

Structured Abstract: Patron Sentiment of Employee-Customer Interaction: Exploring Hotel Customer Satisfaction through Machine Learning

INTRODUCTION

Experiences are a critical element in creating value for customers of service companies (Boswijk et al., 2012; Pine and Gilmore, 2013; Prahalad & Ramaswamy, 2004). In the tourism industry, employee-tourist encounters are particularly important as a lever for experience value creation. However, typically such encounters are based on a logic that is standardised and functional, thus missing considerable opportunities for employee-related experience creation (Sørensen & Jensen, 2015). In this research, we seek to apply big data analytics to identify the types of customer-employee interactions that are the most influential in improving customers' perceptions of service, value and overall satisfaction.

We present the results of a study that explores customer sentiment as expressed by a massive number of reviews and different types of customer-employee interactions. The study is based on an empirical analysis of the text from a popular hotel review website. Each review is content-analysed for sentiment and interaction type in order to explore these important relationships statistically.

BACKGROUND

Pine and Gilmore argue that service employees are performers in an act and should "stage" experiences for customers (Pine & Gilmore, 1999). Employee-tourist encounters associated with meaningful experiential value creation involve the development of new focal characteristics for encounters (Sørensen & Jensen, 2015). Such focal characteristics include:

- **Flexibility.** While standardised and scripted employee-tourist encounters may be cost effective, uniform, and accurate, this may overlook potential avenues to flexibly create unique tourist experiences in encounters (Sørensen and Jensen, 2015).
- **Co-creation.** Customer-employee encounters that involve co-creation can fashion unique and better personal experiences, taking into consideration the wishes of customers, which can increase satisfaction and intentions to revisit (Zátori, 2016).
- **Knowledge gain/learning.** Informative engagement with customers that results in learning and knowledge creation can significantly improve customer experiences through understanding and immersion (Sørensen and Jensen, 2015)
- **Emotions.** Positive emotional engagement and intelligence via employees is paramount to creating positive, unique, tourist experiences (Bærenholdt et al., 2008).
- **Personalization.** Activating employees' individual characteristics, capabilities and knowledge in encounters can result in more authentic, unique experiences (Sørensen and Jensen, 2015), influencing their memorable value (Solnet et al., 2015).

METHODOLOGY

The primary research question for this study is – which types of positive and negative customer-employee interactions have the largest impact on customers' perception of quality, satisfaction and value? A popular and well-known review website was selected to provide data for a range of hotel rankings (one- to five-stars) and sentiment performance. English language reviews and related variables associated with each review were downloaded. This

provided more than a quarter of a million reviews for analysis. A dictionary of terms was created by collecting and compiling synonyms associated with the types of hotel customer-employee interaction based on: *personalization, flexibility, co-creation, emotions and knowledge gain/learning*. Dictionary terms were also developed for mentions of employees. The process helped us to develop a final list of 639 words.

We developed code to analyse the data set for interaction type and sentiment using packages in the Python language. To improve the computational efficiency of the analysis, the data were pre-processed using Python's Natural Language Toolkit (NLTK). This included removing non-English words and characters, tokenization, word stemming, part-of-speech tagging, and replacing typical negative words. Subsequently, we analysed review sentiment in Python. This resulted in variables being created for: the number of instances mentioning employees and the types of employee interaction, polarity, and subjectivity in each review.

In order to focus on the most objective and reliable reviews, we reduced the sample to those reviews with a subjectivity level less than or equal to 0.5. This resulted in $n=122,614$ reviews. Further, since we are only interested in whether a particular type of employee interaction occurred, rather than the number of text mentions, we created binary variables for the five constructs and employee interaction, and then developed an employee interaction variable for each of the five constructs by multiplying them by the binary employee interaction variable. Thus, each review would now register 1 if a particular type of employee interaction, such as personalization, was mentioned, and 0 if not. Finally, we converted the polarity measures for each review into integers, creating a +1/-1 polarity variable, which was then used to add valence to the employee interaction constructs.

ANOVA tests were applied to examine differences in service quality, satisfaction and value based on whether there were positive, negative or no personalization, flexibility, co-creation, emotional, or knowledge gain/learning employee interactions. Due to heteroscedasticity, we used Welch's robust ANOVA test and Tamhane's T2 post-hoc tests.

RESULTS AND DISCUSSION

The results in the appendix indicate significant differences between the types of employee interaction and the resulting perceptions of service quality, satisfaction and value. Each of the Welch ANOVA tests identified significant differences between type of employee interaction and the three outcomes variables at $p<.001$. The analysis demonstrated that positive customer-employee interactions of the various types led to higher overall satisfaction, service quality and perceptions of value, whilst negative customer-employee interactions led to lower overall satisfaction, service quality and perceptions of value. However, negative employee-customer interactions led to much greater shifts in the perceptions of service quality, value and overall satisfaction than positive employee-customer interactions.

The results identified interesting differences among the particular types of employee interactions. Positive employee flexibility did not necessarily lead to higher satisfaction (possibly as it is hard to get right and/or is expected by customers), but a lack of customer flexibility could severely damage satisfaction, service quality and value; employee flexibility had the lowest levels observed for the three outcome variables for the negative group. Interestingly, incidences of no employee flexibility interaction could outperform positive employee flexibility interactions. Similarly, negative experiences regarding employee personalization can drastically and negatively impact satisfaction (again very low levels of satisfaction, service quality and perceived value were observed), whilst positive interactions

marginally, but significantly, improved perceptions of overall satisfaction, service quality and value. Poor knowledge gain and learning employee interactions could also drastically and negatively impact satisfaction, value and service, whilst positive interactions could marginally, but significantly, improve it. Positive emotional and co-creation-based employee interactions significantly improve perceptions of service, value and overall satisfaction (resulting in the highest levels of these variables observed), whilst negative emotional and co-creation-based employee interactions did not have such a dramatic effect, with a negligible decrease below neutral for overall satisfaction, but service quality and value above neutral.

IMPLICATIONS FOR THEORY AND PRACTICE

The findings of this research add to the existing body of literature on service management, customer-employee interaction and customer satisfaction through the unique perspective of text analytics for five key employee interaction types (personalization, flexibility, co-creation, emotions and knowledge gain/learning), based on a big data set of online hotel reviews. While previous studies have explored sentiment from hotel reviews, they did not consider these particular types of customer-employee interaction. This is important since there is a need for exploring the types of interactions which contribute to differences in perceptions of service quality, satisfaction and value as a precursor to the image held by consumers when reading the reviews. This research also makes a contribution through its development of a customer-employee interaction type dictionary for text analytics.

This is a single study within an English language context, and thus the results may not be generalisable beyond this environment. This research used an online review website to represent the customer reviews; however, it would also be useful for a future study to consider platforms such as Twitter, YouTube, Facebook, blogs, and other emergent social media channels. This research analysed hotel satisfaction based on an online channel; in reality, this may differ to how hotel satisfaction in the offline world is perceived. Hence, it would be useful to conduct further qualitative research to see how hotels are developing their customer interaction strategies and the relationship between offline and online satisfaction.

This study is important for hotel managers who are designing their customer relationship strategies. Regular studies such as this would enable brand managers within organisations to understand the impact of employee-customer interactions on patron satisfaction and to identify the most prominent factors contributing to dissatisfaction, aiding targeting specific factors to leverage improvement. This would, for example, be of value in staff training.

The overall assessment of our results appears to suggest that hotel customers are difficult to please; positive employee-customer interactions receive significant positive improvements in customer perceptions of satisfaction, values and service, but customers are extremely sensitive to any problems in employee-customer interactions. As the highest levels of satisfaction were observed when emotional interactions between employee and customer were positive, this appears a key opportunity for hotels to boost perceptions of satisfaction, value and service quality. Emotional intelligence is a key area in which service employees can add value (Solnet et al., 2016). Similarly, poorly performed co-creation interactions are not as harmful as some other types of employee-customer interactions, but done well it provides a significant opportunity to raise perceptions of satisfaction and other outcomes. Involving customers to develop better, unique, individual experiences can increase revisit intentions (Zátori, 2016). In contrast, flexibility is critical not to get wrong – it could lead to the lowest levels of satisfaction. Personalization and knowledge interactions, performed

incorrectly, could also be very damaging to satisfaction, however, done correctly, significantly higher (but still marginally above no interaction) levels can be observed.

REFERENCES

- Bærenholdt, J. O., Haldrup, M., and Larsen, J. (2008). Performing cultural attractions. In J. Sundbo, and P. Darmer (Eds.), *Creating Experiences in the Experience Economy* (pp. 176–202). Cheltenham: Edward Elgar.
- Boswijk, A., Peelen, E., Olthof, S., and Beddow, C. (2012). *Economy of Experiences*. Third edition. Amsterdam: European Centre for the Experience and Transformation Economy.
- Pine, B., and Gilmore, J. (1999). *The Experience Economy - Work is Theatre and Every Business a Stage*. Boston: Harvard Business School Press.
- Pine, B., and Gilmore, J. (2013). The experience economy: past, present and future. In J. Sundbo and F. Sørensen (Eds.), *Handbook on the Experience Economy* (pp. 21–44). Edward Elgar.
- Prahalad, C. K., and Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3), 5–14.
- Solnet, D., Baum, T., Robinson, R. N. S., and Lockstone-Binney, L. (2016). What about the workers? Roles and skills for employees in hotels of the future. *Journal of Vacation Marketing*, 22(3), 212–226.
- Sørensen, F., and Jensen, J. F. (2015). Value creation and knowledge development in tourism experience encounters. *Tourism Management*, 46, 336–346.
- Zátori, A. (2016). Exploring the value co-creation process on guided tours (the “AIM-model”) and the experience-centric management approach. *International Journal of Culture, Tourism and Hospitality Research*, 10(4), 377–395.

APPENDIX: ANOVA AND POST-HOC TESTS

Independent Variable	Dependent Variable ^a	A. Negative	B. None	C. Positive	Welch Test ^b	Post-Hoc Tests ^b
Emotional Employee Interaction	Overall Satisfaction	2.91	3.93	4.32	2253.67 (p<.001)	C>B,A***, B>A***
	Service Quality	3.25	4.10	4.45	1804.80 (p<.001)	C>B,A***, B>A***
	Value	3.06	3.94	4.28	914.38 (p<.001)	C>B,A***, B>A***
Flexibility Employee Interaction	Overall Satisfaction	2.37	4.08	3.98	562.01 (p<.001)	C>A***, B>A,C***
	Service Quality	2.73	4.23	4.18	330.44 (p<.001)	C>A***, B>A,C***
	Value	2.54	4.06	4.01	242.44 (p<.001)	C>A***, B>A***, B>C**
Personalization Employee Interaction	Overall Satisfaction	2.40	4.06	4.12	590.96 (p<.001)	C>B,A***, B>A***
	Service Quality	2.74	4.22	4.27	361.89 (p<.001)	C>B,A***, B>A***
	Value	2.71	4.05	4.11	226.71 (p<.001)	C>B,A***, B>A***
Knowledge Employee Interaction	Overall Satisfaction	2.51	4.05	4.11	621.91 (p<.001)	C>B,A***, B>A***
	Service Quality	2.94	4.20	4.29	399.34 (p<.001)	C>B,A***, B>A***
	Value	2.78	4.04	4.10	242.56 (p<.001)	C>B,A***, B>A***
Co-creation Employee Interaction	Overall Satisfaction	2.96	3.94	4.24	1757.39 (p<.001)	C>B,A***, B>A***
	Service Quality	3.29	4.09	4.40	1556.13 (p<.001)	C>B,A***, B>A***
	Value	3.10	3.95	4.21	726.16 (p<.001)	C>B,A***, B>A***

Notes: * p<.05, ** p<.01, *** p<.001; Value, n=69,297, Service, n=121,028, Satisfaction, n=122,614; b. Welch test and Tamhane's T2 test due to heteroscedasticity.