Using Slutsky equation to find the hotel growth model in the destination life cycle: an empirical study in Myrtle Beach

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Abstract

Purpose – The purpose of this paper is to examine the hotel growth model including hotel brand, culture and life cycle phases of the Myrtle Beach, South Carolina, the fastest growing tourism destination in the United States.
Design/methodology/approach – Culture reflecting consuming behaviour of low-context innovators and high-context imitators is measured by the price elasticity of demand (PED). Hotel brand reflecting guests' hotel class is measured by the income elasticity of demand. Autoregressive distributed lag has been conducted on the Smith Travel Research data in 33 years (1989–2022) to determine the relationship among hotel brand, culture and life cycles.
Findings – Skilled labour is the key to make hotels grow. Therefore, increase room rates when hotels possess skilled professionals and decrease room rates when hotels have no skilled professionals. During the rejuvenation in Myrtle Beach (1999–2003), hoteliers increased room rates for innovators due to skilled professionals to increase revenue. Otherwise, a decrease in room rates due to lack of skilled professionals would lead to increase revenue.
Research limitations/implications – (1) Although Myrtle Beach is one of the fastest growing tourism destinations in the US, it has a relatively small geographic area relative to the country. (2) Data cover over one tourist life cycle, so the time span is relatively short. Hoteliers can forecast the number of guests in different culture by changing room rates.
Practical implications – To optimize revenue, hoteliers can select skilled labour in professional design hotel brands which could make an increase in demand for leisure transient guests no matter what room rates increase after COVID-19 pandemic.
Social implications – The study has considered the applied ethical processes regarding revenue management that would maximize both revenue and customer satisfaction when it set up an increase in room rates to compensate for professional hotel room design or it decreases room rates for low-income imitators in exploration and development.
Originality/value – This research highlights that (1) skilled design in the luxury hotel brand is the key for the hotel growth and (2) there is a steady state of the growth model in the destination life cycle.

Keywords Destination life cycle, Low-context, High-context, Myrtle Beach

Paper type Research paper

Introduction

Failure to identify the life cycle phase of tourist destination markets has created critical issues for hoteliers to position their niche marketing in their growth model after coronavirus disease 2019 (COVID-19) era. A business cannot be successful when its price does not match different customers' demand in each phase of a product life cycle (PLC). There are 6 phases of a tourist area life cycle (TALC): exploration, involvement, development, consolidation, stagnation, and decline or rejuvenation (Butler, 1980).

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According to American Hotel and Lodging Association AH&LA, 2021, after the COVID-19 pandemic, leisure tourists have been the first pioneers to recover the lost business at tourist destinations to open the doors for hotel business. Marriott, Hilton, InterContinental, Hyatt and other hotel brands have searched their niche market demand for the leisure tourists using surviving strategies in business models to match each phase of the tourist destination life cycle to optimize their revenue. In response to changing landscape, hotels have adjusted their business practices and created multiple brands within a larger industry. For example, Marriott Hotels with 31 brands is now called Bonvoy, Hilton Hotels with 19 brands is now called Honors, Intercontinental Hotels with 15 brands is now IHG Rewards Club, Hyatt Hotels with 18 brands is now called The World of Hyatt, Radisson Hotels Group with 7 brands is now Radisson Rewards, Choice Hotels with 17 brands is called Choice Privileges and Best Western Hotels with 13 brands is Best Western Rewards.

The hotel growth model is thus the key direction for hoteliers to overcome the challenges of hospitality industry after the COVID-19 pandemic. The model of growth can provide solutions for hoteliers in the early days of post-COVID-19 pandemic tourism to find the key factor that can push the hotel operations. Hoteliers have attempted the price strategies in revenue management, but they failed to build the trust from customers due to the ethical process in which owner's profit are gained more. Another approach to be sustained in hotel operations is that hoteliers focused on brand names to recognize the guests' social class by their income. This approach seems to be too popular now that there are multiple brands from one owner. The best solution is to combine both the strategies of price and income in a model of growth and apply the success of the growth model in production to the growth model in hotel consumption. The growth model would help the hoteliers to forecast who will be in the hotels when they increase or decrease room rates. For example, who should hoteliers target when they decrease room rates.

The research objective is thus to build a growth model for hotel industry. To achieve this goal, the study has focused on the concept of a growth model, historic and contemporary growth models for production and consumption. The father of the growth model for production is Sollow (1956, 1987) who is a Nobel Laureate for this contribution (Prize Committee, 2018). In this model, there are three main variables: capital, labour and technology. In 2018, Romer has changed the role of technology in Solow's model from exogenous (independent) to endogenous (dependent) and achieved the second Nobel Prize for this contribution. In the hotel growth model, there are three main variables: cultural types of hotel guests, hotel brands and destination life cycle phases. In this study, the cultural types of guests indicate how the guests respond to the change of hotel room rates measured by the price elasticity of demand (PED). The hotel brands show the guests' preferences for the hotel image, hotel design, hotel architecture, hotel service performance and hotel communication measured by the demand when their income increases, that is, the income elasticity of demand. The destination life cycle phases indicate five phases as follows: rejuvenation, exploration, development, consolidation and stagnation. In each stage, guests will change their consumption styles by price and income. Narangajavana, Garrigos-Simon, Sanchez, and Forgas-Coll (2014) report the price difference in month and hour. Roper, Haddad, and Jones (2008) suggest using past booking curves and details for dynamic models for difference in income customers. A hotel price elasticity means consumers pay differently for the same service during their different time of check-in (Badinelli, 2000; Nicholson, 2005). The PED is measured by the change of the variance of demand per unit of price variance. The PED thus reflects the demand response of price change. If the PED of a customer is smaller than 0 but greater than -1, he/she is not affected by price, so the demand is called inelastic. Conversely, if the PED is smaller than -1, the consumer demand is affected by price and called elastic demand.

In the hotel life cycle, tourists are classified into psychocentric and allocentric (Plog, 1974; Cohen, 1972). The allocentric who seek challenged environment rather than price will explore the destination at the beginning in the exploration phase. He/she is called an innovator with the absPED < 1 (Bass, 1969). Then the psychocentric who prefers a safe place controlling for

price will stay in following phases of the development and consolidation in the TALC (Butler, 1980). He/she is called an imitator with the absPED > 1 (Bass, 1969). The culture is thus related to the decision behaviour of tourists who decide which price is right for them to stay in each of the three TALC phases.

There are two types of culture: low context and high context (Hall, 1959). The low-context guest called innovator prefers to be challenged in discovering a new place in the rejuvenation phase (Bass, 1969). The innovator is often focussing on the discovery, so he/she is not affected by price; he/she is called an inelastic innovator. The high-context guest called imitator would like a safe place controlling for price in the late exploration and development. The imitator is affected by the word-of-mouth and price, so he/she is affected by price and called an elastic imitator. Parker (1992) has proved price elasticity will increase during the life cycle of a good or a service in a PLC developed by Vernon and Wells (1966), a similar measure to TALC. The PED is thus changing depending on time, location and income of customers.

In addition to the above price effects, customers have been affected by changing income (Slutsky, 1915). The consumer demand is thus also changed by income and measured by income elasticity of demand (YED). The YED is measured by the change of the demand variance per unit of income variance, an innovator with a positive YED (YED > 0) would prefer a luxury service. Conversely, an imitator with a negative YED (YED < 0) would like a non-luxury service. The present study has used the Slutsky equation (Slutsky, 1915) to identify the price effects by decomposing the utility function into the substitute effect and the income effect when hotel room rates change. The substitute effect measured by the PED is different depending on the two cultural types of guests: high context or low context (Hall, 1956). The low-context guest called innovator prefers to be challenged in discovering a new place in a rejuvenation phase (Bass, 1969). Conversely, the high-context guest called imitator would like to be safe in the development phase (Butler, 1980).

The study has used the PED to measure the demand of an innovator hotel guest for the luxury hotel brands. The PED of a hotel guest is often not changed because it is a habitual culture (Lewis, 1996). Therefore, the demand of the innovator is often inelastic, and the demand of the imitator is elastic. The income effect is the second effect in Slutsky equation to measure the level of hotel skilfulness in different brands after the price change. The positive YED (YED > 0) implies luxury brand, whereas the negative YED (YED < 0) implies non-luxury brand. The purpose of this paper is thus to examine the hotel growth model including hotel brand, culture and life cycle phases of the Myrtle Beach, South Carolina, the fastest growing tourism destination in the United States.

The remainder of the paper has included theories of neoclassical economics and culture with Slutsky equation and hypotheses of the relationships among price, culture, brand and life cycle. Then statistical method of autoregression lag distributed has been used on the Smith Travel Research data in 33 years (1989–2022) to support the hypotheses. Finally, the study has discussed the contribution and limit of the study in concluding remarks.

Literature

To identify the key reasons for hoteliers to change their hotel brands after COVID-19 pandemic, this study has used the approach of Cobb and Douglas's (1928) function to analyse following models.

Solow model

The neoclassical economic growth model of the Nobel Laureate Solow (1987) (Imbens, 2021; Card, 2021; Angrist, 2021) shows that the economic growth is determined by technology, capital and labour.

$$Y(t) = F\left(AK^{\beta}(t), L^{\alpha}(t)\right) \quad (1)$$

where (Y) output, (K) capital stock, (L) labour or quality of work and (A) magnitude of capital, (t) time, AK(t) is capital augmenting, β is the magnitude of AK and α is the magnitude of L.

When applying the Solow growth model for production to the growth model for consumption in hotel operations using Cobb–Douglas (1928) function, the Function (1) will be as follows:

$$\mathrm{Ln}\,(Y) = \beta \ln(AK(t)) + \alpha \ln(L(t)) \quad (2)$$

where (Y) hotel demand measured by annual room revenue, (AK) value of hotel augmented performance measured by average daily rate of the hotel brand (ADR). L(t) demand for quality of lux and non-lux hotel brand service measured by the number of lux and non-lux room-nights sold in a year. β reflecting cultural type measured by the PED and α reflecting skilled labour measured by the income elasticity of demand (Nguyen, Tran, & Le, 2022).

The skilled labour in hotel industry that is the demand for quality of lux hotel service can make the best quality of hotel service through professional design, architecture and software engineering or other communication marketing to maximize high income guest satisfaction. Therefore, the demand depends on skilled labour, whereas the ADR depends on the responsiveness of price of guests in the demand for each of the tourist area life cycle phases.

According to Solow (1956, 1987), when the ratio of capital to labour (K/L) is augmenting with the rate of n, it will meet the output Y by one unit of labour (Y/L) at a steady state which is stable at the equilibrium value. The steady state is the point where technology development approaches to the output. For example, the growth model for production is applied for consumption in hotel operations, the innovators do not want to stay in the hotels without skilled professional design. At that point, the steady state occurs when there are only imitators who are attracted by discounted room rates in the old-design hotels. Solow states "If the initial capital stock is below the equilibrium ratio, capital and output will grow at a faster pace than the labour force until the equilibrium ratio is approached. If the initial ratio is above the equilibrium value, capital and output will grow more slowly than the labor force. The growth of output is always intermediate between those of labor and capital" (p. 70). The Solow's model has been specified by another Nobel Laureate Romer (2018) (Imbens, 2021; Card, 2021; Angrist, 2021) that the growth is determined by nonrivalry skilled labour and intermediate service sector. Romer proves that skilled labour can make the technology grow and push the growth of economics within the control of an intermediate sector. When there is a change in price of hotel service, the level of hotel skilfulness would be related to guest income and the intermediate service sector would be related to hotel control in a hotel growth model based on the characteristics of the growth model (Acemoglu, 2016; Acemoglu & Restrepo, 2018; Acemoglu, Bursztyn, & Hemous, 2012).

Elasticity reflects a variation of a dependent variable when changing another independent variable. PED that is measured by dividing percent change of demand by percent change of price reflects a variation of consumption by a price change. The change of a tourist for visiting a new destination is very little by price due to his excitement as an allocentric. When the destination becomes popular, the psychocentric will consider a price before they visit that place. Therefore, the PED will be inelastic for the allocentric but elastic to the psychocentric.

A culture, which is a habit of human behaviour, in a society can be classified into two types: low context and high context through human silent language based on time and space (Hall, 1959). The low-context person prefers to deal with tasks not people to enjoy benefits from accomplishing a task schedule. Conversely, the high-context person prefers to contact people not tasks to enjoy benefits from social recognition. Lewis (1996) examines low- and high-context people around the world and combined them into the third type of culture called

reactive culture. There are three Lewis's cultural types based on human behaviour: linear-active (low context), multi-active (high context) and reactive (passive context) cultures. Each of these cultures would stand out in each of the destination life cycle when price changes.

In a destination life cycle, a tourist in one of the above three cultures could be an innovator, an imitator or an adopter (Bass, 1969). A tourist innovator loves to discover a new destination with an inelastic demand, called allocentric (Plog, 1974). A tourist imitator loves to attend to a mass of tourists with an elastic demand to be recognized called psychocentric (Plog, 1974). A tourist adopter loves to integrate mass tourists in an old destination to be a pioneer in a sustainable destination with a positive PED creating a brand loyalty (Aaker, 1991; Boo, Busser, & Baloglu, 2009; Tran, Dauchez, & Szemik, 2013; Tran, 2015).

Recent research in hospitality and tourism has focused on optimizing revenue in different destinations but little focused on the order of time (Cheng, Li, Petrick, & O'Leary, 2011; Oses, Gerrikagoitia, & Alzua, 2016; Rosselló, Aguiló, & Riera, 2005). They suggest different price strategies including replacing hotel brands, changing location, segmenting customer market, valuing inventories and ignoring its life cycle phases. In fact, each of the destination brand life phases has attracted a specific customer with different purchasing decision making. Vives, Jacob, & Payeras (2018) report that maximizing brand revenue are based on inventory scarcity, customer segmentation and pricing. Guizzardi, Emanuele, and Ranieri (2017) suggest brands in business destinations apply price discounts by special events, seasonality, locations, star rating, facilities and services.

Low context is a culture type of people who are interested in the task rather than people. In this study, low-context consumers are hotel guests who select any new services or products in a hotel brand advertising rather than follow a mass favourite from word-of-mouth comments in social media. Brand awareness is the name and characteristics of the hotel brand (Konecnik & Gartner, 2007). When the quality of brand awareness is perceived by customers, it is brand quality (Aaker, 1991; Zeithaml, 1988). At the exploration and involvement of a new hotel brand, hotel guests called innovators decide to stay in the new brand when they hear it through the advertising from hoteliers. According to Parker (1992), at the beginning, a hotel brand is new so that little knows about the awareness and quality of the brand. The price is thus inelastic and high. Bonvoy, Honors, IHG Rewards Club are the new brands from Marriott, Hilton and InterContinental after the COVID-19 pandemic. During the development and consolidation phases of the destination life cycle, the luxury and upscale hotel brands increase their strengths in performance and reputation to exceed guests' expectations by investing additional capital and technology and increasing room rates.

High context is a culture type of people who is interested in the people rather than task. In this study, high-context consumers are hotel guests who select a mass favourite from word-of-mouth comments in social media, instead of any new services or products in a hotel brand advertising. Both name and quality of the brand create brand image or brand association (Aaker, 1991; Dobni & Zinkhan, 1990; Keller, 2003). Brand image is brand associations since it combined the social and self of brand personality (Boo *et al.*, 2009; Tran *et al.*, 2013). Brand image or brand associations is very important in hotel industry (Konecnik & Gartner, 2007), so it provides knowledge for hotel guests in their feedback of the hotel quality (Zeithaml, 1988). At the development and consolidation stage of a developed hotel brand, hotel guests called imitators decide to stay in the developed brand when they hear it through the word-of-mouth comments from social media by a decrease in price. According to Parker (1992), the hotel brand price is inelastic. When the hotel brand becomes more and more popular by other recreation service packages, the price becomes elastic in the stagnation stage. Du, Yang, Liang, and Yang (2016) show the impacts of PED over time. Huang and Liu (2021), Song, Liu, Liu, and Niu (2021), Wu, Li, and Song (2011), and Liu, Liu, Mo, and Ng (2021) report different

strategies to enhance methodology. The World of Hyatt and Choice Privileges are developed brands from Hyatt and Choice in the post-pandemic era.

After the stagnation stage, the life cycle will be changed into either rejuvenation or decline. At that time, hoteliers attempt to rejuvenate their brands based on guests' culture. The low-context culture loves the task, brand value or brand competitiveness. It is the key factor to locate the market share of a brand in the stagnation. When brand image is compared with other brand images, it will earn brand value (Tran *et al.*, 2013). Finally, an increase in brand value leads to brand loyalty (Aaker, 1991) resulting in brand rejuvenation. The loyalty is the benchmark for consumers to pay a premium price (Odin, Odin, & Valette, 2001). When a customer selects a brand based on the price, he/she has chosen the value of the brand (Lassar, Mittal, & Sharma, 1995). All the four brand features (awareness, image, value and quality) are related to the ways in which the hotel brand would match tourists' loyalty (Boo *et al.*, 2009; Keller, 2003). At the stagnation stages of hotel brand, innovators in the low-context culture would stay in the old-fashioned brand by its scarcity of consisting value which makes the room rate increase whereas imitators in the high context culture search for a decrease in room rate. Vives and Jacob (2020) report the online customer behaviour in the bookings over time are the benchmark for the revenue maximization process. Radisson Rewards and Best Western Rewards are old fashion brands from Radisson and Best Western in post COVID-19 era whereas Bonvoy and Honors are new brands rejuvenated from Marriott and Hilton.

Slutsky equation

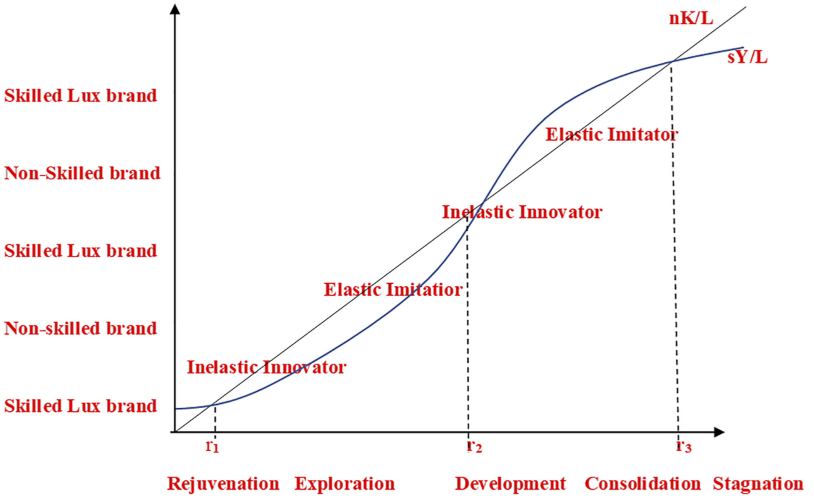
Slutsky equation (Slutsky, 1915) indicates the splitting of a concept based on a random number into the two concepts based on real numbers. Marshall (1920) creates a price elasticity concept based on a variance of price. It is split into Hicksian's (1939) concept of compensated price elasticity based on minimum costs to maintain a fixed level of utility and income elasticity based on benefits attained by the price change. The Slutsky equation applied in this study is to split the price effect by culture into a substitute effect by life cycle and an income effect by hotel brand.

The price effect is measured by the PED which reflects the variance of consumptions by culture when price increases or decreases. The guests in a low-context culture accept high prices in luxury and upscale hotels, but the guests in a high-context culture prefer word-of-mouth prices to stay in midscale and economy hotels.

The income effect makes hotel guests less or more powerful in their consumption when price changes. The income effect is measured by the income elasticity of demand that is measured by a variance of income by an increase or decrease in price. Guests might want a non-lux service when their income effect is negative. Conversely, when the income elasticity of demand is positive, guests prefer a skilled professional lux service. The study has thus examined who in which culture at what stage will want to change hotel brands to provide hoteliers with the best strategy for revenue optimization.

The present study has attempted to prove the steady state in the Solow growth model which appears in tourist area life cycle phases. At the steady state, there is no skilled professional design. Both innovators and imitators are pleased to stay in non-lux hotels with a discounted room rate. The PED for hotel can be used to identify the steady state with PED > 0; the purchase behaviour of the innovators and imitators at the rejuvenation phase, the exploration phase, the development phase, the consolidation phase and the stagnation phase of the life cycle for a hotel in a suggesting model is shown in Figure 1.

In order to find the steady state in the growth model, the present study has used the Cobb–Douglas to change the Solow growth model including a product of two factors (a capital augmented and a technology labour) into the model including a sum of the two factors using logarithm. Then the two factors (capital and technology labour) in Solow model will be compared with the two factors (substitute and income) in Slutsky equation (Slutsky, 1915).



Source(s): Author's integration from Solow (1956), Bass (1969), Butler (1980), and Parker (1992)

Figure 1.
Relationships of culture, brand and life cycles in the growth model

Sasakura (2016) states "The Slutsky equation teaches us, quite correctly, that the price effect can be decomposed into the substitution effect and the income effect (the Slutsky decomposition). It has been the most fundamental tool not only for pure demand theory but also for wide applications, microeconomic or macroeconomic. It is no exaggeration to say that without it economists could have been only half through their works." (p. 253).

In the Slutsky equation (Price effect = Substitute effect + Income effect), there are two sub-effects from the price effect. The two sub-effects are the substitute effect and the income effect. The substitute effect is measured by the PED, whereas the income effect is measured by the income effect of demand (YED). The present study has compared the two factors (capital augmented and skilled or technology labour) of the growth model of Solow (1987) and Romer (2018) in function (2) with the two factors (substitute and income) of the Slutsky model in function (3) to find the steady state for the hotel growth model. The capital augmented that reflects the substitute or culture effect is measured by the PED. The technology or skilled labour that reflects the income effect is measured by the YED.

The decomposition of Slutsky equation thus produces the sum of the substitution effect (capital augmented, culture) and the income effect (skilled brand design) as follows:

$$(\mathrm{dq1/dp1\,|\,p2, y = const}) = (\mathrm{dq1/dp1\,|\,p2, u = const}) + (-\mathrm{q1} * \mathrm{dq1/dy\,|\,p1, p2 = const}) \quad (3)$$

$$(\text{Total or Price effect}) = (\text{Substitution or Culture effect}) + (\text{Income effect to pay for a skilled or brand})$$

Price effect that reflects the guest demand for a skilled service when price changes will equal to the sum of two partial derivatives of the guest's demand: One for his/her substitute type with the same utility or comfort and the other for his/her income to pay a skilled service holding the cultural type of room rate. The substitution effect is often negative for an imitator who often has low income, i.e. given the same comfort level (sound sleep), an increase in room rate leads to a decrease in comfort. The substitution effect is also positive for an innovator who often has high income, i.e. given the same comfort level, an increase in

room rate leads to an increase in another comfort (sound sleep and big breakfast). Equation (3) will become positive or negative depending on the sign of income effect. (1) If the income effect measured by income elasticity of demand is negative (YED < 0), the total effect for the imitator measured by the PED will be negative because of the negative substitute effect. The high context imitator would accept this decreased price in exchange for a non-luxury in the exploration and development phases of the life cycle. (2) If the income effect is positive but its magnitude is smaller than substitution effect (abs (Substitute) > abs (YED)) and the substitute effect is positive for the innovator ("increase room rate, increase comfort"), the price effect will be positive (PED > 0). The low-context innovator would prefer skilled professional service in the rejuvenation phase of the life cycle. (3) The last occurrence is if the income effect is negative and its magnitude is smaller than substitution effect (Substitute > YED < 0) and the substitute effect is positive (Substitute > 0) for the imitator ("increase room rate, decrease comfort"), the price effect will be positive (PED > 0). The high-context imitator with a discounted room rate and low-context innovator with an increase room rate would like a non-lux service in the consolidation and stagnation. All the above three cases are summarized in Slutsky equation by the absolute values of these effects as follows.

(1) If (YED < 0 and PED < −1) => High-context imitator wants a discounted rate for a non-lux hotel service in exploration and development phases of life cycle.

(2) If (YED > 0 and −1 < PED < 0) => Low-context innovator wants a skilled professional lux hotel service in rejuvenation phase of life cycle.

(3) If (YED < 0 and PED > 0) => High context and low context with decreased room rate prefer non-lux hotel service in the consolidation and stagnation.

In sum, the high-context imitator (PED < −1) prefers to be safe in the exploration and development phase. The imitator is often focussing on social engagement using word-of-mouth communication, so he is affected by price. When room rates are discounted in the exploration and development phase, the non-lux hotels will attract more high-context imitators.

When room rates increase for the growth in the rejuvenation, the low-context innovator (−1 < PED < 0) would prefer skilled professional design in a luxury hotel brand (YED > 0).

In the steady state of the hotel growth model in consolidation and stagnation phases of the Myrtle life cycle, the PED is positive. There is no skilled professional design for hotels, an increase in room rate leads to an increase in revenue. The innovator and imitator are pleased to stay in a non-lux hotel service with a decreased rate in the consolidation and stagnation phases of life cycle.

For example, a decrease in room rates for tourists in the stagnation in Myrtle Beach at the moment, both of low-context innovators and high-context imitators are pleased to stay in a non-lux service after COVID-19 pandemic with a decreased room rate.

In sum, an increase in luxury room rates would lead to increase revenue in rejuvenation. Conversely, a decrease in non-luxury room rates would lead to increase revenue in exploration, development, consolidation and stagnation.

Hypotheses would be as follows: (1) In the rejuvenation, there would be low-context innovators with a positive PED and a positive income elasticity (YED > 0) of demand; then the luxury hotel room revenue will be increasing when room rates increase. (2) In the exploration and development, there would be the high-context imitators with a positive income elasticity (YED > 0), the non-luxury hotel room revenue will be increasing when room rates decrease. (3) In the consolidation and stagnation, there would be a steady state without skilled professional hotel design when the low-context innovators meet the high-context imitators, the non-lux revenue would be increasing when room rates decrease.

Methodology

Sample

Myrtle Beach is selected in this study because it is the top fastest growing place in the United States in 2022–2023 (US News, 2022). In addition to Myrtle as the fastest growth tourist destination after COVID-19, the study has selected the 300–500 room hotels in Myrtle because the hotels are in the top 15 hotels in the United States after New York, Chicago, DC, Orlando, Los Angeles, Houston, Dallas, Las Vegas, Orange County, Atlanta, San Diego, San Francisco and Boston. There are 234 hotels with 29,918 rooms ranked as the top 15 of the 300–500 room hotels in the US (STR, 2022). The hotels are divided into three phases: Stagnation (April 2017–Nov 2019) with the upscale and above (20%), Development and Consolidation (Dec 2020–Sep 2020) with the upscale and above (42%), and Exploration (Oct 2020–May 2022) with the upscale and above (72%).

Data were collected from Smith Travel Research Data (STR, 2022) that were used for this study as a benchmark to be consistent with the resources of most other academic papers regarding tourism and hospitality. The STR from CoStar Group provides supply and demand and hotel worldwide.

The study has used Cobb–Douglas function model as follows.

$$u(x_1, x_2, x_3) = x_1^a x_2^b x_3^c \tag{4}$$

where u is the utility function of a US tourist staying in the x number of room nights in an new (x_1), developed (x_2) and old fashioned (x_3) with a, b and c as their preference indices, respectively.

The function is subject to the following budget constraint:

$$p_1 x_1 + p_2 x_2 + p_3 x_3 = m_{us} \tag{5}$$

where p is the average daily room rate in new (p_1), developed (p_2), and old fashioned (p_3). The study has selected the average daily rates of the new, developed and old-fashioned hotels in M_{us} is the US gross domestic product per capita (m_{us}).

Lagrange multiplier was applied for the functions (1) and (2), take logs and transform the tourist's utility function into the following function.

$$lnQ_t = \gamma 0 + \sum \beta_Q lnQ_{kt-j} + \sum \beta_Y lnY_{kt-j} + \sum \beta_P lnP_{kt-j} + \sum \beta_{SP} lnSP_{kt-j} + u_t \tag{6}$$

where Q_t is the number of hotel room nights sold for the US tourists at the end of month t during the 425-month period (Jan 1987–July 2022). Y_{t-j} is the per capita income of US at time t–j ($time_t$ lag_J). P_{t-j} is the average daily rate (ADR) of hotel room in new, developed and old-fashioned hotels in Myrtle Beach market at time t–j. SP_{kt-j} is the substitute ADR in the comp set in Myrtle Beach market at time t–j. All prices were deflated by the exchange rate as $P_{t-j} = P_t/EX_t$ where P_t stands for ADR and EX_t for the exchange rate at time t. u_t is the error term for the demand model that captures any other factors related to tourist hotel demand in Myrtle Beach market.

The coefficients β_p are the price elasticities of demand for hotels in new, developed and old-fashioned hotels. The coefficients β_Y are the income elasticities of demand for hotels in new, developed and old-fashioned hotels in Myrtle Beach market. The coefficients β_{SP} are the PED for substitute hotels in the comp set of branded hotels in Myrtle Beach market.

The coefficients βp are the price elasticities of demand for hotels in new, developed and old-fashioned hotels. The coefficients βY are the income elasticities of demand for hotels in new, developed and old-fashioned hotels in Myrtle Beach market. The coefficients βSP are the PED for substitute hotels in the comp set of branded hotels in Myrtle Beach market.

To avoid spurious regression, the study has transformed all-time series variables into stationary by taking logarithm, differencing and autoregressive in autoregressive

distributed lag (ARDL) using E-VIEWS 11. Error correction modelling was conducted to find a long-term cointegration that is characterized by the property of two or more variables moving together through time in a long-run equilibrium. Using Slutsky equation to decompose the culture, hotel brands and life cycle phases in Myrtle through PED and YED in the 7 phases of the Myrtle life cycle are illustrated in Tables 1, 2 and Figure 2.

Tables 1, 2 and Figure 2 indicate that the PED, the substitute effect (SUB) and the income elasticity of demand (YED) have been in a pattern matching with the life cycle phases. In 1989–1993, the PED is positive because the negative income effect was less powerful than the positive substitute effect when price decreased. It is called consolidation for the high-context guests because the income of guests is negative in a small amount (YED = −5.6), and they stayed in the midscale and economy hotels by discounted room rate. In 1994–1998, the

Table 1.
Price and income elasticities of rejuvenation, exploration, development, consolidation and stagnation

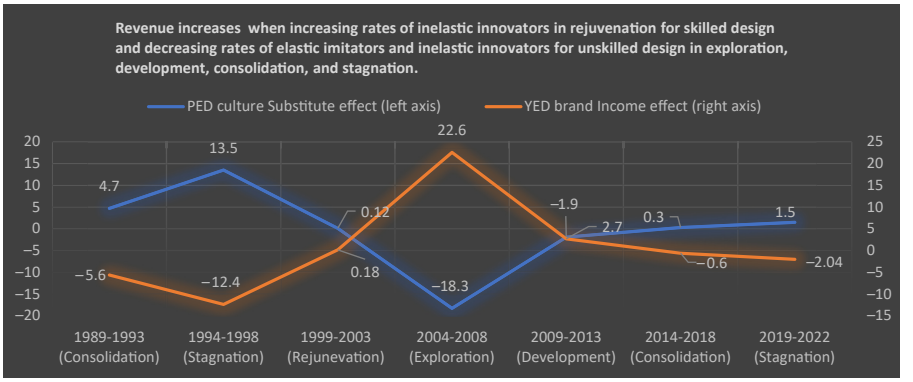
Year	Price elasticity of demand (Substitute effect – culture)	Income elasticity of demand (Income effect-brand and skilled design)	Myrtle life cycle (Total effect)
1989–1993	4.7	−5.6	Consolidation
1994–1998	18.5	−12.4	Stagnation
1999–2003	0.12	0.18	Rejuvenation
2004–2008	−18.3	22.6	Exploration
2009–2013	−1.9	2.7	Development
2014–2018	0.3	−0.6	Consolidation
2019–2022	1.5	−2	Stagnation

Source(s): Author's calculation using E-Views 13

Table 2.
Price strategies for hotel growth based on skilled labor in lux and unskilled labour in upscale

Year	Price strategy in hotel brand	Types of guests	Myrtle life cycle
1989–1993	Decrease for unskilled design	High-context imitator	Consolidation
1994–1998	Decrease for unskilled design	High-context imitator	Stagnation
1999–2003	Increase for skilled design	Low-context innovator	Rejuvenation
2004–2008	Decrease for unskilled design	High-context imitator	Exploration
2009–2013	Decrease for unskilled design	High-context imitator	Development
2014–2018	Decrease for unskilled design	Low-context innovator	Consolidation
2019–2022	Decrease for unskilled design	High-context imitator	Stagnation

Source(s): Author's calculation based on myrtle growth model of the study



Source(s): Author's Calculation

Figure 2.
Coefficients in Slutsky equation – price elasticity of demand in the substitute effect (culture) and income elasticity of demand in the income effect (brand)

pattern of price decreases and less income is similar with greater scope, the phase is changed into stagnation with more substitute hotels of midscale and economy for high-context guests. In 1999–2003, the innovators in low-context culture appeared to explore Myrtle Beach and hotel price increased. The price is inelastic to the low-context guests when their income effect is positive. In 2004–2008, the high-context guests appeared to gain the maximized income effect even though the price decreased so the cycle phase was changed into development. In 2009–2013, the pattern of price decreases and positive income is similar with less scope, the development was changed into consolidation phase. In 2014–2018, the economic crises have changed the culture, the low context was replaced by the high-context guests, so the price decreased. The PED is positive because the negative income effect was less powerful than the positive substitute effect when price decreased. It is called consolidation for the high-context guests because the income of guests is negative in a small amount (YED = −0.6), and they stayed in the midscale and economy hotels by discounted room rate. In 2019–2022, the pattern of price decreases and less income is similar with greater scope, the phase is changed into stagnation with more substitute hotels of midscale and economy for high context guests

The robustness of the study findings is selecting skilled labour in professional design hotel brands could make an increase in demand for leisure transient guests no matter what room rates increase after COVID-19 pandemic.

The findings provide solutions for hoteliers in the early days of post-COVID-19 tourism when includes pricing strategies for suppliers to maximize guest satisfaction while minimizing costs in a single equation that controls the cultural types of guests, the specific stage of the destination life cycle, and the choice of hotel brands they select destinations, and their choice of preferred hotel brands.

In this study, the PED has been used to indicate the price sensitivity of the two types of culture: low context and high context so that the study can identify the phase of the tourist life cycle. The low-context guest called innovator prefers to be challenged in discovering a new place in a rejuvenation phase (Bass, 1969). Conversely, the high-context guest called imitator would like to be safe in the development phase (Butler, 1980). Therefore, the demand of the innovator is often inelastic, and the demand of the imitator is elastic.

In addition, the positive and negative income elasticities of demand have been used to identify the choice of brands in each of the tourist area life cycle phases. The study has applied the growth models of Solow (1987) and Romer (2018) to explain skilled labour in luxury hotels as the key factor to increase hotel revenue. An increase in room rates for high-income leisure tourists in the rejuvenation phase would make both guests and hoteliers happy so that it helps the growth of hotel business in Myrtle Beach. Conversely, a decrease in room rates for low-income business group in the development phase would make both guests and hoteliers happy so that it increases the growth of hotel business in Myrtle Beach.

The study has used Slutsky equation to identify the hotel substitute effect measured by PED and the income effect measured by income elasticity of demand. When room rates increase for the growth in the rejuvenation, the low-context innovator (absPED < 1) would prefer skilled labour in a luxury hotel brand (YED > 0). When room rates are discounted for the growth in the exploration and the development phases, the high-context imitator (PED > 1) would want to stay in a non-lux hotel brand (YED < 0) in the exploration and the development phases.

When hoteliers increase room rates, low-context (PED = 0 < 0.12 < 1) culture guests with the highest income (YED = 22.6 > 0) are willing to pay for a luxury brand during the rejuvenation (low context = rejuvenation). Hypothesis 1 is confirmed. When hoteliers decrease room rates, high-context culture guests (PED = −1 > −1.9) with a high income (YED = 2.7 < 0) in the exploration and development would like to pay discounted room rates (−1.9) for a nonluxury brand during the exploration and development (high context = exploration and development). Hypothesis 2 is confirmed. At the steady state in the consolidation and stagnation, there would be no skilled professional hotel design (YED = −0.6 and −2.04 < 0) when the low-context

innovators meet the high-context imitators, the non-lux revenue would be increasing when room rates decrease. Hypothesis 3 is confirmed.

Discussion

The present study has helped hoteliers to forecast who will be in the hotels when they increase or decrease room rates. When hoteliers decrease room rates, they can attract the high-context group in the exploration and development phase because the guests would increase their income effect during the tourist area life cycle. When hoteliers increase room rates, they can attract the low context innovators in the rejuvenation phase because the leisure guests could gain the new feelings from some new and professional hotel design by skilled hotel designers.

The study has considered the applied ethical processes in discussion regarding revenue management that needs to be considered to the tourist area life cycle to fit the guest demand. The study has considered the applied ethical processes regarding revenue management that would maximize both revenue and customer satisfaction when it set up an increase in room rates to compensate for professional hotel room design or it decreases room rates for low-income imitators in exploration and development.

The future implications of the study can be summarized as follows. (1) After COVID 19, skilled labour reflecting new hotel designs is the key to push the hotel revenue based on the findings of the two Nobel laureates: Solow (1987) and Romer (2019). (2) An increase in price for the low-context transient leisure would increase their income effect during the rejuvenation phase. (3) A decrease in price for the high-context group would increase their income effect during the development phase. (4) There is a steady state when innovators attracted by skilled design of hotel meet imitators attracted by discounted price. (5) Cultural behaviour of guests and skilled design of hoteliers are the first time to use to measure the growth hotel operations.

There are significant relationships among culture (low context or high context), life cycle phases (rejuvenation, exploration, development, consolidation and stagnation) and hotel brand (luxury and non-luxury) in this study when using the growth models of Solow (1956, 1987) and Romer (2018) and the price and income elasticities of demand in Slutsky equation. The PED of a hotel guest is often not changed reflecting a habitual cultural demand which is important for a growth model (Aghion, Akcigit, & Howitt, 2014; Aghion, Bergeaud, Boppart, Klenow, & Li, 2017). The study has used the PED in the Slutsky equation to measure the change of cultural behaviour of the innovators and the imitators when hotel room rates change. The income elasticity of demand (YED) reflects the preference for the hotel brand in the study as well as the demand for a growth model (Akcigit & Kerr, 2018; Akcigit, Celik, & Greenwood, 2016; Arkolakis, Ramondo, Rodriguez, & Yeaple, 2018; Bloom, Jones, Van Reenen, & Webb, 2019; Jones, 2019). The study has used the YED in the Slutsky equation to measure the skilfulness resulting in the technological development in the growth model. The study has identified the steady state of the growth model in the Slutsky equation when there is no skilled design of hotel.

The study findings provide solutions for hoteliers in the early days of post-COVID-19 pandemic tourism when the study includes pricing strategies for suppliers to maximize guest satisfaction; decreasing room rates when there is no new design. Therefore, it helps the hoteliers to forecast who will be in the hotels when they increase or decrease room rates. When hoteliers decrease room rates, they can attract the high-context imitators in the exploration and development phases because the guests would increase their income effect.

This research highlights (1) skilled labour reflecting professional design in luxury hotel brand is the key for the hotel growth, (2) low-context innovators are attracted by skilled design in the luxury hotels in rejuvenation phase, and high-context imitators are attracted by

discounted room rates in the exploration and development; and (3) there is a steady state when there is no skilled design for hotels, the low-context and high-context guests will pay the discounted room rates in the consolidation and stagnation. Therefore, hoteliers can forecast the number of guests in different culture by increase or decrease room rates so they can optimize their revenue based on the relationships.

The contributions of the study to academics and practice can be summarized as follows. (1) Extending the findings of the two Nobel laureates: Solow (1987) and Romer (2019) when identify skilled professional hotel design is the key to push the hotel revenue after COVID-19 era. (2) Increasing hotel revenue through an increase in price for the low-context transient leisure during the rejuvenation phase and through a decrease in price for the high-context group during the exploration and development phases. (3) Developing the Slutsky equation when using the PED to reflect innovator and imitator cultural behaviour. (4) Identifying the steady state in the growth model in the hotel growth model during the tourist area life cycle in Myrtle Beach that includes 7 4-year cycle phases: Rejuvenation (1989–1993), Stagnation (1994–1998), Rejuvenation (1999–2003), Exploration (2004–2008), Development (2009–2013), Consolidation (2014–2018), and Stagnation (2019–2022). Finally, capturing Parker's (1992) pattern of the PED for Myrtle Beach brand life through using autoregressive distributed lag from inelastic innovator demand in rejuvenation to elastic imitator demand in exploration, development, consolidation and stagnation. The difference is Parker's samples are tangible, but the brand in this study is intangible. The study has considered the applied ethical processes regarding revenue management that would maximize both revenue and customer satisfaction when it set up an increase in room rates to compensate for professional hotel room design or it decreases room rates for low-income imitators in exploration and development.

Limitations, conclusions and future implications

There are limitations in the study though. The first limitation of the study is the sample of the study. Myrtle Beach is one of the fastest growing tourism areas in the US, and it has a relatively small geographic area relative to the country. The second one is the short time span of the data even though it is 33 years long (1989–2022). The data cover only over one tourist life cycle, so the time span is relatively short.

In conclusion, the study has provided solutions for hoteliers in the early days of post-COVID-19 pandemic when it includes price strategies for providers to maximize guests' satisfaction with minimum costs in one equation controlling for the guests' cultural types, certain stage of the life cycle of the destination and choice of hotel brands they prefer.

The future implications of the study can be summarized as follows. (1) After COVID 19, skilled labour reflecting new hotel designs is the key to push the hotel revenue based on the findings of the two Nobel Laureates: Solow (1987) and Romer (2019). (2) An increase in price for the low-context transient leisure would increase their income effect during the rejuvenation phase. (3) A decrease in price for the high-context group would increase their income effect during the exploration and development phase. (4) There is a steady state in the consolidation and stagnation phases when both innovators and imitators attracted by discounted price due to lack of skilled professional design for hotels. (5) Cultural behaviour and skilled design of hoteliers have been used to measure the growth of hotel operations.

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