a performance factor. Change in skiers' satisfaction levels operates at a slow pace and, besides general industry trends, time-related segmentation criteria like loyalty and skier skills play a salient role. Especially, the attribute Value-for-Money is prone to temporal changes.

Keywords

customer satisfaction management, attribute performance, Kano model, prospect theory, ski resorts

JEL Classification

M19, M31, Z31, Z33

INTRODUCTION

Customer satisfaction remains a central interest for managers. After having entered the literature about three decades ago, both frequency and volume of publications on this topic are astonishingly persistent over time. A significant amount of papers theorizes and assesses asymmetric effects of attribute performance on overall satisfaction (Albayrak & Caber, 2015; Bi et al., 2020; Lai & Hitchcock, 2017; Slevitch & Oh, 2010). The Kano model (Kano, 1984), often labeled as a three-factor theory (Füller & Matzler, 2008), thereby is a widely used framework. It postulates asymmetric nonlinear relationships between attribute performance and overall satisfaction, differentiating between basic factors, performance factors, and excitement factors. These assumptions have important implications for the management of customer satisfaction as they inform management how to allocate resources to a different product or service attributes to increase customer satisfaction and therefore company performance.

Different empirical approaches have been used to test the three-factor theory (Bartikowski & Llosa, 2004; Mikulić & Prebežac, 2011), most of them having limitations to detect asymmetries and nonlinearities

(Bartikowski & Llosa, 2004; Chen, 2015; Finn, 2011; Mikulić & Prebežac, 2011; Mikulić & Prebežac, 2012) and as a consequence, empirical findings have been inconclusive (Streukens & De Ruyter, 2004). First, these studies are mostly based on dummy variable regressions detecting asymmetric effects but not nonlinearities (Bi et al., 2020; Davras & Caber, 2019; Lee & Choi, 2019). Second, the Kano model also suggests that factors change over time, i.e., excitement factors evolve into basic factors (Nilsson-Witell & Fundin, 2005). This hypothesis however has been barely empirically tested, and if so, only the difference between first-time and frequent users is tested (Davras & Caber, 2019; Lai & Hitchcock, 2017; Nilsson-Witell & Fundin, 2005). Third, customer satisfaction depends on expectations; expectations differ between customers or customer segments, and as a consequence value functions between customer groups should differ, too (Füller & Matzler, 2008). Bi et al. (2020), Davras and Caber (2019), Füller and Matzler (2008) tested the three-factor theory and found differentiate value functions in market segments.

With about 2,000 ski resorts and about 400 million skier visits worldwide, alpine skiing is one of the most popular winter sports activities (Vanat, 2017). Ski tourism is of central importance for winter tourism in many regions, especially in the Alps (Matzler et al., 2008). However, many ski resorts experience declining numbers of skiers (Vanat, 2016). Therefore, it is crucial to understand what causes (dis-)satisfaction with ski resorts and how this (dis-)satisfaction evolves over time. Eight empirical studies were identified to investigate skiers' satisfaction with ski resorts. None of them fully and satisfactorily addressing the gaps in customer satisfaction.

It is intended to make three major contributions to customer satisfaction theory in general and satisfaction research for skiing tourism in particular. First, applying nonlinear structural equation models, asymmetric and nonlinear effects of attribute performance in ski resorts were empirically tested and shown. Second, using two waves of a large-scale sample of more than 40,000 skiers in 55 Alpine ski resorts in 2012 and 2016, it was possible to test whether performance factors change over time. Third, it was also tested whether these relationships are sensitive to skier segments.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

1.1. Theoretical explanations of customer satisfaction formation

It has been long recognized that the assumption of linear and symmetric relationships between satisfaction with individual service attributes and overall satisfaction is wrong (Anderson & Mittal, 2000; Mittal et al., 1998) and would lead to an incorrect prioritization in satisfaction programs (Streukens & De Ruyter, 2004). Different theories are used to explain asymmetric and nonlinear effects (Finn, 2011; Homburg et al., 2005; Lin et al., 2017). Disappointment theory (Bell, 1985; Inman et al., 1997; Loomes & Sugden, 1986), rooted in behavioral decision theory, postulates that disappointment or elation arise when a decision outcome is below or above prior expectations and that disappointment and elation increase with

the difference between expectation and outcomes. Consistent with satisfaction theory that assumes that exceeding expectations (positive confirmation) results in delight, elation, and falling short of expectations (negative confirmation) leads to disappointment and strong dissatisfaction (Oliver, 2014; Oliver et al., 1997), disappointment theory can be used to hypothesize nonlinear effects (Homburg et al., 2005). It assumes that the relationship between attribute performance and overall satisfaction follows an inverse S-shaped function, being first concave and then convex. Kahneman and Tversky (1979) suggested a theory that explains such asymmetric effects, namely a prospect theory assuming that loss aversion leads to a value function that is 'steeper for losses than for gains'. While a prospect theory has become a very influential framework in the management literature (Holmes et al., 2011) and economics (Barberis, 2013) to explain how people make decisions under risk, it has been barely applied in the context of service quality (Sivakumar et al., 2014) or satisfaction. Oh and Kim (2017) identified only

five papers in the leading marketing journals that refer to a prospect theory. Thus, it is one of the less frequently used theories in the study of customer satisfaction. Prospect theory would argue that the relationship between attribute performance and overall satisfaction follows an S-shaped value function, being first convex and then concave.

A third, less theory-driven framework, is the Kano model of customer satisfaction (Kano, 1984; Lin et al., 2017; Matzler et al., 2004; Matzler & Hinterhuber, 1998). The Kano model is a widely used approach in customer satisfaction research in general (Albayrak & Caber, 2015; Bi et al., 2020; Lin et al., 2017; Slevitch & Oh, 2010) and in ski resort satisfaction research specifically (Füller & Matzler, 2008; Füller et al., 2006). It proposes the following asymmetric and nonlinear relationship: basic factors (or must-be requirements) resemble a convex function (as suggested by prospect theory) at low attribute performance but do not increase satisfaction when performance is high. Such basic factors, therefore, affect overall satisfaction the strongest when customer expectations are not met and cause dissatisfaction. They are also described as minimum requirements. At high attribute performance, basic factors have a relatively lower impact on overall satisfaction. Consequentially, “the fulfillment of basic requirements is a necessity, but an insufficient condition for satisfaction” (Füller & Matzler, 2008, p. 117). Excitement factors resemble a concave function at high attribute performance but do not lower satisfaction when performance is low. Their impact on overall satisfaction increases with increasing performance. Customers have no prior expectations regarding the excitement attributes of products or services. Consequently, customers are surprised by an unexpected experience yielding excitement. In turn, not performing well in terms of such delighters does not cause dissatisfaction (Albayrak & Caber, 2015). Both, basic factors and delighters are characterized by an asymmetric impact on overall satisfaction. Finally, the Kano model also theorizes linear/symmetric relations for performance attributes with low performance of such attributes causing dissatisfaction and high performance causing high satisfaction (Albayrak & Caber, 2015; Füller & Matzler, 2008). There is also evidence that a reason for asymmetries in attribute performance of satisfaction links stems from interactions between different

classes of attributes. Slevitch and Oh (2010) show that in hotel settings the relationship between core (or basic) attributes (customer expectations about what the basic service should be) depends on how well a service performs in terms of facilitating (or excitement) attributes (services enriching and going beyond the standard set of a customer).

Ski resort satisfaction and choice depend on service attributes directly related to skiing (e.g., number and quality of slopes and lifts) and non-skiing service attributes (e.g., restaurant availability and quality) (Ferrand & Vecchiattini, 2002; Konu et al., 2011). After a review of literature on customer satisfaction in ski resorts, eight studies investigating antecedents of overall satisfaction with a ski resort were identified (see Appendix A). Based on the existing literature on satisfaction formation in ski resorts and following the theoretical propositions from disappointment theory (Inman et al., 1997; Loomes & Sugden, 1986), prospect theory (Kahneman & Tversky, 1979), satisfaction theory (Oliver, 2014; Oliver et al., 1997) and the Kano model (Kano, 1984), the following baseline hypothesis in terms of customer satisfaction in ski resorts was forward:

1.2. Main hypothesis

There are nonlinear and asymmetric relationships between attribute performance and overall satisfaction in ski resorts, whereby there are attributes that:

- a) have a weak impact on overall satisfaction when performance is high and resemble a convex function denoting strong negative impact at the low performance (basic factors);
- b) increase linearly and symmetrically overall satisfaction (performance factors);
- c) have a weak impact on overall satisfaction when performance is low and resemble a concave denoting strong positive impact function at the high performance (delighters);
- d) have a strong impact on overall satisfaction when performance is high and a strong negative impact at low performance denoting a positive cubic function. It is expected that the

impact on satisfaction at low-performance levels is stronger than at high-performance levels (a hybrid of basic and excitement factors).

The Kano model suggests that satisfaction factors are dynamic and evolve from delight to one-dimensional basic ones (Kano, 1984). Only very little empirical evidence is provided for this assumption (Kano, 2001; Nilsson-Witell & Fundin, 2005). In general, it was found that the importance of attributes in determining overall satisfaction may change over time (Mittal et al., 2001). Theoretical explanations for this relationship are changing expectations. Consequently, reference levels to which quality perceptions are compared do not stay constant. Customers enter a service encounter with initial expectations. If new attributes (delighters) are offered, these cause positive disconfirmation triggering customer delight. As future expectations are influenced by past experiences and other factors (Zeithaml et al., 1993), customers develop explicit expectations and delighters evolve into performance factors, and eventually into basic factors. In this respect, it does not matter whether experiences with the same organization (or ski resort) exist, because familiarity with a service rather than a service organization helps to shape expectations of attribute and performance levels (Robinson, 2006). As such, competition increases service quality over time because higher service levels offered by one competitor will increase general service expectations of customers (Banker et al., 1998; Greenfield, 2014). Thus, over time, poor performance will lead to greater dissatisfaction and good performance will show a decreasing impact on satisfaction. This prediction can be expressed as follows:

H1: The relationship between attribute performance and overall satisfaction in ski resorts changes over time. Poor attribute performance will lead to greater dissatisfaction and good attribute performance will yield lower levels of satisfaction (from delighters to performance, to basic factors).

According to the prevailing expectation-(dis)confirmation paradigm (Oliver, 1980; Oliver, 2014; Parasuraman et al., 1985), satisfaction is a function of the disconfirmation of expectations. Expectations are formed by several factors such

as personal needs, service promises, experience, or situational factors (Zeithaml et al., 1993). As these influencing factors differ across individuals or customer segments, expectations and, consequently, value functions that use expectations as a reference point, must be different between individuals or segments. Thus, segmenting markets, “if properly applied, would guide companies [ski resorts] in tailoring their product and service offerings to the groups most likely to purchase them” (Yankelovich & Meer, 2006, p. 122).

The literature review on satisfaction formation in ski resorts presented in Table 1 highlights three segmentation criteria, which are associated with the factor time: skier age, skier skills, and ski resort loyalty. Age is an important factor in satisfaction and loyalty formation processes (Evanschitzky & Wunderlich, 2006) because it is associated with changing consumer needs and consequentially service attributes will be weighted differently (Matzler et al., 2008). Older consumers have more consumption experiences, which potentially influence customer expectations. Consequently, reference points for customer satisfaction might also be influenced by age. Finally, older consumers process information differently (Moscovitch, 1982) and rely on heuristics more often to reduce information seeking (Evanschitzky & Wunderlich, 2006; Wells & Gubar, 1966; Wilkes, 1992).

Skier skills evolve over time with increased training. Skier skills are important in skier segmentation for two reasons. Higher skills come along with a higher usage yielding distinct attribute appraisals (Matzler et al., 2008). Richards (1996) shows that highly skilled skiers have a more critical, primarily care about skiing conditions and rather neglect price levels. Besides skier skills, loyalty is important. Theoretically, this can be explained through reoccurring consumption over time causing changes in attribute importance and appraisals (Mittal et al., 1999). Matzler et al. (2008, p. 407) state that “this is attributed to the fact that consumption goals can change during the consumption experience, or consumers can perceive performance variability over time.” Therefore, the following hypothesis was proposed:

H2: The relationship between attribute performance and overall satisfaction will differ be-

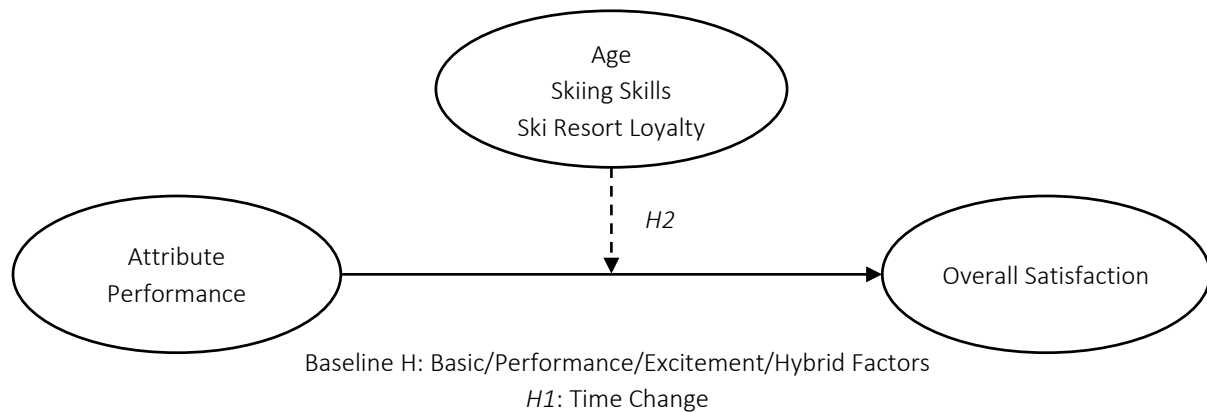


Figure 1. Conceptual model

tween customer segments defined in terms of (a) age, (b) skiing skills, and (c) ski resort loyalty.

Figure 1 presents the conceptual model summarizing all hypotheses.

2. METHODOLOGY

2.1. Sample and measures

The database for this study is formed by two waves (2012 and 2016) of large-scale customer satisfaction surveys of 55 ski resorts in different Alpine countries (Austria, Switzerland, Germany, Italy, and France) carried out by a professional market research company. The ski resorts were selected based on the size of a ski resort, overnights, and importance in a specific country. Self-administered questionnaires were handed out to skiers in highly frequented places like restaurants or lodges. Data collection took place at least at four different time points between December and April to cover peak and off-peak seasons. The overall size for 2012 and 2016 samples amounted to 41,864 and 48,563 cases. The average number of respondents per ski resort was 761.16 (SD = 206.75) in 2012 and 903.48 (SD = 439.12) in 2016. Table 1 presents the most important demographics of the respondents for 2012 and 2016. The numbers vary because of differing missing values in the individual analyses, but about 20,000 fully completed and usable questionnaires for 2012 and 24,000 for 2016 were available for both the exploratory and validation analyses. To measure attribute performance, items were

adapted following results of a study conducted by Matzler et al. (2008). The original set of 30 items was developed in cooperation with tourism experts and evaluated in various workshops and interviews (Matzler et al., 2008). In cooperation with the market research company carrying out the data collection, this set of items was further reduced to 25 items to facilitate the data collection process. In this respect, overlapping or ambiguous items were deleted. For the analysis presented here, the focus was put on attributes relevant for most skiers. Thus, for instance, the item Wellness Offers was excluded from the analysis as day visitors or other skier groups might not use wellness facilities. Finally, the analysis covers satisfaction with 19 ski resort attributes (ski resort size, quality of slopes, entertainment, nature, etc.) as well as one-dimensional measures of satisfaction (1 item), word-of-mouth (1 item), and revisit intention (1 item); all measured on 10-point rating scales. The final set of items can be found in Appendix B. The questionnaires were translated by professional translation offices and were available in seven languages (German, English, French, Italian, Russian, Czech, and Polish). Translations were double-checked by industry experts (managers and professionals).

To test the hypotheses, the 19 attribute performance items were collapsed into four attribute performance dimensions based on exploratory factor analysis (EFA) and with the nonparametric Mokken scale construction procedure (check Appendix B for a detailed description of this analysis). The final dimensions are named 'Ski Core' (e.g., Ski Resort Size), 'Ski Peripherals' (e.g., Nature), 'Fun' (e.g., Après-Ski), and 'Value-for-

Table 1. Demographics

Demographic variables	Categories	2012	2016
Country of origin	Benelux	2,937	4,006
	Germany	11,202	13,064
	France	4,746	4,773
	Great Britain	3,287	3,601
	Italy	3,768	2,585
	Austria	2,854	3,598
	Poland	509	996
	Switzerland	8,145	8,954
	Czech Republic	563	1,044
	Eastern European countries	664	778
	Other countries	2,549	3,641
	Missing	640	1,748
Gender	Male	21,747	24,118
	Female	17,258	19,739
	Missing	2,859	4,931
Age	12 to 19	6,069	5,811
	20 to 34	11,566	12,311
	35 to 49	13,361	13,199
	50 to 64	9,182	8,225
	Over 65	6,182	1,810
	Missing	1,718	7,432
Skiing expertise	Beginner	3,075	3,061
	Mediocre	8,273	8,226
	Good	17,443	18,739
	Expert	8,246	11,920
	Missing	4,827	6,842
Total number of respondents		41,864	48,788

Money' (e.g., Value-for-Money Lifts). Further, the three items One-dimensional Satisfaction, Word-of-Mouth, and Intention to Revisit are the observables (i.e., reflective indicators) of the dependent construct 'Overall Satisfaction'.

2.2. Nonlinear SEM

Responding to critique on dummy-regression analysis and other approaches for investigating nonlinearity between attribute performance and overall satisfaction (Bartikowski & Llosa, 2004; Chen, 2012; Mazanec, 2007; Mikulić & Prebežac, 2011), nonlinear structural equation modeling was applied. Nonlinear structural equation modeling helps to investigate polynomials including quadratic and cubic terms. The study provides evidence that the investigation of polynomials including quadratic and cubic terms is a reliable and

powerful tool for identifying the true relationship between attribute performance and overall satisfaction (Finn, 2011; Mazanec, 2007). Polynomials "provide a flexible approach to identifying whether nonlinearity is significant and can approximate well, within a specific range of values of x , both increasing and decreasing returns and threshold effects, without having to identify a form of nonlinearity or impose thresholds a priori" (Finn, 2011, p. 30).

Nonlinear structural equation models were investigated and the methodology proposed by Mazanec (2007) was used. Applying the interaction term operator in Bengt Muthén's Mplus system (Muthén & Muthén, 2004) once and twice to the same latent variable leads to polynomial relationships of the third order. Quadratic and cubic terms suffice to express the type of nonlinearity posited by satisfaction theory for excitement factors and dissatisfiers (basic factors). The abandonment of pure linearity in structural relationships comes with a restriction. The laborious estimation process based on numerical integration does not allow simultaneous computation of all nonlinear parameters. Repetitive pairwise estimates work around this limitation and, as a fringe benefit, assist in judging the robustness of the structural coefficients.

Both 2012 and 2016 datasets are split randomly into two subsamples of equal size. Given the very large master samples, the split-half approach is an appropriate validation procedure. With one exception, SEMs are estimated with the first split-half samples, modified if appropriate, and then validated with the hold-out samples. On a structural level, the four satisfaction dimensions Ski Core, Ski Peripherals, Fun, and Value-for-Money represent the latent factors determining the Overall Satisfaction construct. The specification of the measurement models follows the conclusions drawn from the data-driven results as reported in Appendix A.

The estimation runs for 2012 and 2016 analysis samples demonstrate that conclusive values of the structural coefficients are not obtainable for the Fun factor. In 2016, e.g., the estimates for the linear, quadratic, and cubic term for Fun when combined with free parameters for the SkiCore and

SkiPeriph factors fluctuate wildly between .030 and .049, -.075 and -.561, and .023 and .251, where four of these coefficients lack significance. With Fun excluded, stable estimates result for the linear, quadratic, and cubic terms of the Ski Core, Ski Peripherals, and Value-for-Money factors emerge. Hence, the weakness of the Fun indicators partially visible in the exploratory findings becomes apparent in the SEM and the final estimations with 2012 and 2016 hold-out samples. Based on these results, the Fun factor was excluded.

3. RESULTS

3.1. Nonlinear and asymmetric effects

According to the baseline hypothesis, three types of factors with specific nonlinear and asymmetric functional properties are expected to appear among the satisfaction response to various ski resort attributes. The relevant findings are based on statistically significant nonlinear terms in the satisfaction functions as shown in Table 2. None of the 95% confidence intervals includes zero. The intervals also inform the conclusions regarding potential changes between 2012 and 2016.

The results advocate the following summary and provide support for three of the four propositions of the baseline hypothesis:

- In support of proposition a, Ski Core and Value-for-Money adopt the shape of a basic factor (dissatisfier). In all analyzed periods and skier segments the contribution to overall

satisfaction drops drastically with decreasing performance (see Figure 2 and Figure 4).

- In support of proposition b, Ski Peripherals generally emerge as a well-behaved, almost linear performance factor (see Figure 3).
- No symptoms are indicating a delighter (excitement factor) among the analyzed resort properties. This might be due to the failure in reproducing the Fun factor. Thus, no support was found for proposition c.
- Supporting proposition d, Ski core (see Figure 2) has a strong impact on overall satisfaction when performance is high and a strong negative impact at low performance denoting a positive cubic function. The impact on satisfaction at low-performance levels is much stronger than at high-performance levels (a hybrid of basic and excitement factors). The Value-for-Money (see Figure 4) factor also shows slight tendencies towards this function.

3.2. General longitudinal effects

Figures 2 to 4 also visualize the third-degree polynomial functions estimated for each of the three factors in the hold-out samples of 2012 and 2016. To maintain the study focus on the relationships on a structural level, measurement sub-models should not vary between the two time-points. Hence, the coefficients in the measurement sub-models for the latent constructs Ski Core, Ski Peripherals, Value-for-Money, and Overall Satisfaction were estimated with the pooled 2012 plus 2016 data (tentative runs with free measure-

Table 2. Coefficients and 95% confidence intervals for the linear, quadratic, and cubic terms 2012–2016

Satisfaction dimension	2012			2016		
	coeff.	std. error	coeff. +/- 2*std.err.	coeff.	std.error	coeff.+/- 2*std.err.
Ski Core	.457	.021	(.499, .415)	.509	.018	(.545, .473)
Ski Core ²	-.272	.012	(-.248, -.296)	-.273	.011	(-.251, -.295)
Ski Core ³	.120	.008	(.136, .104)	.084	.006	(.096, .072)
Ski Peripheral	.308	.020	(.348, .268)	.234	.022	(.278, .190)
Ski Peripheral ²	-.075	.020	(-.035, -.115)	-.100	.018	(-.064, -.136)
Ski Peripheral ³	.042	.016	(.074, .010)	.054	.017	(.088, .020)
VfM	.119	.013	(.145, .093)	.116	.012	(.140, .092)
VfM ²	-.021	.004	(-.013, -.029)	-.039	.005	(-.029, -.049)
VfM ³	.011	.002	(.015, .007)	.017	.002	(.021, .013)

ment parameters produced negligible differences in both the measurement and the structural models). The amazingly similar structural coefficients for 2012 and 2016 generate almost identical function shapes. All confidence intervals in Table 3 except for the cubic term for SkiCore and the quadratic term for Value-for-Money overlap considerably between 2012 and 2016. Value-for-Money only exhibits a slightly stronger dissatisfier (basic) character in 2016. This is due to the parabolic term with estimates $-.039$ (std. error $.005$) in 2016 and $-.021$ (std. error $.004$) in 2012. The difference in the linear and cubic terms is minuscule. Within the relevant ranges of the latent score values for 2012 and 2016, no curves are showing accelerated growth i.e., symptoms of a performance factor causing excitement. Ski Peripherals operate largely linear in 2012 and 2016 as appropriate for an ordinary performance factor. The expected change of factor types over time according to *H1* did not materialize for all factors but Value-for-Money. Value-for-Money shows a slight tendency of steepening in the dissatisfier portion of its function.

3.3. Cross-sectional time-related effects

Separate estimates of the structural coefficients in the validation sample were elaborated for young vs. old skiers, more vs. less experienced skiers, and loyal vs. first-time visitors. The measurement

models had free parameters in all runs. A linear term for Fun was included where it proved significant in runs with the analysis sample.

Judging by the appearance of Figures 5-8 the performance factor behavior is robust and largely unperturbed by the control variables age, or skiing skills. In particular, the influence of Ski Core and Peripherals is insensitive to age and skiing skills (Figures 5 and 6). Concerning Value-for-Money low-skilled skiers appear to react slightly stronger to dissatisfying experiences compared to high-skilled skiers (Figure 7). A closer look into the differences between the estimates and their standard errors is helpful. Table 3 demonstrates the highly significant coefficient values for all polynomial terms with the expected negative sign for Value-for-Money squared. Considering overlapping confidence intervals and the large sample size, we find small differences concerning Value-for-Money for skiing skills but not for the other two factors Ski Core and Peripherals.

Finally, the skiers' level of resort loyalty, measured by the contrasting number of past visits (0 vs. ≥ 10 visits), arouses very strong prior expectations regarding its influence on the structure of relationship satisfaction. Figures 8-10 visualize the findings for the two contrasting subgroups of first-time visitors vs. repeaters with 10 or more past visits to a ski resort. Owing to non-convergence for

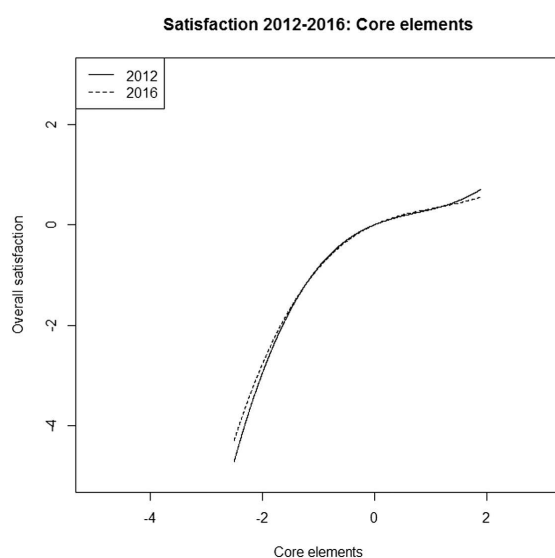


Figure 2. Ski Core factor

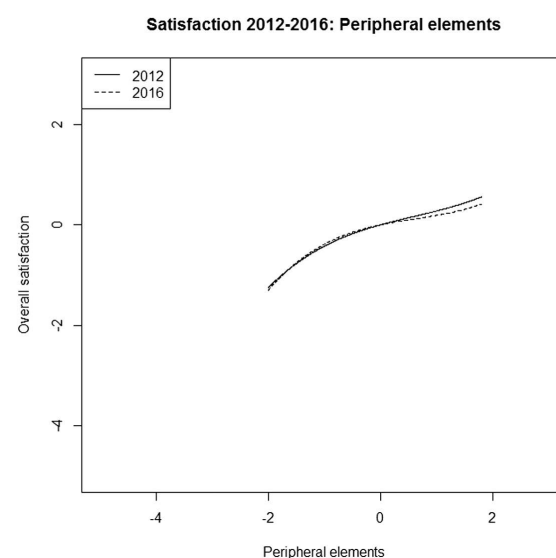


Figure 3. Ski Peripherals factor

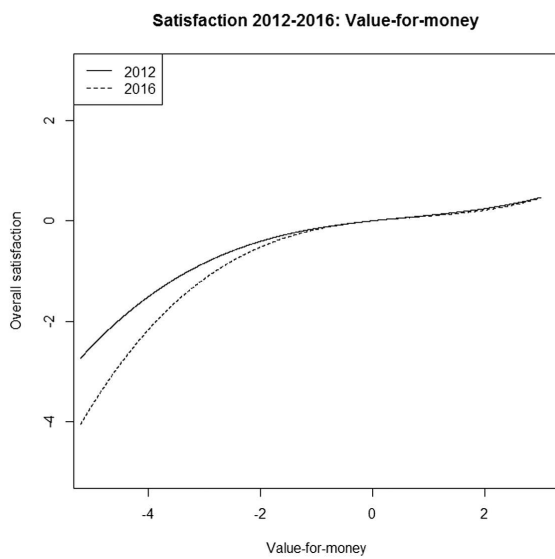


Figure 4. Value-for-Money factor

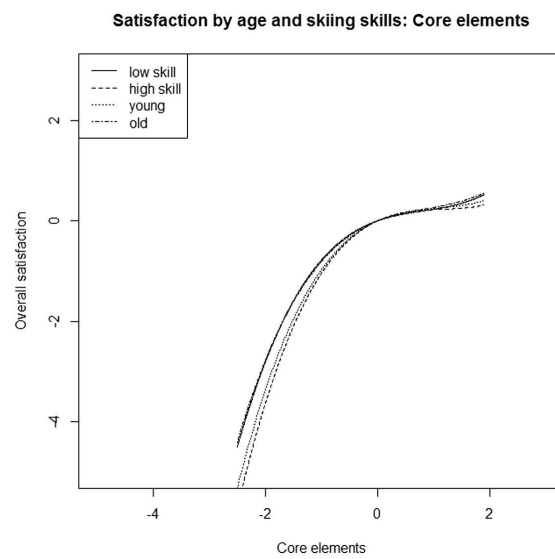


Figure 5. Ski Core in two age and skiing skill groups

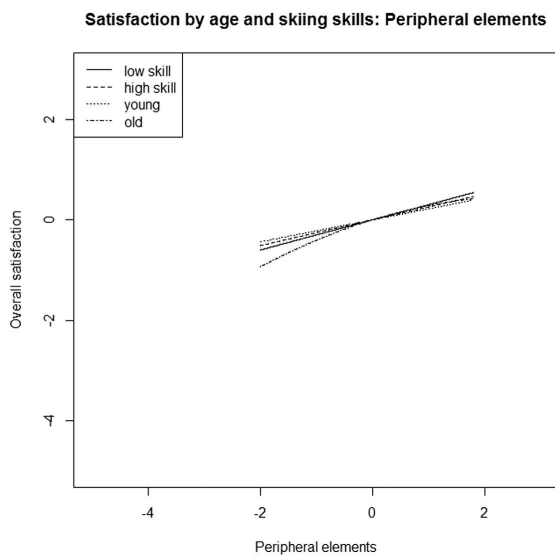


Figure 6. Ski Peripherals in two age and skiing skill groups

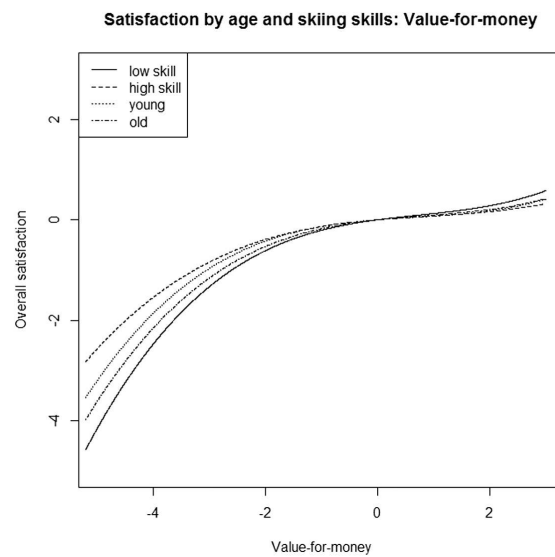


Figure 7. Value-for-Money in two age and skiing skill groups

the two loyalty groups in the hold-out data, the parameter estimation required a total sample of 48,500 respondents containing 12,500 first-time guests and 10,950 repeaters with 10+ past visits.

The Ski Core (see Figure 8) and Ski Peripherals (see Figure 9) functions remain rather unaffected by resort loyalty. The deviation visible in the Value-for-Money chart of Figure 10 seems to indicate a slightly higher sensitivity of the first-time

visitors towards Value-for-Money variations. This observation has face validity as loyal skiers tend to be more tolerant than non-loyal skiers in case of service failures (Mazanec, 2007). The deviation is based on the coefficient of the linear term, which differs significantly with non-overlapping confidence intervals (1st-time: .167, std. error .017; 10+: .096, std. error .016). Thus, there is support for Value-for-Money sensitivity changing based on resort loyalty (in partial support of H2c).



Figure 8. Ski Core in two loyalty groups

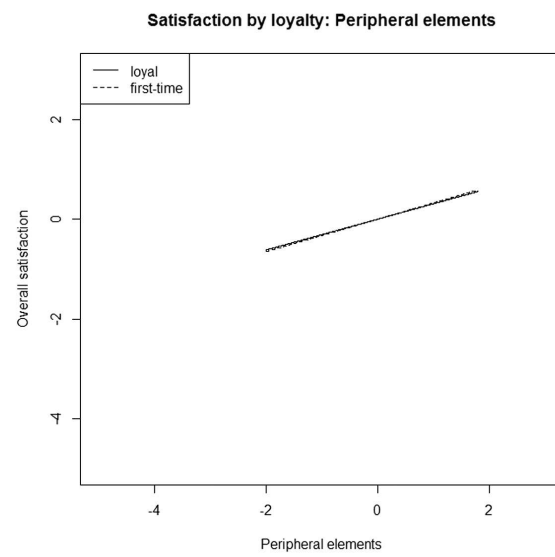


Figure 9. Ski Peripherals in two loyalty groups



Figure 10. Value-for-Money in two loyalty groups

Table 3. Value-for-Money structural coefficients for low- and high-skill skiers

Satisfaction dimension	Low-skill skiers				High-skill skiers			
	Coeff.	Std. Error	t-value	Sign.	Coeff.	Std. Error	t-value	Sign.
VfM	.148	.024	6.25	<.001	.095	.021	4.46	<.001
VfM ²	-.042	.010	-3.98	<.001	-.029	.007	-4.26	<.001
VfM ³	.019	.004	4.18	<.001	.011	.003	3.93	<.001

4. DISCUSSION

The study investigates propositions how time-related influences impact the relationships between attribute performance and overall satisfaction and

as such puts the Kano model (Kano, 1984), also labeled a three-factor theory (Füller & Matzler, 2008), to a test in the context of Alpine ski resorts. The Kano model (Kano, 1984) has been widely used in hospitality and tourism research (Matzler

& Renzl, 2007). The study contributes to existing research on satisfaction formation in ski resorts in three ways. First, the importance of time as a factor shaping the type of relationship between attribute performance and overall satisfaction has been stressed within the Kano model (Kano, 1984). The study is the first to empirically investigate general longitudinal effects on satisfaction formation in ski resorts. Second, prior research found that the type of asymmetry in attribute performance in skiing destinations differs across customer segments (Füller & Matzler, 2008). Differences were explored among the time-related segmentation criteria of age, skills, and loyalty of skiers. Finally, nonlinearity and asymmetry were investigated between attribute performance and overall satisfaction applying an approach based on nonlinear Structural Equation Models (SEM). So far, the study on satisfaction formation in skiing resorts has largely relied on dummy regressions or neglected nonlinearities overall (see Table 1).

Findings detected two nonlinear relationships (basic factors) and one almost linear relationship (performance factor) between attribute performance and overall satisfaction with skiing resorts (*Main H*). First, Value-for-Money can be classified as a basic factor described by Kano (1984). Missing performance of the Value-for-Money factor causes strong overall dissatisfaction while good performance hardly contributes to overall satisfaction. Overall dissatisfaction decreases the more the lower skiers satisfaction is with the Value-for-Money factor. Second, Ski Peripherals largely acts like a performance factor causing satisfaction or dissatisfaction proportional to its level of fulfillment. Third, the most critical factor is the Ski Core dimension. Poor attribute performance of Ski Core triggers severe dissatisfaction and high attribute performance contributes moderately to overall satisfaction. In this respect, the Ski Core attribute acts as a basic factor with a weak excitement component. While the potential to dissatisfy (basic factor) is high, the potential to excite is very limited. However, among the factors influencing overall satisfaction that have been identified in this study, Ski Core shows the strongest impact on overall satisfaction. Results of this study did not yield any true excitement factor according to the Kano model (Kano, 1984). This adds to the mixed picture of previous studies investi-

gating asymmetries in the development of overall customer satisfaction in skiing resorts (Füller & Matzler, 2008; Füller et al., 2006). Past evidence suggests that for skiing resorts excitement factors are most likely to be found in supplementary services like, for example, entertainment, culinary offers, or kids offerings, whereas the excitement potential of such supplementary services is highly segment-specific (Füller & Matzler, 2008). This might explain why the Fun factor (comprising Après-Ski, Friendliness, Entertainment, and Food & Beverage) did not emerge as a general excitement factor. When combined with any other nonlinear factor, Fun does not attain stable significant coefficients even in these large samples, which this study is based upon. Summing up, nonlinear SEM is a suitable method for describing nonlinear relationships between attribute performance and overall satisfaction. It allows researchers and practitioners to avoid shortcomings of other methods adopted for classifying different relationships between attribute performance and overall customer satisfaction (Chen, 2012; Chen, 2015; Deng, 2007; Finn, 2011; Mikulić & Prebežac, 2011).

Regarding the impact of time on the relationship between attribute performance and overall satisfaction (*H1*), this study reveals a slow pace of change of skiers' satisfaction levels over four years. More specifically, the Value-for-Money factor develops into a slightly stronger dissatisfier in the period between 2012 and 2016. When it comes to manifest changes regarding basic and performance factors, it was concluded that satisfaction changes in these factors need a longer time interval to evolve. While the study did not identify any excitement factors, it is believed that excitement factors may wear off quickly and respond faster to the passage of time. The theoretical explanation of temporal effects in satisfaction formation is, according to the expectation disconfirmation paradigm (Oliver et al., 1997), the change of customer expectations. Excitement is caused by quality perceptions that exceed expectations; these perceptions then influence future expectations. This dynamic effect could not be found in ski resorts. The value function of the basic factor core elements (size, slopes, snow, lifts, and security) and peripheral elements was identical in 2012 and 2016. The dynamic effect would mean that low satisfaction with the core elements would have had an even stronger negative impact in 2016. In addition,

the value function of the performance factor peripherals is unchanged. Attribute performance in the study was measured on an abstract level (e.g. satisfaction with lifts, security, ambiance, etc.), not on concrete attributes like seat heating in a gondola, or the presence of security markings. Finding the right level of abstraction may be important as any abstraction means loss of information, discrete effects of concrete attributes might be lost, when satisfaction is measured on an abstract level. This reasoning however needs theoretical elaboration as neither the Kano model nor satisfaction literature explicitly discusses the role of abstract or concrete attributes in expectation and satisfaction formation.

Results reveal that different skiers form their satisfaction differently. Adding to studies investigating segment-specific differences (Füller & Matzler, 2008) regarding nonlinear relationships between attribute performance and overall customer satisfaction (*H2*), this study shows that the impact of the Value-for-Money factor differs across skier subgroups such as skiers' skills and resort loyalty. Low-skilled skiers react slightly stronger to dissatisfying experiences as compared to high-skilled skiers. The effect of the Value-for-Money factor is strongest for the subgroup of first-time visitors. For this subgroup, Value-for-Money has a greater potential to trigger both dissatisfaction and satisfaction. However, the potential to cause dissatisfaction through bad performance in terms of Value-for-Money is also higher. Thus, this study adds to existing research investigating skier price responses on satisfaction-related outcomes such as word-of-mouth (Matzler et al., 2019).

Concluding changes associated with time-related influences, no matter whether they are associated with general industry trends or to segment-specific peculiarities like differences in skill or loyalty, are limited to the Value-for-Money attribute. Time-related changes in other factors seem negligible, at least in the short term (up to four years) and concerning the time-related segmentation criteria of skiing skills, age, and loyalty.

The study also provides some important insights for managers of ski resorts. First, satisfaction patterns are highly stable inter-temporally and inter-personally thereby facilitating the life of ski

resort managers. However, managers are well-advised to attentively manage the Core elements of ski resorts. For instance, bad performance in terms of size of the skiing area, snow conditions, quality of lifts, or security has the greatest potential to cause dissatisfaction and satisfaction, whereas the danger of causing dissatisfaction is far higher. Next, managers should consider carefully what skiers perceive to get in exchange for their money spent because a poor Value-for-Money ratio activates deep dissatisfaction and the general industry trends point towards this relationship becoming even stronger as time passes by. For instance, convincingly demonstrating the bundle of included services to skiers might sensitize their perception and make them feel that the exchange money vs. value is balanced. Managers could use ski resort rankings and refer to websites comparing ski resorts to highlight the value a ski resort offers relative to others. In this respect, ski destination managers should put special emphasis on first-time visitors because the Value-for-Money factor is particularly relevant for this group. Designing special benefits for this skier segment may help to prevent customer dissatisfaction.

The study also comes along with some limitations. Particularly, the absence of an excitement factor may originate from the failure of establishing the proper indicators for the Fun dimension. If the polynomial terms for Fun are estimated together with only linear terms for Ski Core, Ski Peripherals, and Value-for-Money, the Fun factor follows a dissatisfier function and still does not indicate customer delight. Excitement is usually triggered through attributes that have not been expected at all or not been expected in a certain way and hence provoke a surprise effect (Füller & Matzler, 2008; Kano, 1984). Capturing excitement factors with standard satisfaction surveys is difficult because items measuring the performance of new and unexpected attributes are usually scarce and identified systematically. Consequently, the time lag between identifying suitable items and incorporating them in satisfaction surveys complicates or even prevents the detection of excitement factors. However, research has yet to provide evidence for this issue. All findings represent aggregate results for more than 50 ski resorts. Individual resorts or groups of resorts may deviate from the general satisfaction structure.

CONCLUSION

The three-factor structure of customer satisfaction and its temporal effects were investigated. It is shown that there are non-linear relationships between attribute performance and overall satisfaction and that these relationships change over time. These findings have important implications for managers, as they show how individual factors influence overall satisfaction and that these relationships need to be taken into account to increase customer satisfaction. Knowing what the impact of individual factors on overall satisfaction is, managers can make better decisions on resource allocation in quality management and increase the financial performance of their company.

Future research will have to explore destination-specific relationships to examine generalizability critically. Moreover, the study investigated potential changes in skiers' satisfaction at the level of the resort. Exploring changes at the individual level by using panel data is worth pursuing in further studies. Along with that, the period between the observations could be decreased (e.g., on an annual basis to get even more fine-grained results) or increased for a broader picture of the long-term development of winter sports.

AUTHOR CONTRIBUTIONS

Conceptualization: Kurt Matzler, Andreas Strobl, Karin Teichmann.

Data curation: Andreas Strobl, Karin Teichmann.

Formal analysis: Josef Mazanec.

Methodology: Josef Mazanec.

Project administration: Kurt Matzler, Andreas Strobl.

Visualization: Josef Mazanec.

Writing – original draft: Kurt Matzler, Josef Mazanec, Andreas Strobl, Karin Teichmann.

Writing – review & editing: Kurt Matzler, Andreas Strobl, Karin Teichmann.

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APPENDIX A

Table A1. Studies investigating drivers of overall customer satisfaction with a ski resort

Study	Linear drivers of ski resort satisfaction	Non-linear drivers of ski resort satisfaction			Segments investigated	Segment specific differences	Sample	Method for investigating non-linearity
		Basic factors	Performance factors	Excitement factors				
Ferrand & Vecchiatini (2002)	ski resort image, ski attributes (e.g. ski activity facilities), non-ski attributes (e.g. leisure facilities)	not investigated	not investigated	not investigated	not investigated	not applicable	1,428 from one ski resort in Italy	not applicable
Füller et al. (2006)	slopes, restaurants and bars, fun and entertainment, employees	waiting times, slopes, fun & entertainment, employees	restaurants and bars	none	not investigated	not applicable	2,526 snowboarders from 51 ski resorts in Austria, Germany, Italy, and Switzerland	dummy variable regressions
Matzler et al. (2007)	parties and fun, information, price-quality ratio, well-being, slopes and accessibility	not investigated	not investigated	not investigated	5 lifestyle segments of customers (non-family/diversion, family, sportive/life conscious, demanding, settled/intellectual, high vs low spending & high vs low-medium skiing skills)	Importance of satisfaction drivers differ across segments	6,172 customers from 10 leading Alpine ski resorts in Austria, Switzerland, and Italy	not applicable
Mazanec (2007a)	situation at ticket selling points, level and variety of prices, ski lifts, skiing area, skiing runs, services, restaurants	<i>first time customers</i> : access, situation at ticket selling points, services, restaurants; <i>loyal customers</i> : access, services, restaurants, skiing lifts	<i>first-time customers</i> : level and variety of prices, ski lifts, skiing runs, ski area; <i>loyal customers</i> : level and variety of prices, services, ski area	<i>first time customers</i> : restaurants; <i>loyal customers</i> : restaurants, skiing runs	5 customer satisfaction subgroups, first-time vs loyal visitors	Importance of satisfaction drivers differ across segments	30,000 respondents from all 27 ski resorts in Austria	nonlinear structural equation modeling
Matzler et al. (2008)	quality & safety of slopes, restaurants & bars, variety of slopes & sports facilities, ski lifts, employees	not investigated	not investigated	not investigated	Gender, 1-day vs. repeat visitors, three age groups	Importance of satisfaction drivers differ across segments	14,861 from 51 ski resorts in Austria, Germany, Italy, and Switzerland	not applicable

Table A1 (cont.). Studies investigating drivers of overall customer satisfaction with a ski resort

Study	Linear drivers of ski resort satisfaction	Non-linear drivers of ski resort satisfaction			Segments investigated	Segment specific differences	Sample	Method for investigating non-linearity
		Basic factors	Performance factors	Excitement factors				
Füller & Matzler (2008)	parties and fun, information, price-quality ratio, well-being, slopes and accessibility	<i>all customers:</i> information, price-quality ratio, well-being, slopes, accessibility; <i>non-family/diversion lifestyle customers:</i> parties and fun, information, price-quality ratio, slopes, and accessibility; <i>family lifestyle customers:</i> parties and fun, information, price-quality ratio, well-being, slopes, accessibility; <i>sportive/life conscious lifestyle customers:</i> information, price-quality ratio, well-being, slopes, accessibility; <i>demanding lifestyle customers:</i> price-quality ratio, slopes; <i>settled/intellectual lifestyle customers:</i> information, price-quality ratio, slopes, accessibility;	<i>all customers:</i> none; <i>non-family/diversion lifestyle customers:</i> none; <i>family lifestyle customers:</i> none; <i>sportive/life conscious lifestyle customers:</i> none; <i>demanding lifestyle customers:</i> well-being; <i>settled/intellectual lifestyle customers:</i> parties and fun;	<i>all customers:</i> parties and fun, kids offerings; <i>non-family/diversion lifestyle customers:</i> well-being; <i>family lifestyle customers:</i> kids offerings; <i>sportive/life conscious lifestyle customers:</i> parties and fun, kids offerings; <i>demanding lifestyle customers:</i> parties and fun, information, accessibility, kids offerings; <i>settled/intellectual lifestyle customers:</i> kids offerings, well-being;	5 lifestyle segments of customers (non-family/diversion, family, sportive/life conscious, demanding, settled/intellectual, high vs low spending & high vs low-medium skiing skills)	Non-linearity of satisfaction drivers across segments	6,172 customers from 10 ski resorts in Austria, Switzerland, and Italy	dummy variable regressions
Bonnefoy-Claudet & Gbantous (2013)	perceived value of stay, joy, peacefulness	not investigated	not investigated	not investigated	not investigated	not applicable	540 customers from one ski resort in France	not applicable
Zehrer & Raich (2016)	perceived crowding, coping behavior	not investigated	not investigated	not investigated	not investigated	not applicable	285 customers from one ski resort in Austria	not applicable

APPENDIX B

Exploring dimensionality and scale properties

The attribute performance items are expected to form several dimensions, which will be explored with EFA and with the nonparametric Mokken scale construction procedure. Both 2012 and 2016 datasets are randomly split into two subsamples of equal size. For each dataset, the first subsample serves this exploratory purpose. Some pre-processing is required, since, as usual, the rating scales for satisfaction items are heavily skewed. Accumulating the sparse ratings along with points 1 to 6 transforms the original ten points into a scale of five points with reasonable frequencies.

To explore the dimensional pattern underlying the attribute performance items, ordinary principal components analyses – Henry Kaiser’s (1970) ‘Little Jiffy’, the ‘busiest workhorse’ in tourism research (Mazanec et al., 2010, p. 21) – is run for the split-half samples of both 2016 and 2012 datasets.

Columns 2 and 3 of Table B1 exhibit the rotated component loadings of the 19 attribute performance items gained for the four dimensions with eigenvalues > 1. Except for item Friendliness, 2016 and 2012 findings are in full agreement. The item Hotels cannot be unambiguously assigned. The last three items in Table B1 are designated observables for the dependent construct and therefore not included in the search for indicator sets of the independent latent variables. Mokken’s (1971) monotone homogeneity model processes ordinal data under less restrictive assumptions compared to the parametric models of Item Response Theory. The Mokken package as implemented in the R open-source system offers an exploratory search procedure (Rusch et al., 2013). It proposes the number of dimensions and selects the associated items satisfying the cumulative Guttman property to some specified level expressed in the item scalability coefficients.

If one sets an acceptable lower bound for the item

Table B1. Dimensional structure according to EFA and Mokken item scalability > .40

Attribute performance items	Sample #1		Sample #1	
	2016 (n = 24,123)	2012 (n = 20,121)	2016 (n = 24,123)	2012 (n = 20,121)
	EFA Dimension Nr. PCA (Loading)		Mokken Scale Nr. (Scalability Assignment Coefficient)	
Ski Resort Size	2 (.70)	2 (.68)	2 (.58)	2 (.52)
Quality of Slopes	2 (.78)	2 (.76)	2 (.58)	2 (.52)
Snow Reliability	2 (.73)	2 (.70)	2 (.52)	2 (.46)
Lifts	2 (.60)	2 (.61)	2 (.47)	2 (.42)
Security	2 (.61)	2 (.60)	2 (.48)	2 (.43)
Hotels	–	–	0	0
Entertainment	4 (.77)	4 (.77)	4 (.55)	4 (.55)
Food and Beverage	4 (.48)	4 (.43)	1 (.52)	1 (.48)
Nature	1 (.71)	1 (.69)	1 (.52)	1 (.51)
Peace and Quiet	1 (.73)	1 (.73)	1 (.55)	1 (.53)
Après-Ski	4 (.76)	4 (.78)	4 (.55)	4 (.55)
Friendliness	4 (.47)	1 (.45)	1 (.56)	1 (.56)
Ambience	1 (.69)	1 (.67)	1 (.59)	1 (.67)
Exclusivity	1 (.60)	1 (.64)	1 (.58)	1 (.62)
Coziness	1 (.63)	1 (.65)	1 (.62)	1 (.63)
Authenticity	1 (.73)	1 (.73)	1 (.62)	1 (.67)
Value-for-Money Lifts	3 (.75)	3 (.76)	3 (.54)	3 (.54)
VFM Accommodation	3 (.82)	3 (.80)	3 (.56)	3 (.55)
VFM Restaurants	3 (.77)	3 (.79)	3 (.56)	3 (.55)
One-dimensional	–	–	–	–
Satisfaction	–	–	1 (.71)	1 (.62)
Word-of-Mouth	–	–	1 (.71)	5 (.42)
Revisit	–	–	–0	5 (.42)

scalability coefficient of .40, the results for the 19 attribute performance items of both 2016 and 2012 split-half samples agree perfectly. Only the item Hotels, also failing a distinct dimension assignment in the PCA runs, misses the scalability limit. It can be dismissed lightheartedly as the item Accommodation reappears in another dimension. Columns 4 and 5 of Table B1 show the proposed assignment of the attribute performance items to performance scales together with their scalability coefficient values. The three items One-dimensional Satisfaction, Word-of-Mouth, and Intention to Revisit are the observables (i.e., reflective indicators) of the dependent construct 'Overall Satisfaction'. They were included in the Mokken scaling exercise to examine whether they fulfill the Guttman property. This is only partially the case, but not required for an indicator set in SEM. To some

extent, the item Intention to Revisit as a reflective satisfaction indicator may suffer from many respondents' novelty-seeking behavior, which disturbs the satisfaction-loyalty link.

Despite their incommensurable statistical underpinnings, the two exploratory methods generate recommendations of astonishing conformity. Only two out of 19 attribute performance items violate the perfect consistency. Considering the need for 3+ indicators for each latent dimension in the forthcoming Structural Equation Models (SEM) and taking the exploratory results as decision support, the priority was given to 2016 PCA solution for Food and Beverage and Friendliness. Given their item composition, the four suggested attribute performance dimensions are named 'Ski Core' (scale 2 of Table A1), 'Ski Peripherals' (scale 1), 'Fun' (scale 4), and 'Value-for-Money' (scale 3).