

# Reading the Stars - Do Guests Value What the Hotel Classification Ensures?

An empirical analysis of the relationship between objective classification outcomes and subjective online guest ratings for hotels in Switzerland

CRED-Bericht Nr. 17<sup>1</sup>

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## Abstract

The increased transparency in the market for hotel accommodation, due to the emergence of review websites, as well as changing guest needs, such as a greater focus on experiential value and customization instead of standardization, have triggered a debate on the continuing relevance and adequacy of traditional hotel classification systems. Against this background, a master thesis at the Department of Economics has aimed at collecting some evidence on the relationship between objective classification and subjective guest ratings as two quality signals in the hotel industry. Concretely, these ratings were used to evaluate the guest orientation of the expert-based hotel classification by means of multivariate linear regression analyses. The effects of aggregate classification outcomes, namely star category, supplement "superior" and supplementary points achieved through criteria fulfilment, on guest perceptions of quality were analysed. Additionally, the relationship of specific hotel quality components as covered by classification criteria with guest ratings was investigated to find out which assessment areas of the classification are actually relevant for guests. The empirical analysis was carried out for the hotelleriesuisse classification of Switzerland. For the analysis, a rich dataset containing internal hotel-level classification audit data and guest ratings, aggregated by TrustYou and Booking.com, was compiled. The 238 classification criteria that exhibit variance in their fulfilment by hotels were bundled into 14 quality indices for different service areas. The analysis revealed that given the star category and various controls, guests are moderately more satisfied with hotels that fulfil more of the classification criteria. Given objective quality differences, hotels with more stars have a harder time pleasing their guest, probably due to higher expectations. Not all quality components that are covered in the classification contribute to guest satisfaction. It is especially the criteria related to core service areas, such as room or bathroom, sleeping comfort and quality management, that turn out to be relevant. Extensive room service tends to be less valued. Looking at the midscale and luxury segment separately indicates that there is a hierarchy of guest needs, which starts with room quality. In sum, the findings suggest that hotel classification outcomes have a moderately positive relationship with guest perceptions of quality. As an implication of the analysis, classification systems might narrow down their focus and concentrate on criteria in the core service areas of a hotel to carry out market segmentation. Specifying too many requirements, e.g. concerning the provision of add-on services, curtails the entrepreneurial freedom of hotel operators. Furthermore, the availability of guest reviews has reduced information asymmetries in the market and thereby decreased the need to define comprehensive hotel quality standards.

\*In den CRED-Berichten werden Ergebnisse von Forschungsarbeiten und anwendungsrelevanten Projekten publiziert.

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**List of Abbreviations**

add.	additional
Activ.	Activities
Compl.	Complementary
Dep. Var.	Dependent variable
Dr.	Doctor
e.g.	exempli gratia (for example)
et al.	et alii (and others)
Equip.	Equipment
Entmt.	Entertainment
Fac.	Facilities
FSO	Federal Statistical Office
F&B	Food & Beverage
ibid.	ibidem (in the same place, referring to the reference previously cited)
incl.	including
Info.	Information
LD	Linear dependence
Mgmt.	Management
N	Sample size
No.	Number
n.a.	not applicable
obj.	objective
OLS	Ordinary least squares (estimation technique for linear regressions)
OTA	Online travel agency
p./pp.	Page/pages
PC	Principal component
PCA	Principal component analysis
pPCA	Polychoric principal component analysis
Prof.	Professor
P2P	Peer-to-peer
Serv.	Services
Std. Dev.	Standard deviation
vs.	versus
WOM	Word-of-Mouth

# 1 Introduction and Motivation

## 1.1 Initial Situation and Problem Definition

The tourism industry, to a higher degree than other service industries, is a seller of experiences (Crick & Spencer 2011; Hemmington 2007; Van Houts 2000). Several authors have even metaphorically called it a dream factory (ibid.). Due to this high proportion of experiential attributes, the quality of tourism services, such as an overnight stay at a hotel, is difficult to judge at the pre-consumption stage (Núñez-Serrano et al. 2014; Öğüt & Onur Taş 2012). In Economics, this situation of unequally distributed knowledge regarding the quality of products or services between suppliers and consumers is known as the problem of asymmetric information and leads to sub-optimal market outcomes or even market failure (Akerlov 1970). A known solution to alleviate the adverse economic effects resulting from asymmetries of information lies in signalling mechanisms (Spence 1973), through which the better-informed party credibly communicates the defining quality characteristics of an offer (Akerlov 1970; Deaton 2004; Öğüt & Onur Taş 2012). A determinant characteristic for every kind of quality signal to work is that the costs of obtaining it are inversely related to the true level of quality, so that low-quality suppliers will not be able to obtain it.

In the context of tourism services, several different quality indicators or standards that work as signalling mechanisms and thereby increase market transparency exist. The classification of hotels through a third party, mostly based on a system with star categories, is the most traditional quality signal (Martin-Fuentes 2016; Öğüt & Onur Taş 2012). Worldwide, independent experts visit and assess hotels by means of a primarily infrastructure-oriented set of very specific criteria, where more stars signal a higher quality standard. More recently, the ongoing digitalization and thus the involvement of new information and communication technologies have, however, triggered the emergence of other channels through which travellers can find supplier-independent information on hotel quality (Hensens 2015). Nowadays, thousands of subjective online guest reviews on hotel stays are made available via different travel review websites and online travel agencies (OTAs), such as TripAdvisor, Expedia or Booking.com. This user-generated content in the form of guest feedback leads to online reputation for suppliers and also helps to increase market transparency (Minazzi 2010; Zehrer et al. 2011).



Against this background, a debate on the relevance and credibility of these two quality indicators in tourism has been launched by practitioners and an increasing branch of researchers. While the research focus clearly lies on the more recent phenomenon of online guest reviews (Ayeh et al. 2013; Filieri 2016; Liu & Park 2015), the discussion on the relevance and design of hotel classification systems has also gained momentum (Martin-Fuentes 2016; Minazzi 2010; Narangajavana & Hu 2008; Núñez-Serrano et al. 2014; Scheibel & Luthe 2016; Torres et al. 2014). Critics of the traditional quality standard have argued that review websites offer quality signals, whose underlying evaluation criteria are more tailored towards guest needs at low provision-cost, which makes them replace the more supplier-driven, rigid classification (Engl 2017; Hensens 2015; Ögüt & Onur Taş 2012; Stringam et al. 2010). Others have emphasised the complementarity of the two hotel quality indicators due to their different foci (Hensens 2015; Ögüt & Onur Taş 2012; Scheibel & Luthe 2016; Schmidheiny 2007). While the conventional classification relies mainly on tangible criteria and allows travellers to decide on the optimal hotel segment, online reviews primarily cover quality aspects related to staff or experiential value and provide detailed information on specific hotels within a segment (ibid.). First approaches to integrate online guest ratings into classification systems have even been discussed, however controversially (Blomberg-Nygard & Anderson 2016; Hensens 2015; UNWTO 2014). Another argument for the relevance of the classification is that given the endless amount and subjectivity of web content, objective, transparent quality assessments might be a useful orientation tool for the hotel choice (Fang et al. 2016; Torres et al. 2014; UNWTO 2014).

Besides the debate on whether hotel classification systems per se are still relevant, the quality attributes that they ensure have been questioned (Martin-Fuentes 2016). Current literature argues that the relevance of tangible service components, on which hotel classification mainly relies, might have decreased (Crick & Spencer 2011). In today's business context, travellers have very differentiated needs and pay even more attention to the experiential aspects of service provision. The adequacy of standardisation and market segmentation, as encouraged at least to some extent by classification systems, might thus be questioned (ibid). This is also reflected by the rise of the so-called sharing economy, which has put forth new accommodation services that challenge traditional views on hotel quality requirements, such as the conformity between the level of infrastructure and services (Gardini 2010, p. 15; Tussyadiah & Zach 2015). On Airbnb, a worldwide platform for peer-to-peer (P2P) accommodation,

luxuriously furnished apartments without access to staff just as simple accommodations with personalized service are successfully offered. The market for P2P accommodation knows no predefined standards (Tussyadiah & Zach 2017).

Based on these recent developments, the aim of this master thesis is to collect evidence on whether the traditional hotel classification with its set of criteria still exhibits some guest orientation and ensures quality components that guests value. It does so by relating objective classification outcomes to subjective quality perceptions in terms of online guest ratings. Throughout this thesis, the term “hotel classification” is used to denote the whole evaluation system or process. Whenever specifically the “hotel stars” are meant, they are referred to as “star categories”, “categories” or simply “stars”.

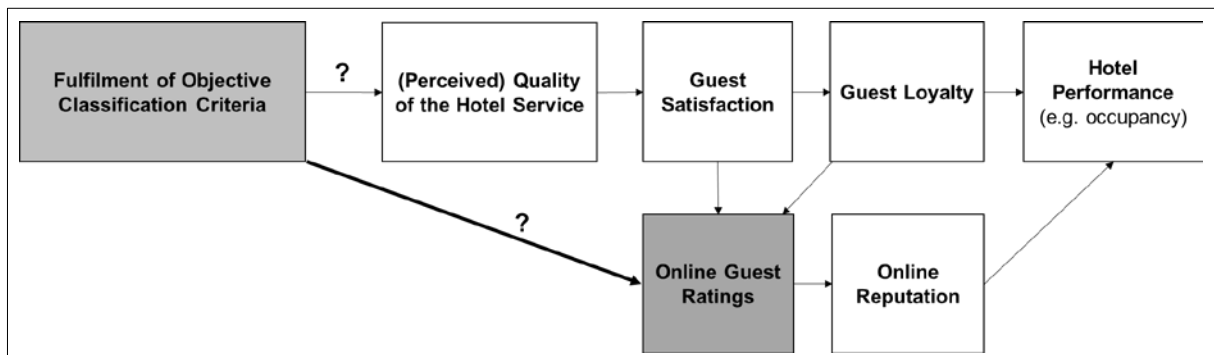
## **1.2 Research Objectives**

Although classification is a wide-spread phenomenon in the hotel industry worldwide, only limited research on the guest orientation of the different systems has been carried out, with controversial results (Abrate et al. 2011; López Fernández & Serrano Bedia 2004; Martin-Fuentes 2016; Núñez-Serrano et al. 2014). At the aggregate level of star categories, some authors have argued that more stars go hand in hand with more positive guest feedback (Bulchand-Gidumal et al. 2011; Martin-Fuentes 2016; O’Connor 2008). The empirical analyses of others, however, have suggested that subjective quality perceptions do not increase linearly with the star category, not least due to guest expectations that are raised with every additional star (Hensens 2011; López Fernández & Serrano Bedia 2004; Martin-Fuentes 2016). At the more disaggregated level of underlying quality attributes, previous studies have found mixed empirical evidence on the relevance of services, facilities or standards as covered by classification systems for guests (Shanka & Taylor 2004; Bulchand-Gidumal et al. 2011). It is therefore of interest to find out whether guests and experts use some common criteria when evaluating hotels.

This master thesis tries to shed some light on this contested issue by looking at the Swiss context, which is not only relevant from a scientific perspective, but also for tourism practice. Switzerland has been a pioneer country in the development and harmonization of classification systems at the European level. The two Swiss hotel associations, *hotelleriesuisse* and *GastroSuisse*, put a lot of effort into continuously developing the systems further (*hotelleriesuisse* 2015a; UNWTO 2014). Furthermore, for an efficient allocation of resources, it is of interest for hotel businesses to

understand how their classification affects guest perceptions of quality and which quality components are relevant drivers of satisfaction as an antecedent of guest loyalty and business performance (Bulchand-Gidumal et al. 2011; Tussyadiah & Zach 2017). The thesis profits from the availability of online guest reviews, and more concretely, the numeric guest ratings, as a measure of demand-side quality perceptions. These guest ratings make it possible to econometrically investigate whether objective hotel quality, as gauged through the hotel classification with its criteria, is (positively) related to quality as perceived by guests. Figure 1 illustrates the relevant theoretical relationships as the conceptual framework of the analysis. The relationship of interest, namely the one between objective hotel quality, measured through the fulfilment of classification criteria, and guest ratings, is depicted in bold.

Figure 1: Conceptual Framework of the Analysis



Source: Own figure based on Huber et al. (2004) and Stringam et al. (2010)

Contrary to many previous studies that look at the aggregate relationship between star categories and online ratings, and thereby methodologically ignore that the expectational level of guests varies with stars (López Fernández & Serrano Bedia 2004; Secchi et al. 2016), this study makes use of more disaggregate hotel-level data. The analysis is carried out for the hotelleriesuisse classification system of Switzerland. Since, besides Switzerland, the same classification criteria are applied in 14 other European countries, the findings of the analysis are also relevant in an international context. The following research objectives are pursued:

- Analyse whether, in broad terms, the hotel classification with its set of criteria ensures services, facilities or associated standards that guests value by linking a hotel's objective classification outcomes with its subjective guest ratings.
- Investigate which of the hotel quality components that are covered by means of the classification criteria are actually relevant determinants of guest satisfaction.
- Derive tentative implications, for the hotel industry and especially for the classification with its institutions, regarding the relevance that guests pay to hotel quality components which are covered by the official classification.

### 1.3 Research Questions and Methodological Approach

Concretely, the master thesis tries to answer the following theoretical and empirical research questions for the case of the hotelleriesuisse classification system:

1. How can the relationships between classification and online guest ratings as two hotel quality indicators be illustrated in a theoretical impact model?
2. Is there an empirical relationship between the objective quality assessment of hotels by means of the classification criteria and subjective online guest ratings? Put differently, are aggregate classification outcomes in terms of stars, points achieved through the fulfilment of criteria and supplement “superior”, reflected in guest perceptions of quality?
3. Which, if any, of the hotel quality components that are covered in the set of classification criteria significantly (positively) affect online guest ratings and can thus be considered relevant determinants of perceived hotel quality?
4. Are there differences between 3- and 4-star hotels in terms of which quality components as covered by the classification are relevant for guests?
5. Which tentative implications for the hotel industry and especially the hotel classification with the responsible institutions can be derived from the analysis?

The case of the hotelleriesuisse classification system provides a unique opportunity for an empirical investigation of the research problem, since its design generates within-star variability in terms of the classification criteria each hotel fulfils. It consists of mandatory minimum criteria per star category and elective criteria out of which a choice can be made to attain the minimum score for the desired category. Hotel-level data on the fulfilment of the totally 270 classification criteria is available. This allows looking at the effect that the level of objective quality, overall and regarding specific components, has on guest ratings, while at the same time controlling for the star category. Furthermore, many previous studies concerned with a similar research question have carried out guest surveys, which requires limiting the list of potentially important hotel quality attributes to be rated by respondents to a manageable amount. Besides this constraint, evaluating quality components of a hotel tends to be difficult for guests in an artificial context of a survey (Li et al. 2013). Online ratings, if truthful, are based on real experiences and are thus a measure of guest satisfaction which is not prone to these issues. The thesis uses online guest ratings from two different sources, namely so-called TrustScores, which are aggregated ratings from various review websites and OTA's, as well as ratings submitted to Booking.com, the currently most relevant hotel booking portal in the Swiss context (Schegg 2016). The empirical research questions are answered by means of multivariate regression analysis using the OLS estimation

technique, with classification outcomes as the explanatory and online guest ratings as the response variables. A primary analytical step for the research question on relevant quality components involves aggregating those classification criteria that exhibit variation in their fulfilment between hotels, in total 238 of them, to meaningful quality indices that can be econometrically investigated. Different weighting schemes for the construction of these indices are proposed. Within-star variance thereby only stems from elective criteria, while mandatory minimum criteria per star category cannot be analysed. It can, however, be argued that, if at all, it is especially these non-mandatory and thus less expected quality attributes which are perceived and valued by guests and thus potentially affect their level of satisfaction (Gardini 2010).

#### **1.4 Structure of the Master Thesis**

This master thesis consists of four main parts. The first part (chapters 2 and 3) lays the theoretical foundations for the analysis. It starts with providing some background on the concept of quality as well as its defining components in the context of hotel services. Subsequently, characteristics and functions of the hotel classification and online guest reviews or ratings as the focal points of the analysis are discussed. Based on these insights, a theoretical impact model, which builds the framework of the empirical analysis, is set up. Part two (chapters 4 and 5) provides a review of relevant literature for the empirical analysis. It summarizes and discussed previous findings on the relationship between star categories and online guest ratings as well as on relevant hotel quality components from the perspective of guests. Furthermore, it gives some background on hotel classification in Switzerland and explains the specific design of the hotelleriesuisse classification system. This is a precondition for understanding the classification audit data that will be used for the econometric analysis. After each these theoretical chapters, the central insights are shortly summarized by means of preliminary conclusions. The third part (chapters 6 and 7) is concerned with the empirical analysis that is carried out for the hotelleriesuisse classification system. It provides an overview on the used data sources and explains the chosen methodological approach in terms of quality index construction and multivariate regression analysis. Subsequently, the results of the econometric analysis are discussed. The fourth concluding section (chapter 8) summarizes the main findings, discusses the contribution of the thesis to previous literature and critically evaluates it. Finally, it derives tentative practical implications for the hotel industry as well as the hotel classification with its responsible institutions.

## 2 The Concept of Quality

Looking at the concept of quality in a theoretical way provides useful guidelines for the analysis of the two different quality indicators and their relationships. Defining and measuring quality, especially of services, is a complex task (O'Neill 2001). Previous literature, which stems mostly from the second half of the 20<sup>th</sup> century, but is still widely applied in current research, has come up with various approaches to deal with the concept (Garvin 1984; Kara et al. 2005; Zeithaml 1988). This chapter theoretically discusses quality and relates the insights to the research problem at hand.

### 2.1 Approaches to Measuring Quality

Garvin (1984) has proposed an influential overview on five approaches to defining quality, which provides a valuable theoretical framework for the analysis. He emphasises, that assessment criteria, or the benchmark according to which quality of products and services are evaluated, can be defined either by consumers, service providers, the industry or experts (ibid). Table 1 on page 8 shortly summarizes the cornerstones of the five quality approaches and provides concrete examples for hotel quality indicators that apply to the different logics. For this analysis, the *product-based* and *user-based* approaches are relevant and therefore discussed more in detail below.

### 2.2 Product-based View on Quality

The product-based view claims that differences in quality stem from differences in the quantity of desirable attributes that are possessed by a product or service (Gardini 2010; Garvin 1984; Zeithaml 1988). The theoretical appeal of this view on quality, at least at first sight, lies in the measurability of the concept and its objectivity. Hotel classification systems or other expert-based quality ratings with their predetermined set of evaluation criteria adopt this input-oriented view on quality (Gardini 2010). Hedonic pricing models also follow this logic by arguing that products and services should be seen as bundles of valued attributes whose price signals quality (Andersson 2010; Thrane 2007). Before product-based quality can, however, be assessed, the list of desired attributes needs to be defined. The selection of and the weights given to these attributes necessarily have a subjective component (Zeithaml 1988). The wide range of different classification systems worldwide and the recently voiced criticism regarding their validity as a quality indicator suggest that experts, customers and researchers do not fully agree on the ideal hotel quality standard.

Table 1: Five Approaches to Defining Quality based on Garvin (1984)

Theoretical Approach	View on Quality	Measurability / Assessor	Examples (for the Hotel Context)
Transcendent	Absolute and innate excellence which is universally recognizable through experiencing the product or service.	– Abstract, non-measurable concept	Group of the Leading Hotels of the World
Product-based	Quality stems from the quantity of measurable desired ingredients or attributes that a product or service possesses.	– Precise and objectively measurable concept referring to “actual” quality – Products and services can be compared and ranked according to the amount of quality attributes they possess, under the assumption that all consumers have similar preferences.	Hotel classification
User-based	Quality results from the ability of a product or service to satisfy the needs and preferences of customers.	– Subjective, perceptual concept – Individuals rank products and services based on their perception of quality. – Quality perceptions are tied to individuals with their preferences and are thus not universal. – The product or service that best meets the needs of most consumers is considered to have the highest quality.	Personal recommendations, online guest ratings
Manufacturing-based	Quality results from conformance to business internal requirements, standards or product/service specifications.	– Measurable concept – Quality means no deviation from the internal, predefined product/service specifications.	ISO certification, conformance with the internal hotel service manual
Value-based	Quality results from an optimal price-performance ratio.	– Subjective concept, challenging to measure – Individual comparison of perceived benefits and costs	Predicate “Best Value for Money”

Source: Own table based on Gardini (2010) and Garvin (1984)

### 2.3 User-based View on Quality

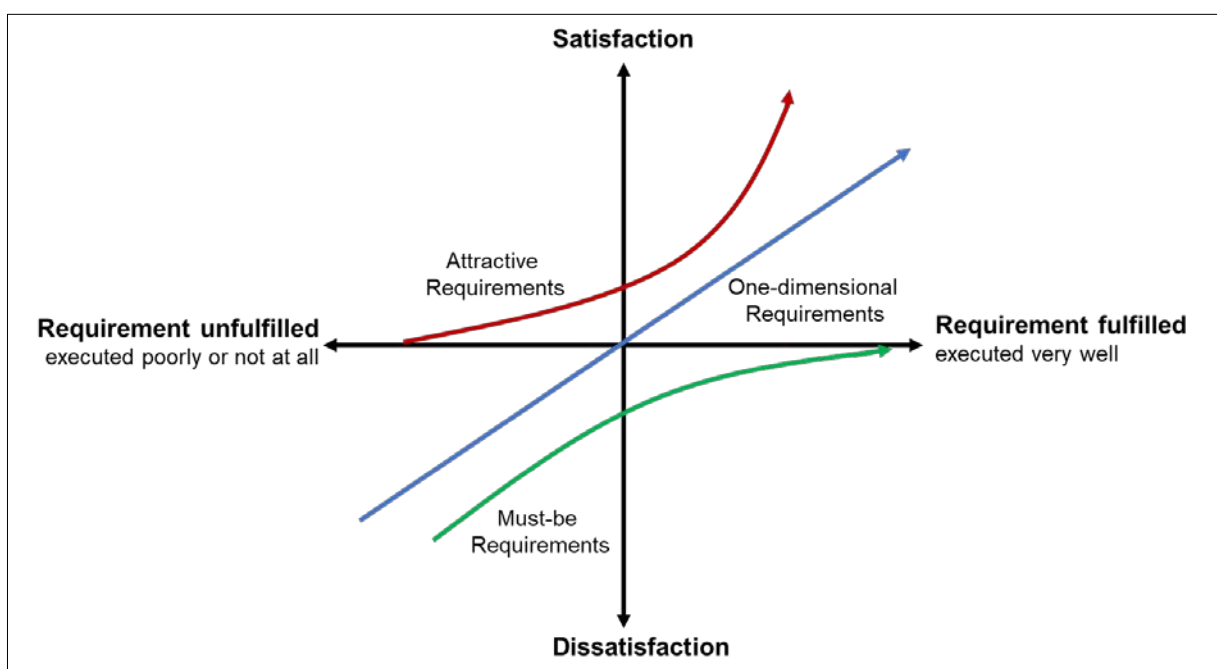
In a nutshell, the user-based view argues that the quality of products and services should be measured from the consumer's point of view, which amounts to a subjective evaluation based on perceptions (Garvin 1984; Matzler et al. 2006). In the context of services and especially in tourism research, most theoretical and empirical studies adhere to the user-based, output-oriented approach to defining quality (Gardini 2010). The service provider which is able to satisfy the highest share of customers is considered to offer the best quality (Garvin 1984). Service quality as perceived by customers is closely related to customer satisfaction, which theorists understand as an outcome of quality (Kara et al. 2005). Customer satisfaction is the result from a customer's comparison between the expected service and the subjective perception of the service that has actually been received (Grönroos 1984; Parasuraman et al. 1985). According to the disconfirmation of expectations paradigm (Oliver 1980), moderate to high satisfaction is achieved if the perceived service meets or exceeds expectations (zero or positive disconfirmation), while dissatisfaction roots in unfulfilled expectations (negative disconfirmation). It is often argued that customer satisfaction relates to a specific transaction and is more situational as well as emotional, while user-based quality describes the overall judgment or evaluation of a firm's product or service by its customers, which is formed over years (Cronin & Taylor 1992; Parasuraman et al. 1988). The two concepts are, however, used as synonyms in many applications (Taylan Dortyol et al. 2014). This master thesis also uses the terms customer or guest satisfaction and user-based quality interchangeably.

Due to the strong linkage customer expectations have with the attained level of satisfaction, it has been argued and empirically shown that the relationship between quality attributes and customer satisfaction is not always linear (Kano et al. 1984; Matzler et al. 2006). The well-known Kano model (Kano et al. 1984) adopts this view and states that the desirable attributes of a product or service can be understood as being either "must-be", "one-dimensional" or "attractive" requirements (see Figure 2). The "must-be" requirements are expected by customers and, if not provided in adequate quality, lead to dissatisfaction. A high level of quality or fulfilment of these very basic minimum requirements, however, does not increase the level of satisfaction. In the hotel context, cleanliness of the room or functioning basic facilities, such as the shower, could be seen as examples for "must-be" requirements. In terms of the hotel classification, minimum criteria that are mandatory for every star category are



considered “must-be” by experts. “One-dimensional” requirements, also called performance factors, linearly lead to satisfaction when fulfilled and to dissatisfaction when not present in decent quality (e.g. a well-functioning service or a comfortable room arrangement). Lastly, “attractive” requirements are unexpected by customers and surprise them positively (e.g. a present provided to guests at arrival). They lead to customer satisfaction or even delight, but do not cause dissatisfaction when not fulfilled (Kano et al. 1984). Over time, as customer expectations change on the basis of what is generally offered, previous “attractive” requirements can become “one-dimensional” or even “must-be” attributes (Gardini 2010).

Figure 2: Kano’s Model on Two-dimensional Quality



Source: Own figure based on Kano et al. (1984); Lin et al. (2010)

## 2.4 Theoretical Dimensions of Quality in the Hotel Context

After discussing how and based on which benchmarks quality can be defined, it is of interest to look at the specific components that constitute quality in the context of hotel services. Contrary to material products, services are intangible and their production and consumption takes place to a large extent simultaneously, which involves close interaction between service providers and their customers (Grönroos 1984). It is therefore meaningful to distinguish two main dimensions of service provision that contribute to overall quality perceptions, namely a *technical* and a *functional* dimension. The technical, also called material or tangible, service dimension refers to what consumers get from service providers in terms of quantifiable aspects or concrete

output. The functional service dimension concerns the way of service provision which is more personal or relational in nature (Grönroos 1984; O'Neill 2001). Applying this dichotomization to the hotel service, the room facilities or room service hours are examples for the technical dimension, while responsiveness or empathy of the staff belong to the functional dimension. Similarly, the widely adopted SERVQUAL model on service quality proposes, that the latter results from the quality of tangibles in the technical dimension and reliability, responsiveness, assurance and empathy of the personnel in the functional dimension (Parasuraman et al. 1985, 1988). It has been argued that in the context of hospitality services, functional quality tends to be more important and may even partly be able to compensate deficiencies in the technical quality dimension, at least as long as tangibles fulfil basic standards (O'Neill 2001).

It is important to note that hotel accommodation consists of a whole bundle of different and interlinked service components, which in their totality make up the overall experience and contribute to the quality perception of guests (Crick & Spencer 2011). A useful framework for the derivation of concrete components which contribute to overall quality is to look at the four main different service areas of hotels, namely (Freyer 2015, p. 168):

- *Accommodation* as the core product (with physical components such as room, bed or bathroom and services such as housekeeping or front-office),
- *F&B* as the supporting product (with restaurants, bars and room service)
- *Add-on services* as the supplementary product (with business infrastructure as well as recreational facilities or services and wellness), which offer most potential for differentiation between hotels
- *Locational attractiveness* as a non-business component of the hotel offer

## 2.5 Preliminary Conclusions

Figure 3 summarizes the most important insights of this chapter on the concept of quality in the hotel context. Based on Garvin (1984), the hotel classification can be seen as a product-based, input-oriented quality indicator, whereas online guest reviews reflect user-based quality or alternatively guest satisfaction by adopting an output-oriented logic (ibid.). In theory, the quality of services consists of a technical and a functional dimension, where the first relates to the material, tangible aspects of the offer and the second to personal, relational aspects of service delivery (Grönroos 1984). The two quality indicators reflect these dimensions to a varying degree, with

hotel classification focusing clearly on the technical one. To assess hotel quality more concretely, four core areas of the hotel service can be distinguished, namely accommodation, F&B, add-on services and locational attractiveness (Freyer 2015). This logic will help to structure the wide range of classification criteria for the econometric analysis.

Figure 3: The Concept of Quality in the Hotel Context

Quality of the Hotel Service							
Evaluated by							
Experts: <b>Product-based Quality</b> (objective, output-oriented)				Guests: <b>User-based Quality</b> (subjective, input-oriented)			
Hotel Quality Components							
Price-Performance Ratio / Value for Money							
Technical Quality	Functional Quality	Technical Quality	Functional Quality	Technical Quality	Functional Quality	Technical Quality	Functional Quality
<b>Accommodation</b> (Core Product) <ul style="list-style-type: none"> <li>• Room</li> <li>• Beds / Sleeping Comfort</li> <li>• Bathroom</li> <li>• Housekeeping</li> <li>• Front Office</li> <li>• Supporting Services and Public Infrastructure</li> </ul>		<b>Food &amp; Beverage</b> (Supporting Product) <ul style="list-style-type: none"> <li>• Restaurants and Bars</li> <li>• Room Service</li> </ul>		<b>Add-on Services</b> (Supplementary Product) <ul style="list-style-type: none"> <li>• Business / MICE Infrastructure</li> <li>• Recreational Facilities (Sports, Culture)</li> <li>• Wellness</li> </ul>		<b>Locational Attractiveness</b> (Non-hotel Product) <ul style="list-style-type: none"> <li>• Proximity to and Number of Attractions</li> <li>• Public Transport</li> <li>• Hospitality (of the Local Population)</li> </ul>	

Source: Own figure based on Dolnicar & Otter (2003); Freyer (2015); Grönroos (1984) and Poon & Lock-Teng Low (2005)

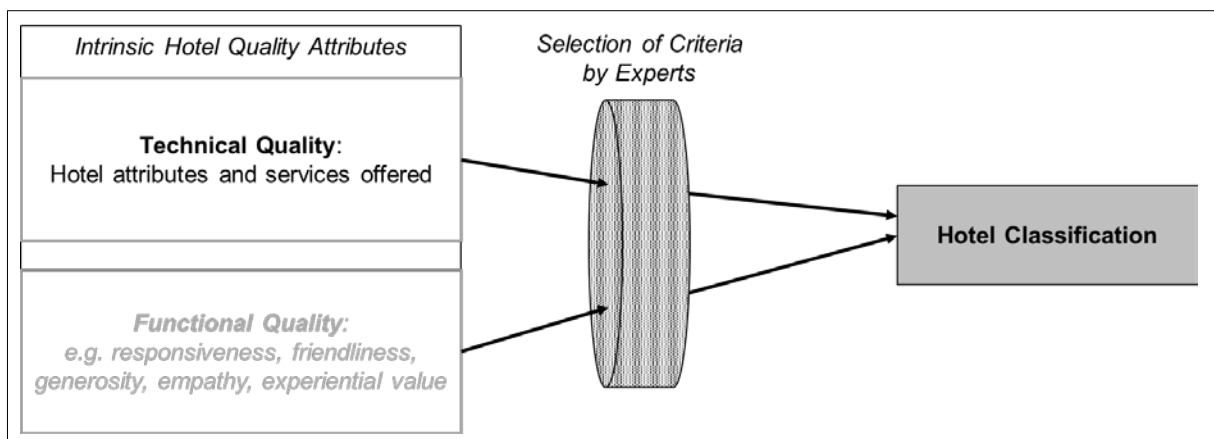
### 3 The Two Quality Indicators and their Relationships

This chapter further elaborates on the two quality indicators which are at the core of this thesis. The main characteristics and functions of the hotel classification as well as online guest reviews are summarized based on previous literature. Subsequently, a theoretical impact model that visualizes their relationships is derived.

#### 3.1 Hotel Classification

Hotel classification systems have historically been developed as an instrument to ensure safe lodging during a time in which the supply of trustworthy accommodation services was limited (UNWTO & IH&RA 2004). Nowadays, their primary reason lies in establishing quality and communicating it effectively (Stringam & Gerdes 2010; UNWTO & IH&RA 2004). Hotel classification can be defined as “a system, duly published, in which accommodation establishments of the same type (e.g. hotels, motels, inns, etc.) [are] broken down into classes, categories or grades according to their common physical and service characteristics and [which is] established at government, industry or other private levels” (UNWTO & IH&RA 2004, p. 9).

Figure 4: General Set-up of the Hotel Classification



Source: Own figure based on Minazzi (2010) and Hensens (2011, 2015)

Besides segmentation into relatively homogenous classes, some hotel classification systems also consist of a grading element, which allows for some qualitative differentiation within categories (Callan 1995; Denizci Guillet & Law 2010). The systems are in general very country- or even region-specific and thus hardly comparable internationally (Minazzi 2010; Stringam & Gerdes 2012). In some countries, hotel classification is carried out by public authorities as a regulatory tool and mandatory for hotels (Minazzi 2010). In others, private third parties are responsible

for the definition and application of the criteria to which hotel managers can adhere on a voluntary basis. The criteria behind the star categories usually have a strong focus on technical quality (see Figure 4), as tangible hotel attributes are straightforward to value (Hensens 2011, 2015; Minazzi 2010). In some countries, e.g. the UK, functional quality aspects like friendliness of the service also play a role in the assessment scheme (ibid.). Besides conveying hotel quality information to guests, classification contributes to the pricing, positioning and marketing strategy of hotels (hotelleriesuisse 2016; Israeli 2002; Narangajavana & Hu 2008). Finally, it has been argued that classification systems set incentives for quality improvements by providing guidelines on relevant quality attributes to hotel managers (Narangajavana & Hu 2008).

### **3.2 Online Guest Reviews**

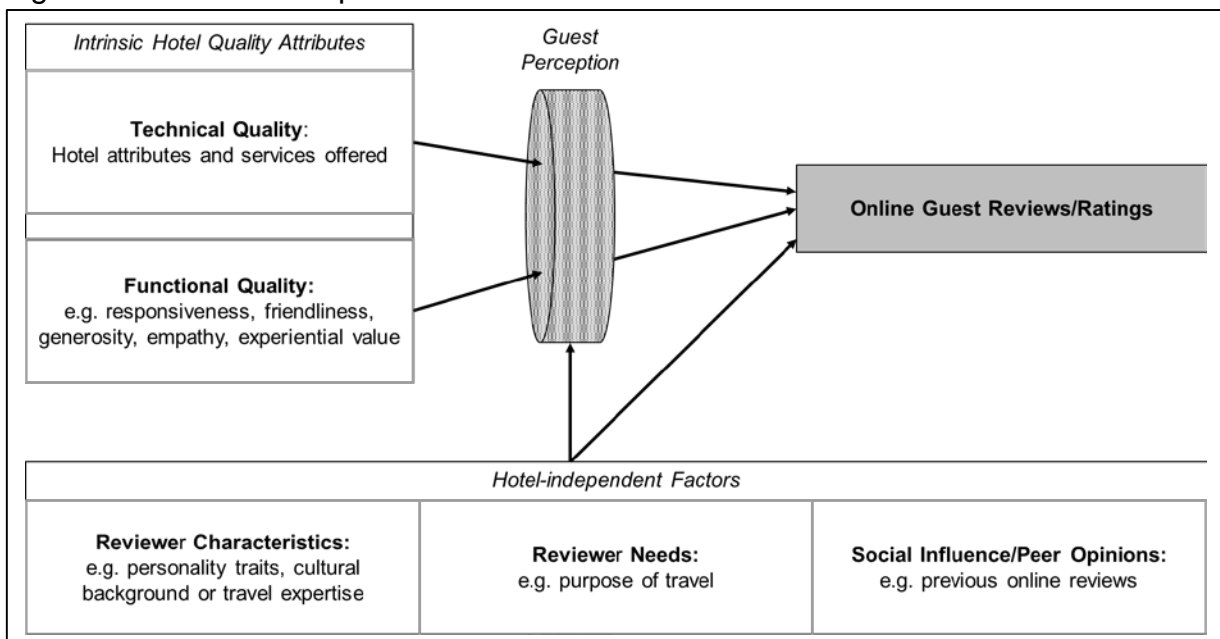
Online user-generated feedback or word-of-mouth (WOM) in the form of guest reviews has become a crucial information source for travellers and service providers alike (Li & Hitt 2008; Marchiori et al. 2011; Stringam & Gerdes 2010; Xiang et al. 2017). These reviews are submitted either to transaction-based online travel agencies (OTAs) or community-based review sites and social media, where a wide range of different sites exist worldwide. Nowadays, online opinions are considered the most important variables in the lodging choice, as they affect guest attitudes and expectations towards the service providers as well as purchase probability (Maslowska et al. 2017; Melián-González et al. 2013; Ye et al. 2011). Differentiating characteristics of online reviews are free, public accessibility, independence from suppliers and, thus, high perceived credibility as well as up-to-datedness of their content (Liang et al. 2017; Li & Hitt 2008; Melián-González et al. 2013). Despite the relevance of these reviews, authenticity concerns are discussed extensively in literature and practice, due to the high potential for fraud (Bulchand-Gidumal et al. 2011; O'Connor 2008; Xiang et al. 2017) .

Hotel reviews on most travel websites consist of two conceptually different sources of information, namely guest ratings, either in the form of numeric scores or graphical symbols such as stars, and user-written text comments (Geetha et al. 2017; Stringam & Gerdes 2012). By means of the ratings, guests assess the overall hotel quality as well as in most cases specific hotel service components, e.g. room, service or locational attractiveness, on a predetermined quantitative scale. It has been shown that the customer sentiment described in the text comments is in general consistent with the numeric ratings that guests provide (Engler et al. 2015). The guest ratings are determined by pre-purchase expectations as well as actual performance in terms of

hotel service quality and can thus be seen as a measure of guest satisfaction or user-based quality (Cronin & Taylor 1992; Engler et al. 2015; Park & Nicolau 2015).

Previous literature suggests that the ratings which guests provide for a specific hotel are not only influenced by its actual quality attributes, but also by hotel-independent factors like reviewer characteristics, reviewer needs as well as prior reviews for the same hotel (Gao et al. 2017; Liang et al. 2017; Wang et al. 2017) (see Figure 5). Besides hotel-level quality components in the technical and functional dimension, these factors influence how guests perceive the offered service. They can, however, also affect guest ratings directly and independent from hotel-related components. As an example, some guests are hard to please as a matter of character whereas others are highly influenced by peer reviewers to whose opinion they conform, rather than communicating their own, potentially contrary impressions (Gao et al. 2017). In terms of the effect on ratings stemming from reviewer characteristics, it has been shown that mean hotel ratings of Western guests are higher compared to the ones provided by Asians (Mattila 2000). Concerning the purpose of travel, leisure guests tend to rate hotels more positively than business guests, probably because they are able to choose the hotel which best matches their own preferences (Bulchand-Gidumal et al. 2011; Liang et al. 2017). This subjective, unsystematic component of reviews has to be considered when using guest ratings as a measure of user-based quality or guest satisfaction.

Figure 5: General Set-up of Online Guest Reviews



Source: Own figure based on Bulchand-Guidumal et al (2011); Gao et al. (2017); Hensens (2011, 2015); Liang et al. (2017) and Wang et al. (2017)

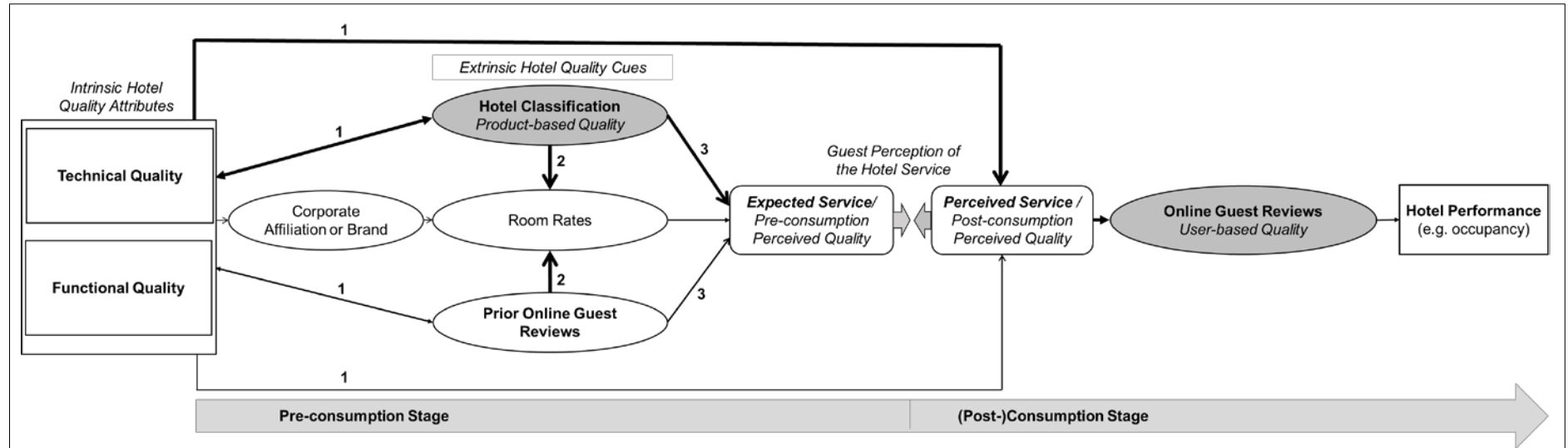
### 3.3 Theoretical Impact Model

Based on the theoretical resources and models discussed previously, the relationships of hotel classification and online guest reviews can be illustrated in a theoretical impact model to answer the first research question (see Figure 6). The economic concept underlying the model are information asymmetries in the market for hotel accommodation. The model thus distinguishes a pre- as well as a (post-)consumption stage and argues that the two quality indicators play three main and closely interrelated functions, each of them to a varying extent, namely:

- Quality management and assurance (1)
- Pricing and positioning (2)
- Quality signalling or expectation management (3)

At the pre-consumption stage, *intrinsic* quality attributes which constitute the “physical” composition of the hotel offer, namely attributes and services that are actually provided (technical quality) as well as the way of service delivery (functional quality), cannot directly be observed by travellers (Núñez-Serrano et al. 2014; Öğüt & Onur Taş 2012; Zeithaml 1988). In the absence of credible third-party quality signals, travellers have to rely on cues, such as the objective price, corporate affiliation or brand as well as the selective information communicated to them by the service providers, to infer the quality of an offer. Theorists refer to these elements and quality signals as so-called *extrinsic* cues, because they, contrary to the *intrinsic* cues, are only product-related and not directly part of the physical product or service itself (Zeithaml 1988). These examples of extrinsic cues are, however, supplier-dependent pieces of information and might thus be biased indicators of quality. Supplier-independent and thus potentially more credible quality indicators, such as hotel classification with especially the star categories or online guest reviews, help to alleviate the problem of asymmetric information. They perform the important function of *quality signalling or expectation management* (3) through narrowing the gap between customer expectations and actual level of service quality (Kara et al. 2005; Öğüt & Onur Taş 2012; Parasuraman et al. 1988). By doing so, they help to match the customers with the right suppliers in order to maximise guest satisfaction. The same holds for prior online guest reviews, which can be consulted by travellers in the pre-consumption stage.

Figure 6: Relationships between Classification and Guest Reviews (Impact Model)



Source: Own figure based on Abrate et al. (2011); Öğüt & Onur Taş (2012) ; Parasuraman et al. (1985, 1988) and Zeithaml (1988)

For the expectation management function of the hotel classification to hold, it has, of course to be the case that travellers are familiar with the meaning of the star categories. It has been shown empirically that guest expectations regarding hotel quality are highly dependent on the hotel stars as an explicit service promise (Ariffin & Maghzi 2012; López Fernández & Serrano Bedia 2004; Secchi et al. 2016). Expectations tend to increase with stars, which means that the higher the category, the more difficult it might also be for hotel managers to provide a service that outperforms what guests already expect (ibid.).

As the provision of quality attributes is credibly made visible to guests through the hotel classification, this impacts room rates and facilitates marketing through a clear positioning in the market (Öğüt & Onur Taş 2012). The *pricing function* (2) of hotel classification has been consistently verified in empirical studies on hotel room rates (Israeli 2002; Zhang et al. 2011).

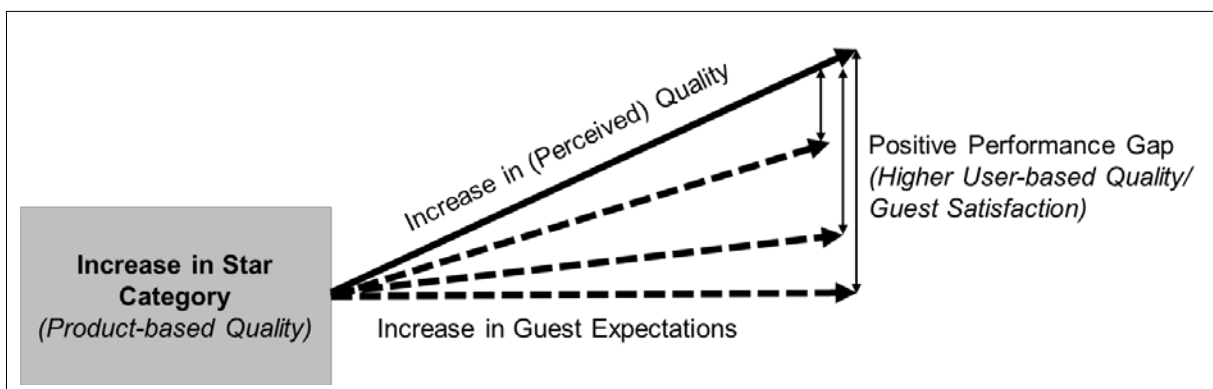


Although less pronounced than it is the case with hotel stars, there is empirical evidence that the online reputation stemming from online reviews of a hotel can also have an effect on the price charged to guests (Öğüt & Onur Taş 2012; Yacouel & Fleischer 2012).

After the hotel stay, guests have experienced the actual, intrinsic hotel service attributes and can subjectively evaluate the level of service quality that has been provided to them by taking into account their prior expectations. Some of them communicate their quality perceptions to peers by means of online reviews. The hotel classification with its criteria can thereby be seen as setting incentives and contributing to the technical quality attributes of a hotel (Narangajavana & Hu 2008). Every star category involves the verified provision of predetermined hotel attributes and services, which affects the level of intrinsic technical hotel quality. An important additional function of classification is thus *quality management and assurance (1)*. Online guest reviews can also more indirectly contribute to quality management, as through them, hotel managers can learn about their performance in terms of technical as well as functional quality and adapt their offer accordingly (Stringam & Gerdes 2010).

The impact model highlights that when investigating the relationship of classification outcomes, such as most importantly the star categories or underlying criteria, with online guest ratings, it is crucial to consider that hotel classification is simultaneously a driver of guest expectations and of product-based quality (see Figure 7).

Figure 7: Quality Effect and Expectational Effect of Hotel Classification (Example)



Source: own figure based on López Fernández & Serrano Bedia (2004) and Öğüt & Onur Taş (2012)

The product-based quality increases from one star category to the next, but so do guest expectations. This means that the effect of an additional star on guest satisfaction is not clear per se. It could be hypothesized that the distribution of guest ratings is not related to the number of stars if guests know what the ensured standard of each star

category is, and hotels fulfil it as expected. In this case, expectations might adapt perfectly to the provided level of objective quality and balance the two countervailing effects of hotel stars out. If, however, the increase in terms of quality between star levels, and thus a decreasing potential for dissatisfaction, is the dominant effect, a positive relationship between the number of stars and guest ratings might be observed (see Figure 7). A prerequisite for higher star categories to lead to higher average guest satisfaction or user-based quality, of course, is that guests value the technical quality attributes that the hotel classification ensures. The following hypothesis can be derived based on the model:

*When holding guest expectations (and room rates) constant, e.g. by looking at product-based quality levels within categories or by controlling for stars, hotels fulfilling more of the classification criteria should achieve higher average guest satisfaction, if guests value what the classification system ensures by means of its criteria.*

### **3.4 Preliminary Conclusions**

This chapter has argued that hotel classification follows two main objectives. These are namely *segmenting* the hotel market by breaking down hotels into relatively homogenous categories, based on common physical and service characteristics, and, to a variable extent, *grading* the quality within segments (Callan & Lefebvre 1997; Denizci Guillet & Law 2010; UNWTO & IH&RA 2004). Quality statements of the hotel classification derive from the application of very specific, objective criteria that are related to the technical quality dimension and are applied by experts. Online guest reviews as the second hotel quality indicator inherently contain a subjective component, because the overall judgement made by guests is influenced by hotel-independent factors, such as reviewer characteristics, reviewer needs or peer opinions. Both quality indicators, to a varying degree, perform the functions of *quality signalling or expectation management, quality management and assurance* as well as *pricing and positioning*. Their potential relationship can best be pinned down by considering these three functions. The derived theoretical impact model argues that as online guest reviews reflect guest satisfaction or user-based quality, they should be positively influenced by better classification outcomes through fulfilling more of the criteria, if hotel classification conforms with guest needs. At the aggregate level of star categories, this positive effect is, however, only observable if guest expectations do not increase disproportionately more or at the same pace with objective levels of quality when the hotel gets one more star.

## **4 State of Research: Empirical Evidence**

The following chapter reviews existing empirical evidence on the relationships between hotel classification and online guest reviews.

### **4.1 Relationship Between Star Category and Online Guest Ratings**

In the following, previous empirical evidence on the aggregate relationship between the star category, which is the primary outcome of hotel classification, and online guest ratings, is discussed. Although the focus is on online ratings as the measure of user-based, perceived quality or satisfaction, relevant results of studies that apply offline guest surveys are also considered for completeness.

Based on bivariate analyses, several authors have found that guest ratings for hotels tend to increase with the official star category, although not necessarily in a completely linear way (Bulchand-Gidumal et al. 2011; Hensens 2011; Martin-Fuentes 2016; O'Connor 2008). Martin-Fuentes (2016) grouped a sample of hotels in 100 known worldwide destinations into four brackets, based on their Booking.com and TripAdvisor ratings. He found that 4- or 5-star hotels were significantly more often in the higher brackets than hotels with a lower star category (ibid). The resulting Spearman's rank correlation was only moderate, e.g. because 2-star hotels were significantly more often in the lowest bracket than 1-star hotels (ibid.). Guests might thus perceive quality differences between categories of the midscale and the luxury segment as more significant than the differences between 1- to 3-star hotels. O'Connor (2008), however, has found some evidence for 5-star hotels being less able to fulfil the high expectations of their guests, as compared to 3- and 4-star hotels. Their average ratings tended to be lower in his analysis, although not significantly. In a regression analysis, Bulchand-Gidumal et al. (2011) found that each additional official star increases a hotel's rating on Booking.com.

In an attempt to directly consider the effect of guest expectations on satisfaction, López Fernández & Serrano Bedia (2004) carried out interviews in 54 different 1- to 5-star hotels in Spain. The surveyed guests were asked to assess their expectations and perceptions of overall hotel quality as well as of specific quality components, such as reliability, tangible elements, complementary offering and characteristics of the personnel, on a 7-point Likert scale. There was no clear pattern of increasing quality perceptions with higher star categories. The luxury segment was rated highest only

when not subtracting guest expectation assessments from the perceived level of quality. The 4- and 5-star hotels received negative scores of higher magnitude than the sample average in all aspects, except for the tangible elements, which are most closely related to the quality components covered in the hotel classification (López Fernández & Serrano Bedia 2004). This finding makes intuitive sense, as it is more difficult for hotels of the luxury segment to positively surprise their guests. From a methodological point of view, however, some authors have questioned whether it is feasible to let guests separately assess their expectational level and quality perceptions (Cronin & Taylor 1992). They might do this comparison with their prior expectations automatically when asked for their assessment of hotel quality (ibid.).

In sum, previous empirical findings suggest that there is some relationship between the official star category and quality as perceived by guests, which is in tendency positive when looking at online guest ratings. The two countervailing effects of rising expectations and increasing product-based quality with star-levels make it hard to reach clear-cut conclusions. They call for refined methodological approaches or an analysis at the more detailed level of classification criteria, by controlling for stars.

#### **4.2 Relevance of Hotel Quality Components for Guests**

Various authors have empirically investigated which quality components of the hotel service are most relevant for desired outcomes like guest satisfaction or loyalty (Huber et al. 2009; Marić et al. 2016). Many of them have relied on qualitative approaches, such as content analysis, review text mining, case studies or expert interviews, instead of adopting econometric techniques, or they have used small samples of survey-based data (Matzler et al. 2006). Prior evidence on the relevance of *technical* quality components is most relevant for the research problem at hand, as those are the ones which are most likely covered by hotel classification systems. The findings of previous authors might, however, not be fully generalizable to the research context of this study, as perceptions of quality tend to differ based on guests' cultural background and they also change over time (Poon & Lock-Teng Low 2005).

In some studies, surveys with guests have been carried out, where the latter had to state their satisfaction with different hotel service components. Based on their findings, both, technical and functional quality components are important for hotel guests, but the evidence regarding their relative importance and contribution to guest satisfaction is inconclusive (Albayrak et al. 2010; Choi & Chu 2001; Marić et al. 2016).

Albayrak et al. (2010) carried out a regression analysis with survey-data from hotel guests in Antalya and found that tangible hotel service attributes had a greater influence on guest satisfaction than intangible ones. Another study for Serbia, however, concluded that, overall, guests considered more of the listed intangible elements of the hotel service as highly relevant (Marić et al. 2016). In line with this finding, an empirical analysis for the hotel industry in Hong Kong revealed that the service quality of the staff, measured based on items such as helpfulness, friendliness or efficiency, was the most important determinant of overall satisfaction with hotels (Choi & Chu 2001). Specific quality components that frequently turned out to be important in guest surveys were hospitality or service quality of the staff, employee-guest interactions and friendliness, personal attention, precision and efficiency as well as technical aspects, such as F&B, room, bed and bathroom quality (Dolnicar & Otter 2003; Marić et al. 2016; Matzler et al. 2006; Poon & Lock-Teng Low 2005). Friendliness and service as well as reception and room were tested to be “must-be” requirements based on the Kano model (Matzler et al. 2006). Two other studies using guest survey data found that cleanliness and comfort of rooms, including sleeping comfort and bathroom, restaurants and bars as well as lobby ambiance were considered especially important by guests (Marić et al. 2016; Shanka & Taylor 2004). Using online reviews as the empirical basis, several authors have investigated by means of content analysis or text mining which quality attributes are most frequently mentioned in text comments, overall, as well as by satisfied and dissatisfied guests specifically. Factors such as room, transportation convenience, value for money as well as F&B management were found to be the most important evaluation criteria for guests independent of the segment (Li et al. 2013). Parking, air conditioning, lobby, TV or bathroom, on the other hand, were rarely mentioned in reviews and might thus be considered as being less relevant for guests (ibid.). Satisfied guests in tendency more often referred to functional service aspects, such as staff, and eventually to public spaces or facilities, while dissatisfied guests emphasised technical aspects, such as room quality and size, furnishing, cleanliness and noise level or quality of food more frequently (Berezina et al. 2016; Ramanathan & Ramanathan 2011; Zhou et al. 2014). These technical aspects leading to dissatisfaction when not present are, thus, in tendency must-be requirements. No evidence for entertainment facilities as well as location in terms of proximity to relevant places, e.g. the airport or the city centre, to have an influence on guest satisfaction was found (Zhou et al. 2014), probably because guests choose their hotel based on these aspects.

More directly linked to the approach of this master thesis, the effect of the mere provision of specific hotel amenities and services instead of their quality level on guest satisfaction has been tested by a limited amount of empirical studies. Based on linear regression analysis with the guests' travel motive as a control variable, Bulchand-Gidumal et al. (2011) found that the provision of free WiFi significantly positively affects guest ratings on TripAdvisor. This is a quality attribute which might have already turned into a "must-be" requirement by now. Room service had no statistically significant effect on satisfaction in this study, while the availability of a business centre was even negatively related to the guest ratings (Bulchand-Gidumal et al. 2011). This counter-intuitive effect, however, seems to stem from the fact that business guests tend to rate hotels more negatively than leisure guests and the provision of a business centre might be a proxy for a higher focus of a hotel on the business segment (ibid.). Add-on services or facilities, such as sports facilities, the provision of a sauna, dry-cleaning services, business facilities, and the equipment of the room with a minibar, turned out to be less important (Marić et al. 2016; Shanka & Taylor 2004). It should, however, be mentioned that individual opinions tended to diverge markedly in the guest surveys carried out by these studies, as standard deviations of the mean importance ratings given to the listed components were quite high in some cases (Marić et al. 2016).

### **4.3 Preliminary Conclusions**

Previous empirical studies have shown that higher star categories in tendency imply higher guest ratings, as long as one does not simultaneously control for guest expectations which tend to increase with the stars (Bulchand-Gidumal et al. 2011; Hensens 2011; Martin-Fuentes 2016; O'Connor 2008). In terms of concrete quality components, technical quality aspects, mainly related to cleanliness, room including sleeping comfort and bathroom as well as food and beverage quality, tend to be expected by guests, which also implies that an outstanding level of satisfaction cannot be achieved solely via the fulfilment of these material components (Gardini 2010). The potential for positive surprises tends to be higher for functional service aspects, while add-on services do not seem to systematically affect satisfaction, potentially because guests choose their hotel based on them. Table 2 summarizes the discussed previous findings on relevant respectively irrelevant hotel quality attributes for guests. It also indicates whether they can be classified as expected "must-be" requirements, if prior evidence regarding this issue is available (see Kano et al. 1984).

Table 2: Previous Empirical Findings on the Relevance of Hotel Quality Attributes

Analysed Hotel Quality Attributes		Relevant	Must-be
<b>General Hotel Characteristics</b>	<b>Staff/Hospitality</b>	✓	~
	<b>Cleanliness</b>	✓	✓
	<b>Noise Level</b>	✓	✓
<b>Accommodation</b>	<b>Room Quality and Size</b>	✓	✓
	<b>Furnishing</b>	✓	✓
	<b>Bed Quality / Sleeping Comfort</b>	✓	✓
	Bathroom Quality	~	✓
	Reception	✓	✓
	Parking		
	Air conditioning		
	Lobby (Ambiance)	~	
	TV		
	<b>Free WiFi</b>	✓	
	<b>Public Spaces and Facilities</b>	✓	
	Dry-cleaning Services		
<b>F&amp;B</b>	<b>F&amp;B Management</b>	✓	
	<b>Restaurants and Bars</b>	✓	
	<b>Quality of Food</b>	✓	✓
	Room Service		
	Minibar		
<b>Add-on Services</b>	Entertainment Facilities		
	Sports Facilities		
	Sauna		
	Business Facilities		
	Business Center		
<b>Locational Attractiveness</b>	Proximity to Relevant Places		
	<b>Transport Convenience</b>	✓	

*Note:* Relevant determinants are depicted in **bold**, ✓=yes, ~ =contradicting evidence, no tick/tilde means that the attribute has not proven relevant based on the discussed previous literature. *Source:* Own table based on Berezina et al. (2016); Bulchand-Gidumal et al. (2011); Dolnicar & Otter (2003); Li et al. (2013); Marić et al. (2016); Matzler et al. (2006); Poon & Lock-Teng Low (2005); Ramanathan & Ramanathan (2011); and Zhou et al. (2014)

## 5 Hotel Classification in Switzerland

This chapter provides some background on the evolution of hotel classification in Switzerland and explains how the hotelleriesuisse classification system is designed. Understanding in detail how hotelleriesuisse awards stars to Swiss hotels is important, as the data used for the econometric analysis stems from this classification process.

### 5.1 Historic Background and Evolution

The primary Swiss hotel classification system has been introduced by hotelleriesuisse in 1979, as one of the first private sector systems with model character for other countries such as Germany or Austria (UNWTO & IH&RA 2004). Since then, its set of criteria has continuously been adapted to changing guest needs and expectations, normally every five years (hotelleriesuisse 2017d). GastroSuisse, the second Swiss association for hotels and restaurants, has officially introduced its own classification system based on stars in 2011<sup>2</sup>, with the aim of providing a less costly solution to small and medium hotels (Regenass 2011). The systems share many similarities in terms of criteria, but also have structural differences. Most notably, the GastroSuisse system knows no grading element, as it is solely based on mandatory requirements and no elective criteria per star category (GastroSuisse 2017).

In total, the share of Swiss hotels that are classified according to the two standards has proven quite stable since 1994<sup>3</sup> (see Figure 8). The sharp decrease between 2003 and 2005 is artificial, as the collection of tourist accommodation statistics was suspended in 2004 and reintroduced in 2005 under a new financing scheme. Since the introduction of the GastroSuisse classification system, the share of Swiss hotels with an official classification has even shown an increasing trend between 2010 and 2012, which is now stabilizing. This might be seen as some evidence against the argument that the hotel classification has already lost momentum in the market. In terms of relevance, the hotelleriesuisse system still clearly dominates the industry based on all key figures of hotel accommodation supply and demand (see Figure 9). For both institutions, most hotels hold three stars (FSO 2017e).

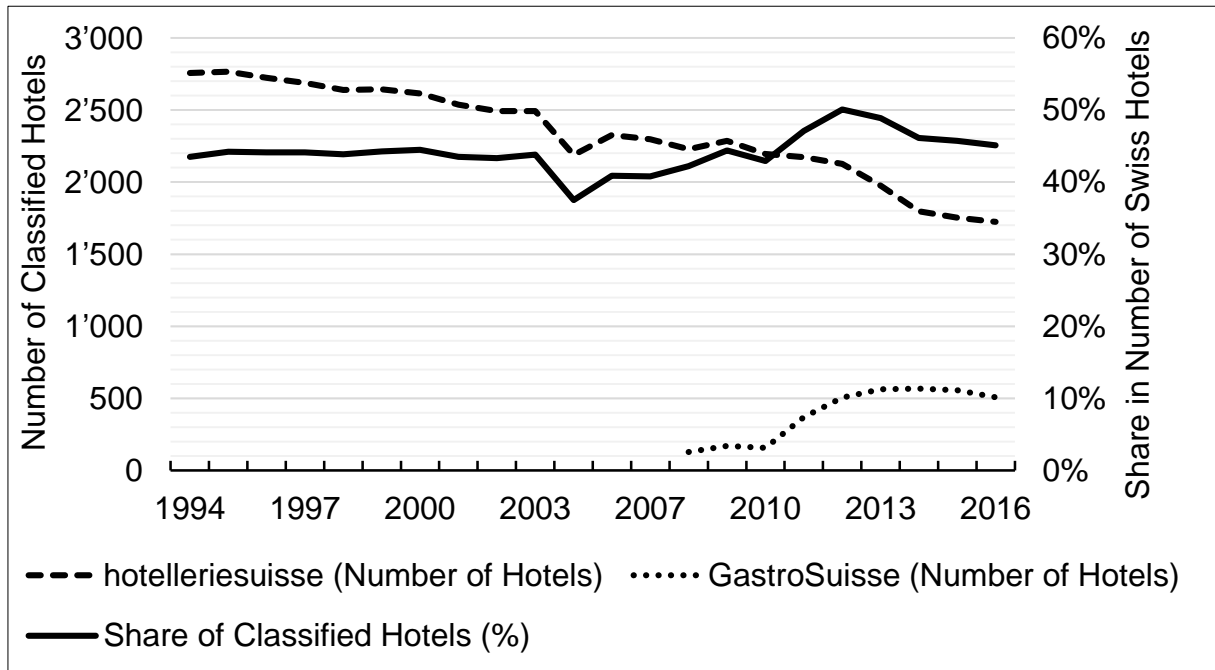
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<sup>2</sup> The system has initially been introduced in 2008, but GastroSuisse was legally not allowed to use the stars as symbols for the categories until 2011, due to a legal dispute with hotelleriesuisse.

<sup>3</sup> This is the first year for which the tourism accommodation statistics (HESTA) offer reliable data.

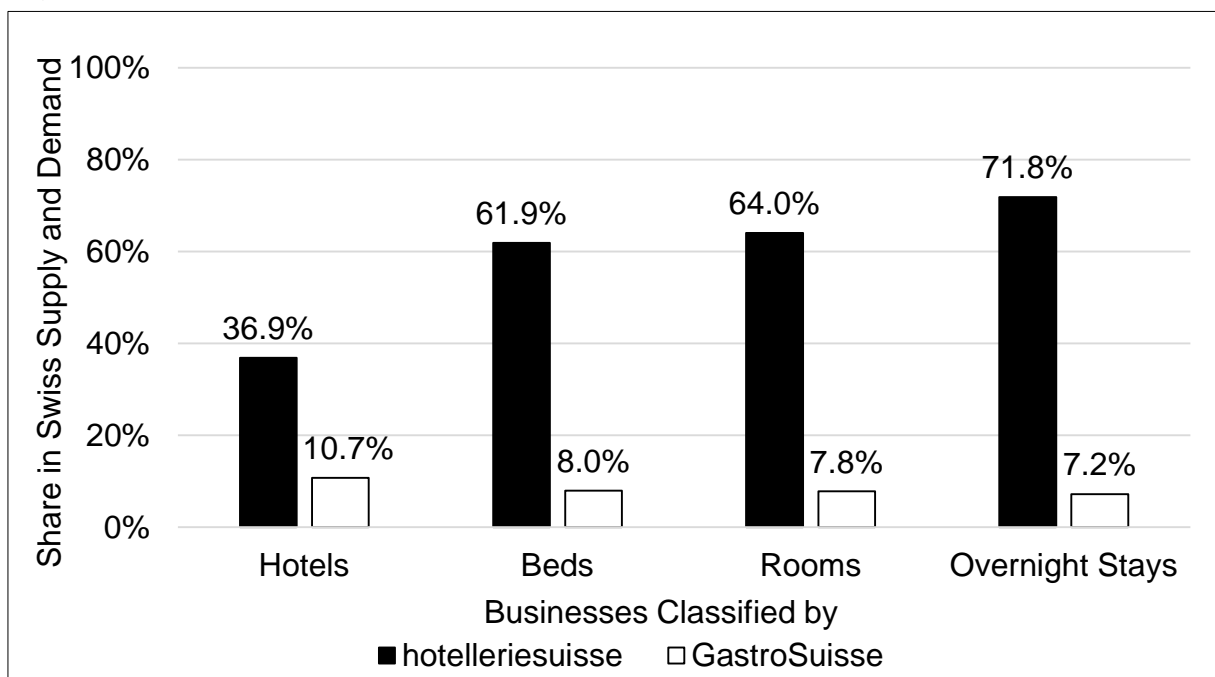


Figure 8: Significance and Pervasiveness of Swiss Hotel Classification 1994-2016



Source: Own figure, Data: HESTA data on the number of classified Swiss hotels (FSO 2017a, 2017b)

Figure 9: Relative Importance of the Two Swiss Classification Systems in 2016



Note: Contribution of (open) classified hotels per association to hotel accommodation supply and demand in Switzerland 2016. Source: Own figure, Data: HESTA data on the number of classified Swiss hotels, their key figures and total supply and demand for the hotel industry (FSO 2017a, 2017b)

Although only approximately 50% of the Swiss hotels are classified, these businesses generated nearly 80% of total hotel overnight stays in 2016 (see Figure 9). The group of non-classified hotels is dominated by small businesses, which makes the classified hotels absorb the largest share of the tourism demand (BAKBASEL 2016). The hotels classified by hotelleriesuisse, which are investigated in this master thesis, are thus a

relevant sub-sample of the whole Swiss hotel industry. In 2009, efforts to harmonize the classification criteria at the European level have led to the foundation of the Hotelstars Union (Hotelstars Union 2017; Hotelverband Deutschland 2016). Besides Switzerland with the hotelleriesuisse classification, 14 other countries<sup>4</sup> now apply the same system with some very minor differences in terms of country-specific regulations, e.g. regarding mandatory security standards (ibid).

## 5.2 The hotelleriesuisse Classification System

For hotels which decide to become hotelleriesuisse members, getting classified is mandatory and the costs for it are included in the membership fee (hotelleriesuisse 2015b). Classification is carried out by a national pool of 30 independent and qualified auditors, who, in pairs, visit and assess around 600 hotels every year (hotelleriesuisse 2017d). The assessment for the classification is based on (hotelleriesuisse 2015a):

- the mandatory fulfilment of predetermined security-related norms for all hotels, independent of the targeted category, which are mainly tied to fire protection
- a set of 270 criteria with category-specific mandatory requirements
- an evaluation of the state of infrastructural amenities as covered in the criteria, where for all categories at most five amenities can exhibit shortcomings

Based on how well a hotel performs in fulfilling the criteria of the official assessment catalogue, the segmentation into one of the five different star categories or the Swiss Lodge category takes place. This last category has been created especially for hostels which are not able to fulfil some basic requirements of the 1-star category due to their business concept. The 270 classification criteria (see Appendix A for the detailed list) are structured according to six main assessment areas (hotelleriesuisse 2015a):

- **General hotel info** (e.g. parking at the hotel, freedom from barriers, elevators)
- **Reception and services** (e.g. reception opening hours, multilingual staff, dry-cleaning services, luggage service, limousine service)
- **Rooms** (e.g. room and bathroom size, lighting, safekeeping facilities, air conditioning, entertainment electronics, provision of cosmetic products)

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<sup>4</sup> The other full members are Austria, Belgium, Czech Republic, Denmark, Estonia, Germany, Hungary, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands and Sweden.

- **Gastronomy** (e.g. number of restaurants, type of provided breakfast, dietary and regional kitchen, room service, minibar)
- **Event facilities** (e.g. banquet options, conference rooms, business centre)
- **Leisure** (e.g. recreational facilities on site, gym, sauna, spa treatments, swimming pool, in-house child care, library, host animation programme)
- **Quality and online activities** (e.g. service quality controls through mystery guesting, quality management system, invitation for guests to submit a review)

The criterion No. 3 of the official classification catalogue pins down the general requirements on the overall hotel standard for every category, which makes a first broad segmentation possible (see Table 3 on page 29). It is the criterion with the highest subjective component of the whole assessment scheme, as auditors have some leeway in evaluating it. Besides physical attributes, the scope and quality of the provided services increase most notably between 3-star hotels and the luxury segment. Table 3 provides a choice of the most important mandatory criteria per star-level to get an insight of what differentiates each category from the lower one next to it. In general, the criteria are quite technical and specific (see Figure 10).

Figure 10: Extract from the Set of Criteria 2015-2020 on “Reception and Services”

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	26	Bilingual staff	2			M	M	
	27	Multilingual staff	4					M
	28	Photocopy/scan service	2				M	M
	29	Valet parking service	10					M
	30	Doorman (separate personnel)	15					
	31	Concierge (separate personnel)	15					M
	32	Page boys (separate personnel)	15					M
	33	Luggage service on demand	2			M	M	
	34	Luggage service	5					M

Source: Hotelstars Union (2015, p. 8.)

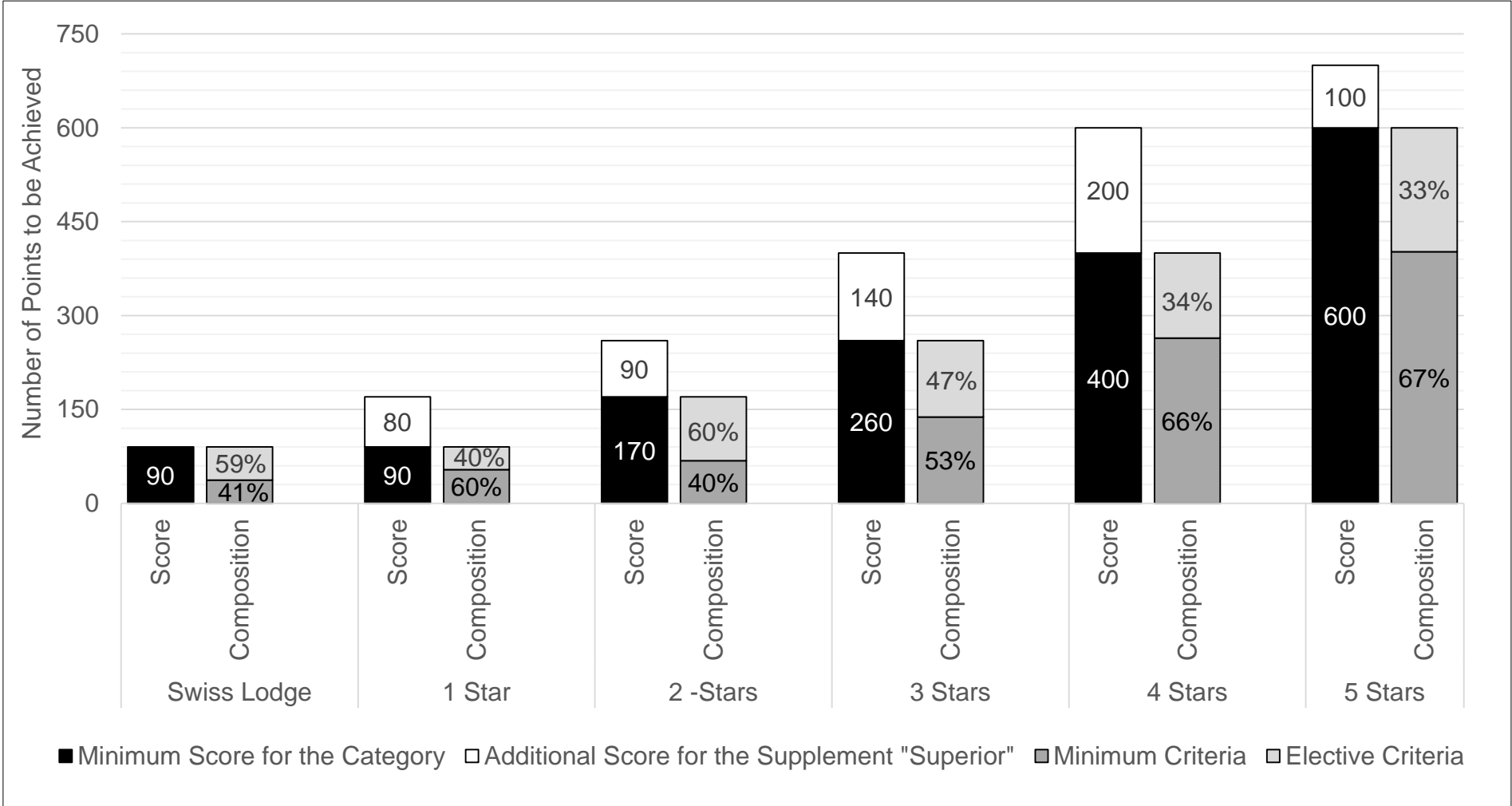
The criteria either require the provision of a facility or service including details regarding its delivery (binary yes/no criteria) or they assess the number of provided amenities in an area (numeric criteria). No differentiation in terms of how well a hotel fulfils a criterion are made. Overall, types of criteria can further be distinguished based on their binding character. *Minimum criteria* are denoted with an “M” and are mandatory for all or some of the star categories (see Figure 11). *Elective criteria* are requirements out of which hotels can choose to achieve the minimum score of the desired category.

Table 3: General Standard per Star Category and Differentiating Features

	<b>1-star</b>	<b>2-star</b>	<b>3-star</b>	<b>4-star</b>	<b>5-star</b>
	<i>Simple</i>	<i>Medium</i>	<i>Elevated</i>	<i>High</i>	<i>highest</i>
<b>Criterion No. 3</b>	Furnishing and equipment are appropriate and maintained.	Furnishing and equipment are maintained and harmonized.	Furnishing and equipment are consistently harmonized in form and colour. The general impression is that of elevated comfort and cosiness.	Furnishing and equipment are high-quality and offer first-class comfort. The overall appearance is consistently harmonized in form, colour and materials.	Furnishing and equipment are luxurious and offer highest comfort. The overall appearance is consistently harmonized in form, colour and materials.
<b>Choice of differentiating features based on minimum criteria per star category</b>					
<b>Room/ Bathroom</b>	- Shower/bathtub, WC - Table and chair - TV with remote control	- Reading light - Offer of sanitary products	- Dressing mirror - Suitcase rack - Hairdryer	- Minibar - Upholstered chair - Cosmetic products, heating option in bathroom	- Care products in flacons - Safe
<b>Reception &amp; Services</b>	- Reception Service - Daily cleaning of rooms	- Payment via credit card - Internet access	- Reception open 14h - Bilingual staff - Luggage service - Laundry/ironing service	- Reception open 16h - Lobby with seats and beverage service	- Reception open 24h - Multilingual staff - Spacious reception hall - Valet parking service, concierge, page boys - Turndown service (housekeeping) - Personalized greeting in the room
<b>Gastronomy</b>	- Extended breakfast	- Breakfast buffet	- Beverage offer in the room	- Breakfast buffet and service - Hotel bar - 16h room service	- 24h room service (food and beverages) incl. breakfast
<b>Quality Management</b>			- Systematic complaint management system		- Quality controls through mystery guesing

Source: Own table based on hotelleriesuisse (2015a) and Hotelstars Union (2015)

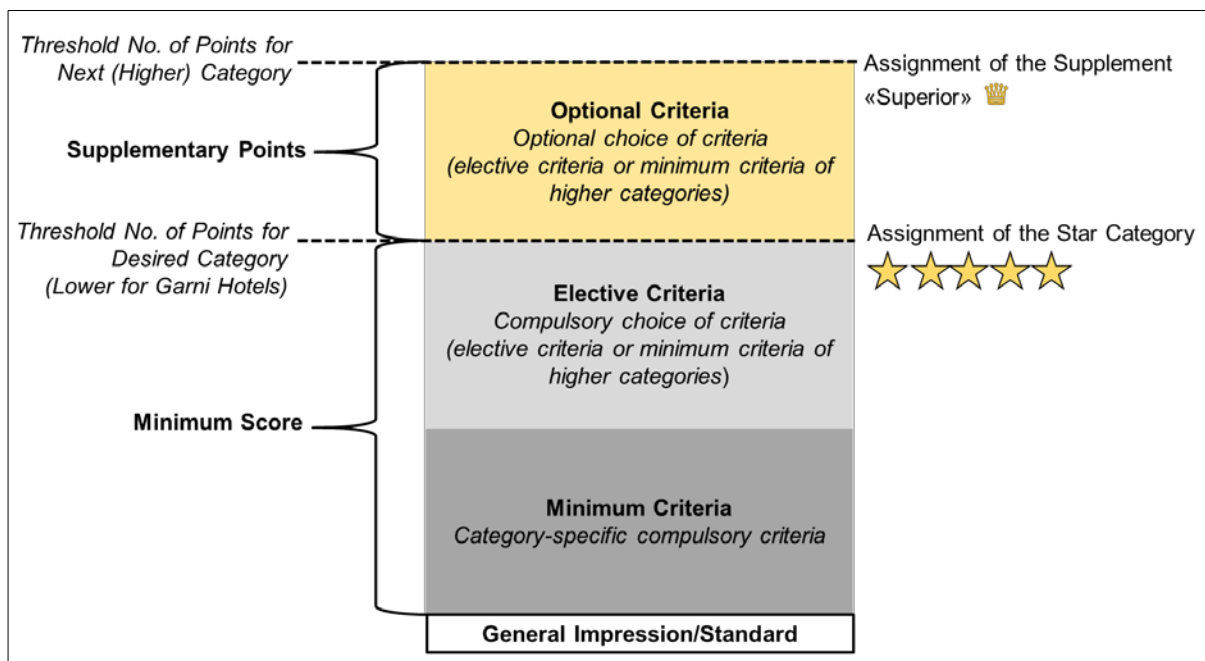
Figure 11: Classification Assessment Scheme



Note: Minimum scores per star category, threshold number of points for supplement “superior” and composition of the minimum score out of minimum and elective criteria; Source: Own figure based on hotelleriesuisse (2015a)

Elective criteria for a specific hotel can either be minimum criteria of higher categories than the targeted one or criteria which are not mandatory at any level, as it is the case with all criteria on event and leisure facilities. This flexible choice of elective criteria takes the heterogeneity of hotel concepts into account (hotelleriesuisse 2015a). The fulfilment of every criterion is rewarded with a fix number of points, where infrastructural requirements or facilities and services related to the luxury segment are rewarded highest. In sum, the minimum score, which has to be attained for a specific category and increases with the stars, is made up of two elements, namely a fix number of points from category-specific minimum criteria and points achieved through fulfilling a choice of elective criteria (see Figures 11 and 12). The share of elective criteria in this minimum score differs per star category and amounts to around 45% on average (see Figure 11). For 5-star hotels, the relative number of points that can freely be allocated is lowest and for 2-star hotels highest of all categories. Figure 12 schematically illustrates the design of the classification system with its different elements.

Figure 12: Design of the hotelleriesuisse Classification System



Source: Own figure based on hotelleriesuisse (2015a)

Except for 5-star hotels, all categories know the so-called “garni” supplement, which is awarded to hotels that, based on their business concept, offer only breakfast and are thus relieved from the fulfilment of criteria tied to gastronomy. The amendment “garni” is transparently communicated to guests (e.g. 4-star garni). Besides segmentation into star categories, the hotelleriesuisse classification system also involves an element of grading. The supplement “superior” is awarded to the hotels that perform best in their

category in terms of classification criteria they fulfil (see Figure 12). Superior hotels have to attain the minimum score of the next higher star category, obviously without fulfilling all of its minimum criteria, and have flawless amenities (hotelleriesuisse 2015a). Furthermore, they need to apply a quality management system, e.g. through the participation in the quality management programme of Switzerland. From the 4-star level on, quality controls through mystery guesting are an additional requirement to be fulfilled by these hotels (ibid.).

### **5.3 Preliminary Conclusions**

In Switzerland, two official classification systems exist. The hotelleriesuisse system as the more traditional standard still clearly dominates the market and is relevant for the empirical application of this thesis. Its mix of elective and mandatory criteria creates within-star variance of product-based, objective quality. Overall, the system generates two types of classification outcomes which will be investigated, namely:

- Outcomes that are publicly communicated (to guests):
  - Star category
  - Supplement “superior” for best-performing hotels within a star category
- Outcomes that are not publicly communicated (to guests):
  - Total score and supplementary points, which amount to the total score minus the minimum score of a category, that a hotel has achieved in the classification audit
  - Individual criteria that are fulfilled by a hotel

## 6 Data and Method

To empirically test how objective classification outcomes and subjective online guest ratings are related, multivariate linear regression analysis is performed. In the following, the data sources as well as the methods that are used for the empirical analysis are extensively discussed.

### 6.1 Data

For this thesis, a rich dataset has newly been compiled from five different sources:

- *hotelleriesuisse data on objective classification outcomes (benchmarQ database)*  
Hotel-level data on classification results of Swiss hotels which have been classified according to the hotelleriesuisse criteria for the period 2015-2020
- *TrustYou data on subjective quality perceptions by guests (TrustYou export)*  
Hotel-level data on guest rating scores, which are based on the aggregation of hotel ratings that have been submitted to various websites during a period of 24 months
- *Booking.com data on subjective quality perceptions by guests (web scraped data)*  
Hotel-level data on guest ratings scores for overall hotel quality and for specific quality components that have been submitted to Booking.com
- *hotelleriesuisse data on additional hotel characteristics (swisshoteldata)*  
Hotel-level data on the number of rooms, listed room rates, location of the hotel or affiliations to hotel groups and other characteristics
- *Municipality-level tourism data (FSO/HESTA)*  
Municipality-level data on touristic relevance, degree of urbanisation and other characteristics of the municipalities in which the hotels are located

The data on the two quality indicators under investigation is described more in detail below. Additional data on hotel characteristics as well as on municipalities - the most disaggregated administrative level for which data on the locational context exists - serves as a source for control variables. Table 4 summarizes the available data and provides information on the variables that are used for the analysis.



Table 4: Available Secondary Data with Sources (Summary)

Theoretical Concept	Variables	Type	Source	Year(s)
<i>Response Variables</i>				
<b>Overall Satisfaction</b> (user-based quality)	<ul style="list-style-type: none"> <li>– <b>TrustScores</b> (value range 0-100<sup>5</sup> in theory)</li> <li>– <b>Booking.com overall rating scores</b> as the average from detailed ratings (value range 2.5-10 in theory)<sup>6</sup></li> </ul>	numeric	TrustYou (2017b) and Booking.com (2017)	last 24 months (April 2017)
<b>Satisfaction with Quality Components</b> (user-based quality)	<ul style="list-style-type: none"> <li>– <b>Booking.com detailed rating scores</b> (value range 2.5-10)<sup>4</sup> on cleanliness, facilities, staff, location, comfort and price-performance ratio<sup>7</sup></li> </ul>	ordinal	TrustYou (2017b) and Booking.com (2017)	last 24 months (April 2017)
<i>Explanatory Variables</i>				
<b>Classification Outcomes</b> (product-based quality)	<ul style="list-style-type: none"> <li>– <b>Star category</b></li> <li>– <b>Supplement “superior”</b></li> <li>– <b>Supplementary points</b> achieved</li> </ul>	categorical/ numeric	hotelleriesuisse (2017c)	current <sup>8</sup>
<b>Objective Quality Components</b> (product-based quality)	<ul style="list-style-type: none"> <li>– <b>Objective quality indices</b> (criteria fulfilment) <ul style="list-style-type: none"> <li>○ General Hotel Appearance &amp; Facilities</li> <li>○ Housekeeping &amp; Laundry Services</li> <li>○ Reception Services</li> <li>○ Parking &amp; Transfer Services</li> <li>○ Room Arrangement &amp; Equipment</li> <li>○ Bathroom Arrangement &amp; Equipment</li> </ul> </li> </ul>	numeric	hotelleriesuisse (2017c), constructed indices	current <sup>6</sup>

Source: Own table

<sup>5</sup> TrustYou assigns the following meaning to the different value ranges: poor=0-67, fair=68-74, good=75-79, very good=80-85, excellent: 86 – 100.

<sup>6</sup> According to Mellinas et al. (2015), Booking.com inflates the ratings by setting the minimum score of a hotel to 2.5, probably to make ratings of the hotels which are bookable via the platform look better. Guests rate the hotels on a qualitative scale (poor=2.5, fair= 5, good=7.5, excellent=10).

<sup>7</sup> In the regression analysis, the guest ratings on location and staff are used as control variables due to their theoretical linkage with hotel classification outcomes. This is to work against potential omitted variable bias in the estimation of the effects of interest.

<sup>8</sup> Exported in March 2017

Table 4 (continued): Available Secondary Data with Sources (Summary)

Concept	Variables	Type	Source	Year(s)
<i>Explanatory Variables (continued)</i>				
<b>Objective Quality Components</b> (product-based quality)	<ul style="list-style-type: none"> <li>○ Sleeping Comfort</li> <li>○ Electronics &amp; Connectivity</li> <li>○ Complementary Conveniences &amp; Information</li> <li>○ Quality Management &amp; Online Activities</li> <li>○ F&amp;B Services or Facilities</li> <li>○ Room Service</li> <li>○ Event Facilities and Services (MICE)</li> <li>○ Recreational &amp; Entertainment Facilities or Services (incl. Wellness)</li> </ul>	numeric	hotelleriesuisse (2017c), constructed indices	current <sup>6</sup>
<i>Control variables</i>				
<b>Hotel Characteristics</b>	<ul style="list-style-type: none"> <li>– <b>Number of rooms</b></li> <li>– <b>Room rates</b> (minimum rate for a double room)</li> <li>– <b>Affiliation to a relevant hotel chain</b> (operating in an international context)</li> <li>– <b>Average number of reviews</b> on TrustYou or Booking.com per hotel room</li> </ul>	numeric / binary	TrustYou (2017b), Booking.com (2017) and (hotelleriesuisse 2017a)	current <sup>6</sup> / last 24 months (as of April 2017)
<b>Municipality Characteristics</b>	<ul style="list-style-type: none"> <li>– <b>Urban location</b> (in a core city of an agglomeration or in a densely populated other agglomeration municipality)</li> <li>– <b>Touristic relevance</b> (share of a municipality's amount of hotel beds in Switzerland's total supply)</li> </ul>	binary/ numeric	hotelleriesuisse (2017a) and FSO (2017a, c, d)	current <sup>6</sup> / 2011/ 2015

Source: Own table

### 6.1.1 Classification Audit Data

Based on the practical relevance of the research topic, hotelleriesuisse has provided internal data on classification outcomes of all hotels that have been classified since 2015. Information is available for all the discussed objective quality indicators that result from classification, namely the star category, supplement “superior, total score achieved in the assessment as well as information on the fulfilment of the 270 criteria. The raw data stems from the classification audits and has been compiled by qualified classification experts who visit the hotels, assess them and record the results digitally by means of the classification software *benchmarQ*.

The data has never been analysed or used for scientific purposes previously. Bringing it into a suitable format for the statistical analysis by means of the software STATA 14 therefore involved a complex process of data cleaning, merging and recoding. During this process, hotelleriesuisse representatives and the IT provider which is responsible for the *benchmarQ* software were consulted. By doing so, it could be ensured that the data and variable values were correctly understood, and no coding or recoding errors were made.

To guarantee similar classification audit conditions for all hotels, only those that have been audited and classified according to the new set of criteria for the period 2015-2020 should be considered for the analysis. In practice, the new criteria have been consistently applied as of April 1, 2015 (Luzi March 2017). In total, 72 hotels in the sample have been audited before this date and should thus be excluded. Furthermore, 133 observations cannot be analysed as no information on the individual fulfilment of classification criteria is available for these hotels.<sup>9</sup> After data cleaning, the sample consists of 1'310 hotels including Swiss Lodges with complete classification data. This approximately amounts to 77% of all hotelleriesuisse member hotels (hotelleriesuisse 2017b) and 26.5% of Swiss hotels (FSO 2017a). Comparing this sample with the population, defined as all hotels which currently hold a hotelleriesuisse classification, reveals that, broadly, the star categories are adequately reflected (see Table 5).

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<sup>9</sup> For these observations, no classification criteria were coded as fulfilled, but the total score achieved was registered. The exclusion of these observations should not have led to a systematic bias of the sample, as the fact that the information is missing for these hotels is independent from relevant intrinsic hotel characteristics. Most missing values stem from a collective data clearing request by hotelleriesuisse (Luzi 2017). The data for the concerned hotels was either no longer valid due to them having quit the hotelleriesuisse membership or their audit result had not yet been authorized for the *benchmarQ* database.

There is some underrepresentation of the luxury segment, while the relative share of the largest group of 3-star hotels is a bit higher in the sample than in the population. It can be argued that the sample should be close to random, as the prioritization of the classification audits, or in other words, the presence of hotels in the sample, is not tied to potentially relevant hotel characteristics and just occurs to smooth the workload of the auditors.<sup>10</sup> The sample should thus reflect the population accurately.

Table 5: Number of Hotels per Star Category in Sample and Population

Star Category	Switzerland 2016 (population)		benchmarQ (used sample)	
	Hotels	Share (%)	Hotels	Share (%)
Swiss Lodge	181	10.22%	160	12.21%
1 Star	16	0.90%	11	0.84%
2 Stars	150	8.47%	111	8.47%
3 Stars	866	<b>48.90%</b>	715	<b>54.58%</b>
4 Stars	461	<b>26.03%</b>	267	<b>20.38%</b>
5 Stars	97	<b>5.48%</b>	46	<b>3.51%</b>
<i>Total</i>	<i>1'771</i>	<i>100%</i>	<i>1'310</i>	<i>100%</i>

Source: Own table based on hotelleriesuisse (2017b, c)

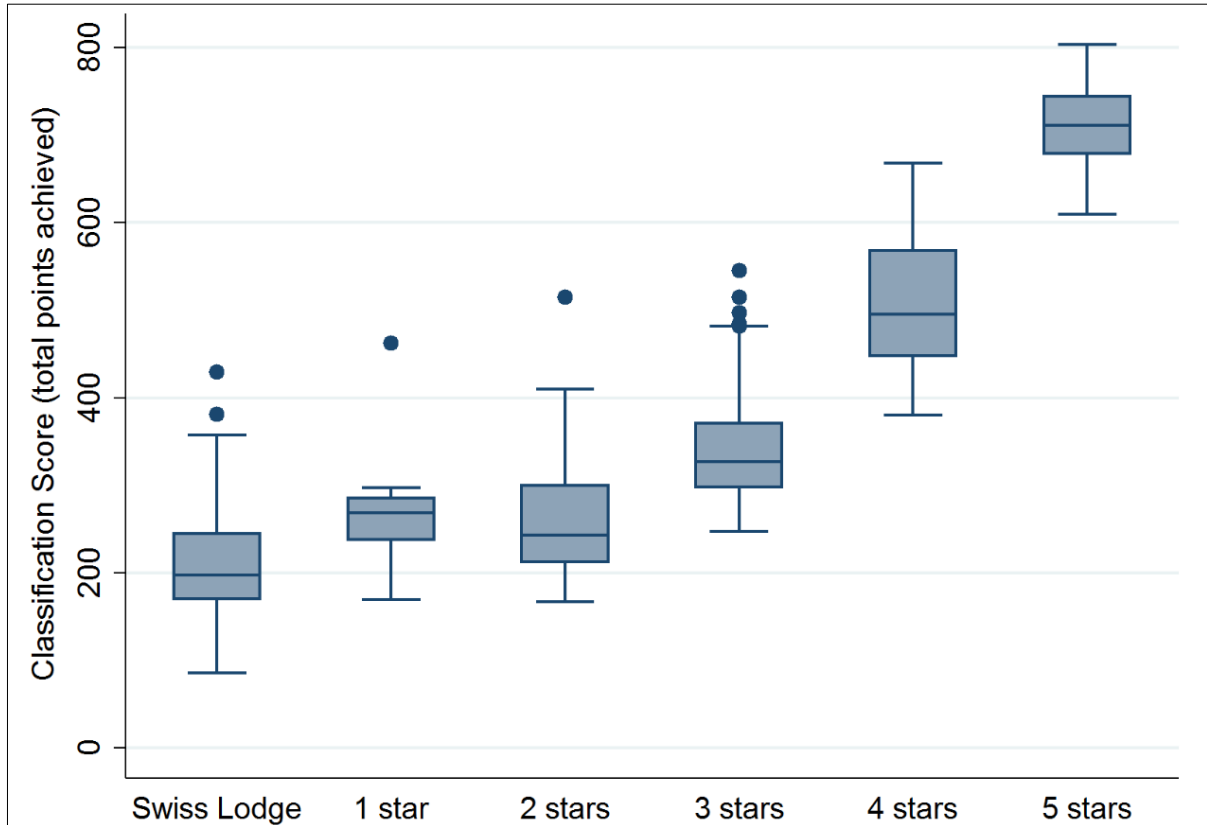
The most appealing characteristic of the dataset, as compared to the data used in other studies concerned with a similar research question, is that hotel-level information on the fulfilment of individual classification criteria is available and varies within star categories. This allows measuring objective quality differences based on classification criteria between hotels that belong to different or to the same category. A first impression on the amount of within-star variance in product-based quality can be obtained by means of box plots for the total number of points that hotels have achieved in the audit (see Figure 13). While the fulfilment of the category-specific minimum criteria is given for all hotels<sup>11</sup>, within-star variance results from the elective criteria. Figure 13 suggests that there is considerable heterogeneity in terms of how well hotels of the same star category perform in the fulfilment of classification criteria. Product-based, objective quality differences, as defined through the classification system, thus, also exist between hotels with the same number of stars. It can even be observed that

<sup>10</sup>The timing of the classification audits according to the new set of criteria are planned such that the workload for auditors is more or less constant across years. The prioritization in terms of hotels does not follow systematic rules. Some priority is given to newly renovated hotels for which most probably the old classification does no longer apply anyways.

<sup>11</sup> In very few cases, minor exemptions are made if criteria cannot reasonably be fulfilled by a hotel due to its special business concept or constructive features of the building.

there are considerable overlaps in the classification scores between the categories, with the eleven 1-star hotels achieving even a higher average score based on the median than 2-star hotels.

Figure 13: Current Classification Scores of the Sampled Hotels per Star Category

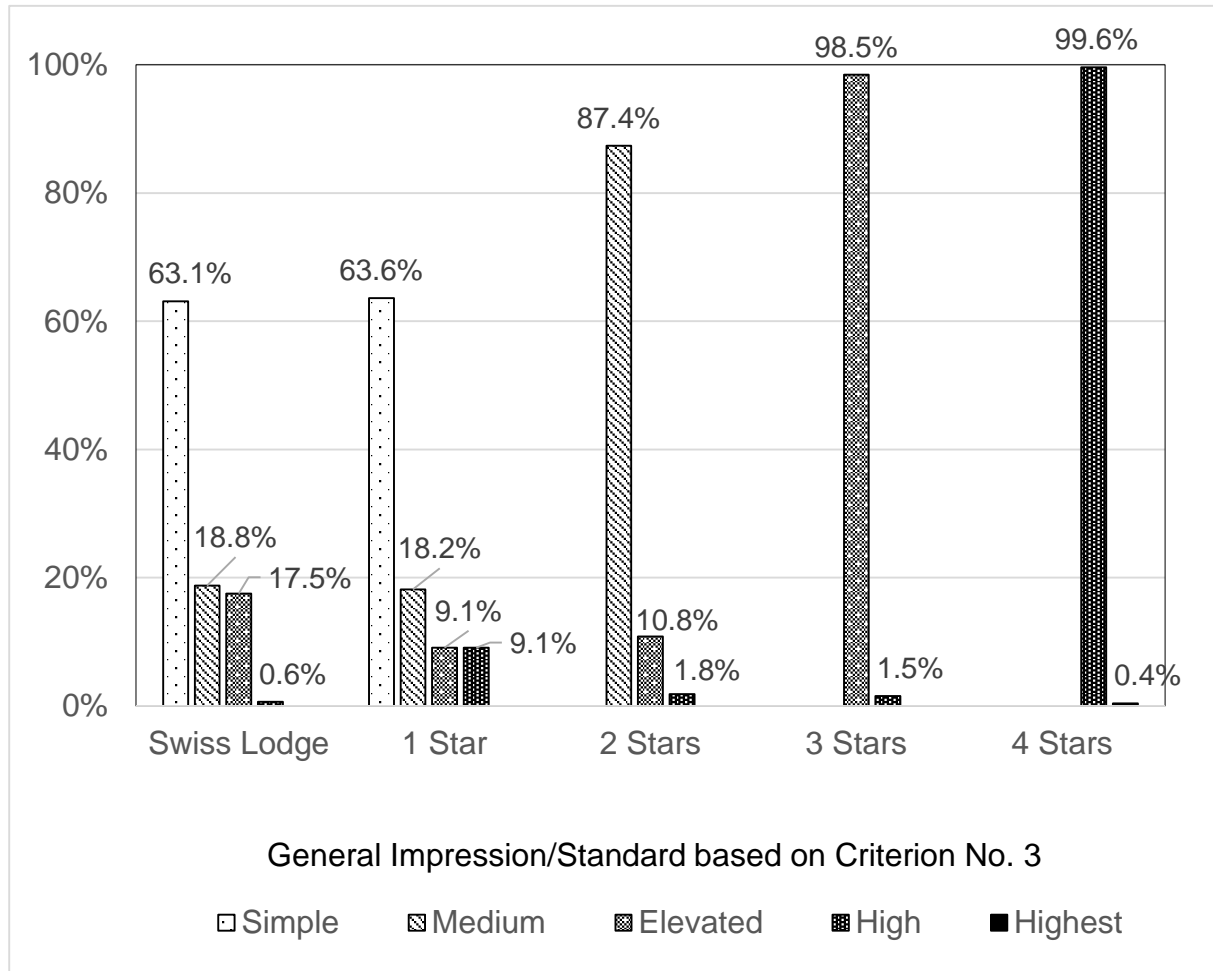


*Note:* The length of the whiskers corresponds to the lowest and the highest value that is still within 1.5 interquartile ranges of the lower and upper quartile respectively; N=1'302, where Swiss Lodges=158, 1 star=11, 2 stars=111, 3 stars=711, 4 stars=265, 5 stars=46

*Source:* Own figure, *Data:* hotelleriesuisse (2017c)

Looking at the fulfilment of the official criterion No. 3, which measures the general impression of the hotel standard and exhibits quite some variance in the economy segment, leads to a similar conclusion (see Figure 14). While not many 3- and 4-star hotels have left the impression of a higher overall standard than suggested by their category to the auditors, this is quite often the case for Swiss Lodges as well as 1- to 3-star hotels. The heterogeneity of product-based quality within star categories has already been emphasised by a study which analysed the Spanish hotel classification (see Núñez-Serrano et al. 2014). Whether these product-based quality differences between and within star categories are perceived as such and considered relevant by guests, which would point towards the classification criteria having some effect on guest satisfaction, is to be analysed empirically in this thesis.

Figure 14: Heterogeneity of General Hotel Standard within Star Categories



Note: N=1'302, where Swiss Lodges=158, 1 star=11, 2 stars=111, 3 stars=711, 4 stars=265, 5-star=46;  
Source: Own figure, Data: hotelleriesuisse (2017c)

### 6.1.2 Online Guest Review Data

In terms of online guest review data, this master thesis solely draws on indicators in the form of numeric guest ratings. Contrary to text comments as unstructured data, these ratings are quantitative and can be analysed econometrically. The aggregation of many individual guest ratings, which express a single reviewer's satisfaction with a hotel, to an overall review score is considered a suitable measure for the operationalization of user-based quality (Engler et al. 2015; Liang et al. 2017; Park & Nicolau 2015). It somehow hinges on the assumption that although the evaluation of a service differs by judges, collecting many individual opinions provides a valid overall evaluation of user-based quality or average guest satisfaction.

The used data is primarily provided by TrustYou. This is a private company which generates meta review content by semantically analysing and aggregating millions of online reviews and opinions from a wide range of worldwide OTAs, travel review

websites or social media. Additionally, the dataset is enriched with review data from Booking.com that is collected by means of a customized web crawler.

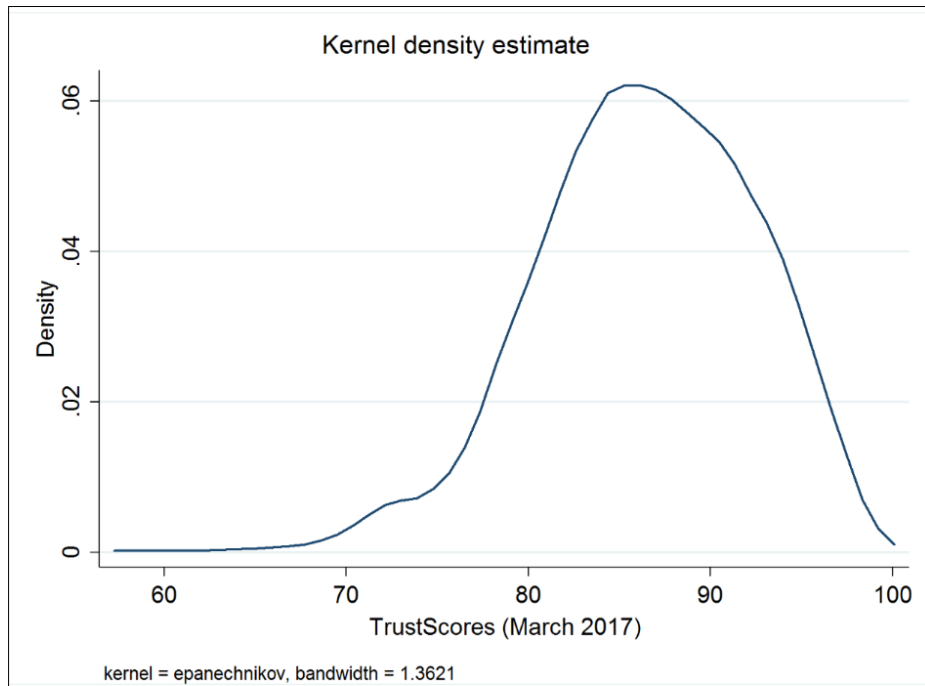
#### **6.1.2.1 TrustYou Data**

For the purpose of this thesis, TrustYou has provided customized raw data as well as a temporary access to the online tool TrustYou Analytics. TrustYou Analytics enables hotel managers to closely monitor and work with the online reviews that guests have submitted for them on various portals. The TrustScore, which is the primary indicator of perceived hotel quality that is investigated in this analysis, is the core product of TrustYou. It is currently the most widely used comparative measure of Swiss hotel reputation, not least because the two hotel associations and the marketing organization Swiss Tourism closely collaborate with the company (Phillips et al. 2017). The TrustScore is an aggregation of the overall numeric guest rating scores that a hotel has obtained on different websites such as TripAdvisor, Booking.com, HolidayCheck, Expedia, Agoda, DaoDao or Facebook in the period of the past 24 months. The weighting scheme to construct the TrustScores out of individual ratings does not differentiate between reviews coming from OTAs or travel review websites (Möllers March 2017). The exact algorithm is the company's property and not released, but it is communicated that the highest relative weight is given to the most recent ratings (TrustYou 2017a). The index theoretically ranges from 0 to 100, where 100 means excellent performance (ibid.). TrustYou data is available for most observations in the classification dataset, with only 28 missing hotels.

An advantage of the TrustScores as a measure of user-based quality is that they consider user-generated content from different online sources, which allows for a more comprehensive and generalizable picture than relying on one single portal with its specific target group. Limitations are that the quality of the reviews behind the scores may be heterogenous due to the different review policies and potential for fraud of the considered websites as well as the unknown algorithm to compute them.

Looking at the sample distribution of the TrustScores (see Figure 15) shows some tendency for positive feedback, which is a frequent observation in the context of online review data (Melián-González et al. 2013; Stringam et al. 2010; Tussyadiah & Zach 2017). This is also reflected by the fact that TrustYou considers scores below 67 as referring to poor quality (TrustYou 2017a).

Figure 15: Sample Distribution of the TrustScores



Note: Guest ratings are based on a minimum of 50 reviews and considered for 2- to 5-star hotels, N=848; Source: Own figure, Data: TrustYou (2017b)

#### 6.1.2.2 Booking.com Data

In addition to the data provided by TrustYou, overall Booking.com hotel rating scores as well as guest ratings for facilities, cleanliness, staff, comfort, price-performance ratio and location are used as alternative indicators of user-based quality. The overall rating scores are not provided by the reviewers themselves, but are the unweighted average of the ratings guests have assigned to these six quality components and to the evaluation criterion of free WiFi (Mellinas et al. 2015). All rating scores theoretically have values that range from 2.5 to 10, where 10 means excellent performance (ibid.).

The argument to additionally collect this review data is that Booking.com ratings should be less prone to fake feedback than the ones from review websites, as reviews can only be submitted when the rated hotel has been booked via the OTA. This makes the Booking.com rating scores a useful alternative measure to carry out robustness checks of the findings that the TrustScores generate. Additionally, the rating scores for specific hotel quality components, such as staff, can be used for descriptive analyses and to work against potential omitted variable bias (see chapter 6.2.2). Booking.com is currently the most relevant OTA in terms of market share as well as the number of hotels that it has listed for the Swiss context and worldwide (Martin-Fuentes 2016; Schegg 2016). It is thus considered the most suitable additional data source from a

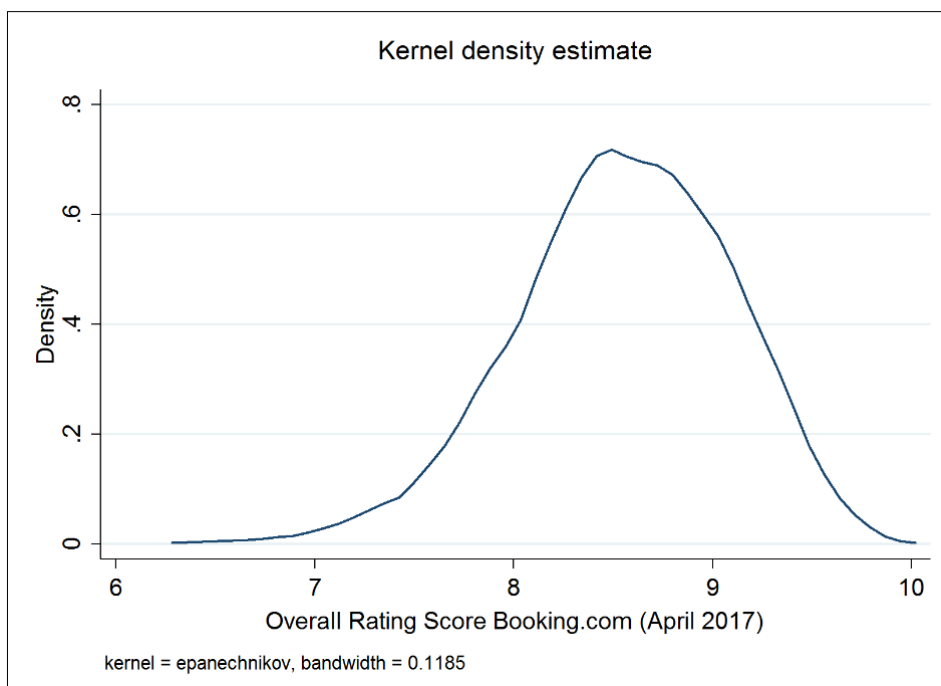


methodological point of view. The chance that Swiss hotels collaborate with this provider is highest, which in turn minimizes potential sample selection bias.

The overall rating scores as well as the number of reviews have been extracted from Booking.com for the hotels of the classification audit sample. The data collection process by means of a customized web scraper, which could be built with the Software *Octoparse Version 6.2*, has involved several steps. It is to be mentioned that the data for all hotels has been web scraped at the same weekend in April 2017. This was considered important to guarantee that the cross-sectional sample is generated under the same data collection conditions for all hotels.

As expected, most hotels present in the TrustYou dataset can also be found on Booking.com. Only 81 of them, mainly Swiss Lodges and 3-star hotels, do at least temporarily not collaborate with the OTA. The distribution of the overall Booking.com rating scores in the sample, as it is the case for the TrustScores, shows some bias towards positive feedback (see Figure 16).

Figure 16: Sample Distribution of the Booking.com Rating Scores



*Note:* Guest ratings are based on a minimum of 50 reviews and considered for 2- to 5-star hotels, N=870; *Source:* Own figure, *Data:* Booking.com (2017)

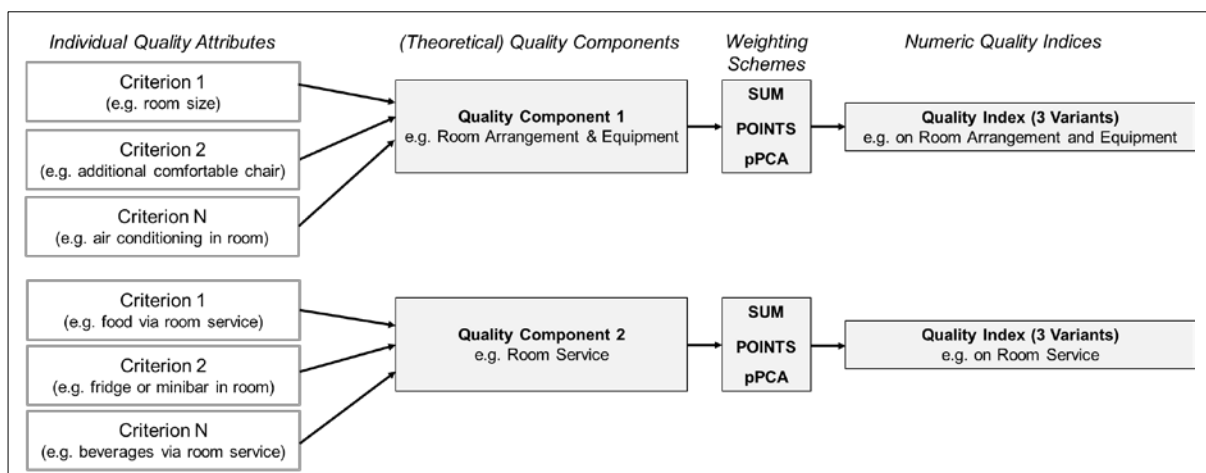
## 6.2 Method

In the following, the methodological approaches in terms of aggregating individual classification criteria to objective quality indices and the econometric models to answer the empirical research questions are discussed.

### 6.2.1 Construction of Quality Indices

The second and third empirical research questions ask which hotel quality components that the classification criteria cover are relevant determinants of guest satisfaction and thus affect online guest ratings. With its 270 individual criteria, out of which 238<sup>12</sup> exhibit variance in their fulfilment between star categories, the classification assessment catalogue is far too large to consider all of them as individual predictors in an econometric model. As a means of data reduction, objective quality indices are therefore built out of criteria that belong to similar hotel service components (see Figure 17). Aggregating individual classification criteria to indices that map objective quality differences in service components between hotels seems to be a meaningful approach not only from methodological considerations, but also on theoretical grounds. It is questionable that the fulfilment of single criteria, such as the availability of a safe in the room or the provision of dietary kitchen, affects guest satisfaction for itself. On the contrary, it is more plausible that the overall degree of fulfilment for criteria relating to a quality component, e.g. the room, is the relevant determinant factor.

Figure 17: Bundling of Individual Classification Criteria into Quality Indices



Source: Own figure

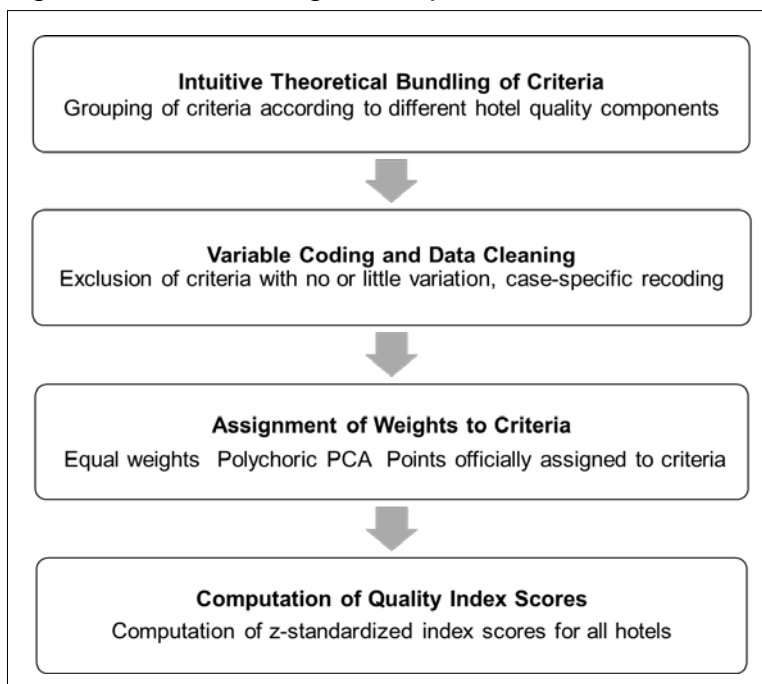
<sup>12</sup> In total, 32 criteria are mandatory for all star categories. For the sample of 2- to 5-star hotels, which will be relevant for the regression analyses, 213 criteria exhibit between-star variation (hotelleriesuisse 2015a).

For the index construction, the following requirements are considered important:

- **Theoretical meaning of indices:** Criteria that bundled by means of an index should, at least loosely, belong together and theoretically contribute to the same quality component of the hotel service (e.g. room, bathroom or F&B). If this is not the case, the econometric results are uninformative and difficult to interpret.
- **The higher the index score, the better:** To adhere to the logic of the hotel classification, index scores should increase with the number of fulfilled criteria. In other words, high scores for a service component should point towards better objective performance in terms of the quality provided by the hotel.
- **Minimum loss of variation:** The criteria should be bundled in a way that leads to a manageable amount of data. Simultaneously, as much product-based quality differences as possible should be reflected by the indices to keep most of the variation in classification outcomes present in the dataset.

Two main analytical steps have to be taken when constructing the indices, namely the bundling of related criteria and the weighting of each criterion. Figure 8 illustrates the methodological steps in index construction.

Figure 18: Methodological Steps in Index Construction



Source: Own figure

### 6.2.1.1 Theoretical Bundling of Criteria

In previous studies that have constructed indices, the single items to be bundled were often ratings for the importance or quality of hotel service attributes collected by means of guest survey. Based on these ordinal variables, the grouping of individual variables belonging to the same theoretical component has been carried out by means of factor or principal component analysis (Choi & Chu 2001; Marić et al. 2016; Poon & Lock-Teng Low 2005; Taylan Dortyol et al. 2014). For indicator variables, as it is the case with most classification criteria, these methods are, however, not applicable. Furthermore, in the mentioned analyses, the factorization by means of econometric techniques sometimes led to unintuitive bundling of items that shared common variation, but belonged to very different theoretical hotel quality components. Since the set of classification criteria is defined in a way that in theory makes it possible for a hotel to fulfil all of them at the same time<sup>13</sup>, it is considered feasible to group the variables according to theoretical intuition instead of using econometric techniques.

For the bundling of criteria, the general framework of the core hotel service areas is chosen, as guests tend to perceive them as the main elements of the hotel offer (see Figure 3 in chapter 2.5). Additionally, the findings of previous studies that performed factor analyses with tangible hotel attributes are considered to derive relevant components within these core service areas. Lastly, the structuring of the criteria according to assessment areas in the official classification catalogue (see Appendix A) serves as a guideline. A mixing up of physical or tangible attributes and more person-oriented services is avoided as far as possible, because they differ in their characteristics and prerequisites. The provision of infrastructure entails higher requirements than services, as it often implies large physical investments and depends on structural conditions like hotel construction and conception (Bulchand-Gidumal et al. 2011). In general, a trade-off between data reduction and theoretical homogeneity of pooled criteria must be solved. Overall, a sensible number of criteria should be bundled into in one component to ensure that the resulting indices display enough variance so that they can feasibly be included into the regression as numeric variables.

Figure 19 depicts the 14 quality components that result from the bundling of the criteria. The detailed list of variables behind each index can be found in Appendix C.

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<sup>13</sup> Except for some mutually exclusive criteria which are declared as such and can be coded appropriately.

Figure 19: The 14 Resulting Quality Indices by Core Service Area

Indices for the Objective Quality of the Hotel Service					
• Quality Management & Online Activities					
Technical Quality	Functional Quality	Technical Quality	Functional Quality	Technical Quality	Functional Quality
<b>Accommodation (Core Product)</b> <ul style="list-style-type: none"> <li>• General Hotel Appearance &amp; Facilities</li> <li>• Housekeeping &amp; Laundry Services</li> <li>• Reception Services</li> <li>• Parking &amp; Transfer Services</li> <li>• Room Arrangement &amp; Equipment</li> <li>• Bathroom Arrangement &amp; Equipment</li> <li>• Sleeping Comfort</li> <li>• Electronics &amp; Connectivity</li> <li>• Complementary Conveniences &amp; Information</li> </ul>		<b>Food &amp; Beverage (Supporting Product)</b> <ul style="list-style-type: none"> <li>• Food &amp; Beverages Services or Facilities</li> <li>• Room Service</li> </ul>		<b>Add-on Services (Supplementary Product)</b> <ul style="list-style-type: none"> <li>• Event Facilities &amp; Services (MICE)</li> <li>• Recreational &amp; Entertainment Facilities or Services (incl. Wellness)</li> </ul>	

Source: Own figure based on Choi & Chu (2001); Marić et al. (2016); Poon & Lock-Teng Low (2005) and Taylan Dortyol et al. (2014)

### 6.2.1.2 Weighting Schemes for Criteria

For the computation of the index scores, weights for the criterion-level variables have to be chosen. Different weighting schemes are proposed. This allows checking the robustness of the results when assessing the effects of the quality indices on guest ratings. Furthermore, testing different weighting schemes also seems to be relevant to gain some evidence on whether potential effects stem from the overall degree of criteria fulfilment or their presence depends strongly on the weights assigned to individual criteria. To some extent, comparing the findings across index variants might also provide some hints regarding which criteria might drive the results. By referring to previous studies that constructed indices out of categorical variables (see Howe et al. 2008; Njong & Ningaye 2008), the following different weighting schemes are proposed:

- *Unweighted summation (SUM)* of the fulfilled criteria per component as a basic variant with equal weights for comparisons
- Weighting based on the number of points (POINTS) that the hotel classification system officially assigns to each fulfilled criterion
- Aggregation based on weights that are derived by means of *polychoric principal component analysis (pPCA)*, which is an adaptation of PCA for categorical data (Kolenikov & Angeles 2009)

In the composite index based on the pPCA variant, original items that are more unequally distributed across the sample get a higher weight (Howe et al. 2008; Núñez-Serrano et al. 2014; Njong & Ningaye 2008). This is considered theoretically feasible, as it means that classification criteria with which most of the hotels comply only lead to

a marginally higher score when fulfilled and to a considerable “punishment” when not fulfilled.

All resulting indices are standardized to have approximately a mean of 0 and a standard deviation of 1, as the metric of the indices has no meaning and comparing regression effects becomes somehow more straightforward with standardization (Howe et al. 2008). The standardization is carried out for the overall sample of 2- to 5-star hotels as well as separately for the 3- and 4-star samples, for which individual regression models are estimated.

## 6.2.2 Linear Regression Models

To answer the empirical research questions, two basic linear regression model variants, with online guest ratings as the dependent and classification outcomes as the explanatory variables, are proposed. The model specifications and empirical strategy are presented in detail in the following.

### 6.2.2.1 General Model Specifications

To analyse the overall relationship between aggregate outcomes of the classification and guests’ perception of quality, the following econometric model is specified, where the subscript (i) stands for hotels:

$$RATING_i = \beta_0 + \beta_1 STAR_i + \beta_2 SUPERIOR_i + \beta_3 SUPPOINTS_i + \theta CONTROLS_i + \varepsilon_i \quad (2)$$

The primary outcome  $RATING_i$  is a hotel’s *TrustScore* in 2017, where the Booking.com ratings for overall hotel quality and for facilities are used in alternative model variants to check the robustness of the results. The classification outcomes as the variables of interest are denoted by  $STAR_i$  for the *star category*, which is included by means of a categorical variable with 3-star hotels as the reference group<sup>14</sup>,  $SUPERIOR_i$  for the indicator variable classifying hotels that hold *the supplement “superior”* and  $SUPPOINTS_i$  for the *supplementary points* a hotel has obtained in excess of the minimum score to be achieved for its category. This last variable is used instead of the total classification score, because the supplementary points a hotel has obtained measure above average performance in terms of criteria fulfilment and are not

<sup>14</sup> The star category should not be included as an ordinal variable due to the small number of different values and because assuming a linear effect of one more star on guest ratings is likely not feasible. Choosing the 3-star category as the reference group seems to be appropriate. In this way, except for the 5-star category, guest ratings of hotels belonging to one star category can be compared with those of the hotels holding the adjacent category (namely 2-star vs. 3-star hotels and 4-star vs. 3-star hotels).

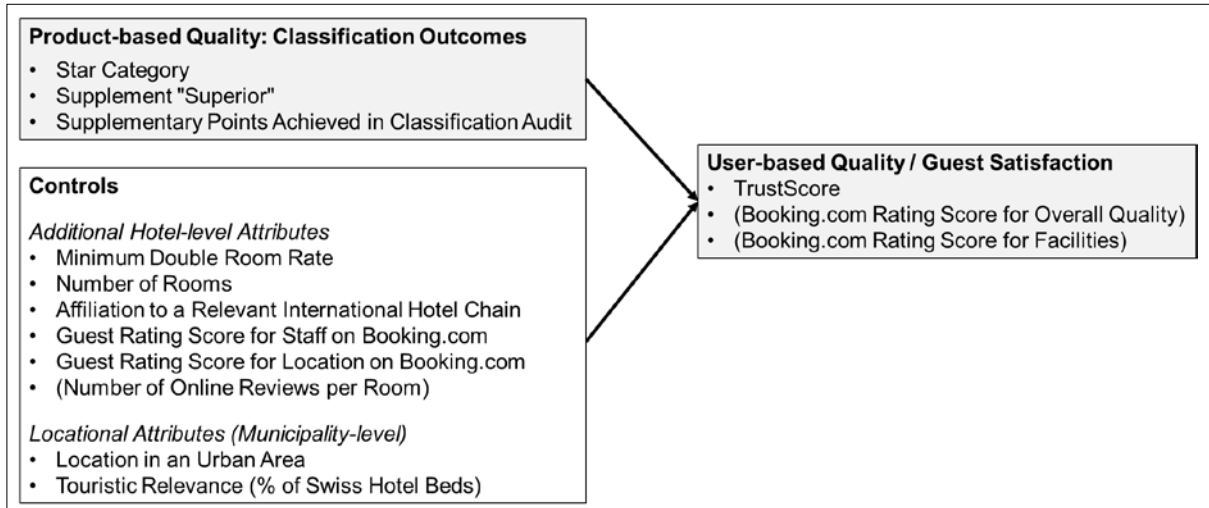
correlated as highly with the star category. Consequently, the dummy for superior hotels only measures the additional requirements tied to this supplement. These are namely the fact that their number of obtained supplementary points makes them achieve the next higher minimum score as well as the required application of a quality management programme or quality checks through mystery guesting. Finally,  $CONTROLS_i$  denotes a vector of control variables at the hotel- and municipality-level, while  $\varepsilon_i$  stands for the error term. The primary interest of this part of the analysis lies in the sign and significance of the regression coefficients for the classification outcomes. Overall, if fulfilling more classification criteria reflects higher quality also from the guests' point of view, given prior expectations, we should expect the effect of the included classification variables to be positive in this model.

Several potential endogeneity issues in the form of omitted variable bias have to be counteracted through the inclusion of relevant control variables. First of all, the provision of high-level infrastructure and amenities often goes hand in hand with high-skilled staff and a higher focus on the quality of the guest-host relationship, which should be reflected in higher perceived functional quality of the offer (Ariffin & Maghzi 2012; Briggs et al. 2007). Thus, omitted variable bias could result from the correlation of these functional hotel quality components with the technical classification outcomes, whose individual effect on online guest ratings is to be estimated. The same holds for locational quality, as hotels of higher star categories often have better locations, e.g. in terms of proximity to attractions or the attractiveness of the view from the hotel (López Fernández & Serrano Bedia 2004). To work against this methodological issue, *Booking.com guest ratings for location and staff* are included as control variables. This is to partial out these effects, as far as possible, from the effects of interest. Additionally, it has been shown that guest ratings tend to be affected *by hotel chain affiliation or brand* (Israeli 2002). As guests know better what they can expect from a branded chain hotel, it might be easier for them to choose the hotel that best matches their preferences, which should be reflected in higher average guest satisfaction. They might, however, also have higher expectations and be more critical if the service promise made by the brand is not held (Banerjee & Chua 2016; Choi & Chu 2001). There exists some evidence of chain affiliation having a negative effect on guest ratings (Banerjee & Chua 2016). Again, this variable is related to the number of stars a hotel holds, with 1- and 5-star hotels belonging disproportionately more often to a chain than the other categories in the Swiss context (Horwath HTL & hotelleriesuisse 2017). This

effect should therefore also be partialled out from the effects of interest by including a dummy variable on international chain affiliation. Another important determinant factor of guest satisfaction, which also directly relates to hotel classification outcomes, are *room rates* (Liang et al. 2017; Minazzi 2010). Price is a driver of expectations and a quality signal, especially in the absence of information on the intrinsic quality attributes of the offer (Abrate et al. 2011; Martin-Fuentes 2016; Zeithaml 1988). For a given quality-level, a higher price, however, tends to affect guest satisfaction negatively, as it lowers the perceived value (Abrate et al. 2011; Martin-Fuentes 2016). The minimum rate for a double room is thus included as a further control variable to partial out a potentially negative price effect on satisfaction from the expected positive effect of providing higher product-based quality. The listed minimum rate for a double room is considered the most sensible proxy for the average hotel price paid by guests. Double rooms are the room type which is most commonly booked and price ranges of room rates can be quite large, which would potentially lead to an upward bias if the maximum rate was incorporated. Furthermore, the size of the hotel in terms of *number of rooms* is included as a potentially relevant control variable that is also weakly related to the star categories (Liang et al. 2017; Martin-Fuentes 2016). Hotel size might be positively linked to the professionalism of the service or to the amount of available resources, e.g. in terms of marketing or online customer-relationship management, while the degree of familiarity and personalization tends to decrease with the number of rooms (Briggs et al. 2007). The *number of reviews* per hotel room, on which the guest ratings are based, is included as a last hotel-level control variable in some model variants. It has been shown that guest ratings tend to increase first with the number of reviews and later eventually decrease again (Melián-González et al. 2013). At the same time, the credibility of guest ratings also depends on the number of underlying guest opinions. In general, the higher the number of online reviews for a hotel, the better the rating score tends to reflect overall guest satisfaction, as the bias from fake or atypical reviews should be lower (Melián-González et al. 2013; Öğüt & Onur Taş 2012; Park & Lee 2009). For this reason, another model variant is estimated in which the number of reviews is used for the calculation of analytical weights (see chapter 6.2.2). As municipality-level controls, a dummy for *urban location* of the hotel and a proxy for *touristic relevance of the municipality* in which it is located, are included. This is to control for potential locational effects that might be reflected in guest ratings and are eventually related to classification outcomes as well (Öğüt & Onur Taş 2012). Figure 20 provides an illustration of the variables which are included in the model.



Figure 20: Model on the Effect of Classification Outcomes on Guest Ratings



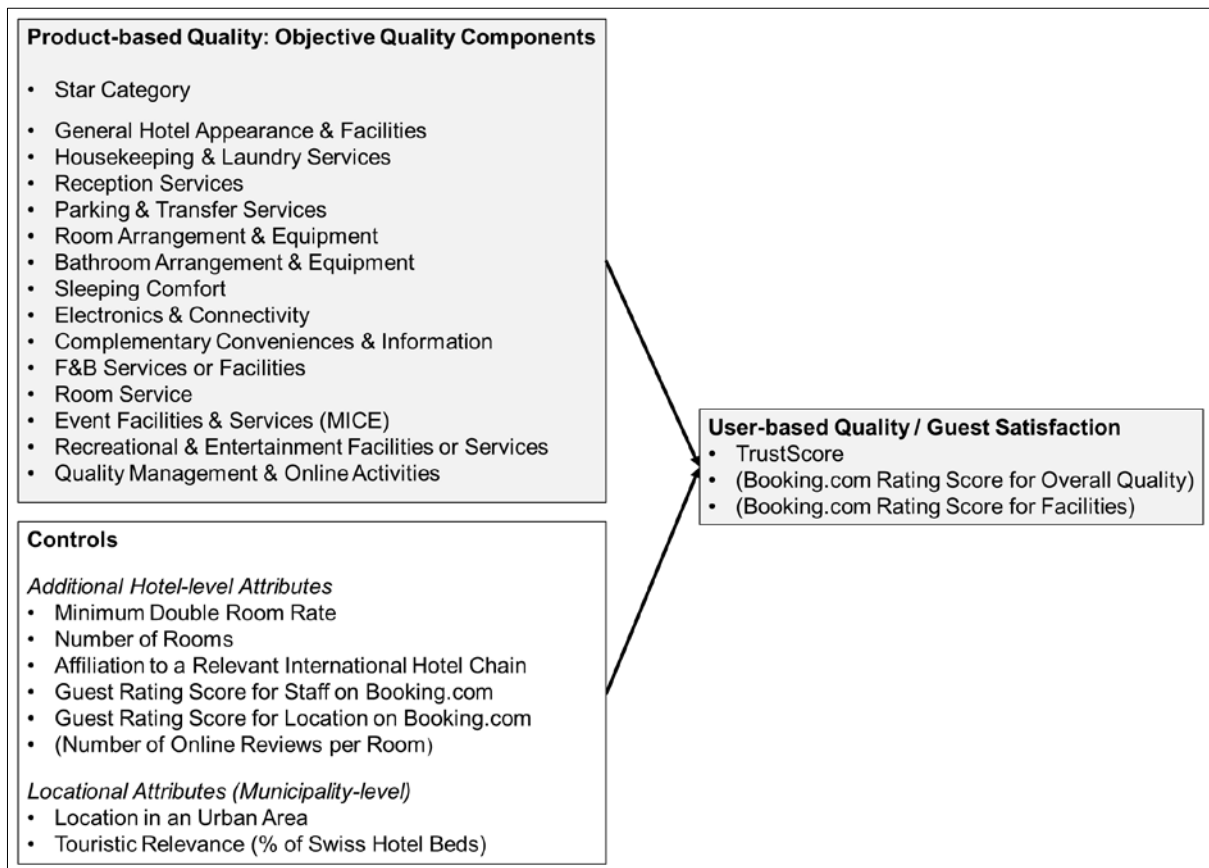
Source: Own figure

To assess the relevance of different objective hotel quality components that are covered by the classification for guests, a second model is specified. It is similar to the model discussed previously, except for the fact that aggregate classification outcomes are replaced by the 14 constructed objective quality indices ( $INDICES_i$ ):

$$RATING_i = \beta_0 + \beta_1 STAR_i + \beta INDICES_i + \theta CONTROLS_i + \varepsilon_i \quad (3)$$

The star category is retained as a control variable, as it is directly linked to the scores that hotels obtain in the quality indices. A potential mere star effect on guest ratings should thus be partialled out from the effects of the services, facilities and standards a hotel provides or adheres to. In this model, the sign and significance of the coefficients for the quality indices are of interest. The line of argument is that if higher quality index scores lead to higher guest ratings, overall, the criteria behind the index seem to reflect product-based quality differences which are perceived as such also by guests. Observed significant and positive quality index effects can thus be interpreted as some evidence for the overall relevance of the bundled criteria for the demand-side. Figure 21 provides an illustration of this second model with the included variables.

Figure 21: Model on the Effect of Objective Quality Components on Guest Ratings



Source: Own figure

### 6.2.2.2 Econometric Methodology

The coefficients of the regression equations are estimated via OLS, because guest ratings are a continuous dependent variable. In theory, the guest ratings have values that are arbitrarily bound in both directions due to the predefined scale, which is referred to as censored Y-data. For this type of data, Tobit regression variants are generally preferred (McDonald & Moffitt 1980; Schmidheiny 2007). As, however, nearly none of the hotels in the sample actually achieve the maximum or minimum rating scores, OLS is considered the most suitable estimation technique. Furthermore, the cross-sectional model specification seems to be reasonable for the problem under research, as no reverse causality issues should be at work. In the long run, objective quality attributes as covered by the classification might adapt to guest ratings when hotel managers treat the latter seriously and make amendments to their offer. In the short term, the hotel offer and its quality can, however, be considered as fix. Causality thus runs from classification outcomes to guest ratings.

### *Analysed Samples*

The two models are first run on an overall sample including 2- to 5-star hotels, which amounts to 951 observations in total. The Swiss Lodges and 1-star hotels have to be excluded from the analysis. For the Swiss Lodges, the inclusion is considered unfeasible due to the heterogeneity of hotel concepts within the category and the dissimilar characteristics of hostels as compared to classified hotels holding. The category unifies hostels and hotels which, based on their innovative or unconventional concepts, do not wish to position themselves through holding a star category or they do not fulfil all of the necessary minimum criteria. The differences in terms of characteristics and clientele attracted by these hotels and hostels would potentially bias the results. Furthermore, the supplement “superior” is not applicable to Swiss Lodges and could thus not be investigated. For the 1-star hotels, only eleven observations are present in the sample and a high share of them belongs to the same hotel chain, which makes it problematic to include the category by means of an indicator variable. Besides these between-star regressions, separate regressions for individual star categories are carried out. This makes it possible to abstract totally from the expectational effect of stars and to take into account that in general, different quality components tend to be critical for upscale compared to economy class guests (López Fernández & Serrano Bedia 2004; Secchi et al. 2016). The beta coefficients or statistical relevance of individual hotel quality indices as analysed in Model 2 might thus differ between categories. The last empirical research question is concerned with this issue. For the estimation of separate regression equations to be feasible in terms of sample size, these can only be estimated for the upscale and luxury segment, namely for 3- and 4-star hotels. These are the only two groups that consist of an appropriate number of observations when considering the many independent variables to be included into the regressions, namely of 585 and 237 observations respectively. They are, however, also a relevant sub-group, as together they generate the majority of overnight stays for the Swiss hotel industry.

### *Taking into Account the Expected Credibility of Ratings*

To take into account that the credibility of online rating scores is not independent from the underlying number of online guest reviews per hotel, two approaches are proposed (Bulchand-Gidumal et al. 2011). One of them is to include the number of online guest reviews per hotel as a control variable. At the same time, only hotels with a minimum

number of 50 reviews are considered. Fixing the threshold for the inclusion of an observation at 50 reviews seems to be feasible to exclude potential fake reviews. Previous authors have chosen thresholds between 25 and 100 reviews (Bulchand-Gidumal et al. 2011; Chaves et al. 2012). When fixing it at 50 reviews, less than 10% of the observations have to be excluded from the analysis. A second approach is to include all observations, but to use analytical weights for the number of guest reviews per hotel room as a correction mechanism. Analytical weights take into account that the outcome variable, here the guest rating score of a hotel, is actually an average (Dupraz 2013). The weights are usually set equal to the number of elements that gave rise to this average (ibid.). In this application, the elements are the number of reviews per hotel, which means that a higher weight is assigned to hotel observations whose rating is based on a larger number of reviews. Formally, in a sample with  $m$  observations and  $k$  independent variables, every row of the vector of independent variables  $X$  and the scalar of the dependent variable  $y$  is multiplied by the square root of the weight  $\omega_1$ , which here amounts to the number of guest reviews per hotel room (Dupraz 2013p. 2f):

$$\tilde{\mathbf{X}} = \begin{bmatrix} \sqrt{\omega_1} & \sqrt{\omega_1}X_{11} & \sqrt{\omega_1}X_{1k} \\ \vdots & \vdots & \vdots \\ \sqrt{\omega_m} & \sqrt{\omega_m}X_{m1} & \sqrt{\omega_m}X_{mk} \end{bmatrix} \quad \tilde{\mathbf{y}} = \begin{bmatrix} \sqrt{\omega_1}y_1 \\ \vdots \\ \sqrt{\omega_m}y_m \end{bmatrix}, \quad (4)$$

with the OLS estimator for the beta coefficients being  $\hat{\boldsymbol{\beta}} = (\tilde{\mathbf{X}}' \tilde{\mathbf{X}})^{-1} \tilde{\mathbf{X}}' \tilde{\mathbf{y}}$  (5)

#### *Robustness Checks Concerning the Measurement of Outcomes and Predictors*

Robustness checks concerning the measurement of both, the dependent variables as well as the objective quality indices, are carried out. The benchmark variants of the models use the TrustScores of the hotels as the dependent variable, because they are based on a higher number of review websites resulting in more comprehensive evaluation criteria. The Booking.com rating scores for overall quality and for facilities are considered as alternative, but less comprehensive measures.<sup>15</sup> Furthermore, separate model variants are estimated for all three index versions per quality component, which differ in their weighting schemes. Additionally, in the basic model

<sup>15</sup>The Booking.com overall rating scores are calculated as the unweighted average of the ratings for location, staff, cleanliness, price-performance ratio, free WiFi, comfort and facilities. This ignores the whole important quality component of F&B, which is, however, considered in the objective quality indices that have been constructed and will be used as predictor variables.

variants, the Booking.com rating scores for staff and locational quality are not included in order to be able to grasp their relationship with the predictors of interest.

#### *Testing Finite Sample Assumptions of OLS and Model Specification*

The finite sample assumptions of OLS, namely normality of error terms and homoscedasticity, are tested for the between-stars model variants that include all control variables and no analytical weights. Furthermore, analyses for multicollinearity as well as outliers are carried out. The assumption of normally distributed residuals is only approximately met based on the graphical analysis by means of normal quantile-quantile plots. This is, however, often the case in small samples and should not be problematic. Breusch-Pagan's as well as White's test for no heteroskedasticity are clearly rejected at the 1%-level or even below. Heteroskedasticity is thus present and robust standard errors have to be estimated for the coefficients.

Despite the fact that the hotel quality index scores are per definition correlated with the star category, which also results in relatively high intercorrelations between the different quality indices for a single hotel, multicollinearity should not be a real issue. The variance inflation factor (VIF) is lower than 10 in all cases, which is the threshold value that, according to a rule of thumb, would point towards severe multicollinearity issues (Kennedy 2008, p. 199; O'Brien 2007; Verbeek 2008, p. 44-45).

To investigate if the effects of interest are driven by outliers, it is tested whether the findings differ when excluding all observations with a Cook's distance larger than four divided by the sample size (Kennedy 2008, p. 353). This measure considers the leverage of an observation, defined as the distance from the mean of  $X$  and from the standardized residuals, to detect whether it is potentially influential (ibid.). In general, outliers are not a great concern in the analysis, but more detailed insights regarding this issue are presented in the results section.

Furthermore, model specification testing is carried out graphically and based on the Regression Equation Specification Error Test (RESET). It is not rejected at conventional significance levels and thus points towards no econometric necessity of including interactions or polynomial terms. The investigated predictors seem to be related linearly to the response variable.

Table 6 gives an overview on the most relevant aspects of model specification. It does so by providing information on the model factors that are varied for robustness checks and by indicating the corresponding sample sizes.

Table 6: Varying Factors in Model Specification and Corresponding Sample Sizes

Dependent Variable	Independent Variables of Interest	Correction for the Number of Reviews	Sample (N)		
			Overall (2- to 5-star)	3-star	4-star
<ul style="list-style-type: none"> <li>• <b>TrustScore</b></li> </ul> <p>For robustness checks:</p> <ul style="list-style-type: none"> <li>• Booking.com overall rating score</li> </ul>	<p><b>Classification outcomes</b> (star category, supplement “superior”, supplementary points achieved)</p>	<ul style="list-style-type: none"> <li>• <b>Inclusion as a control variable</b> (only observations with at least 50 reviews are included)</li> </ul>	848	513	222
<ul style="list-style-type: none"> <li>• Booking.com rating score for facilities</li> </ul>	<p><b>Quality Indices with variants</b></p> <ul style="list-style-type: none"> <li>• PCA</li> <li>• Points assigned in classification</li> <li>• Unweighted summation of criteria</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Analytical weighting</b> (No. of reviews per hotel room used as weights)</li> </ul>	950	584	237

Source: Own figure

## 7 Empirical Results

In the following, the empirical findings from the estimation of the two specified models are presented. Each chapter starts with some descriptive or graphical evidence before the regression results are discussed.

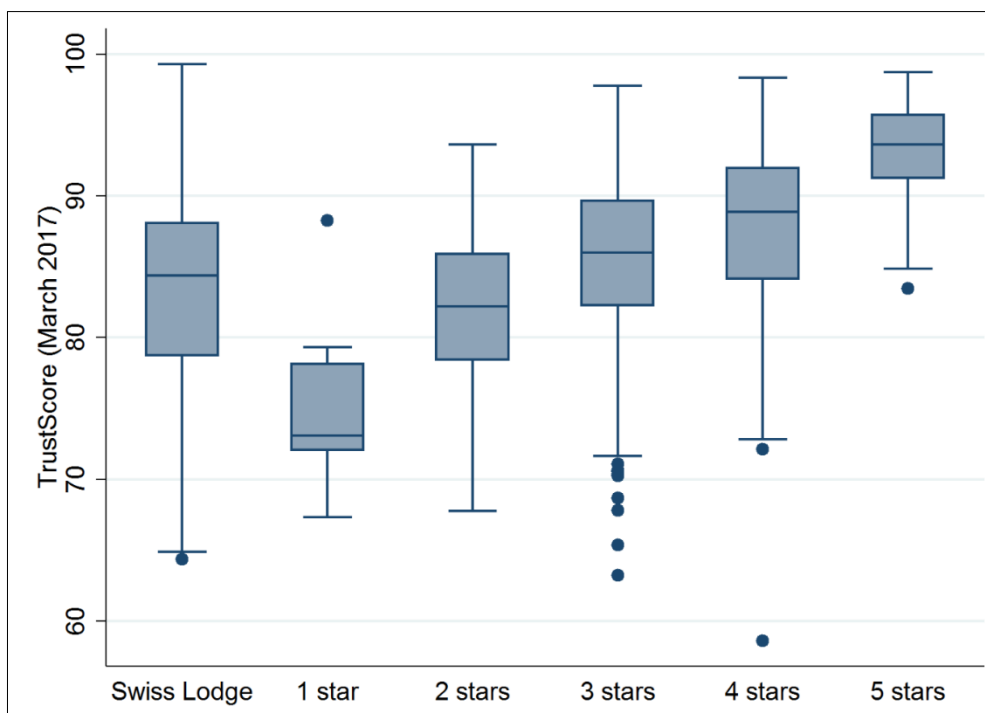
### 7.1 Effect of Aggregate Classification Outcomes on Guest Ratings

This chapter is concerned with the empirical findings on the overall relationship between the objective assessment of hotels through the classification system - with star category, supplement “superior” and supplementary points achieved in the audit as classification outcomes to be investigated - and the subjective online guest ratings.

#### 7.1.1 Descriptive Analysis

A first impression on the overall relationship between the two quality indicators can be gained by graphically analysing the distribution of online guest ratings over star categories by means of boxplots (see Figure 22). As a matter of completeness, data on all star categories, including Swiss Lodges and 1-star hotels which will not be considered in the regression analysis, is plotted.

Figure 22: Distribution of TrustScores over Star Categories



Note: length of the whiskers corresponds to the lowest and the highest TrustScore value that is still within 1.5 interquartile ranges of the lower and upper quartile respectively; only observations whose guest rating is based on at least 50 online reviews are included; N=920, where Swiss Lodges=63, 1 star=8, 2 stars=73, 3 stars=514, 4 stars=222, 5 stars=40

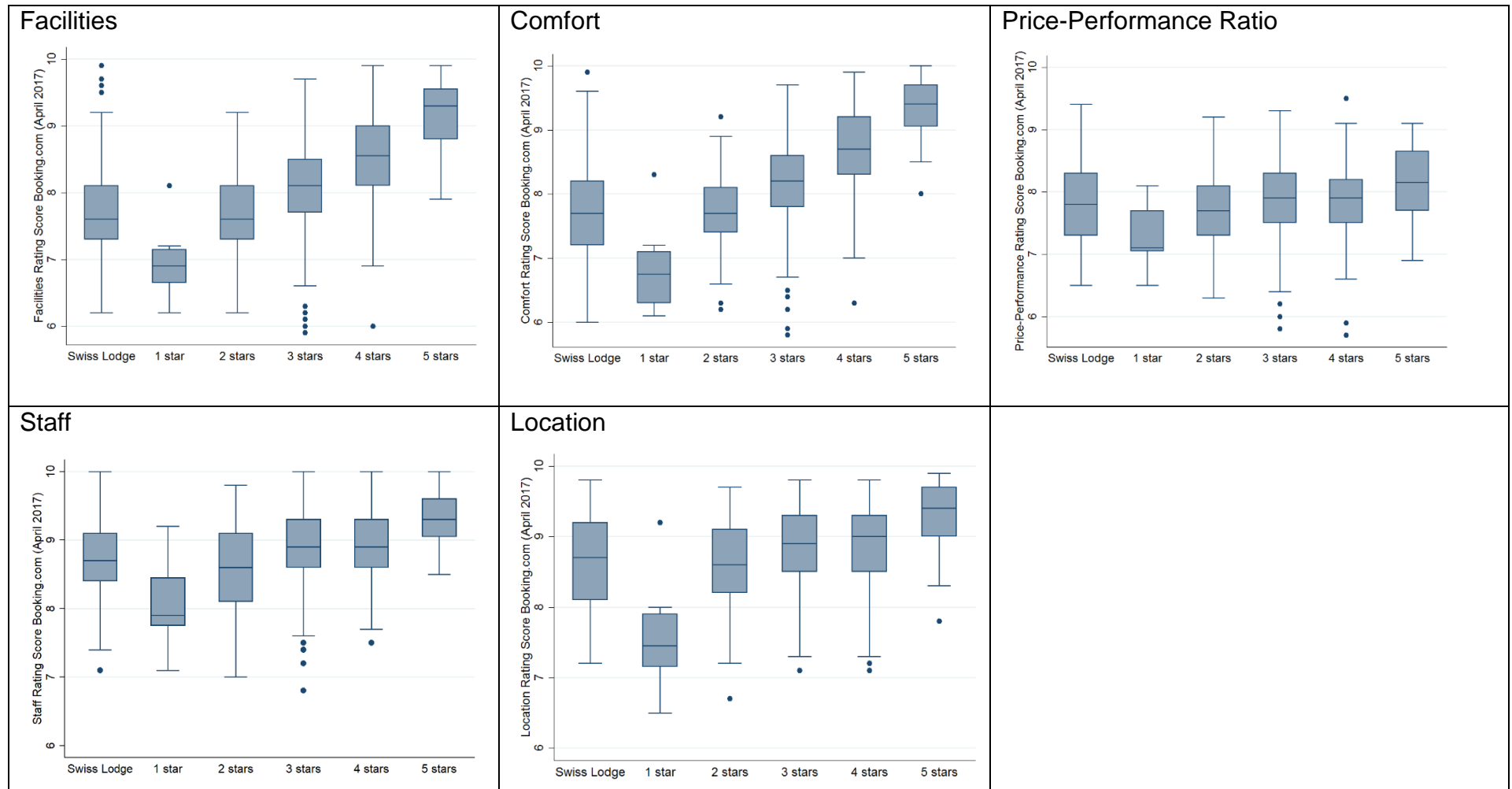
Source: Own figure, Data: hotelleriesuisse (2017c), TrustYou (2017b)

This first graphical representation reveals that median TrustScores, at least moderately, increase with the star category. This is the case with the exemption of the Swiss Lodge category, where median TrustScores are higher than for 1- and even 2-star hotels. There are, however, clear overlaps in the value ranges of the ratings for the different star categories, which points towards a moderate relationship. Furthermore, the variance in terms of ratings is highest within the heterogeneous Swiss Lodge category and lowest for the 5-star hotels, which seem to offer a consistently high quality level from the perception of guests. In sum, the box plots suggest that there is some relationship between guest's and experts' hotel quality assessment, or put differently, that hotel stars do something with guests' perception of quality. The pattern that is observed between the two quality indicators, however, has its roots not necessarily in the criteria behind the stars. It could also result from more "artificial" factors, such as a systematically different rating behaviour of the clientele that is attracted by each star category.

A potentially more instructive picture is obtained by plotting the guest ratings for different quality components over the star categories (see Figure 23). The resulting box plots show that the distribution of ratings for facilities and comfort follows a pattern which is most similar to the one observed for the TrustScores in Figure 22, with higher star categories obtaining higher median values. This is less the case for the other quality components. Price-performance ratings are hardly systematically linked to stars. Furthermore, there is at most a weak tendency for median staff and location ratings to be higher for hotels holding more stars. The distribution of the ratings for staff is for example very similar between 3- and 4-star hotels. The finding that it is especially the guest ratings for facilities and comfort that tend to increase with the number of stars is actually of interest. It is exactly these quality assessment areas which are most closely linked to the criteria of the official hotel classification, whereas no criteria that directly target staff or location are present in the catalogue. A tentative conclusion out of this is that it might really be the criteria behind the star categories which are responsible for the quality differences that guests, on average, perceive between the hotel segments.



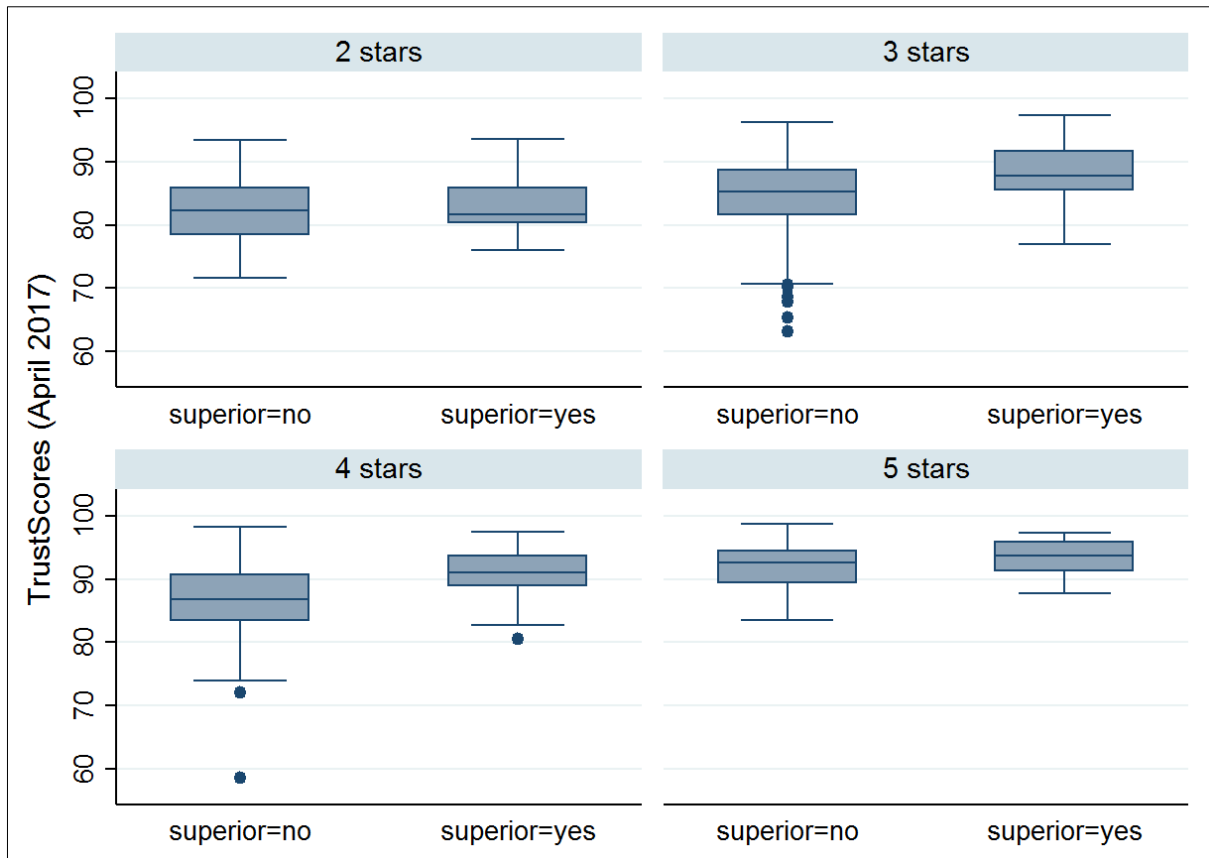
Figure 23: Booking.com Rating Scores for Service Components across Categories



Note: length of the whiskers corresponds to the lowest and the highest Booking.com rating score that is still within 1.5 interquartile ranges of the lower and upper quartile respectively; only observations whose guest rating is based on at least 50 online reviews are included; N; N=920, where Swiss Lodges=63, 1 star=8, 2 stars=73, 3 stars=514, 4 stars=222, 5 stars=40; Source: Own figure, Data: Booking.com (2017), hotelleriesuisse(2017c)

Moving to the supplement “superior” as the next classification outcome, the graphical analysis does not reveal a very clear pattern (see Figure 24). 1-star hotels are not plotted, as the number of observations is too small. Hotels holding the supplement do not receive higher ratings than their competitors per se, given their star category.

Figure 24: TrustScores for Hotels with or without Supplement “Superior”

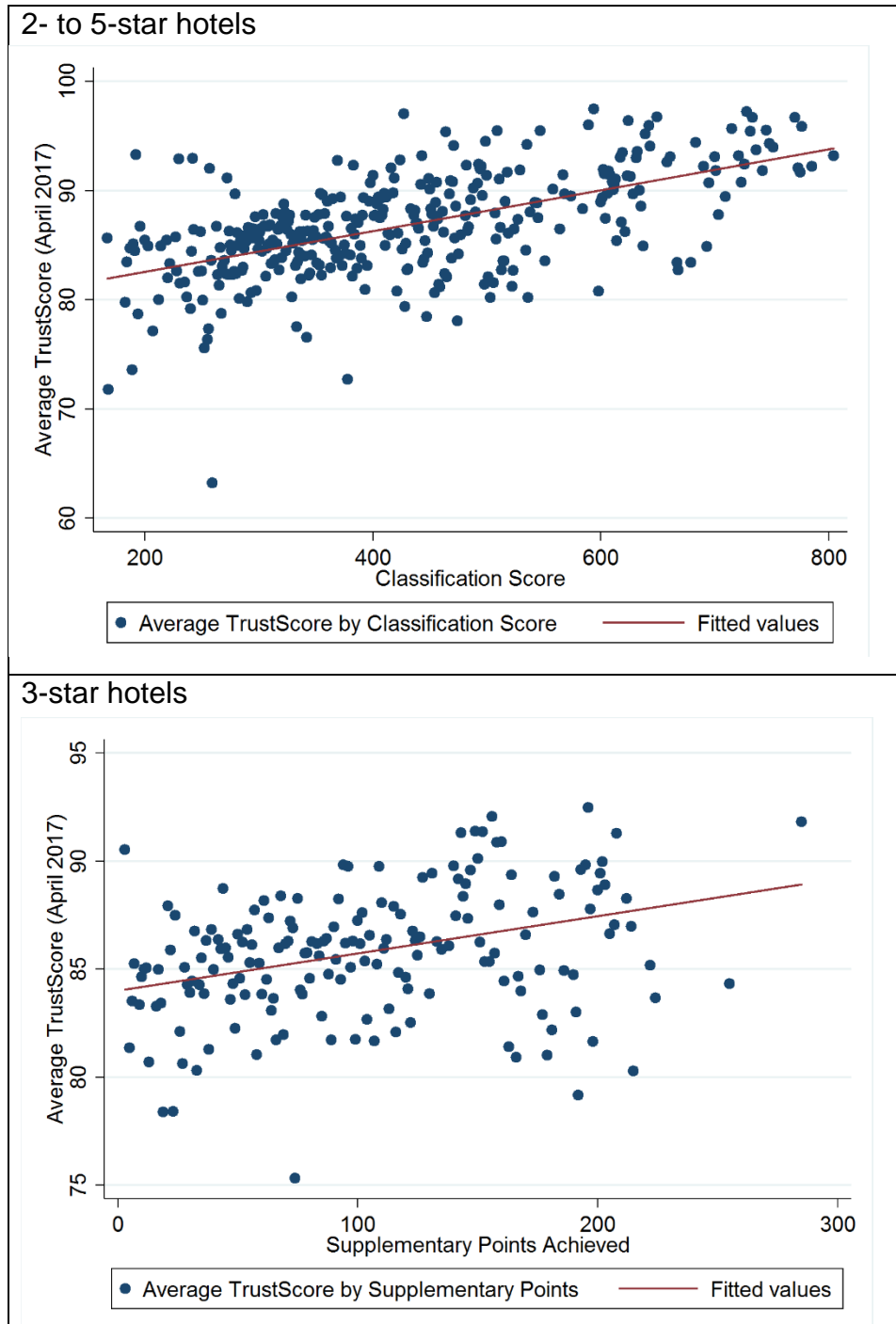


Note: length of the whiskers corresponds to the lowest and the highest TrustScore value that is still within 1.5 interquartile ranges of the lower and upper quartile respectively; only observations whose guest rating is based on at least 50 online reviews are included; N=849, where 2 stars=73, 3 stars=514, 4 stars=222, 5 stars=40; Source: Own figure, Data: hotelleriesuisse (2017c), TrustYou (2017b)

For 3- to 5-star hotels, superior hotels are rated marginally higher by guests when looking at the median, while this seems not to be the case for 2-star hotels. It is thus not a priori clear, whether superior hotels are perceived as providing higher quality.

Finally, the relationship of the achieved classification score, or the total number of points from fulfilling criteria, with guest ratings is of interest. The plots for 2- to 5-star hotels and for the largest group of 3-star hotels suggest that in tendency, hotels that achieve a higher classification score and can thus be considered providing higher product-based quality, also tend to get moderately higher guest ratings on average (see Figure 25). The relationship is weaker and potentially driven by an outlier when looking at the 3-star hotels separately, which is probably also the case because objective quality differences are smaller within a segment.

Figure 25: Correlation between Classification Scores and TrustScores



*Note:* Only observations whose guest rating is based on at least 50 online reviews are included; N=849, where 3 stars=514; *Source:* Own figure, *Data:* hotelleriesuisse (2017c), TrustYou (2017b)

In sum, the graphical analysis suggests that there seems to be some moderate empirical relationship between outcomes of objective hotel classification and subjective guest ratings. In tendency, higher product-based quality points towards higher user-based-quality. It is, however, to be investigated by means of the regression models whether the relationships are robust to the inclusion of control variables and prove to be systematic.

### 7.1.2 Regression Results

The linear regression analysis for the samples of 2- to 5-star hotels and for 3- and 4-star hotels separately support most of the conclusions that the graphical analysis on classification outcomes has generated. The observed relationships are thus robust to the inclusion of potentially relevant hotel-level and locational characteristics.

In general, objective classification outcomes are only able to explain subjective guest ratings to a limited degree. This conclusion can be drawn from the adjusted R-squared of the model variant including solely the classification outcomes as predictors in column (1) of Table 7, which amounts to 17.3% of explained variance. The *star category* dummies as the main classification outcome are all highly significantly related to guest ratings for the overall sample of 2- to 5-star hotels. 2-star hotels on average perform worse and 4- and 5-star hotels better in terms of guest ratings than 3-star hotels, also when controlling for hotel-level and locational characteristics. The positive coefficient is highest for the 5-star dummy in absolute terms. From this result, one might tentatively conclude that overall, the positive quality effect dominates the negative expectational effect of a higher number of stars on guest satisfaction. In this model specification, the star category dummies actually measure these two countervailing effects simultaneously, although part of the expectational effect might also be captured by the variable for room rates. For the full sample, ratings of *superior hotels*, *ceteris paribus*, are also significantly higher on average, where the positive effect is significant at conventional levels. Furthermore, achieving *supplementary points* in the audit by fulfilling additional elective criteria also results in a significant increase in guest ratings. Concretely, achieving ten more points in the classification audit, *ceteris paribus*, increases TrustScores by around 0.1 points on average. This is not a huge, but still notable effect when taking the limited variance of the observed TrustScores into account (see Tussyadiah & Zach 2017).

The discussed effects decrease in absolute size, but remain stable and significant when the Booking.com ratings on staff and location are included as controls in column (3) and when analytical weights based on the number of reviews per hotel room are introduced in column (4) of Table 7. The fact that the goodness of fit is clearly highest for the models that include these Booking.com rating variables, as suggested by the adjusted R-squared and Akaike as well as Bayesian information criteria, should be ignored, because the two variables are related to the TrustScores by construction. The finding that the beta coefficients for the staff rating are higher than for the location rating

in both model variants is, however, of some interest. Having a well-performing staff seems to have an especially positive effect on guest ratings and might thus bear high differentiation potential for hotels.

Table 7: Effect of Classification Outcomes on TrustScores for 2- to 5-Star Hotels

Linear Regression (OLS) Dep. Var.: TrustScores 2017	(1) No controls	(2) Objective controls	(3) Full, unweighted	(4) Full, weighted
Classification = 2 stars	-3.507*** (0.693)	-3.297*** (0.639)	-0.925*** (0.296)	-1.075*** (0.268)
Classification = 4 stars	1.804*** (0.430)	2.430*** (0.417)	1.592*** (0.233)	1.398*** (0.265)
Classification = 5 stars	6.358*** (0.659)	7.920*** (0.824)	3.590*** (0.487)	3.132*** (0.539)
Superior hotel = 1, yes	2.166*** (0.555)	1.374*** (0.511)	0.776*** (0.270)	0.597* (0.308)
Supplementary points (classification)	0.011** (0.004)	0.024*** (0.004)	0.014*** (0.002)	0.013*** (0.002)
Minimum double room rate		0.004* (0.002)	-0.003** (0.001)	-0.001 (0.002)
Number of rooms		-0.028*** (0.005)	0.003 (0.003)	0.002 (0.003)
International hotel chain affiliation		-2.260*** (0.592)	-0.145 (0.352)	-0.262 (0.360)
Location in urban area		-3.634*** (0.384)	-1.214*** (0.210)	-1.065*** (0.239)
Touristic relevance (% of hotel beds)		0.235** (0.113)	-0.041 (0.070)	-0.0425 (0.069)
No. of reviews (TrustYou) per room		0.120*** (0.026)	0.067*** (0.015)	
Staff score Booking.com			7.665*** (0.232)	7.763*** (0.256)
Location score Booking.com			1.727*** (0.208)	1.461*** (0.261)
Constant	84.13*** (0.421)	83.47*** (0.577)	0.731 (2.459)	3.020 (2.588)
Observations	848	848	848	950
Analytical Weights	No	No	No	Yes
Adjusted R-squared	0.173	0.363	0.831	0.832
AIC	5238.206	5022.603	3897.521	4365.084
BIC	5266.663	5079.518	3963.921	4428.218

Note: The dependent variable is the TrustScore of the hotels as of April 2017. Robust standard errors are shown in brackets. Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Source: Own computations with STATA 14, Data: Own dataset based on Booking.com (2017); FSO (2017a, c, d); hotelleriesuisse (2017a, c); TrustYou (2017b)

Guests probably have no clear expectations regarding staff service quality *ex ante*, which may make it easier for hotels to overperform. This is in line with the observation that the mean rating for staff in the full sample is highest compared to the other rated aspects. Locational attractiveness, on the other hand, is a non-business component of the hotel offer which cannot be influenced by the management. It might thus not be linked strongly to the perceived quality of the other hotel service elements and thus impact overall ratings less notably.

In terms of the other controls, hotels located in an urban area, other things equal, have significantly lower guest ratings on average in all models. This highly significant effect might eventually stem from a higher share of business guests in these municipalities, which tend to rate hotels more critically, or from less incentives to overperform due to a more stable level of demand in cities (see Bulchand-Gidumal et al. 2011). Similar to previous studies (see Melián-González et al. 2013), the number of reviews on which the guest ratings are based, here corrected for hotel size, has a positive effect on the TrustScores and is significant at the 1%-level in all models that include it. No robust effects in terms of statistical significance are found for the number of rooms, the minimum double room rate, international chain affiliation and touristic relevance of the municipality in which the hotel is located.<sup>16</sup> The room rates, in tendency, affect the TrustScores negatively when all controls are included, but the effect fails to get statistically significant in the model with analytical weights. This might be because guests try to provide an objective feedback and abstract from room rates when rating hotel quality or they only consider the aspect when assessing the price-performance ratio. Other explanations for the absence of a relevant price effect could be that the hotel stars are key in driving expectations (see Zeithaml 1988) or that the listed price is not an adequate measure of the room rates guests have actually paid.

The second analytical step involves running separate regressions for 3- and 4-star hotels (see Table 8). This allows looking at ratings coming from the same clientele with comparable expectations regarding service provision. It also allows testing whether the overall results are driven by one of the smaller segments, e.g. the 5-star hotels. The

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<sup>16</sup> The number of rooms and chain affiliation might work as proxies for the hospitality of the staff or tailor-made service, which tends to be higher in small and individually managed hotels. At the same time, touristic relevance is potentially a proxy for locational attractiveness. This would explain why these controls lose their statistically significant negative effect when directly controlling for the perceived satisfaction regarding the hotel staff or location by means of the Booking.com ratings. Furthermore, the group of chain-affiliated hotels is small, which may make it difficult to observe significant effects.

effect of the *supplementary points achieved* in the classification audit is still significant and positive at least at the 5%-level in all except for the 4-star model variant with analytical weights. The effect size is also comparable with the one found for the overall model of 2- to 5-star hotels. This is, however, no longer true for the effect of holding the *supplement "superior"*. Superior hotels, *ceteris paribus*, only have significantly higher TrustScores in the weighted model for 4-star hotels in column (4) of Table 8, in which hotels with more reviews get a higher weight.

Table 8: Effect of Classification Outcomes on TrustScores for 3- vs. 4-Star Hotels

Linear Regression (OLS) Dep. Var.: TrustScores 2017	(1) 3 stars unweighted	(2) 3 stars weighted	(3) 4 stars, unweighted	(4) 4 stars, weighted
Superior hotel = 1, yes	0.486 (0.377)	0.050 (0.425)	0.997 (0.628)	1.438* (0.759)
Supplementary points (classification)	0.019*** (0.003)	0.020*** (0.004)	0.010** (0.005)	0.003 (0.005)
Minimum double room rate	-0.0045 (0.003)	-0.003 (0.004)	-0.003 (0.003)	0.000 (0.002)
Number of rooms	-0.004 (0.005)	-0.007 (0.007)	0.007 (0.006)	0.010* (0.006)
International hotel chain affiliation	-1.116* (0.584)	-1.117* (0.670)	-0.125 (0.563)	-0.233 (0.515)
Location in urban area	-1.263*** (0.285)	-0.925*** (0.333)	-1.483*** (0.395)	-1.991*** (0.484)
Touristic relevance (% of hotel beds)	-0.052 (0.111)	0.031 (0.100)	0.020 (0.119)	-0.082 (0.130)
No. of reviews (TrustYou) per room	0.081*** (0.020)		0.063** (0.031)	
Staff score Booking.com	7.748*** (0.274)	7.874*** (0.351)	7.460*** (0.689)	7.671*** (0.599)
Location score Booking.com	1.527*** (0.273)	1.392*** (0.363)	2.311*** (0.415)	1.923*** (0.427)
Constant	1.885 (2.604)	2.690 (3.497)	-0.716 (7.864)	1.669 (6.127)
Observations	513	584	222	237
Analytical Weights	No	Yes	No	Yes
Adjusted R-squared	0.806	0.786	0.801	0.813

Note: The dependent variable is the TrustScore of the hotels as of April 2017. Robust standard errors are shown in brackets. Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Source: Own computations with STATA 14, Data: Own dataset based on Booking.com (2017); FSO (2017a, c, d); hotelleriesuisse (2017a, c); TrustYou (2017b)

The absence of this effect might indicate that superior hotels, especially in the 3-star category, are not perceived as offering a considerably higher quality product than those

without this attribute. Put differently, these hotels might not be able to overfulfil the potentially higher guest expectations. It is, however, to be noted that the effect gets statistically significant when the Booking.com ratings on staff and location are not included as controls. This is in line with the fact that hotels holding the supplement superior have to fulfil additional criteria that are linked to functional quality components. These are namely the application of a quality management system for all categories up to 3 stars and quality controls through mystery guesting as an additional criterion for 4-star hotels. It could be tentatively concluded that at most for 4-star hotels is the impact of fulfilling the superior requirements on service quality high enough to be perceived by guests. Concerning the control variables, the conclusions are broadly the same as in the overall model for 2- to 5-star hotels. As one exemption, there is a statistically significant negative effect of holding an international chain affiliation on TrustScores for 3-star hotels. As one potential argument, this might eventually point towards some negative guest perceptions stemming from standardization of the hotel product in this segment. The effect should, however, be interpreted with some caution, as only 15 of the 3-star hotels in the sample belong to a chain as defined for the analysis. Furthermore, the effect for the variable measuring hotel size is positive and statistically significant for the 4-star segment in the model variant with analytical weights in column (4) of Table 8. It potentially captures a higher degree of professionalism in service delivery for larger hotels of the luxury segment. In tendency, in the regressions with smaller sample sizes, analytical weighting seems to have more of an effect on standard errors, which leads to some conclusions on observed effects which are not in line with the ones drawn from the unweighted models. The fact that the effects are less robust when using smaller samples might point towards some concern of potentially overfitted regression models (see Babyak 2004). It is, however, not necessarily the case, that the weighted model variant is superior methodologically.

#### **7.1.2.1 Robustness Checks**

For the sample of 2- to 5-star hotels, additional robustness checks have been carried out. The effects of interest do not seem to be driven by outliers. Merely for the superior dummy does the significance level for the effect increase from the 1% to the 10%- level when excluding potential outliers with a Cook's distance above  $4/N$ . Furthermore, a model variant with the overall Booking.com rating scores as the dependent variable has been computed. The conclusions regarding the effects of interest remain the



same.<sup>17</sup> Finally, the Booking.com ratings for facilities, which is the rated hotel quality component that is most directly related to the classification criteria, have been included as the dependent variable. This additional model variant reveals that the positive effects observed for the classification outcomes are even higher in absolute terms when looking at the ratings for hotel facilities instead of overall perceived hotel quality. This can be interpreted as further evidence that the observed positive relationship between classification outcomes and guest ratings really stems from the criteria behind the stars and not from “artificial” phenomena, such as for example systematically different rating behaviour of guests or higher efforts in online activities carried out by hotels with more stars. Such “artificial” effects would likely not map into different conclusions regarding the effects of interest, depending on which aspect of hotel quality is rated by guests.

## **7.2 Effect of Objective Quality Components on Guest Ratings**

Based on the empirical results of the previous chapter, it is of interest to find out which quality components as covered by the set of classification criteria contribute to the observed positive effect of aggregate classification outcomes on guest ratings. For the estimation of the second model, the unweighted variant is considered the preferred specification, as analytical weighting has not led to different conclusions regarding the effects of interest in the first model. Although introducing analytical weights allows including more observations, this weighting scheme could also lead to a bias from weighting some of the observations disproportionately high. It is not per se true that the credibility of ratings increases monotonically with the number of underlying reviews.

Furthermore, it is of interest to compare the resulting index scores per component across star categories. This reveals that the degree of criteria fulfilment in terms of room and bathroom arrangement, housekeeping and laundry services, room service as well as general hotel appearance and facilities is most strongly related to the star categories. For these indices, independent of the weighting scheme, a higher number of stars goes hand in hand with higher index scores. The average share of 4-star hotels whose score lies in the lowest quintile of the index is approximately zero for these quality indices, where only a low share of 3-star hotels reaches the relatively highest scores (see Table 10). The provision of event, recreational or entertainment as well as parking and transfer facilities or services, is less related to the star category, not least

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<sup>17</sup> The beta coefficients are lower, due to the different scales of Booking.com ratings and TrustScores.

because the indices are constructed mostly out of elective criteria. This is visible in the considerable average share of 4-star hotels that only achieve an index score that lies in the lowest quintile. A 4-star hotel does not necessarily provide more extensive recreational or entertainment facilities than a 3-star hotel, which is probably somehow astonishing.

### **7.2.1 Regression Results**

The regression model for 2-to 5-star hotels reveals at first that the different index variants mostly lead to similar conclusions regarding relevant quality components for guest satisfaction (see Table 11). For these between-star comparisons, the index weighting scheme does not seem to be the driving factor behind the effects. Rather than the exact combination of fulfilled criteria per component, it is in the first place the relative number of criteria fulfilled by a hotel that drives the results. This makes intuitive sense, as when comparing hotels across categories, differences in quality indices are more strongly linked to the overall degree of criteria fulfilment. This statement applies to a lesser degree to the separate regressions for 3- and 4-star hotels (see Table 12).

#### **7.2.1.1 Overall Sample for 2- to 5-Star Hotels**

An important first finding from the estimation of Model 2 is that the star effect on guest ratings tends to get significantly negative in all full model variants. Controlling for objective quality differences behind the categories by means of the constructed indices thus seems to reverse the effect which has been observed in Model 1 on aggregate classification outcomes. Including these indices as a measurement of the provided level of product-based quality somehow helps to disentangle the expectational and the quality effect linked to the stars. Given objective performance in different quality components and other controls, higher star categories tend to be rated less positively than the 3-star reference group, while 2-star hotels, *ceteris paribus*, achieve higher average TrustScores. This is in line with the argumentation that due to higher expectations, guests of the luxury segment are more difficult to please.

Table 9: Effect of Objective Quality Components on TrustScores (2- to 5-Star)

Linear Regression (OLS) Dep. Var: TrustScores 2017	(1) pPCA <i>obj. controls</i>	(2) pPCA <i>no weights</i>	(3) pPCA <i>weights</i>	(4) Points <i>no weights</i>	(5) Sum <i>no weights</i>
Classification = 2 stars	-0.243 (0.738)	0.773** (0.370)	0.719** (0.340)	0.780** (0.349)	0.848** (0.366)
Classification = 4 stars	-1.451** (0.650)	-1.109*** (0.338)	-1.056*** (0.386)	-0.969*** (0.335)	-1.088*** (0.335)
Classification = 5 stars	-2.139* (1.189)	-1.895*** (0.645)	-1.820** (0.791)	-1.567** (0.630)	-1.744*** (0.611)
General Hotel Appearance	-0.467* (0.262)	-0.0683 (0.132)	-0.229 (0.149)	-0.124 (0.116)	-0.040 (0.125)
Room Arrangement	0.488 (0.437)	<b>0.632***</b> (0.229)	<b>0.696***</b> (0.238)	<b>0.565***</b> (0.191)	<b>0.775***</b> (0.215)
Bathroom Arrangement	<b>1.242***</b> (0.339)	<b>0.646***</b> (0.179)	<b>0.595***</b> (0.221)	<b>0.752***</b> (0.152)	<b>0.598***</b> (0.179)
Sleeping Comfort	<b>1.069***</b> (0.265)	<b>0.417***</b> (0.137)	<b>0.751***</b> (0.164)	<b>0.453***</b> (0.126)	<b>0.268**</b> (0.135)
Reception Services	0.822*** (0.272)	-0.135 (0.158)	-0.0774 (0.206)	-0.237* (0.138)	-0.179 (0.159)
Electronics & Connectivity	0.652** (0.263)	0.287* (0.148)	0.076 (0.188)	0.325** (0.144)	0.266* (0.144)
Parking & Transfer Services	0.030 (0.225)	0.251** (0.118)	0.174 (0.131)	0.166 (0.114)	0.246** (0.117)
Compl. Conveniences	0.829*** (0.239)	0.214* (0.126)	0.149 (0.140)	0.261** (0.107)	0.262** (0.124)
Quality Mgmt. & Online Act.	<b>0.950***</b> (0.217)	<b>0.318***</b> (0.116)	<b>0.288**</b> (0.141)	<b>0.259**</b> (0.108)	<b>0.295**</b> (0.116)
F&B Services or Facilities	0.287 (0.229)	0.335*** (0.130)	0.219 (0.136)	0.418*** (0.138)	0.356*** (0.130)
Room Service	<b>-1.503***</b> (0.322)	<b>-0.412***</b> (0.156)	<b>-0.485***</b> (0.165)	<b>-0.322**</b> (0.148)	<b>-0.421***</b> (0.145)
Housekeeping & Laundry	-0.254 (0.308)	-0.0831 (0.170)	-0.0915 (0.189)	-0.159 (0.155)	-0.038 (0.167)
Event Fac. & Serv. (MICE)	-0.170 (0.184)	0.046 (0.103)	0.126 (0.119)	0.00571 (0.105)	0.030 (0.103)
Recreational & Entmt. Fac.	<b>0.394*</b> (0.214)	<b>0.239**</b> (0.116)	<b>0.242*</b> (0.141)	<b>0.196*</b> (0.110)	<b>0.264**</b> (0.115)
Constant	86.390*** (0.576)	4.100 (2.539)	6.044** (2.670)	3.494 (2.535)	3.874 (2.514)
Observations	849	849	951	849	849
Adjusted R-squared	0.425	0.839	0.840	0.839	0.840
Staff and Location Ratings	No	Yes	Yes	Yes	Yes
Analytical Weights	No	No	Yes	No	No

Note: Quality indices are z-standardized; included controls: minimum double room rate, number of rooms, international hotel chain affiliation, location in an urban area, touristic relevance of the municipality, online reviews per room, Booking.com location and staff ratings (in some model variants); Significance level: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; Source: Own computations with STATA 14, Data: Own dataset based on Booking.com (2017); FSO (2017a, c, d); hotelleriesuisse (2017a, c); TrustYou (2017b)

The overall conclusions regarding the control variables are the same as for Model 1. They are therefore not reported in the regression tables for ease of orientation. Most quality indices have the expected positive sign, but not all of them are significant at conventional levels (see Table 11). The evidence is most convincing for the indices that deal with to the core product of a hotel, as they are significantly positively related to the TrustScore at least at the 5%-level in all model variants containing the full set of controls. These obviously relevant quality indices are *Room Arrangement and Equipment*, with criteria such as room size or seating accommodations, *Bathroom Arrangement and Equipment* measuring the sanitary comfort, and *Sleeping Comfort* including criteria on bed size or bed system quality. Hotels that fulfil more of the classification criteria in these service areas thus, other things equal, tend to achieve higher guest satisfaction on average. The criteria underlying these quality indices, at least overall, seem to reflect quality differences that are relevant for guests. Similarly, hotels performing better in *Quality Management and Online Activities*, ceteris paribus, have significantly higher TrustScores on average. This quality component is not tied to a specific service area and measured through criteria such as the application of a quality management system or quality controls via mystery guesting, which seem to be relevant overall. Furthermore, hotels achieving higher index scores invest into their online activities and deal more actively with reviews, which obviously tends to pay off in the form of better ratings. As a last robust and significant effect at the 10%-level in all models, providing extensive *Recreational and Entertainment Facilities or Services* tends to be valued by guests.

For the other indices, the empirical evidence is less convincing, as the statistical significance of the effects varies based on the index and model variants. Hotels fulfilling more criteria in terms of *Complementary Conveniences and Information*, such as delivering the daily newspapers to the room or providing a charging station for electric vehicles, ceteris paribus, are rated higher in all models except for the one with analytical weights in column (3) of Table 11. The same is true for the index on *F&B Services or Facilities*, given that Booking.com staff ratings are included as controls. Furthermore, the extensive provision of services and facilities related to *Electronics and Connectivity*, as defined by the classification, tends to please today's guests. The effect of the *Parking & Transfer Services* quality index is less stable. The variant using the official classification points as weights leads to a positive effect that is not significant at conventional levels, as compared to the other two index variants. A potentially

relevant insight to explain this contradictory result is that the official classification assigns a comparably high number of points to the provision of a valet parking service, an attribute which pPCA weights less positively. The pPCA variant itself places a higher weight on shuttle services, which might be of use for comparably more guests.

Astonishingly extensive *Room Service* seems to be negatively related to guest satisfaction on average. The effect is negative and statistically significant at the 1%-level in all models. The clientele of 2- and 3-star hotels, which make up the largest hotel groups in the sample, might perceive room service as something that is too posh and inflates prices unnecessarily.<sup>18</sup>

Quality indices whose effects never reach statistical significance at conventional levels in any of the full models are *Event Facilities & Services*, *Housekeeping and Laundry Services* as well as *General Hotel Appearance and Facilities*. Event facilities are very target-group specific and might thus not be relevant for the average guest. Similarly, differences in the fulfilment of criteria related to add-on housekeeping services, such as dry-cleaning or ironing service, probably do not contribute to the level of guest satisfaction because too few of the guests make use of these services. Cleanliness and general housekeeping services, which should be considered relevant based on previous findings, are mandatory for all classified hotels and are thus not reflected in the constructed index. Regarding the index on *General Hotel Appearance and Facilities*, under which heterogenous criteria such as the technical lobby appearance, accessibility for wheelchairs or air conditioning in the public area are subsumed, it might be argued that these tangible criteria are less relevant for today's guests than the ambiance or cosiness of the public area. Furthermore, *Reception Services* as covered by the classification are only positively related to guest ratings when guest ratings for the staff are not included as a control variable. Positive confounding might be at play here, as some of the underlying criteria, e.g. accompanying guests to the room or languages spoken, are related to the staff.<sup>19</sup>

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<sup>18</sup> Including the underlying criteria into the regression as dummy variables reveals that most of them tend to be negatively related to the TrustScore. Depending on included controls, exemptions are providing a beverage offer as well as a coffee machine and water boiler in the room, all quality attributes from which most guests can profit at no cost.

<sup>19</sup> In the model with the index based on the points officially assigned to the criteria, the effect even gets negative. It seems to be primarily the criteria on long reception opening hours and doorman personnel that drive the result. The friendliness of the reception staff might be more important to guests than its efficiency. Fulfilling more of the criteria related to efficiency and availability of the staff may indirectly lead to a more standardized service and a hectic atmosphere that is perceived negatively by guests.

The main findings are supported when interchanging the TrustScores with the overall Booking.com rating scores and ratings for facilities. Furthermore, the discussed effects are not driven by outliers, but remain robust when excluding observations with a Cook's distance above 4/N. The picture even gets clearer, as all indices are either significant in all or none of the models. The only significant effect that is additionally observed when excluding potentially influential observations stems from the index on Reception Services, which gets negative. This might point towards some undesired side-effects on staff service quality triggered by fulfilling a lot of the criteria related to efficiency or long opening hours of the reception.

### 7.2.1.2 Comparing the 3- and 4-Star Segments

Previous literature has shown that the importance that guests attach to different hotel quality components tends to differ based on the segment or star category. The hotel classification takes this fact into account by defining different minimum criteria for all categories. To investigate whether there are differences in the perception of quality components by segments, separate regressions for 3- and 4-star hotels are estimated. For greater clarity of the regression table, only the results for the polychoric PCA index variant and the one based on the points officially assigned to criteria are depicted. As expected, the criteria weighting scheme of the quality indices seems to matter comparably more when performing separate star-level regressions (see Table 12). In general, for the interpretation of the results, it seems meaningful to adopt the understanding of a hierarchy of guest needs. In this sense, quality components that exhibit significantly positive effects on guest ratings for 3-star hotels should be thought of as being relevant for the luxury segment as well. If no significant effect is observed for the 4-star hotels, as compared to the midscale segment, the reason for this might be that minor quality differences no longer affect satisfaction meaningfully due to higher expectations. As a first result, the criteria tied to *room quality* significantly contribute positively to guest satisfaction in the 3-star segment. Minor quality differences based on the fulfilment of elective criteria, however, do not seem to play a role for 4-star hotel guests.<sup>20</sup> This is also the case for the indices on *F&B Facilities or Services* and *Quality Management and Online Activities*, which are only significant in the 3-stars model. For the upscale segment, food quality or high-skilled staff might make the difference.

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<sup>20</sup> When potential outliers based on Cook's distance are excluded, the effect of the index on room quality gets significant in the variant which uses the official classification points as the weighting scheme.

Table 10: Effect of Objective Quality Components on TrustScores (3- vs. 4-Star)

Linear Regression (OLS) Dep. Var.: TrustScores 2017	(1) 3 stars <i>pPCA</i>	(2) 3 stars <i>Points</i>	(3) 4 stars <i>pPCA</i>	(4) 4 stars <i>Points</i>
General Hotel Appearance	0.097 (0.134)	0.022 (0.129)	-0.233 (0.226)	-0.326 (0.205)
Room Arrangement & Equip.	<b>0.497***</b> (0.141)	<b>0.451***</b> (0.133)	-0.138 (0.285)	0.114 (0.283)
Bathroom Arrangement & Equip.	<b>0.328***</b> (0.126)	<b>0.395***</b> (0.116)	<b>0.592**</b> (0.241)	<b>0.628***</b> (0.197)
Sleeping Comfort	0.202 (0.125)	0.306** (0.131)	<b>0.418**</b> (0.197)	<b>0.419**</b> (0.180)
Reception Services	0.076 (0.117)	0.001 (0.100)	-0.294 (0.214)	-0.230 (0.191)
Electronics & Connectivity	0.181 (0.128)	0.267** (0.132)	0.324 (0.215)	0.228 (0.206)
Parking & Transfer Services	0.254** (0.126)	0.120 (0.117)	0.094 (0.216)	0.140 (0.194)
Compl. Conveniences & Information	0.056 (0.118)	0.075 (0.113)	<b>0.396*</b> (0.237)	<b>0.399**</b> (0.191)
Quality Mgmt. & Online Activities	<b>0.309**</b> (0.126)	<b>0.273**</b> (0.119)	0.120 (0.201)	0.085 (0.193)
Food & Beverages Serv. & Fac.	<b>0.376***</b> (0.132)	<b>0.414***</b> (0.134)	0.257 (0.250)	0.267 (0.291)
Room Service	<b>-0.401***</b> (0.107)	<b>-0.343***</b> (0.106)	0.0311 (0.201)	0.056 (0.197)
Housekeeping & Laundry Services	0.082 (0.119)	0.055 (0.113)	-0.123 (0.250)	-0.341 (0.208)
Event Facilities & Services (MICE)	-0.200* (0.116)	-0.186 (0.115)	<b>0.458**</b> (0.210)	<b>0.392*</b> (0.223)
Recreational & Entmt. Fac. or Services	0.236** (0.110)	0.124 (0.115)	0.109 (0.241)	0.196 (0.228)
Constant	6.274** (2.729)	5.597** (2.701)	-0.408 (7.723)	-1.808 (8.376)
Observations	514	514	222	222
Analytical Weights	No	No	No	No
Adjusted R-squared	0.823	0.818	0.805	0.809

*Note:* Quality indices are z-standardized; included controls: minimum double room rate, number of rooms, international hotel chain affiliation, location in an urban area, touristic relevance of the municipality, online reviews per room, Booking.com location and staff ratings; Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; *Source:* Own computations with STATA 14, *Data:* Own dataset based on Booking.com (2017); FSO (2017a, c, d); hotelleriesuisse (2017a, c); TrustYou (2017b)

The criteria on objective *bathroom quality* and *sleeping comfort*, on the other hand, tend to reflect relevant quality differences for the midscale as well as the upscale segment. Sanitary facilities and sleeping comfort are both tied to the level of comfort regarding basic needs. The central role of these hotel service aspects might explain why even minor quality differences seem to be perceived and valued by most hotel guests, independent of the segment. Furthermore, the fulfilment of criteria related to add-on services in terms of *Complementary Conveniences and Information* seems to be relevant for 4-star hotel guests only, and might serve as a minor differentiation factor. In terms of further add-on services, extensive and high-quality *event facilities* seem to be appreciated by guests of the upscale segment. Interestingly, the fulfilment of many criteria related to event facilities even exhibits a negative effect for the 3-star segment in one model variant. A possible explanation for this finding might lie in the fact that the midscale segment tends to be more frequented by guests on vacation, including a high share of families, who might not profit or even negatively perceive the provided services or ambiance in hotels with a higher focus on business guests.<sup>21</sup> The 4-star hotel standard, on the other hand, is often chosen for overnight stays in the business context. Guests of 3-star hotels in tendency seem to value the facilities and services that the classification covers in terms of *parking and transfer services* as well as *recreational facilities*<sup>22</sup>, although the effects are only statistically significant at the 5%-level in the pPCA variant. A higher fulfilment of criteria regarding *electronic devices* tend to be valued by 3-star hotel guests<sup>23</sup>, as the positive and significant effect of the index based on the official classification points assigned to the criteria suggests. Lastly, as in the overall model, a high fulfilment of criteria tied to *room service* exhibits a significantly negative effect on guest ratings, but only for the 3-star segment. This is in line with the argument that it might be considered too high-end and unnecessary by midscale guests. The effect is positive, but not significant for the 4-star segment. It might, thus, be tentatively concluded that the relevance of room service for hotel guests, at least in the midscale and economy segments, is questionable. Table 13 summarizes all findings regarding the effects of interest for ease of orientation.

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<sup>21</sup> Including the criteria tied to the event facilities index into the regression as dummy variables reveals that it is mainly large conference rooms and the availability of a business centre that are responsible for the negative effect on TrustScores of 3-star hotels, which would be in line with this argument.

<sup>22</sup> The provision of wellness facilities thereby seems to be most highly appreciated. This becomes evident when analysing the effect of recreational facilities and wellness facilities by means of separate indices. In this specification, only the effect for the wellness facilities remains statistically significant.

<sup>23</sup>The effect, however, also gets significant for 4-star hotels when potential outliers are excluded.



Table 11: Summary of the Empirical Findings

Investigated Predictors (Product-based Quality)		Overall	3-star	4-star
<b>Classification Outcomes</b>	<b>Number of stars</b> (without controlling for quality indices)	+		
	<b>Number of stars</b> (when controlling for quality indices)	-	n.a.	n.a.
	<b>Supplementary points achieved in the audit</b>	+	+	+
	<b>Supplement “superior”</b>			+
<b>Area</b>	<b>Quality Index</b>			
Accommodation	General Hotel Appearance & Facilities			
	Housekeeping & Laundry Services			
	Reception Services			
	Parking & Transfer Services	+	+	
	Room Arrangement & Equipment	+	+	
	Bathroom Arrangement & Equipment	+	+	+
	Sleeping Comfort	+	+	+
	Electronics and Connectivity	+	+	
	Complementary Conveniences & Information	+		+
	F&B	F&B Services or Facilities	+	+
Room Service		-	-	
Add-on services	Event Facilities & Services (MICE)			+
	Recreational & Entertainment Facilities or Services	+	+	
Quality Management	Quality Management & Online Activities	+	+	

*Note:* Effects that are statistically significant at least at the 5%-level in two or more of the four full model variants and can thus be considered robust are reported.

+ indicates a statistically significant positive effect and is coloured in green

- indicates a statistically significant negative effect and is coloured in red

**bold** font and darker fill colour marks effects that are statistically significant in all of the full model variants and can thus be considered especially robust

n.a. (not applicable) refers to effects that could not be estimated per definition

*Source:* Own computations with STATA 14, *Data:* Own dataset based on Booking.com (2017); FSO (2017a, c, d); hotelleriesuisse (2017a, c); TrustYou (2017b)

## **8 Discussion and Conclusion**

This last chapter summarizes and discusses the empirical findings. It critically appraises the thesis and finally derives tentative implications for the hotel industry as well as the hotel classification with the institutions that are responsible for it.

### **8.1 Concluding Remarks and Contribution to the Literature**

Several recent developments have put pressure on classification systems as the traditional quality standard in the hotel industry. Driving factors are for example the increased transparency in the market for hotel accommodation, primarily through the availability of online guest reviews, as well as changing guest needs with a higher focus on experiential aspects of the hotel product. The relevance of rigid hotel classification systems has been questioned and researchers as well as the hotel industry itself have voiced some criticism on the set of criteria behind the hotel stars. Taking this current debate as a starting point, this thesis has made use of the fact that with online guest reviews, a second, user-based indicator for hotel quality exists. This allowed, at least to some extent, investigating the guest orientation of the Swiss hotel classification based on an econometric approach for the case of the *hotelleriesuisse* system. Besides shedding some light on the overall relationships between classification outcomes and guest ratings, the thesis has analysed in how far objective quality components, as covered and specified by the classification, are reflected in subjective quality perceptions of guests. These online guest ratings, thus, have been used as the benchmark against which to assess whether the classification still at least partially targets what guests value.

Based on previous literature, a theoretical impact model that illustrates the potential relationships between the two quality indicators has been developed to answer the first research question. This model stresses that the hotel classification can be seen as a manager or guarantor of intrinsic, mainly technical hotel quality attributes. If the provision of these attributes is perceived as valuable by guests, a hotel's degree of fulfilment in terms of classification criteria should, in theory, be reflected in guest ratings. Besides this quality management effect, the hotel classification also works as a manager of expectations. This potentially leads to a countervailing negative effect of higher star-levels on guest ratings due to rising guest expectations. In methodological terms, this thesis contributes to the research issue by compiling a new dataset on

individual hotel-level classification outcomes and guest ratings, which made it possible to investigate these relationships by means of multivariate regression analyses and at the more disaggregate level of bundled classification criteria. Previous studies have assessed the overall relationship between star categories and guest ratings mainly bivariately (Martin-Fuentes 2016; Hensens 2011, 2015) or have only investigated the relevance of a few classification-related quality attributes through guest surveys or mining of text reviews (see Berezina et al. 2016; Bulchand-Gidumal et al. 2011; Li et al. 2013; Ramanathan & Ramanathan 2011; Shanka & Taylor 2004). This study, to the author's knowledge, is the first one to, as far as possible, comprehensively and specifically assess classification-relevant quality components for guests based on more recent data. Over time, the significance of hotel quality attributes tends to change due to adapting expectations of guests (Gardini 2010), which requires ongoing research on the issue. In more technical terms, the thesis also contributes to the discussion on constructing quality indices out of a large set of single attributes. Besides unweighted summation and weighting through the number of points officially assigned to each classification criterion, it has applied polychoric PCA as a weighting scheme. The application of this, so far rarely used method, resulted in meaningful item weights and an appropriate amount of retained variance, which seems to make it a suitable approach for data reduction in the case of categorical variables.

Overall, the empirical evidence provided by this thesis towards a, *ceteris paribus*, moderate positive effect of fulfilling more classification criteria on guest satisfaction as measured by online guest ratings. The classification outcomes in terms of the star category, supplementary points achieved in the classification audit and to some extent also the supplement "superior" are positively related to guest perceptions of quality. This is in line with the findings of previous studies that assessed the relationship between hotel stars and guest ratings (see Bulchand-Gidumal et al. 2011; Hensens 2011; Martin-Fuentes 2016; O'Connor 2008). The observed effects are moderate, but robust to the inclusion of other potentially relevant hotel and locational characteristics. The positive effect of holding the supplement "superior", however, disappears when looking at the 3-star segment separately. The additional requirements to which these hotels conform, at least as far as the midscale segment is concerned, might thus not be relevant enough to lead to a substantial quality gain for guests. As a further finding, the observed positive star effect gets negative when objective quality differences between categories are explicitly controlled for by means of the constructed indices,

which points towards the expectational effect of hotel stars being at play. Overall, the first part of the empirical analysis suggests that expert-based classification still seems to be somehow related to guest perceptions of quality. On average, the demand-side tends to, at least partially, agree with the quality assessments by experts. There seem to be systematic quality differences between the different categories, which guests perceive as such. They do not seem to produce overinflated expectations, as this would result in lower average guest satisfaction for hotels of the luxury segment.

As a second empirical contribution, the thesis has tried to dig more deeply into the relationship between the criteria underlying the stars and guest ratings. It has tried to assess their guest orientation by means of bundling these criteria into quality indices. The analysis suggests that not all quality components which are covered in the set of classification criteria, and could be investigated, seem to be equally appreciated by guests. Criteria related to very basic guest needs, such as bathroom and room quality as well as sleeping comfort, seem to be of relevance, as the quality indices constructed out of them exhibit significant and positive effects on guest satisfaction. There must be some consensus between guests and classification experts concerning the importance of these quality components. Previous authors have uniformly classified room quality and size as well as sleeping comfort as “must-be” requirements (see Li et al. 2013; Matzler et al. 2006). Similar to previous findings (see Li et al. 2013; Shanka & Taylor 2004), supporting facilities or services in the areas of housekeeping or public spaces and amenities do not seem to influence guest satisfaction systematically. In this empirical application, the same is true for extensive reception services, which have been considered “must-be” by previous authors (see Matzler et al. 2006). This contradicting result could stem from the fact that most other studies have measured reception service quality based on functional, staff-related factors, such as friendliness or efficiency, while the classification criteria cover more technical aspects, such as opening hours or express check-out. A higher degree of fulfilment regarding the criteria related to add-on services such as electronic devices, complementary conveniences, parking and transfer services as well as recreational facilities and entertainment is at least in tendency reflected in higher average guest ratings. For the provision of recreational, entertainment and sports facilities, usually no effects on guest-related outcomes have been found by previous studies (Marić et al. 2016; Zhou et al. 2014). An explanation for the differing result of this study might lie in the chosen methodological approach, where these factors potentially work as proxies for the

positioning or guest mix of hotels. Finally, F&B facilities and services, measured through the presence of restaurants and bars as well as the type of breakfast, turned out to be relevant for guests, which is in line with previous findings (see Matzler et al. 2006, Poon & Lock-Teng Low 2004). Extensive room service, however, does not seem to contribute positively to guest satisfaction. This study, in contrast to others that have found no effect of room service or the availability of a minibar (see Bulchand-Gidumal et al. 2011; Shanka & Taylor 2004), suggests that its extensive provision might be even detrimental to a hotel's guest rating, at least when looking at the economy and midscale segment. This is potentially the most astonishing finding of the analysis. The separate regressions for the 3- and 4-star segment indicate a tendency towards a hierarchy of guest needs, which seems to start with aspects related to room quality, as already postulated by Zhang et al. (2011). In general, the differentiation potential in terms of technical quality aspects obviously gets lower with every additional star. High objective quality with regard to sleeping comfort, bathroom quality as well as complementary conveniences, however, still seems to be actively valued by guests of 4-star hotels. In sum, the analysis suggests that criteria tied to the core service areas of a hotel tend to be reflected in ratings, whereas the evidence regarding the relevance of add-on services, as covered by the classification, is somehow less convincing.

## **8.2 Limitations of the Study**

Despite the new potentials that the compiled dataset has offered, the econometric analysis has some limitations that should be discussed. The first and probably most important drawback of the study is that TrustScores and Booking.com guest ratings might not fully adequately reflect guest satisfaction or user-based-quality. The anonymity of the internet and limited control mechanisms bear considerable fraud potential for online reviews (Bulchand-Gidumal et al. 2011; O'Connor 2008; Xiang et al. 2017). Although only hotels whose ratings are based on an adequate number of reviews have been considered for the analysis, the truthfulness of these ratings cannot be guaranteed. Besides authenticity concerns, the available reviews only stem from travellers that are willing to share their experiences and recommendations with others, which leads to a self-selection bias. The motivation to write a review tends to be higher for guests with extreme opinions, or in other words, with high levels of satisfaction or dissatisfaction (Melián-González et al. 2013; Öğüt & Onur Taş 2012; Stringam et al. 2010). Interestingly, a bias towards positive ratings can on average be observed (Melián-González et al. 2013; Stringam et al. 2010). Although dissatisfied guests

should actually have higher incentives to voice their negative experiences, they seem to be less prone to submit text reviews and ratings online. This is a limiting factor for the analysis, as most classification criteria are considered being avoiders of dissatisfaction rather than attractors. Given that opinions of dissatisfied guests are reflected in the data only to a limited degree, the true relationships between the covered quality components and guest satisfaction might not be fully observable or attenuated. Furthermore, the fact that reviewer characteristics affect guest ratings (Liang et al. 2017; Stringam et al. 2010) can have a distorting impact on the findings through omitted variable bias, despite the inclusion of various controls. Differences in guest ratings between hotels might thus not stem from discrepancies in their product-based level of quality, but they are potentially rooted in the guest mix of these hotels or the target group of the review sites. Consequently, especially the observed effects for the quality indices on recreational and event facilities might actually not stem from the classification criteria behind them, but from these variables working as a proxy for the guest mix. This would be in line with the negative effect of providing extensive event facilities that has been observed in one model, as it has been shown that business guests tend to rate hotels more critically on average (see Bulchand-Gidumal et al. 2011). Controlling for reviewer characteristics in regression analyses concerned with guest ratings is in general difficult, because information on who submits the reviews is very limited and provided only on a voluntary basis on most review websites and OTAs. At least for the TrustScores, a further limitation is the lack of transparency regarding which sub-criteria guests have rated on each considered website to evaluate their hotel stay (see Núñez-Serrano et al. 2014). The choice of evaluation criteria which underlie the ratings can, however, affect the empirical relationships that are observed between the quality indices and these ratings.<sup>24</sup> Guest ratings specifically for the hotel quality components that are targeted by classification criteria would probably be preferable, to more directly pin down their relevance as determinants of perceived quality. In sum, the measure against which the guest orientation of the hotel classification has been assessed is, thus, not flawless. It is, however, difficult to get more accurate data on guest satisfaction than the one stemming from online reviews.

A further methodological limitation of the study is related to the high number of predictors combined with limited sample sizes, overall and especially for some

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<sup>24</sup> As an example, the Booking.com overall score does not include a sub-criterion on F&B that guests have to rate. This results in no effect of the objective quality index regarding F&B on guest satisfaction, contrary to the models that use the TrustScore as the measure of user-based quality.

individual star categories. Especially comparing the 3- and 4-star segments in terms of relevant quality components is thus afflicted with the methodological concern of potentially overfitted regression models. The sample of 4-star hotels is in tendency too small for the number of included predictors. A known rule of thumb, based on simulation studies, states that 10 to 15 observations should be available per estimated coefficient (Babyak 2004). This is only approximately met in this case, which might result in limited statistical power of the tests. The problem should not, however, be of greatest concern, as significant effects have been found. Given that the number of classified Swiss hotels is small for some star categories even in the population, a way to get significantly larger samples would be to generate primary data by means of guest surveys or experiments. These methods, however, have other drawbacks, such as strategic response behaviour or limited generalizability.

The analysis also has some limitations in terms of explanatory power and scope. The chosen methodological approach based on secondary data as well as the bundling of classification criteria into quality indices made it impossible to analyse the relevance of individual classification criteria for guests. This would have been of practical importance. Methodologically, the interpretation of effects stemming from “artificial” indices that are constructed out of various, potentially heterogenous items, is unfortunately always afflicted with some uncertainties, as it is unclear which of the underlying variables drive the results. Furthermore, the relevance of mandatory minimum criteria that the classification system specifies for each star category could not be assessed, as they do per definition not exhibit variation between hotels. This is, of course, a relevant limitation, as these mandatory requirements are a central element of hotel classification and amount to the criteria whose relevance is most intensely discussed and questioned in practice. In sum, the limitations of the study point towards the conclusion that the observed effects should be interpreted with some caution. The analysis is a first attempt to more comprehensively assess the guest orientation of the hotel classification system based on secondary data.

### **8.3 Further Research**

The limitations and focus of the present study leave some potential for further research. The newly compiled dataset actually still bears the possibility to analyse the effects of a subset of individual classification criteria on guest ratings, which might be of interest. A potential data reduction technique could thereby lie in the “Lasso” method (Tibshirani 1996), which suggests an econometric solution to the choice of relevant variables out

of a large set. At the time of writing this thesis, no STATA package for the most recent Lasso approach has been introduced so far, which made the bundling of criteria into quality indices the most feasible methodological approach. Furthermore, it might be of interest to investigate potential asymmetric effects of objective quality components on satisfaction based on the Kano model (see Kano et al. 1984). In this analysis, the model specification has imposed linear effects of the quality indices on guest ratings. Besides this, a similar analysis could be carried out specifically for the hostel segment by making use of the available data on the heterogeneous group of Swiss Lodges. This might also be relevant to gain insight into potential flaws in the design of the classification, as this segment tends to unify critics of the current system, e.g. hotels who do not wish to hold a star category. Given more observations per segment, further within-star analyses could also be carried out to get a more comprehensive picture on which quality components are relevant for guests of the different star categories. Additionally, the variation of the ratings for a specific hotel, or in other words the consensus of reviewers regarding hotel quality at a specific point in time, could be investigated as a further variable of interest (see Stringam & Gerdes 2010; Xie et al. 2014). Finding innovative ways to correct for the potential bias of ratings tied to reviewer characteristics and self-selection would contribute to the literature dealing with guest review data. Lastly, given the necessary data, analysing the effect of getting classified on a hotel's level of user-based quality or other guest-related outcomes would be an interesting, but methodologically challenging research topic.

## **8.4 Practical Implications**

In this chapter, tentative implications for the hotel industry and especially for the institutions that design the classification system are derived from the empirical findings.

### **8.4.1 For the Hotel Industry**

For hotel managers, the observed positive relationships between classification outcomes and guest ratings, given the star category, are of interest. They suggest that it might still be meaningful to perform well in terms of fulfilling classification criteria, as this tends to affect guest perceptions of quality. A further important, but intuitive implication is that hotels should rather stay with one star less than getting awarded a higher star category based on achieving just the minimum classification score. This conclusion can be drawn from the negative star effect that is observed when controlling for the objective level of quality. In terms of relevant quality components, or in other



words, assessment areas where it seems to be worthwhile to fulfil elective classification criteria, the following implications might be derived:

- For all hotel segments, offering high quality in the core service areas, namely room and bathroom quality, sleeping comfort and F&B facilities or services, seems to be important. This also applies, to some extent, to supporting services, such as parking and transfer services or the provision of electronic devices.
- Hotels in the economy and midscale segment can, in tendency, differentiate themselves from competitors even in term of their core product, especially when offering high room quality.
- For 4-star hotels, there seems to be some remaining potential to perform better than their competitors in terms of sleeping comfort and bathroom quality.
- Investing into quality management and online activities is relevant for hotels of all star categories, as it significantly affects guest satisfaction.
- Offering extensive recreational and entertainment facilities, based on the needs and desires of a hotel's target groups, tends to increase the average level of guest satisfaction, given the quality in the other service areas. It additionally contributes to the positioning of the hotels.
- For 3-star hotels and lower categories, investing into quality components that are typical for the luxury segment, such as room service or extensive reception services (e.g. concierges or page boys as additional personnel), does not seem to enhance guest satisfaction significantly. It might even occur that guests perceive these services as being too posh for the economy or midscale segment or as unnecessarily inflating the room rates.

#### **8.4.2 For the Hotel Classification and its Institutions**

Overall, the fact that an empirical relationship between the two quality indicators has been found implies that it is probably inadequate to argue that the classification is in contrast to guest perceptions of hotel quality. The low variation of guest ratings with their high subjective component and the overall relatively weak relationship with objective, product-based quality assessments might also be taken as some evidence against the argument that guest reviews challenge the relevance of the traditional classification. Objective quality differences as well as other relevant hotel characteristics actually explain guest ratings only to a limited degree. Reversing the line of argument might lead to the conclusion, that these ratings are potentially biased as well and should not be seen as a flawless indicator of hotel quality.

The finding that fulfilling more elective classification criteria, *ceteris paribus*, leads to higher guest ratings in all model specifications suggests, that within star categories, there are still relevant quality differences that are perceived as such by guests. Hotel classification institutions might thus consider publicly communicating these differences to guests. This could be done by adding the achieved classification score to the star category, e.g. in terms of a degree of fulfilment or a relative grading of the achieved points on a category-specific scale. It would, however, be important to test whether guests would value such an additional grading element of the hotel classification. The partial evidence for the, *ceteris paribus*, higher guest ratings of “superior” hotels, together with the positive effect of fulfilling more elective criteria, implies that overall, it seems to make sense to retain this supplement as a grading element in the classification system. It allows a more detailed segmentation of the market. The evidence on the expectational effect of the hotel stars further implies that it is of utmost importance to ensure that the quality differences between categories, and eventually also between hotels with or without the supplement “superior”, are and remain considerable. If this is not the case, there are limited incentives for hotels to strive for a better classification result, as outperforming guest expectations gets difficult.

The design of the analysis does not make it possible to derive implications regarding the importance of individual criteria, but the quality indices still provide some evidence on where the most relevant classification assessment areas might lie. Overall, it can be argued that criteria related to the core product and very basic guest needs, namely room and bathroom quality as well as sleeping comfort, are relevant for guests and should be retained in the set of classification criteria. The significant positive and robust effect of fulfilling more criteria related to quality management and online activities on guest ratings, which is present overall as well as for the 3-star sample, bears some practical importance as well. It implies that it could make sense to define the underlying criteria, such as the application of a quality management system, service quality controls through mystery guesting as well as currently elective criteria in terms of online activities, as mandatory for more star categories. This might be desirable also against the background that the functional dimension, e.g. the service quality of the staff, is considered as becoming even more relevant in the future, independent of the star category (Benitez et al. 2007; Marić et al. 2016). Currently, more than 90% of all sampled hotels have a website with a direct booking option and guest reviews, although this is an elective criterion. Additionally, more than 75% of the eligible hotels

voluntarily analyse their online reviews in a systematic way. This additionally speaks for the feasibility of defining some of the criteria which underlie this quality index as mandatory for all or most of the categories.

Interestingly, it is in tendency the quality components whose inclusion into the set of classification criteria has been criticized by practitioners, e.g. room service or event and to some extent recreational facilities (Engl 2017), that exhibit no or contradicting effects on guest satisfaction. This finding might lead to the tentative conclusion that it may make sense for the classification to concentrate more on the core needs of sleeping, basic F&B services and increasingly internet as well as on systematic quality management, while placing less weight on add-on-services. Quality attributes tied to the basic guest needs not only turned out to be relevant drivers of guest satisfaction, but they are also more prone to the problem of asymmetric information, as guests potentially talk less about them in their reviews, if they exhibit no severe drawbacks. The other quality components, namely, recreational and event facilities as well as to a certain degree room service, are less directly related to the star categories and are considered more relevant for the positioning of a hotel. Covering too many aspects in the set of classification criteria that affect the entrepreneurial freedom can have undesired effects. Some hotels with new, innovative business concepts might decide not to get classified, because they are not willing to conform with some of these criteria as part of their business strategy. A prominent example is the aspiring Motel One hotel chain, whose hotels deliberately do not offer room service, minibar, spa facilities or restaurants (Engl 2017). Although the criteria on recreational and event facilities are currently electives, they are awarded with a high number of points and are thus still relevant to achieve the necessary minimum score of higher star categories. In fact, hotelleriesuisse, besides the basic hotel classification, also proposes a choice of specialization categories that can be awarded to hotels, e.g. for wellness facilities or a focus on business or leisure guests (hotelleriesuisse 2017e). This actually corroborates the argument of placing an even higher focus on the quality of the core service areas and eventually service quality through the classification.

In sum, the following tentative suggestions for the institutions that are responsible for the hotel classification can be made based on the analysis:

- Publicly communicate the classification score that hotels have achieved as an additional grading element to guests, if the latter would make use of it.

- Concentrate on defining standards tied to basic guest needs, namely room and bathroom quality, sleeping comfort, internet connectivity and general F&B amenities as well as on criteria related to quality management and leave the entrepreneurial freedom of positioning their business in the market even more extensively to the hotel managers. This might imply dropping some of the criteria related to room service or other add-on services from the catalogue.
- In general, further develop the classification system by considering that with the availability of online reviews as quality indicators, the primary and differentiating function of hotel classification, even to a larger degree, lies in segmenting the hotel market rather than defining comprehensive quality standards to reduce information asymmetries. To perform this exercise, a more limited number of criteria related to quality attributes that are not relevant for the positioning of a hotel, might be sufficient.

The analysis has not covered all aspects of the classification system and is thus limited in scope. Nevertheless, a general implication that might be derived from the thesis is, that the hotelleriesuisse classification seems to cover assessment areas that are relevant for guests, but there might be potential to design it even more flexibly and also allow different, new hotel concepts to get awarded with stars. The time in which guest experiences were tied to a large extent to infrastructural or more technical quality aspects of a hotel have certainly passed, which would speak for such an approach.

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## Appendix

### Appendix A: Official Set of Classification Criteria

In the following, the full extract of the official set of classification criteria (Hotelstars Union 2015), including the points assigned to each criterion and additional remarks, is listed. The international English version of the classification catalogue does not include the Swiss Lodge category, whose criteria are very similar to 1-star hotels. The Swiss Lodge category is, however, not relevant for the largest part of the analysis, due to its characteristics that systematically differ from the other categories. The Swiss Lodge criteria can be accessed by following this link: [https://www.hotelleriesuisse.ch/files/pdf8/Kriterienkatalog\\_Normen\\_2015\\_2020\\_CH\\_dt.pdf](https://www.hotelleriesuisse.ch/files/pdf8/Kriterienkatalog_Normen_2015_2020_CH_dt.pdf)



### Hotel Classification Criteria 2015-2020 (Hotelstars Union)

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
<b>I. General Hotel Info</b>								
Cleanliness / Hygiene	1	Cleanliness and perfect hygiene are prerequisites are basic conditions in all categories.	-	M	M	M	M	M
Preservation condition	2	All mechanisms and equipment are functional and in faultless condition.	-	M	M	M	M	M
General impression	3	The general impression of the hotel is sufficient for _____ requirements.	-	simple <sup>1</sup>	medium <sup>2</sup>	elevated <sup>3</sup>	high <sup>4</sup>	highest <sup>5</sup>
Staff	4	All services must be provided by competent and identifiable staff.	-	M	M	M	M	M
Car Park	5	Parking directly at the hotel	3					
	6	Parking possibilities for busses	1					
	7	Garage	5					
	8	Charging station for electrical vehicles (e.g. cars, bicycles)	3					
Others	9	Min. 50% of the rooms with balcony or terrace	2					
	10	Elevator <sup>6</sup>	15				M	M
Facilities for disabled persons <sup>7</sup>	11	Barrier-free  Wheelchair or assistance	5					
	12	Barrier-free  Electronic wheelchair	8					
	13	Barrier-free 	5					

1 In particular, furnishing and equipment are appropriate and maintained.  
 2 In particular, furnishing and equipment are maintained and harmonized.  
 3 In particular, furnishing and equipment are consistent in form and colour. The general impression is that of elevated comfort.  
 4 In particular, furnishing and equipment are high-quality and offer first-class comfort. The overall appearance is consistent in form, colour and materials.  
 5 In particular, furnishing and equipment are luxurious and offer highest comfort. The overall appearance is consistent in form, colour, and materials.  
 6 For hotels with more than three floors (incl. ground floor).  
 7 According to national regulations.

Source: Hotelstars Union (2015, p. 2)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
		Blind or visually impaired						
	14	Barrier-free  Deaf or hearing impaired	5					
	15	Completely barrier-free 	5					

II. Reception and Services								
	16	Visually, separated area or desk securing privacy (appropriate table or secretary is acceptable)	1	M	M	M		
	17	Separate, independent reception station or desk securing privacy	6				M	M
	18	Lounge suite at the reception	1			M		
	19	Lobby with seats and beverage service	5				M	
	20	Reception hall with several seats and beverage service	10					M
	21	Reception service, available for phone calls (from inside and outside the hotel) 24 hours	1	M	M			
	22	Reception open 14 hours, available for phone calls (from inside and outside the hotel) 24 hours	3			M		
	23	Reception open 16 hours, available for phone calls (from inside and outside the hotel) 24 hours and staffed 24 hours <sup>8</sup>	4				M	
	24	Reception opened and staffed 24 hours, available for phone calls (from inside and outside the hotel) 24 hours	6					M
	25	Express check-out	3					

<sup>8</sup> "staffed 24 hours" means 24h availability.

Source: Hotelstars Union (2015, p. 3)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	26	Bilingual staff	2			M	M	
	27	Multilingual staff	4					M
	28	Photocopy/scan service	2				M	M
	29	Valet parking service	10					M
	30	Doorman (separate personnel)	15					
	31	Concierge (separate personnel)	15					M
	32	Page boys (separate personnel)	15					M
	33	Luggage service on demand	2			M	M	
	34	Luggage service	5					M
	35	Secure left-luggage service for arriving or departing guests	5				M	M
Cleaning of rooms / change of laundry	36	Daily room cleaning	1	M	M	M	M	M
	37	Daily change of towels on demand	1	M	M	M	M	M
	38	Change of bed linen at least once a week	1	M	M	M		
	39	Change of bed linen at least twice a week	2				M	M
	40	Daily change of bed linen on demand	4				M	M
Laundry and ironing service	41	Chemical cleaning/dry cleaning (delivery before 9 a.m., return within 24 hours)	1					
	42	Chemical cleaning/dry cleaning (delivery before 9 a.m., return within 9 hours)	3					

Source: Hotelstars Union (2015, p. 4)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	43	Ironing service (return within 1 hour)	2					M
	44	Laundry and ironing service (return as agreed)	1			M		
	45	Laundry and ironing service (delivery before 9 a.m., return on the same day – weekend excluded)	3				M	
	46	Laundry and ironing service (delivery before 9 a.m., return within 9 hours)	4					M
Payment	47	Payment via card	2		M	M	M	M
Miscellaneous	48	Support for in-house IT	2					M
	49	Umbrella at the reception/in the room	1					
	50	Up-to-date magazines	1					M
	51	Daily newspapers (print or digital)	2				M	M
	52	Sewing service	2				M	M
	53	Shoe polishing service	2			M <sup>9</sup>	M <sup>10</sup>	M
	54	Shuttle or limousine service	2					M
	55	Offer of sanitary products (e.g. toothbrush, toothpaste, shaving kit)	2		M	M	M	M
	56	Personalized greeting for each guest with flowers or a present in the room (not only a welcome message on the TV-screen)	6					M
	57	Accompanying the guest to the room at the arrival	2					
	58	Turndown service in the evening as an additional room check <sup>11</sup>	10					M

<sup>9</sup> A shoe polishing machine (see no. 163) can be offered instead of a shoe polishing service in the hotel. A shoe polishing kit in the room is also considered equivalent (see no. 162).

<sup>10</sup> A shoe polishing machine (see no. 163) can be offered instead of a shoe polishing service in the hotel.

Source: Hotelstars Union (2015, p. 5)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
<b>III. Rooms</b>								
General Room Info	59	Size of rooms (incl. bathroom) $\geq 14\text{m}^2$ <sup>12</sup>	10					
	60	Size of rooms (incl. bathroom) $\geq 18\text{m}^2$ <sup>12</sup>	15					
	61	Size of rooms (incl. bathroom) $\geq 22\text{m}^2$ <sup>12</sup>	20					
	62	Size of rooms (incl. bathroom) $\geq 30\text{m}^2$ <sup>12</sup>	25					
	63	Number of suites <sup>13</sup>	2 per suite, max. 6					M (min. 2)
	64	Min. 50% of the rooms is non-smoking	3					
Sleeping comfort	65	Bed system with a modern and well-kept mattress of at least 13 cm	1	M	M			
	66	Bed system consisting of an elastic system in combination with a modern and well-kept mattress with an overall height of at least 18 cm <sup>14</sup>	5			M	M	M
	67	Bed system consisting of an elastic system in combination with a modern and well-kept mattress with an overall height of at least 22 cm <sup>14</sup>	10					
	68	Ergonomically adjustable bed system	5					
	69	Single beds with a min. size of 0.80m x 1.90m and double beds with a min. size of 1.60m x 1.90m <sup>15</sup>	1	M	M			
	70	Single beds with a min. size of 0.90m x 1.90m and double beds with a min. size of 1.80m x 1.90m <sup>15</sup>	5			M		

11 Also called "Second service". Change of towels, removal of bedspread, emptying of waste paper basket, etc.

12 If the hotel has a limited number of rooms (max. 15 %) that are below this size, the guest must be informed about this fact before the accommodation contract is made.

13 No "Junior suites". Suites consist of at least two separate rooms; one of which is furnished as a bedroom and one as living room. The rooms do not need to be connected by a door; an opening is sufficient. Basically, a holiday flat in a dépendance is not considered a suite. In order to ensure that guests can make full use of the hotel services, suites must be situated in the hotel building.

14 The base of the system can be a box spring, a sprung slatted or any other equivalent system.

15 If there are two single beds or one queen size bed (1.50m x 2.00m) instead of one double bed, the guest must be informed about the fact that it does not comply with the usual standard before the accommodation contract is made. If the hotel has a limited number of beds (max. 15%) that are below the appropriate size for the respective category, the guest must be informed about this, before the accommodation contract is made.

Source: Hotelstars Union (2015, p. 6)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	71	Single beds with a min. size of 0.90m x 2.00m and double beds with a min. size of 1.80m x 2.00m <sup>15</sup>	15				M	M
	72	Single beds with a min. size of 1.00m x 2.00m and double beds with a min. size of 2.00m x 2.00m <sup>15</sup>	25					
	73	10% of the beds with a min. length of 2.10m	5					
	74	Additional crib	3					
	75	Hygienic covers for mattresses <sup>16</sup> ("encasings")	10					
	76	New acquisition of mattresses max. 3 years ago (The certificate has to be added to the application.)	10					
	77	Annual laundry or thorough cleaning of mattresses <sup>17</sup> (The certificate has to be added to the application.)	10					
	78	Allergy friendly sleeping alternative available on demand (The certificate has to be added to the application.)	2					
	79	Modern and well-kept blanket	1	M	M	M	M	M
	80	Additional blanket on demand	2			M	M	M
	81	Modern and well-kept pillow	1	M	M	M	M	M
	82	Hygienic covers for pillows ("encasings")	5					
	83	Annual laundry of pillows or new acquisition max.1 year ago (cleaning) (A proof has to be added to the application.)	8					
	84	Additional usable, non-decorative pillow on demand	1			M	M	M
	85	Two usable, non-decorative pillows per person	4					M

16 A simple molleton mattress pad is not accepted. But a (chemo-thermally) washable, breathable, bedcover free from mites and their excrements, made of cotton or synthetic materials that is opened at the bottom side will fulfil this criterion.

17 This criterion is fulfilled, if there is no residual moistness, the mites are killed and their growth is eliminated.

Source: Hotelstars Union (2015, p. 7)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	86	Choice of pillows <sup>18</sup>	4				M	M
	87	Possibility to darken the room (e.g. curtain)	1	M	M	M	M	
	88	Possibility to completely darken the room (e.g. shutter or blackout curtain)	5					M
	89	Sheer curtain/screen/blinds or equivalent	3					
	90	Washable bedside carpet	3					
	91	Wake-up service or device	1	M	M	M	M	M
Room equipment	92	Adequate wardrobe or clothes niche	1	M	M	M	M	M
	93	Linen shelves	1		M	M	M	M
	94	Adequate number of hangers <sup>19</sup>	1	M	M	M		
	95	Adequate number of hangers of different types	3				M	M
	96	Wardrobe or clothing hooks	1	M	M	M	M	M
	97	Possibility to hang up a suit bag (outside the wardrobe)	1			M	M	M
	98	1 chair	1	M	M			
	99	1 seating accommodation, at least one chair per bed	2			M	M	M
	100	1 comfortable seating accommodation (upholstered chair/couch) with side table/tray	4				M	M
	101	1 additional comfortable upholstered chair or loveseat in double rooms or suites	4					M

18 The guest can choose among different types of pillows.

19 Simple wired hangers do not fulfil this criterion.

Source: Hotelstars Union (2015, p. 8)



Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	102	Table/desk or desk top	1	M	M			
	103	Table, desk or desk top with a free min. working space of 0.5 m <sup>2</sup> and an adequate appropriate lighting	5			M	M	M
	104	Bedside table/tray	2			M	M	M
	105	Accessible power socket in the room	1	M	M	M	M	M
	106	Additional accessible power socket next to the table/desk or desk top	2			M	M	M
	107	Accessible power socket next to the bed	1			M	M	M
	108	Central light switch for the room light	3					
	109	Bedside light switch for the room light	2					
	110	Bedside light switch for the complete room light	4					
	111	Night light	1					
	112	Adequate room lighting	1	M	M	M	M	M
	113	Reading light next to the bed	2		M	M	M	M
	114	Dressing mirror	2			M	M	M
	115	Adequate place or rack to put the luggage/suitcase	1			M	M	M
	116	Wastepaper basket	2			M	M	M
Safekeeping	117	Safekeeping facilities (e. g. at the reception)	1	M	M			

Source: Hotelstars Union (2015, p. 9)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	118	Central safe (e. g. at the reception)	3			M <sup>20</sup>	M <sup>20</sup>	M
	119	Safe in the room	8					M
	120	Safe with integrated power socket in the room	10					
Noise control / air conditioning	121	Adequate noise protection (windows)	8					
	122	Sound-absorbing doors or double doors	8					
	123	Rooms with centrally adjustable air conditioning	8					
	124	Rooms with individually adjustable air conditioning	15					
	125	Air conditioning in public guest areas (restaurant, lobby, entrance hall, breakfast room)	4					
	126	Harmonious room atmosphere in public areas (light, smell, music, colour, etc.)	4					
Entertainment electronics	127	Radio <sup>21</sup> broadcast device	1			M	M	M
	128	Audio or multimedia player	2					
	129	Fixed electronic media in the bathroom	5					
	130	TV with remote control	2	M	M			
	131	TV in a size appropriate for the room with a remote control and a channel list	4			M		
	132	Modern TV in a size appropriate for the room with a remote control, a channel list and a programme	6				M	M
	133	Additional modern TV in suites in a size appropriate for the room	2					

20 Or a safe in the room (see no. 119).

21 The radio reception can also be organized via TV or the hotel's central telecommunication system.

Source: Hotelstars Union (2015, p. 10)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	134	National and international channels available	2					
	135	Pay-TV, movie channels or videogames with the possibility of "Adult lock"	5					
	136	International power adapter plug on demand	2					
	137	Charging station (for multiple electronic devices) and/or different adapters on demand	2					
Telecommunications	138	Publicly available telephone for guests	1	M	M	M	M	M
	139	(Mobile) telephone on demand in the room along with at least bilingual instruction manual <sup>22</sup>	3			M		
	140	Telephone in the room along with a multilingual instruction manual	8				M	M
	141	Internet access in the public areas (e. g. broadband, WIFI)	2		M <sup>23</sup>	M	M	M
	142	Internet access in the room (e. g. broadband, WIFI)	8			M	M	M
	143	Internet device with printing option in public area	5				M	M
	144	Internet device in the room on demand	1					M
	145	Internet device in the room	3					
Miscellaneous	146	Hotel information <sup>24</sup> (The hotel information has to be added to the application.)	1	M	M			
	147	Bilingual service manual A-Z (The service manual A-Z has to be added to the application.)	2			M		
	148	Multilingual service manual A-Z (The service manual A-Z has to be added to the application.)	3				M	M
	149	Regional information material available in public area	1	M	M	M	M	M

22 The guest must be informed about this offer during the check-in; a display, etc. is accepted.

23 Or internet access in the room (see no. 142).

24 The hotel information includes at least the breakfast time, the check-out time, and the opening hours of hotel facilities.

Source: Hotelstars Union (2015, p. 11)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	150	Daily newspaper in the room (printed or digital)	2					
	151	Guest magazine in the room	1					M
	152	Writing utensils and note pad	1			M	M	M
	153	Correspondence folder	3					M
	154	Trouser press	3					
	155	Laundry bag	1			M	M	M
	156	Iron and ironing board on demand or ironing room	2					
	157	Iron and ironing board in the room	4					
	158	Sewing kit on demand	1		M <sup>25</sup>	M <sup>25</sup>	M	
	159	Sewing kit in the room	2					M
	160	Shoehorn in the room	1					M
	161	Shoe polishing kit on demand	1		M <sup>26</sup>	M <sup>26</sup>		
	162	Shoe polishing kit in the room	2				M <sup>27</sup>	M
	163	Shoe polishing machine in the hotel	3			M <sup>28</sup>	M <sup>29</sup>	M
	164	Door viewer	2					

25 A sewing service (see no. 52) can be offered as well, instead of a sewing kit on demand.

26 A shoe polishing service (see no. 53) or shoe polishing kit in the room (see no. 162) can also be offered instead of the shoe polishing kit on demand. A shoe polishing machine in the hotel (see no. 163) does also fulfil this criterion.

27 A shoe polishing service (see no. 53) can be offered instead of the shoe polishing kit in the room.

28 A shoe polishing service (see no. 53) can be offered instead of the shoe polishing machine in the hotel. A shoe polishing kit (see no. 162) in the room does also fulfil this criterion.

29 A shoe polishing service (see no. 53) can be offered, instead of the shoe polishing machine in the hotel.

Source: Hotelstars Union (2015, p. 12)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	165	Additional locking mechanism at the room's door	3					
General Bathroom Info	166	Bathroom/Sanitary facilities $\geq 5\text{m}^2$ <sup>30</sup>	5					
	167	Bathroom/Sanitary facilities $\geq 7,5\text{m}^2$ <sup>30</sup>	10					
	168	100% of the rooms with shower/WC or bath tub/WC	1	M <sup>31</sup>	M <sup>31</sup>	M	M	M
	169	100% of the rooms with shower/WC or bath tub/WC and <u>thereof</u> 50% of the rooms with bath tub and separate shower cubicle	10					
	170	30% of the rooms with toilet separately	5					
	171	Shower with curtain <sup>32</sup>	1	M	M	M	M	M
	172	Shower with screen <sup>32</sup>	5					
	173	Washbasin	1	M	M	M	M	M
	174	Twin wash basin in double rooms and suites	5					
	175	Washable bath mat	1		M	M	M	M
	176	Adequate lighting at the washbasin	1	M	M	M	M	M
	177	Permanent or removable anti-slip appliance in shower and bathtub	3					
	178	Safety handles	1					
179	Mirror	1	M	M	M	M	M	

30 If the hotel has a limited number of rooms (max. 15%) that are below this size, the guest must be informed about this fact before the accommodation contract is made.

31 If up to 15% of the hotel's rooms are not equipped with private showers/WC but offer shared showers/WC instead, the guest has to be informed of the fact that the room does not comply with the usual standard before the accommodation contract is made.

32 If there is a separation between the sanitary facilities and the toilet in the bathroom, the existence of a shower curtain or shower screen is not necessary.

Source: Hotelstars Union (2015, p. 13)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	180	Accessible power socket near the mirror	1	M	M	M	M	M
	181	Vanity mirror	1					
	182	Flexible vanity mirror	2				M	M
	183	Lighted vanity mirror	1					
	184	Towel rails or towel hooks	1	M	M	M	M	M
	185	Heating option in the bathroom <sup>33</sup>	5				M	M
	186	Heated towel rail	3					
	187	Shelf	1	M	M	M		
	188	Large shelf	3				M	M
	189	Toothbrush tumbler	1	M	M	M	M	M
	190	Soap or body wash at the wash basin	1	M	M	M	M	M
	191	Body wash or shower gel at the shower/bath tub	1		M	M	M	M
	192	Shampoo <sup>34</sup>	1		M	M	M	M
	193	Personal care products in bottles	2					M
	194	Additional cosmetic products (e.g. bath essence, shower cap, nail file, Q-tips, cotton wool pads, body lotion)	1 per item, max. 4				M	M
	195	Facial tissues	2			M	M	M

<sup>33</sup> Minimum criterion is already considered as fulfilled, if the criterion "Heated towel rail" (see no. 186) is fulfilled.

<sup>34</sup> This criterion is considered as fulfilled, if the bath essence or shower gel is suitable as shampoo as well, and this is indicated (on bottle or dispenser).

Source: Hotelstars Union (2015, p. 14)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	196	Toilet paper in reserve	1	M	M	M	M	M
	197	1 hand towel per person	1		M	M	M	M
	198	1 bath towel per person	2	M	M	M	M	M
	199	Bathrobe on demand	2				M	
	200	Bathrobe	4					M
	201	Slippers on demand	1				M	
	202	Slippers	3					M
	203	Hairdryer on demand	1					
	204	Hairdryer	2			M	M	M
	205	Stool in the bathroom on demand	3					M
	206	Bathroom scales	1					
	207	Waste bin	1	M	M	M	M	M

IV. Gastronomy								
Beverages	208	Beverage offer in the hotel	1	M	M	M	M	M
	209	Beverage offer in the room	2			M	M	M
	210	16 hours beverages via room service	2				M <sup>35</sup>	

<sup>35</sup> Or minibar (see no. 214) or Maxibar (see no. 212).

Source: Hotelstars Union (2015, p. 15)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	211	24 hours beverages via room service	4					M
	212	Maxibar on each floor <sup>36</sup>	2					
	213	Fridge in the room	2					
	214	Minibar (with drinks and snacks)	6				M <sup>37</sup>	M
	215	Coffee machine or water boiler for tea/coffee together with accessories in the room	4					
Bar	216	Bar <sup>38</sup> (open at least 6 days per week)	4				M	
	217	Bar <sup>37</sup> (open at least 7 days per week)	6					M
Breakfast	218	Breakfast room	3	M	M	M	M	M
	219	Extended breakfast <sup>39</sup>	1	M				
	220	Breakfast buffet or equivalent breakfast menu card <sup>40</sup>	2		M	M		
	221	Breakfast buffet <u>with service</u> or equivalent breakfast menu card	8				M	M
	222	Breakfast menu card via room service	5					M
Food	223	Food offer in the hotel	1	M	M	M	M	M
	224	14 hours food offer via room service	5				M	
	225	24 hours food offer via room service	10					M

36 The products can be charged to the room.

37 Or 16 hours beverages via room service (see no. 210) or Maxibar (see no. 212) on each floor.

38 A "bar" is more than a simple beverage service. It must be separate from the restaurant.

39 An extended breakfast includes at least one hot beverage (e. g. coffee or tea), a fruit juice, selection of fruits or fruit salad, a choice of bread and rolls with butter, jam, cold cuts and cheese.

40 Self-service offer with at least the same choice of products as in the extended breakfast with an egg or an egg-plate and cereals.

Source: Hotelstars Union (2015, p. 16)



Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	226	Restaurant <sup>41</sup> open 5 days per week	5 each, max. 10	M <sup>42</sup> (min. 1)	M <sup>42</sup> (min. 1)	M <sup>43</sup> (min. 1)		
	227	Restaurant <sup>41</sup> open 6 days per week	8 each, max. 16				M <sup>44</sup> (min. 1)	
	228	Restaurant <sup>41</sup> open 7 days per week	10 each, max. 20					M <sup>45</sup> (min. 1)
	229	Dietary-kitchen	2					
	230	Regional kitchen <sup>46</sup>	4					

V. Event Facilities (MICE)								
Banquet options	231	Banquet options for at least 50 people <sup>47</sup>	2					
	232	Banquet options for at least 100 people <sup>47</sup>	4					
	233	Banquet options for at least 250 people <sup>47</sup>	8					
Conference rooms	234	Conference room(s) of at least 36 m <sup>2</sup> to 100 m <sup>2</sup> , ceiling height of at least 2.50 m <sup>48</sup>	10					
	235	Conference room(s) larger than 100 m <sup>2</sup> , ceiling height of at least 2.75 m <sup>48</sup>	15					
	236	Conference room(s) larger than 250 m <sup>2</sup> , ceiling height of at least 3.50 m <sup>48</sup>	20					
	237	Group work rooms/break rooms <sup>49</sup>	2 per room,					

41 Each of them with a different concept, choice of food and location.

42 Three-course menu or "à la carte" or buffet.

43 Three-course menu with choice or "à la carte" or buffet.

44 Three-course menu with choice or "à la carte" or buffet for Dinner.

45 Three-course menu with choice or "à la carte" or buffet for Lunch and Dinner.

46 The food offer features a significant part of regional/national specialities. The majority of used products is from the region.

47 The restaurant area is not included.

48 A conference room must have appropriate lighting, (with artificial light 200lux), a telephone, WIFI of appropriate capacity, a projector, a projection screen (appropriate ceiling height and room size), two pin boards a flip chart, workshop material, a coat rack or locker, at least eight power sockets, an extension cable and power distribution.

Source: Hotelstars Union (2015, p. 17)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
			max. 4					
	238	Business centre (separate office and available staff)	3					
	239	Conference service <sup>49</sup> (separate department, separate staff)	5					
	240	Conference office/typing pool <sup>49</sup>	1					
Equipment/ technology of conference rooms	241	Sufficient power sockets adapted to the number of seats <sup>49, 50</sup>	2					
	242	Daylight in the conference room and possibility to darken the room <sup>49, 50</sup>	3					
	243	Individually adjustable air conditioning of the conference rooms <sup>49</sup>	3					

VI. Leisure								
Sport	244	Adequate own recreation facilities onsite (indoor or outdoor) <sup>51</sup> (e. g. tennis court, beach, golf course)	3 per facility, max. 9					
	245	Rental of sports equipment (e. g. skis, boats, bicycles)	2					
	246	Gym <sup>52</sup> with at least 4 different exercise machines (e.g. ergometer, dumb bell, machine for weight training, treadmill, rowing machine, stairmaster)	4					
Spa/Wellness <sup>53</sup>	247	Massages <sup>54</sup> (e. g. full body massage, lymph drainage, Shiatsu, foot reflexology)	2 per cabin, max. 6					

49 Acceptance only if at least one of the criteria no. 234 – 236 is fulfilled.

50 Minimum criterion for every conference room.

51 Facilities are part of the hotel area and possible costs of use can be charged to the room.

52 The gym has a minimum size of 20m<sup>2</sup>.

53 The spa area has to be accessible without crossing the conference or the restaurant area.

54 The cabins have a minimum size of 10m<sup>2</sup>.

Source: Hotelstars Union (2015, p. 18)

Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	248	Separate relaxation room <sup>55</sup>	3					
	249	Whirlpool or equivalent	3					
	250	Sauna (with a minimum size of 6 seats)	5 per sauna type <sup>56</sup> , max. 10					
	251	Beauty farm <sup>54</sup> with at least 4 different kinds of treatment (e. g. facial, manicure, pedicure, peeling and stress relaxation massage are offered)	5					
	252	Spa <sup>54</sup> with at least 4 different kinds of treatment (e. g. bath, Kneipp, hydrotherapy, moor, hammam and steambath are offered)	5					
	253	Private spa cabin	2					
	254	Swimming pool (outdoor) <sup>57</sup> or swimming pond <sup>58</sup>	10					
	255	Swimming pool (indoor) <sup>59</sup>	15					
Children	256	In-house child care (for children younger than 3 years) for at least 3 hours on weekdays by skilled staff	10					
	257	In-house child care (for children older than 3 years) for at least 3 hours on weekdays by skilled staff	10					
	258	Children's area (playroom/playground)	4					
Others	259	Lounge for hotel guests (in addition to breakfast room or restaurant)	2					
	260	Reading and writing room (separate location)	1					

55 The relaxation room has a minimum size of 20m<sup>2</sup>.

56 Sauna types: "hot/dry" (e. g. Finnish sauna), "warm/slightly humid" (e. g. Tepidarium), or "warm/heavily humid" (e. g. steam room).

57 The outdoor swimming pool is heated and has a minimum size of 60m<sup>2</sup>.

58 A swimming pond is a man-made, standing water body for swimming or bathing free of chemical water preparation.

59 The indoor swimming pool is heated and has a minimum size of 40m<sup>2</sup>.

Source: Source: Hotelstars Union (2015, p. 19)

## Appendix A: Official Set of Classification Criteria

Area	No.	Criterion	Points	★	★★	★★★	★★★★	★★★★★
	261	Library (separate location)	2					
	262	Host/animation programme	3					

VII. Quality and Online Activities								
Quality Systems	263	Systematic complaint management system <sup>60</sup>	3			M	M	M
	264	Systematic analysis of guest reviews <sup>61</sup>	5				M	M
	265	Quality controls by mystery guesting <sup>62</sup> (Proof thereof has to be added to the application.)	10				(M) <sup>63</sup>	M
	266	Quality management system according EHQ <sup>64</sup> or equivalent	10					
Online Activities	267	Website <sup>65</sup> with updated information and realistic pictures together with the location of the hotel	5	M	M	M <sup>66</sup>	M <sup>66</sup>	M <sup>66</sup>
	268	Website with direct booking option and guest reviews <sup>67</sup>	10					
	269	Active invitation of departing/checked-out guests to write a review on a portal or on the website	5				M	M
Others	270	Eco-label <sup>68</sup>	10					

<sup>60</sup> A systematic complaint management system includes structured complaint acceptance, evaluation, and response.

<sup>61</sup> Active and systematic gathering and evaluation of guest opinions about the quality of the hotels services, analysis of weaknesses, and the realization of improvement.

<sup>62</sup> For the Mystery guesting to be accepted the following aspects need to be fulfilled at least once during a classification period: by professional externals upon initiative and on the account of the hotel, analysed and documented. Hidden (internal) controls e. g. of the hotel chain or cooperation are accepted as equal.

<sup>63</sup> Mystery guesting is a minimum criterion in the 4-star-superior-sector.

<sup>64</sup> European Hospitality Quality (EHQ) is the European Hospitality Quality scheme launched by HOTREC, the umbrella association of national trade associations representing hotels, restaurants, cafés, and similar establishments in Europe (cf. [www.hotrec.eu](http://www.hotrec.eu)). It serves as a reference model for national and regional quality schemes on European level. E. g. the initiative "ServiceQualität Deutschland" (cf. [www.servicequalitaet-deutschland.de](http://www.servicequalitaet-deutschland.de)) is accredited in its entirety.

<sup>65</sup> Pictures have to show at least an exterior view, the public area and a room.

<sup>66</sup> The website must be at least bilingual.

<sup>67</sup> A simple e mail is not accepted.

<sup>68</sup> For instance (without implying exclusivity): Austrian Umweltzeichen, DEHOGA Umweltcheck, DIN6, EarthCheck, EMAS, EU Ecolabel, Green Globe, Green Key, ISO 14001 or Viabono.

Source: Hotelstars Union (2015, p. 20)

## Appendix B: List of Criteria Behind the Objective Quality Indices

In the following, for every constructed quality index, the criteria on which it is based are listed. If a classification criterion that would theoretically belong to a component could not be included due to methodological issues, the reason for non-inclusion is mentioned as well.

Table 12: Criteria for “General Hotel Appearance & Facilities”

General Hotel Appearance and Facilities			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Physical: appearance	Min. 50% of rooms with balcony/terrace	-	k9
Physical: appearance	min. 50% of rooms non-smoking	-	k64
Physical: appearance	Barrier-free (for wheelchairs)	-	k11_12
Physical: appearance	<i>Barrier free for visually impaired or blind</i>	mostly not fulfilled, very target-group specific	k13
Physical: appearance	<i>Barrier free for deaf or hearing impaired</i>	mostly not fulfilled, very target-group specific	k14
Physical: appearance	<i>Completely barrier free</i>	mostly not fulfilled, very target-group specific	k15
Physical: appearance	Harmonious room atmosphere in public areas	-	k126
Physical: appearance	Entrance hall/lobby appearance	-	k18_20
Physical: appearance	Reception area appearance	-	k16_17
Physical: equipment	Air conditioning in public areas	-	k125
Physical: equipment	Elevator (if more than 2 floors)	-	k10

Source: Own table based on hotelleriesuisse (2015c)

Table 13: Criteria for “Parking & Transfer Services”

Parking and Transfer Services			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Physical: infrastructure	Garage	-	k7
Physical: infrastructure	Parking at hotel	-	k5
Physical: infrastructure	Parking for busses	-	k6
Service: product-based	Shuttle or limousine service	-	k54
Service: product-based	Valet parking service	-	k29

Source: Own table based on hotelleriesuisse (2015c)

Table 14: Criteria for "Room Arrangement &amp; Equipment"

Room Arrangement and Equipment			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Physical: appearance	Room size (min. 14m <sup>2</sup> , 18m <sup>2</sup> , 22m <sup>2</sup> , 30m <sup>2</sup> )	-	k59_62
Physical: furnishing	<i>Bedside table/tray</i>	LD	k104
Physical: furnishing	1 add. comfortable chair or loveseat in DR	-	k101
Physical: furnishing	<i>Dressing mirror</i>	LD	k114
Physical: furnishing	1 comfortable seating accommodation with side table	-	k100
Physical: furnishing	<i>desk/table (small/big with light)</i>	LD	k102_103
Physical: furnishing	<i>Seating accommodation (1/1 per bed)</i>	LD	k98_99
Physical: equipment	Washable bedside carpet		k90
Physical: equipment	<i>Accessible power socket next to bed</i>	LD	k107
Physical: equipment	Sewing kit (in room)	-	k158_159
Physical: equipment	Shoe polishing possibility (in room)	-	k162
Physical: equipment	Shoehorn in room	-	k160
Physical: equipment	Iron and ironing board (in room)	-	k156_157
Physical: equipment	<i>Wastepaper basket</i>	LD	k116
Physical: equipment	<i>Laundry bag</i>	LD	k155
Physical: equipment	<i>Trouser press</i>	LD	k154
Physical: equipment	Hangers (adequate number/different types)	-	k94_95
Physical: equipment	Correspondence folder	-	k153
Physical: equipment	<i>Writing utensils and note pad</i>	LD	152
Physical: equipment	<i>Possibility to hang up a suit bag</i>	LD	k97
Physical: equipment	<i>Place for suitcase</i>	LD	k115
Physical: equipment	<i>Additional power socket next to desk</i>	LD	k106
Physical: equipment	Air conditioning in room (recoded)	-	k123_124
Physical: equipment	Bedside light switch (yes/yes, for complete light)	-	k109_110
Physical: equipment	<i>Night light</i>	LD	k111
Physical: equipment	Central light switch	-	k108
Physical: equipment	<i>Reading light next to bed</i>	LD	k113
Physical: safety	Safe	-	k117_120
Physical: safety	Door viewer	-	k181_183
Physical: safety	Additional door locker	-	k164

Source: Own table based on hotelleriesuisse (2015c)

Table 15: Criteria for "Bathroom Arrangement &amp; Equipment"

<b>Bathroom Arrangement and Equipment</b>			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Physical: appearance	100% of rooms with shower/WC and 50% with bath tub	-	k169
Physical: appearance	Bathroom size (min, 5m <sup>2</sup> , min, 7.5m <sup>2</sup> )	-	k166_167
Physical: furnishing	Shower with screen	-	k172
Physical: furnishing	Twin washbasins in DR and suites	-	k174
Physical: furnishing	Shelf in bathroom (small/big)	-	k187_188
Physical: furnishing	Anti-slip appliance in shower and bathtub	-	k177
Physical: equipment	Safety handles (in shower/bathtub)	-	k178
Physical: equipment	<i>Washable bath mat</i>	LD	k175
Physical: equipment	Bathroom scales	-	k206
Physical: equipment	Additional cosmetic products	-	k194_ordin
Physical: equipment	Slippers (on demand/always)	-	k201_202
Physical: equipment	Heated towel rail	-	k186
Physical: equipment	Stool in bathroom on demand	-	k205
Physical: equipment	Heating option in bathroom	-	k185
Physical: appearance	30% of rooms with separate toilet	-	k170
Physical: equipment	<i>Facial tissues</i>	LD	k195
Physical: equipment	Bathrobe (provided)	-	k199_200
Physical: equipment	Personal care products in bottles	-	k193
Physical: equipment	<i>Hairdryer (provided)</i>	LD	k203_204
Physical: equipment	Vanity mirror	-	k181_183

Source: Own table based on hotelleriesuisse (2015c)

Table 16: Criteria for "Reception Services"

<b>Reception Services (front-office/arrival)</b>			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Services	<i>Secure left-luggage service</i>	LD (mostly fulfilled)	k35
Services	Luggage service	-	k33_34
Physical: Personalized equipment	Personalized greeting with flowers or present in room	-	k56
Services	Concierge	-	k31
Services	Doorman	-	k30
Services	Page boys	-	k32
Services	Languages staff (bilingual, multilingual)	-	k26_27
Services	Accompanying guest to room at arrival	-	k57
Services	Reception availability (reception service, 14h, 16h, 24h)	-	k21_24
Services	Express check-out	-	k25

Source: Own table based on hotelleriesuisse (2015c)

Table 17: Criteria for "Sleeping Comfort"

Sleeping Comfort			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Physical: furnishing	Bed size (4 sizes)	-	k69_72
Physical: furnishing	Additional crib (bed for kid)	-	k74
Physical: furnishing	10% of long beds (>=2.10m)	-	k73
Physical: isolation	Sound-absorbing doors or double doors	-	k122
Physical: isolation	Adequate noise protection (of windows)	-	k121
Physical: equipment	<i>Ergonomically adjustable bed system</i>	Weak, negative PC	k68
Physical: equipment	Bed system quality (3 levels)	-	k65_67
Physical: equipment	New mattresses (max 3 years old)	-	k76
Physical equipment:	Additional blanked on demand	-	k80
Physical: equipment	Choice of pillows	-	k86
Physical: equipment	Allergy friendly sleeping alternative on demand	-	k78
Physical: equipment	Additional usable pillow on demand	-	k84
Physical: equipment	Two usable pillows per person	-	k85
Physical: equipment	Sheer curtain/screen/blinds or similar	-	k89
Physical: equipment	Room darkening (partially, completely)	-	k87_88
Technical: hygiene	<i>Hygienic mattress cover</i>	not directly visible	k75
Technical: hygiene	<i>Annual laundry/cleaning of mattresses</i>	not directly visible	k77
Technical: hygiene	<i>Annual laundry of/new pillows every year</i>	not directly visible	k83
Technical: hygiene	<i>Hygienic covers for pillows</i>	not directly visible	k82

Source: Own table based on hotelleriesuisse (2015c)



Table 18: Criteria for “Complementary Conveniences & Information”

Complementary Conveniences and Information			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Service: Technical, object-focused	Photocopy/Scan service	-	k28
Service: entertainment, object-focused	Daily newspaper in room	-	k150
Physical: equipment	<i>Daily newspaper (provided in public area)</i>	LD	k51
Physical: equipment	Umbrella at reception/in room	-	k49
Physical: equipment	Shoe polishing machine	-	k163
Physical: equipment	Charging station for electrical vehicles	-	k8
Physical: information	Guest magazine in room	-	k151
Physical: information	Service manual	-	k146_148
Physical: entertainment/information	Up-to-date magazines available in public area	-	k50

Source: Own table based on hotelleriesuisse (2015c)

Table 19: Criteria for “Housekeeping & Laundry Services”

Housekeeping & Laundry Services			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Service: housekeeping	Ironing service	-	k43
Service: housekeeping	Sewing service	-	k52
Service: housekeeping	Laundry and ironing service (return as agreed, same day, within 9 h)	-	k44_46
Service: housekeeping	<i>Offer of sanitary products</i>	LD	k55
Service: housekeeping	<i>Shoe polishing service</i>	LD	k53
Service: housekeeping	Change of bed linen (at least once a week/twice a week)	-	k38_39
Service: housekeeping	Chemical cleaning/dry-cleaning	-	k41_42
Service: housekeeping	Turndown/second service	-	k58
Service: housekeeping	Daily change of bed-linen on demand	-	k40

Source: Own table based on hotelleriesuisse (2015c)

Table 20: Criteria for "Electronics &amp; Connectivity"

Electronics and Connectivity			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Physical: equipment	<i>Fixed electronic media in bathroom</i>	LD (only very rarely fulfilled)	k129
Physical: equipment	Pay-TV, movie channels, videogames	-	k135
Physical: equipment	Internet device in room (on demand)	-	k144_145
Physical: equipment	TV (with remote control/appropriate size/modern)	-	k130_132
Physical: equipment	<i>Telephone in room (on demand/always)</i>	LD (mostly fulfilled, differentiation only in terms of manual languages)	k139_140
Physical: equipment	<i>Nat. &amp; int. channels available</i>	LD (mostly fulfilled)	k134
Service: technical	Support for in-house IT	-	k48
Physical: equipment	<i>Radio broadcast device/programmes</i>	LD (mostly fulfilled)	k127
Physical: equipment	Internet device with printing possibility in public area	-	k143
Physical: equipment	Additional modern TV in suites	-	k133
Physical: equipment	Charging station or diff. adapters on demand	-	k137
Physical: equipment	<i>Internet in public areas</i>	LD (mostly fulfilled)	k141
Physical: equipment	<i>Internet in room</i>	LD (mostly fulfilled)	k142
Physical: equipment	Int. power adapter plug on demand	-	k136
Physical: equipment	Audio or multimedia player	-	k128

Source: Own table based on hotelleriesuisse (2015c)

Table 21: Criteria for "Food &amp; Beverages Services or Facilities"

Food & Beverages Services or Facilities			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Physical: infrastructure	Bar	-	k216_217
Physical: infrastructure	Restaurants	-	k226_228
Physical: F&B offer	Regional kitchen	-	k229
Physical: F&B offer	Breakfast (extended, buffet, buffet with service)	-	k219_221
Physical: F&B offer	Dietary kitchen	-	k230

Source: Own table based on hotelleriesuisse (2015c)

Table 22: Criteria for “Room Service”

Room Service			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Physical: equipment	Fridge or minibar	-	k213_214
Physical: equipment	Coffee machine or water boiler	-	k215
Physical: equipment	<i>Maxibar on each floor</i>	LD (mostly not fulfilled)	k212
Physical: F&B offer	Beverage offer in the room	-	k209
Service: gastronomy	Beverages room services (16h/24h)	-	k210_211
Service: gastronomy	Breakfast menu card via room service	-	k222
Service: gastronomy	Food via room service (14h/24h)	-	k224_225

Source: Own table based on hotelleriesuisse (2015c)

Table 23: Criteria for “Event Facilities & Services (MICE)”

Event Facilities and Services (MICE)			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Physical: infrastructure	Conference office/typing pool	-	k240
Physical: infrastructure	Conference rooms	-	k234_236
Physical: infrastructure	Group work rooms	-	k237_ordin
Physical: infrastructure	Banquet options	-	k231_233
Service: business/secretariat	Conference service	-	k239
Service: business/secretariat	Business centre	-	k238
Physical: equipment	<i>Daylight and darkening possibility in conference rooms</i>	LD (minimum criterion for all conference rooms)	k242
Physical: equipment	<i>Sufficient power sockets</i>	LD (minimum criterion for all conference rooms)	k241
Physical: equipment	Individually adjustable air conditioning in conference rooms	-	k243

Source: Own table based on hotelleriesuisse (2015c)

Table 24: Criteria for “Recreational &amp; Entertainment Facilities or Services”

Recreational & Entertainment Facilities or Services			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Physical: infrastructure	Adequate own recreation facilities (indoor/outdoor, e.g tennis or golf court)	-	k244_ordin
Physical: infrastructure	Gym with min. 4 diff. machines	-	k246
Physical: infrastructure	Swimming pool (indoor)	-	k255
Physical: infrastructure	Swimming pool or pond (outdoor)	-	k254
Physical: infrastructure	Reading and writing room	-	k260
Physical: infrastructure	Library	-	k261
Physical: infrastructure	Lounge for hotel guests	-	k259
Service: object-focused	Sports equipment rental	-	k245
Physical: infrastructure	Children's area	-	k258
Service: person-focused	Host/animation programme	-	k262
Service: person-focused	In-house child care	-	k256_257
<b>Wellness (individual index for robustness checks)</b>			
Physical: infrastructure	Spa with min. 4 treatments	-	k252
Physical: infrastructure	Separate relaxation room	-	k248
Service: person-focused	Massages	-	k247_ordin
Physical: infrastructure	Whirlpool or equivalent	-	k249
Physical: infrastructure	Private spa cabin	-	k253
Service: person-focused	Beauty farm with min. 4 treatments	-	k251
Physical: infrastructure	Sauna	-	k250_ordin

Source: Own table based on hotelleriesuisse (2015c)

Table 25: Criteria for “Quality Management &amp; Online Activities”

Quality Management and Online Activities			
Type of Criterion	Criterion	Reason for Non-Inclusion (if applicable)	Variable Name
Quality management	Quality management/programme	-	k266
Quality management	Mystery guesting	-	k265
Quality management	<i>Eco-Label</i>	LD (very scarcely fulfilled)	k270
Quality management	Active invitation for reviews	-	k269
Quality management	Systematic analysis of guest reviews	-	k264
Quality management	<i>Systematic complaint management system</i>	LD (mostly fulfilled)	k263
Quality management	Website with direct booking option and guest reviews	-	k268

Source: Own table based on hotelleriesuisse (2015c)

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