

BIROn - Birkbeck Institutional Research Online

Sims, Julian and Ameen, N. and Bauer, R. (2019) Dynamic pricing and benchmarking in AirBnB. In: UNSPECIFIED (ed.) Proceedings of the 24th UK Academy for Information Systems (UKAIS) International Conference. UKAIS, pp. 517-545. ISBN 9780956027238.

Downloaded from: <https://eprints.bbk.ac.uk/id/eprint/28066/>

Usage Guidelines:

Please refer to usage guidelines at <https://eprints.bbk.ac.uk/policies.html> or alternatively contact lib-eprints@bbk.ac.uk.

Dynamic pricing and benchmarking in AirBnB

Julian Sims

*School of Business, Economics and Informatics
Birkbeck, University of London
Email: j.sims@bbk.ac.uk*

Nisreen Ameen

*School of Electronic Engineering and Computer Science, Queen Mary University of London,
London, UK
Email: n.ameen@qmul.ac.uk*

Robert Bauer

*School of Business, Economics and Informatics
Birkbeck, University of London
Email: robert.k.bauer@googlemail.com*

Abstract

Since Airbnb opened in 2008, renting private accommodation has evolved into a strong market presence worldwide. Recent research has focused on whether this new supply will negatively affect hotel performance. Studies mainly focus on market performance and professionalization, but there is an absence of research regarding available knowledge and experience of pricing considerations. This research focuses on pricing decisions for individual apartment rental, examining the relationship between Airbnb pricing and knowledge transfer from related fields, such as hotel revenue management, benchmarking and online travel agencies. The primary research was conducted through semi-structured interviews with industry professionals, complemented by data examples that show the relevance of individual pricing. Findings confirm that applied revenue management and benchmarking concepts can enhance a host's booking performances. Motivation and pricing experience amongst professional/non-professional hosts differ. Benchmarking professionals identify that market research becomes a key activity for running a successful business.

Keywords: Dynamic pricing, Gig-economy, AirBnB, sharing economy

1.0 Introduction

Despite the hotel industry being the largest provider of accommodation supply, disruptive players have entered the industry and forced providers to adapt within this fast-changing environment. The sharing economy has become a new trend. Their largest industry provider - Airbnb - has been growing significantly, since it was founded in 2008. According to STR (2016), Airbnb listed 3 million accommodations globally in November 2016. This scale illustrates how impactful Airbnb has become in a short time and continues with strong supply growth. Consequently, Airbnb is perceived as a disruptor to the traditional hotel industry (Guttentag, 2017).

Airbnb has emerged as a powerful platform, with almost three times more supply listings than the largest global hotel chain, Marriott International (Haywood, 2017). Rapid growth and development in the sharing economy have highlighted the need for training and learning between the established hotel industry and the sharing economy, in particular Airbnb (Li et al., 2015). The objectives of this research are to determine to what extent dynamic pricing strategies and benchmarking practices are applied in the sharing economy of accommodation and whether benchmarking and dynamic pricing concepts can be applied to Airbnb.

The most recent trend in the hospitality industry is the change in customer needs in relation to the sharing economy and consumerisation of supply, extending accommodation into personal homes (Staff, 2017). Compared to the hotel industry, Airbnb has emerged as one of the most powerful platforms for private accommodation supply (Haywood, 2017), a trend that expanded very quickly since Airbnb was founded. The past decade has not only seen rapid supply development in this segment of the sharing economy, but also renting private accommodation has become more commercialised.

Surprisingly, the effects of pricing in AirBnB have not been closely examined, especially the concept of 'Dynamic Pricing'. Dynamic Pricing methods aim to optimise pricing in response to supply and market demand changes. Dynamic pricing is also referred to as Revenue Management (hotel industry) (Zheng & Forgacs 2017) or Yield Management (airline industry) (Smith, Leimkuhler & Darrow 1992). In its current context, it refers to the adaptability of price according to fluctuating variables: selling the right product, to the right customer, at the right time, for the right price and through the right distribution channel. American Airlines was first to introduce the concept of Yield Management in 1987; after which it was quickly adopted and developed further by other industries, such as the hotel industry, and most recently, influences are applied in the sharing economy of the hospitality industry. The hotel industry benefits from years of experience, data resources and sophisticated revenue management systems applied by trained revenue managers. Airbnb, on the other hand, is operated mainly by private hosts.

This study obtains qualitative data to address knowledge gaps of pricing implications for Airbnb hosts and to understand possible benefits from key revenue management principles and industry benchmarking. The discussion with industry experts shares individual findings and common themes of strategic pricing that apply to Airbnb operations, such as rate restrictions, market research and monitoring of performance data. This research contributes to better understanding of pricing strategies used by industry experts, demonstrating relevance of benchmarking and success of revenue management concepts, and by AirBnb hosts.

1.1 Main Research Question

To what extent are dynamic pricing strategies and benchmarking practices applied in the sharing economy of accommodation; are concepts of dynamic pricing and benchmarking transferable?

2.0 Hotel & Airbnb market comparisons and pricing considerations

Airbnb is one of most recent trends in the hospitality industry (Haywood, 2017). There has been little quantitative analysis of this topic; the STR report is one of few that analyses data provided by Airbnb directly. In this study, Haywood (2017) suggests that Airbnb supply listings outnumbered the largest hotel chain – Marriott International - by almost three units to one in 2017.

Haywood (2017) finds that despite the recent increase of Airbnb supply, hotels in the U.S. have seen consistent revenue-per-available-room (RevPAR) growth for 77 consecutive months with 117 million room nights sold. Haywood (2017) confirms that demand patterns are highly dependent on market dynamics. Airbnb generally showed highest performance in markets with high hotel occupancies. As a result, the occupancy for Airbnb was significantly lower than for hotels in 2017. Consequently, the demand for Airbnb compared to its supply is still relatively low.

A number of studies have attempted to evaluate the impact of Airbnb for hotel occupancies and pricing. Zervas and Proserpio (2017) find Airbnb has a measurable impact on hotel revenues, serving as a substitute for hotel stays during specific

demand periods. The impact, however, depends on the region, market segment and seasonal cycles. Hoteliers either perceive peer-to-peer platforms such as Airbnb serve a niche market, or fulfil complementary segments of hotel demand.

Zervas and Proserpio (2017) indicate that significant seasonal fluctuations in Airbnb supply correlate with hotel demand during peak demand periods. The fluctuation of supply, in combination with special events, limits hotel pricing power. However, Zervas and Proserpio (2017) conclude that the sharing economy is significantly changing consumption patterns, and in the example of Airbnb, results in a negative impact on hotel revenues.

Similar to Zervas and Proserpio (2017), Hooijer (2017) analysed the largest Airbnb sample markets in South Korea but found no impact on hotel revenue.

2.1 Airbnb and disruptive innovation

In contrast to Hooijer (2017), Guttentag (2017) found performance shifts within the industry when analysing specific hotel classifications compared to Airbnb, describing Airbnb as “disruptive innovation”, where 4- and 5-star hotels are priced much higher than entire homes or apartments in Airbnb. The results suggest that private Airbnb rooms are more comparable to 1- or 2-star hotel classification in the lowest price brackets.

Guttentag (2017) concludes that Internet technology, cost savings, household amenities and local experiences provide new attributes, which have the potential to disrupt the traditional accommodation sector. According to Zervas and Proserpio (2017), 10% growth in Airbnb supply listings, results in 0.35% decrease in monthly hotel room revenue.

Further supporting the disruptor label, Henten and Windekilde (2016) examine transaction costs for the particular examples of Uber and Airbnb in regard to firm growth objectives and suggest the “old models” (hotel and taxi) will suffer from new business models in the foreseeable future, but they will not be “entirely eradicated”. The sharing economy has become more commercial, shifting from non-profit sharing to for-profit sharing over time.

Oskam and Boswijk (2017) describe Airbnb as a challenging innovation, which will require a response from the traditional hotel industry, especially in booming destinations, the risk for commercialization is high and counters the benefits of innovation. They argue that the sharing economy has to be understood as a “market transaction”. As a result, they see business and leisure travel becoming more and more a blurred segment. Airbnb has been increasing its focus on the business segment by using strategic partnerships, such as Concur, to widen their reach into the hotel market share (Weed, 2015).

The existing literature shows that pricing is a major focus for Airbnb and it is subject to comparison with hotels in the hospitality industry (Weed, 2015; Oskam and Boswijk, 2017; Zervas and Proserpio, 2017). However, further research is required to analyse the impact of how pricing is considered by Airbnb and its impact on hotel performance. Hotel revenue management and benchmarking in relevance to Airbnb

Rohani (2012) defines dynamic pricing as 'making price changes in response to market demand'. He suggests that dynamic pricing not only offers higher price ranges, but sets rates flexibly according to demand and take more pricing influence when market supply is limited. Linking this to the performance impact of Airbnb, dynamic pricing does not only apply to a change in demand, but also to changes in fluctuating supply. Other authors confirm the importance of market fluctuations. Cleophas (2016) describes revenue management as the prime example of planning under uncertainty. Revenue management relies on forecasting future demand as well as making the right assumptions for setting appropriate parameters as part of strategic planning. Cleophas (2016) elaborates that most revenue management models consider a fixed capacity and therefore do not factor capacity changes into their model. Therefore, efficient revenue management aims to absorb the impact of uncertainty to find flexible, as well as stable, solutions. Kimes (2010) analysed survey data from over 500 hotel revenue management professionals to find common strategic directions for the future and identified ‘analytical skills’ to be the most important characteristic of future revenue management professionals. As this study focused on professional revenue managers, it raises the question of whether analytical knowledge is equally available and applied in the sharing economy. Hwang and Lockwood (2006, p.338) find small and medium

size enterprises (SME) in the hospitality industry have higher knowledge barriers and fewer resources, often resulting in “poor strategic planning”. Hwang and Lockwood (2006) suggest this is a fundamental issue for SMEs, as the hospitality industry is subject to sudden and unforeseen changes in demand.

Yeoman and McMahon-Beattie (2017) describe revenue management as more than just operational research and algorithms, but as a holistic approach encompassing consumer behaviour. Therefore, it is not only the ability to sell the right product or service to the right client, at the right time and for the right price, but more importantly to understand consumer behaviour. This is essential for making the right pricing implementations and developing a pricing strategy.

Taken together, these studies support the notion that revenue management relates to benchmarking and market knowledge. Trento et al. (2016) explain that setting the right pricing strategy requires identifying the value proposition and pricing expectations of the customer first. Demand-based pricing and customer willingness to accept a price requires benchmarking on several levels: price value for the customer, customer expectations associated with each value, price alternatives and substitutes.

2.2 Technological enhancements in the hospitality industry

Revenue management and benchmarking are crucial to understand consumer demand, uncertainties and demand fluctuations. The airline and hotel industries have developed technological advancements, big data processing and mathematical algorithms for better pricing decisions (Yeoman and McMahon-Beattie, 2017). These concepts have been mimicked by secondary industries; Airbnb has recently rolled out their own rate recommendation tool.

Lee (2015) describes Airbnb's price recommendation tool as a machine-learning tool that suggests pricing according to location, travel trends and listings. That Airbnb developed an independent machine-learning system shows on one hand the complexity around benchmarking and dynamic pricing of this industry, and on the other hand tries to simplify the effort of research to a level of convenience for the end users. Lee (2015) states the tool's main function is to adjust a host's listing price for a higher likelihood of securing a reservation. The evidence reviewed here seems to

suggest revenue management is mainly applied for higher occupancy rather than better pricing independence for higher yields. Airbnb itself confirms this argument in its own blog (Blog.airbnb.com, 2017): "When you see a tip, the model gives you insight on whether you could earn more money while maintaining your likelihood of getting booked, or you could increase your likelihood of getting booked by lowering your price". It is possible that Airbnb has a stronger interest in higher occupancy levels over the actual total price achieved. Higher market occupancies seem to benefit Airbnb.

2.3 Rate determinants and influences on Airbnb

Denning (2014) investigates the main factors that determine price setting in the sharing economy suggesting that user values have to be understood first. Hotel users "not looking for friendships" are unlikely to stay with Airbnb and are less price-sensitive. Furthermore, the costs and service level for a hotel stay are significantly higher than Airbnb. Despite the higher cost of accommodation for hotels, the reliability, brand reputation and service standards remain a more important factor than price alone.

The effect of discounting results in benefits for the user and generally higher ratings for the host. Rohani (2012) found dynamic pricing resulted in higher response rates than uniform pricing. This shows that dynamic pricing can be used in customer engagement and lead to higher values. Choi and Mattila (2009) confirm that consumers are aware of price differences and seem to accept the application of dynamic pricing, as it gives the consumers a choice over the price. To illustrate the result, consumers may receive a lower rate for accepting early bookings or minimum day restrictions for a reservation.

2.4 The influence of ratings to performance

A considerable body of literature has developed around the theme of pricing in regard to ratings. Teubner, Hawlitschek and Dann (2017) find revenue generation depends on how much demand a particular host is able to attract at a specific price. The reputation of a host is therefore instrumental for converting booking requests into actual reservations. Capitalizing on high reputation opens more opportunities when selecting guests and raises their willingness to pay higher rates. These results suggest that

Airbnb ‘Superhosts’ can leverage higher rates without losing significant demand, compared to hosts without such a title.

This finding is contrary to Neumann and Gut (2017), who find that online ratings tend to be inflated and are therefore not a reliable indicator of quality. They also find high rates can result in negative ratings, which may bring down future rates and suggest that building a good online rating in the beginning can result in raising prices.

Concerns have been expressed about general knowledge gaps for price setting by Airbnb hosts. Li et al. (2015), find a knowledge gap between individual non-professional Airbnb hosts’ and professional revenue managers results in substantial differences in operational and financial performance. Supply managed by professionals achieved on average a 16.9% higher daily revenue and 15.5% higher occupancy rate. In addition to the performance results, professionally managed supply is also 13.6% less likely to exit the market (Li et al. 2015): Demand is less effectively managed by non-professionals, for example during conventions, festive seasons or holiday periods; non-professional hosts perform only minimal pricing adjustments. In contrast to the hotel industry, available supply is continuously adjusted depending on the booking horizon, days left and changes in demand pick up. Li et al. (2015) conclude that it takes ownership and control in order to operate apartments efficiently. Supply and distribution management is a key task for revenue managers, certain concepts can be applied to Airbnb.

2.5 Single supply distribution and application of outsourced services

Revenue management decisions generally calculate the cost of distribution into their demand forecasts and therefore still aim for profit optimization. Distribution channels vary in cost and attract differently customers, which has to be considered as customers differ in their price-sensitivity and loyalty and flexible management of distribution channels help to direct business to those channels that are most profitable (McGuire 2009). . The key for profit optimization can be achieved through integrated pricing, marketing and distribution strategy. Revenue forecasting, followed by promotion strategies through marketing and customer-centric pricing will result in willingness to pay the cost of rental and increase overall demand levels (McGuire 2009). Airbnb

hosts have fewer available options to fine-tune their distribution strategy, as they rely on the integrated marketing and distribution of Airbnb.

Cost management of an Airbnb booking benefits the hosts more than the guests, due to the booking payment contributions to Airbnb (Zervas and Proserpio 2017). While hosts are generally charged only 3% cost of processing payments, guests are charged a much higher mark-up, up to 12%, when completing the booking. Online travel agency commissions are generally applied to the total room rate, which directly affects hotels' profit margin.

The knowledge gap for pricing around Airbnb has created new businesses that commercially provide pricing recommendations and distribution of Airbnb supply, e.g. Airsorted, Hostmaker, Pass the Keys etc., opening opportunities for Airbnb hosts with less pricing experience than professional revenue managers (Loescher 2017). Hosts have neither revenue management teams on staff nor extensive data sources available to support precise forecasting and pricing decisions, thus services provided by outside companies can help hosts with pricing decisions. These services benchmark to other vacation rental sites and analyse the wider impacts of dependencies, such as seasonality, airline arrivals, weekday/weekend patterns and the impact of events. However, Loescher (2017) points out that these services have their price added to every booking, thus increasing the overall costs, decreasing profit margins. As a possible solution, Loescher (2017) suggests that hosts can remove their listing when demand is low and apply high rates when demand is identified as strong and inelastic.

3.0 Data Collection Methodology and Limitations

This research is conducted as an exploratory study using primary qualitative data from semi-structured interviews. In addition, the discussion is supported with data examples taken from a rate scraping exercise and hotel performance data. The research combines discussion themes with data examples and visualizations, to underline the relevance of the arguments and relate the findings back to the main research question and literature review.

3.1 Qualitative Research

Qualitative data for this research was collected through interviews within a specific target population and industry segment - non-probability purposive sampling. The purpose of conducting interviews is to gain a higher understanding of the transferability of specialized knowledge from the hospitality industry to Airbnb.

Issues, such as price discrimination, restrictions, booking patterns or seasonality have been addressed in the interviews. As part of the rate scraping exercise, the examples are used to showcase specific interview answers and their application within the scraped data set.

In order to gain more understanding of the decision-making behind pricing, primary data has been collected through semi-structured interviews with sixteen industry professionals from four main knowledge groups: revenue-management, benchmarking, online travel agencies (OTA) and Airbnb hosts. The four groups are most relevant to evaluate pricing considerations and benchmarking within the hotel industry. Common themes for the interviews were chosen according to the expected expertise the individual groups bring to the discussion. The interview outlines were semi-structured, in order to allow respondents to provide detailed answers within their field.

Most interviewees have requested their answers to be treated anonymously; certain questions could therefore not be specified in the interviews.

3.2 Interview Outlines

- Central to the discipline of pricing are the themes around experience, training, market knowledge, independence of decision making, forecasting, setting of restrictions and the reasons for renting properties. An outline of these themes according to the target groups is provided below and will be elaborated in the discussion section.
- The interviews were conducted over the phone, on Skype or in person. All interviews were recorded after approval was provided prior to the first question.
- The recordings of all interviews were transcribed. Due to confidentiality, the interviewee names are replaced by a category and an abbreviation.
- Depending on the details provided, the interview times ranged between 8 – 20 minutes.

3.3 Interview Target Groups and Key Themes

Perspective 1: Airbnb Hosts

- Evaluation of the base price
- Learning from experience and adapting to price changes
- Pricing considerations and dynamic pricing
- Use of third-party service providers

Perspective 2: Revenue Managers

- Advantages of revenue management in the hotel industry
- Application of revenue management in the sharing economy of accommodation
- Evaluation of revenue management concepts applied for Airbnb
- Further pricing strategies, analysis tools and analytical concepts

Perspective 3: Benchmarking Experts

- Comparability of supply between hotels and Airbnb
- Disruption of Airbnb on the current hotel industry
- Use and benefits of performance benchmarking
- Pricing strategies for Airbnb through benchmarking knowledge

Perspective 4: Online Travel Agency Experts

- Influence of OTAs on Airbnb
- Benefits of OTAs and use of multiple distribution channels
- Knowledge transfer from OTAs into Airbnb

The quantitative research is limited to certain specific examples of availability and pricing between Airbnb and hotel performance, for example by comparing availability and pricing of selected Airbnb properties during an event period against hotel occupancy and average daily rate performance during that same period. As part of the quantitative analysis, a total of 3036 hotel and Airbnb data points were collected.

All data visualisations were built in Tableau Desktop, version 10.2. The Airbnb apartments used in the rate scraping exercise are not related to those of the interviewees that participated in this research but merely used as illustration.

3.4 Sampling

As part of the Airbnb rate and demand analysis, a convenient sample of 15 properties is analysed in three locations in London. A manual approach for rate scraping was used by visiting the sample properties on the public Airbnb website (Airbnb.com) manually recording their performances and changes. For a month and a half, starting

in April 2017, each property was recorded (rate scraping) in terms of availability, published rate for current day and same day the following month (day-to-day comparison). The data was collected in Microsoft Excel tables and further analysed in Tableau Desktop.

Additional information recorded from the website were the “limited availability” notifications when available market supply dropped below 30 listings. This exercise allowed for the analysing of current day rates, occupancy and market availabilities for the three event locations in London.

The scraped data was compared to STR Trend Reports, analysing the same location criteria and comparable sample within the economy and midscale market segment. The subject listings and hotels are within 1.5km proximity to the event venue. Hotels were selected as a convenient sample within the specific market class. Airbnb supply was selected based on listings showing up first through the location search on the Airbnb website. For the purpose of this analysis and better comparability, Airbnb rates were indexed to their average advertised rates in order to get a clearer understanding of rate changes. The rate for Airbnb apartments ranges from 30 GBP to approximately 200 GBP. The analysis therefore used indexed performance in order to test the elasticity of the rates that fluctuate by the day. Due to the limited sample in this exercise, Airbnb market averages are less representative within the total available supply. Indexes therefore allow a more representative perspective on performance changes.

In order to guarantee that no individual hotel performance can be isolated, STR statistics have to follow strict reporting guidelines. All guidelines around sufficiency and isolation have been fulfilled for all ad-hoc Trend Reports used for this research. The data therefore does not reveal individual hotel performance. An STR ad-hoc set has to include a minimum of 5 properties. In addition, the room count share must not exceed 50% (Property) /50% (Affiliation) /75% (Parent Company) /75% (Owner Company) /75% (Management Company) of the total room count share.

3.5 Sample Locations

The following locations have been chosen as case studies for analysis. The selected locations show generally high demand dependencies and event details are publicly available.

O2 Arena: The O2 Arena is located on the Greenwich Peninsula in East London. The arena functions as an exhibition space and event venue with a capacity up to 20,000 spectators.

Wembley Stadium: Wembley Stadium is located in northwest London, Borough of Brent. It is the largest sports venue in London. Besides major sport events, the stadium hosts large concerts.

ExCeL London: Exhibitions and international convention centre. London, Borough of Newham. The convention centre is located in close proximity to the banking district Canary Warf and London City Airport.

4.0 Data analysis

Pricing determinations are dependent on many different factors, such as market supply changes (Zervals and Proserpio, 2017), customer price perception (Trento et al., 2016) or ratings (Teubner et al., 2017). Li et al. (2017) identify a knowledge gap between individual non-professional Airbnb hosts and professional revenue managers, which results in differences in operational and financial performance. The following section investigates four perspectives on pricing experience and knowledge spillover into Airbnb. The aim of the semi-structured interviews with industry professionals and hosts is to gain better understanding of pricing, benchmarking and distribution concepts in Airbnb.

4.1 Perspective 1: Airbnb Hosts

Evaluating the base price of an apartment with motivation for a cash bonus

The participants, on the whole, demonstrated that Airbnb is not perceived as a 365-day business, unlike hotel room rentals. The interviewees illustrated their personal motivation towards the work and time they put into apartment rental, which differs from host to host. ABBH1 has no concern about "not having full occupancy", as long

as the price achieved is high on the anticipated days of rental. Using Airbnb as a "bonus" or extra cash, instead of a "necessity of cash flow" can therefore be riskier for securing a reservation, when prices are set too high.

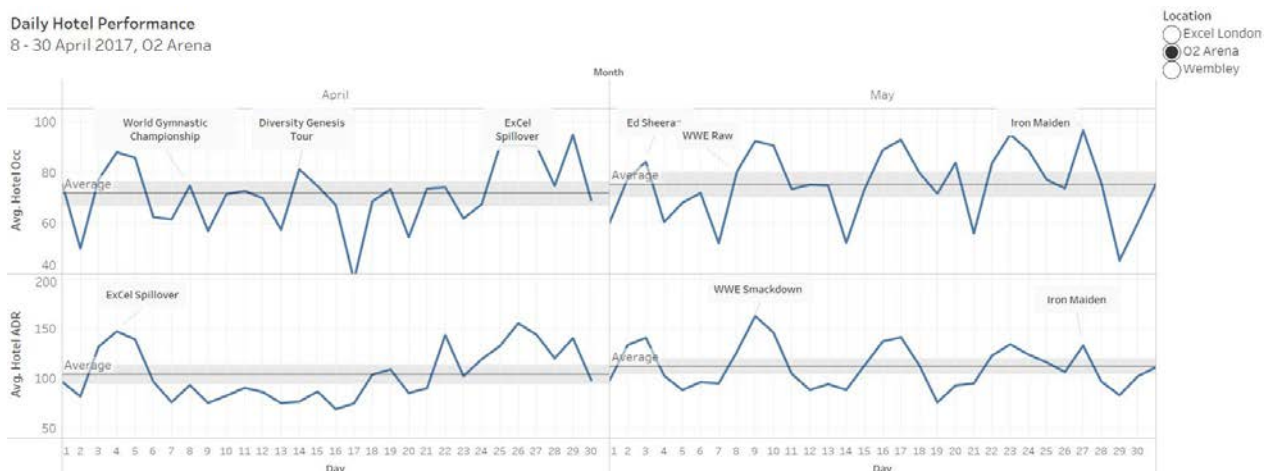
The aim of ABBH2 is to rent out on particular days and is therefore willing to accept bookings at lower rates, as long as they fill the anticipated day requirements. ABBH2 perceives Airbnb's price recommendations and push-notifications as helpful to fill supply, especially ahead of time. "I find that what Airbnb is recommending is good, it's correct." This price setting is motivated by filling occupancy on desired dates rather than achieving high rates, or in the worst-case scenario losing an opportunity if the desired booking window cannot be filled.

When asked about the initial price setting of the listing, ABBH3 described her knowledge as "in all honesty, my dad told me the price." Her apartment rental is seasonal and rates seem to follow a regular pattern; she describes "my rates are different in winter to what they are in summer". The price setting in seasonal markets implies certain price expectations as to what can be achieved and how many days can be used as a bonus income for the duration of a season. The statement suggests that there are different levels of experience amongst hosts around simply renting their supply and aiming to maximise profits.

Commenting on initial price setting, ABBH4 stated, the "outgoing costs play part of how much I would charge to rent the room". In addition to the fixed costs it seems to be important "looking what others charge and the alternatives to Airbnb, which could be hotels, hostels and other accommodation".

Data example*: Use of hotel benchmarks to understand market impacts

The data by STR shows the average hotel occupancy and ADR for an economy & midscale ad-hoc set 1.5km diameter around the O2 Arena. The performance shows how hotels achieve above-average occupancy rates for specific event periods. Airbnb hosts can use hotel performance data to benchmark their demand patterns and significance for events impacting Airbnb demand. Events such as WWE (92.4% OCC) or the Iron Maiden concert (96.5% OCC) illustrate how performance is increasing and impacting both occupancy and rate.



4.2 Learning from lost opportunities and playing with data

The majority of interviewees reported that initial market research is common practice for price setting and testing, after signing up as a host. ABBH3 and ABBH4 operate in seasonal markets, which show high demand and increased rates during high season and low demand and competitive undercutting of prices during low season.

Most interviewees echoed a willingness "to play around" with the price in order to guarantee a reservation. ABBH1-3 consider price decreases in order to secure a booking. ABBH2 noticed that Airbnb users are often price-sensitive and that small price decreases can result in a reservation shortly after. Especially the target market of Airbnb is attracted by low rates; "Backpackers, young people, students, they even think of one Pound, and if the price is two Pounds less then they will book that."

An alternative pricing approach was suggested by ABBH1, setting the price very high towards a target date and then reducing the rate in small and consistent steps. This can result in high rates ahead of the booking, however it carries the risk of not selling out during a particular time.

There were concerns about the Airbnb pricing tool and rate recommendations. ABBH1 and ABBH4 have identified that Airbnb's price recommendations are set too low and are therefore not followed for achieving higher yields; "the Airbnb recommended price is so low that you are pretty much guaranteed to get somebody if you sell straight from that price" (ABBH1). Independence of decision-making

requires independent market knowledge, learning and adjustments from previous rentals.

ABBH4 answers the question on "how did missed opportunities influence your future pricing strategy?" by saying, "generally it is the case of under-pricing has resulted in learning and increasing the price for the same or similar events the following season or year".

4.3 Establishing market benchmarks and evaluating events

Apart from seasonality affecting demand changes, hosts are aware that events can impact the demand on their market. Events can result in a much shorter booking window and increase the price for the duration of an event. Even though this kind of information is publicly available, not all hosts seem to be aware of the events that impact their business most. ABBH3 answers, "I always find out from the travellers that the event is up. Like now the Adele concert, people are writing me because of the concert".

ABBH4 concluded: "the main lesson learned is to try and increase your knowledge of these events coming up in time to adjust your pricing". Awareness about events that do not follow the regular seasonal or weekly patterns can influence the revenue potential of an apartment.

4.4 Dynamic pricing and discounting considerations

Every Airbnb apartment requires a base price for weekdays and weekends. After initially setting this fixed rate the host decides whether to switch on dynamic price recommendations or keep the rates fixed throughout the calendar. All interviewees were using the dynamic price setting. Hosts generally experience the pricing tool as easy to understand and "play around with it and see what is working and what isn't" (ABBH3). Playing with the Airbnb internal data may help hosts to get more experience around their property and market performance, though "playing" with the data instead of being able to derive informed decisions from larger data sets and advanced systems may still result in lost opportunities for price setting or in responsiveness to market changes.

Data example: Use of flexible rates when competing for demand

The rate scraping data example visualises the index of two Airbnb participants compared to indexed hotel pricing in ExCel, London. While data participant Airbnb3 offers static rates (e.g. 8-13 April, 16-20 April) Airbnb4 lowers the advertised rates on several days where hotel occupancy falls below the average (11 & 12 April, 23-25 April). Lowering rates during lower demand periods aims to increase occupancy rates, often by undercutting direct competitors.



ABBH4 experienced that pricing does not only affect high demand periods, ABBH2 and ABBH3 decide to offer discounts if guests stay longer than their usual minimum nights.

All interviewees operate their apartment more as a hobby and opportunity for some “extra cash”, rather than running it as a professional business. This shows that Airbnb rental is triggered by different motivation for optimizing rates. None of the four hosts operates more than one listing on the Airbnb platform or advertise it through other platforms. The general consent about using third-party service providers or pricing agencies, such as Airsorted, Hostmaker or Pass The Key, were not perceived as necessary for their capacity.

Data example: Static rates vs. dynamic pricing

The graph visualises the rate performance advertised on individual Airbnb apartments compared to the daily hotel ADR. For the purpose of comparability, the rate performance is indexed to the average rate performance of the month April & May. The graph shows how hotel rates fluctuate between high and low performances while Airbnb supply shows more or less static rates, as advertised on the platform.

This supports the assumption that dynamic pricing techniques are not generally applied. Further research and larger sample is required to confirm a general trend.



Summary: Perspective 1 – Airbnb Hosts

- Airbnb is not perceived as a 365-day business for non-professional hosts. Therefore, motivation and pricing experience amongst professional/non-professional hosts differ strongly. Dates often more important than maximising revenue.
- Price setting is either motivated by filling occupancy on desired days and accepting a lower base rate, or renting out the apartment for a higher rate and risking supply to be empty.
- The interviewees do not commonly agree about the price recommendation tool provided by Airbnb. While some hosts perceive it as a good rate recommendation, others identified the rates set as too low.
- Seasonality and events were identified as main influences for market demand changes. While information is publicly available, not all hosts are aware of the impacting events in their market.
- All participants use the dynamic pricing feature that Airbnb provides. However, it seems that “playing” with rates and booking is performed more commonly than applying strategic pricing decisions.
- None of the participants has used third party service providers to manage their supply. While they see advantage in their services, they seem more applicable for rentals of several properties.

4.5 Perspective 2: Revenue Managers

Success factors of revenue management

While REVM1 describes revenue management (RM) simply as "changing the rate according to demand", REVM3 explains the success of RM as "knowing your business and knowing the hotel and history". Analysis of historical performance and consistently analysing "prices for every single business mix" is essential for reacting and refining a hotel's strategy. REVM4 sees the success of RM in reviewing the numbers at all times and "creating the pickup for the year" in order to predict and adjust future performance.

REVM2 takes a more detailed approach explaining the improvements of RM over time. The definition of revenue management has expanded from "selling the right room at the right price to the right customer" into a more granular focus: "selling the right room, with the right restrictions, for the right lengths of stay, to the right customer and so on". He concludes that practicing revenue management became highly complicated and should therefore be defined best as "science of maximising revenue by all means necessary".

4.6 Pricing considerations for Airbnb hosts

The second set of questions asks how RM practices can help Airbnb hosts make better business decisions. The common perspective is to keep things simple and manageable. REVM2 illustrates that "revenue management came first before any tools". The revenue management cycle – monitor, forecast, optimize, control - can even be simplified as "put many trackers on Microsoft Excel spread sheets and monitor them". REVM2's advice is to "know your own data. This is something you don't need a study degree for to keep tracking on your bookings". He also suggests that Microsoft Excel is commonly available to help "understand your seasonality, when you have the most booking requests".

The main difference between hotels and Airbnb is the operating supply. REVM1 points this out as the main difficulty - "with one bedroom you only have one chance to get it right". He further elaborates that regulations may restrict a host to only rent a property for a certain number of days per year. In this case the main consideration is "when to allocate". This can either be done throughout a season or by "dividing it into certain periods within the year". REVM4 recommends tracking high demand periods

and "creating a low-season, mid-season and high-season", with a need to "know which day of the week is the highest".

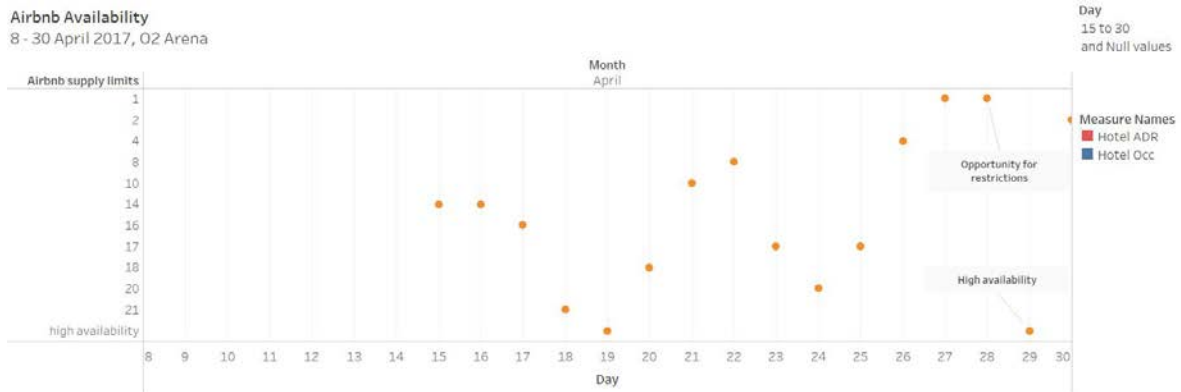
REVM1 emphasizes particularly on market research and location: "maybe there is a concert venue nearby that could potentially lead to more demand, maybe a sporting venue, maybe a wedding venue". Demand does not always derive from the obvious and can lead to a competitive advantage when segmenting the right target market.

REVM2 introduces the concept of applying restrictions to Airbnb. "The simplest restriction would definitely be the minimum lengths of stay". Using a simple tool, such as a demand calendar, can help clarify particular demand periods: "you should not unrestrictedly keep your apartment available for one-night stays, because the one-night stay may ruin your entire high season". Further restrictions suggest keeping short lead-times for highest anticipated demand periods, "closing for arrivals on certain days of arrivals or departure" and applying dynamic pricing to "flex your rates towards the demand". The following data example shows the practical relevance of setting restrictions during high demand periods.

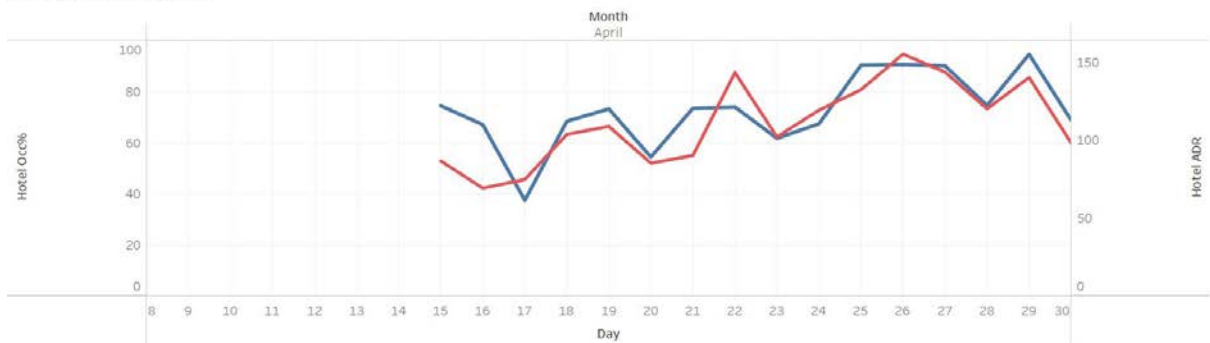
Data example: Opportunity for Airbnb to apply restrictions

Days with high occupancy rates for hotels do not always follow the same trend line for Airbnb supply. The supply on 29 April was indicated as "high availability" on the Airbnb website, while at the same time hotels reached almost 100% occupancy levels around the O2 Arena in London. Revenue Managers advise using minimum length-of-stay restrictions to bridge the high and low demand days for Airbnb and only accept bookings that cover low demand days. These restrictions help to achieve higher occupancy rates over longer time periods and at the same time adjust pricing to achieve higher rates, as REVM2 confirms.

Airbnb Availability
8 - 30 April 2017, O2 Arena



Hotel Occupancy Level
8 - 30 April 2017, O2 Arena



The discipline of revenue management demonstrates that it requires full-time attention to data collection, interpretation and both proactive and reactive decision-making with thorough planning. Moreover, concepts and tools can be simplified overall and still allow Airbnb hosts to make independent and informed decisions. The spill-over of knowledge mainly lies in the experience a host gains over time about their own performance, understanding their specific market segment and making the right decisions through data.

Summary: Perspective 2 – Revenue Managers

- The discipline of RM is perceived as a full-time commitment requiring high attention to detail, continuous monitoring of performance and decisions driven by data. RM aims to maximise revenues through the distribution and pricing of all available supply.
- Understanding RM concepts is more important than understanding systems, as performance (listing, competitors, market) can be recorded in Microsoft Excel.
- Restrictions are key concepts to maximise rate opportunities or secure higher booking volumes for specific demand periods, when guests are willing to pay a higher rate.
- Revenue managers suggest comparing data to alternative sources in order to gain better understanding of demand changes.
- The significant difference between hotels and individual Airbnb supply is that hosts mostly have only one chance to maximise their revenue. Strategic decisions are essential to achieve higher rates and occupancies.

4.7 Perspective 3: Benchmarking Experts

Comparisons between the trend Airbnb and the hotel industry

The interviews conducted with benchmarking experts from different fields within the hospitality industry showed that answers differ and are less streamlined compared to the answers provided by revenue managers.

BEN1 and BEN3 commonly agree that Airbnb and hotels can compete in the limited service segment, such as hostels, economy and midscale hotels, but do not see Airbnb competing in higher tier segments such as luxury. BEN1 explains that “people are willing to pay a lot of money for these services and this is something the sharing economy does not really offer”. In regard to the luxury hotel segment BEN3 notes that specific markets, such as the upscale market in Paris, have seen competition through Airbnb for luxury listings that also offer additional services, for instance concierge services. Commonly the interviewees see Airbnb as a new type of supply available in the industry. BEN4 mentions that the “Airbnb phenomenon” has opened up the market’s client base over time and is not only attracting young travellers, but has now expanded to other customer types as well. Benefit through benchmarking

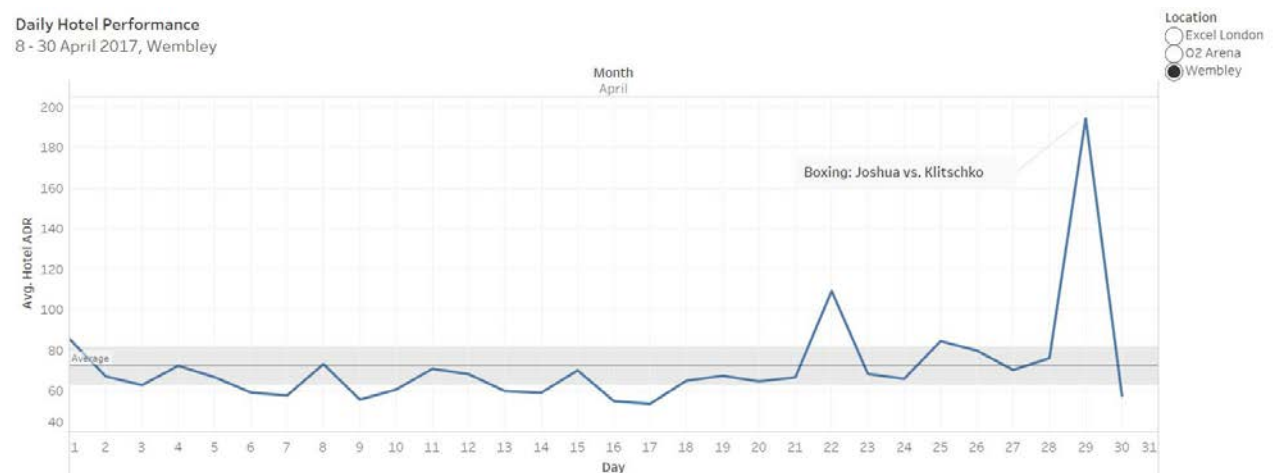
The overall response to the question of whether Airbnb hosts can benefit from benchmarking practices was affirmative. “If used wisely, it can help them to increase their occupancy and rates” (BEN1). BEN2 specifies that knowing “your market and the more you know about your competitors” the better your yield possibilities become, which will then require “flexible” rates.

BEN3 suggested that the diligence of benchmarking “depends on the goals of the host”. A host who is “just looking for a little bit of extra cash” would likely not be concerned about optimizing rates or strategic benchmarking, while a host looking for long term rental and income would have to take a more strategic approach with “more education” required. For example, BEN2, points out that if a host does “not rent out throughout the whole year” to “identify” those periods that guarantee highest occupancies and highest average daily rate (ADR). Collecting “market intelligence” can be challenging and depends how advanced a host is in making use of this data. Strategic benchmarking would hereby compare a listing to an individual “Compset”, work with “online rate shopping” and “consider commissions and other add-ons” that

hotels use, in order to understand what “the guest is willing to pay” and how high rates can be pushed for Airbnb or accepting the premium of stay in a hotel.

Data example: Understanding special events and their impact

How impactful special events can be and how they affect pattern changes is demonstrated in the example below. The midscale and economy hotels ad-hoc set achieved GBP 194.6 on the day of the boxing event. Occupancy increased to 98.3%, while at the same time only 8 Airbnb properties were listed on the website. This shows that not only hotels took advantage of the event, also Airbnb hosts identified their opportunity for renting out their supply.



4.8 Strategy through benchmarking

The majority of participants agreed that benchmarking and getting a proper understanding of market conditions is strongly research-driven, to the point that “this is becoming an extra job for them and not like a hobby” (BEN1). BEN2 said, it “would be very similar to how it is done in the hospitality industry”, and “revenue management requires a certain mind-set and not everyone easily gets into that”.

Summary: Perspective 3 – Benchmarking Experts

- Benchmarking practices can help Airbnb hosts achieve higher performances. The benefits of benchmarking depend on the individual goals and how much diligence and time hosts invest.
- Benchmarking is segment specific. Hotel segments, such as economy and midscale are more comparable to Airbnb than the high-end segments, due to the limited service component. Markets behave differently and have to be analysed according to their individual characteristics.
- Governmental regulations and legal restrictions will be a key issue for the future of Airbnb.
- Rate shopping and compset benchmarking are common practices in understanding market demand and price changes. Benchmarking will always consider market conditions and the knowledge of what other accommodation providers offer.
- The aspect of rate maximisation can be seen critically in regard to the initial purpose of the sharing economy. Professionalising this trend may bring harm to the concept in the long term.

4.9 Perspective 4: Online Travel Agencies

OTAs perspective on Airbnb and hotels

Similar to the interviews with benchmarking experts, participants in the online travel agency (OTA) interviews share different perspectives, when comparing hotels and Airbnb. OTA1 states that from a supply perspective there can be a “strong effect on occupancy in certain markets”. OTA2 notes that it is very difficult to “quantify and measure how Airbnb is competing” against hotels. The general consensus from the OTA’s perspective is that Airbnb and hotels are only comparable through the supply offer, which causes disruption, however, the sharing economy does not compete with the “full range of services” (OTA3) and is therefore not a comparable product. In contrast, it has to be considered that Airbnb’s product has transitioned over time, from shared rooms to offers of entire apartments.

OTAs can be used as an alternative source of research for Airbnb hosts to “see their comparable apartment and get an idea on pricing” (OTA1). These findings and data can be compared to Airbnb pricing tool and contrasted with Airbnb price recommendations. More than the pricing element, OTAs provide information on market availability and filled supply. This information can support pricing decisions when hotels are filling up capacity and demand spill-over opens for Airbnb supply.

When it comes to initial price setting, OTA supply can be reviewed according to their standards and amenities available in a certain location. As OTA2 mentions “Airbnb is struggling putting this standardization in place”.

After the initial price setting, hosts need to research event drivers in the market and “understand the segment they are going after” (OTA3); “a dentist conference is probably not going to affect them (Airbnb hosts) as much as, let’s say, Dreamforce and Salesforce, where you would have a demographic of people that would very likely book on Airbnb”. Event impact and demand spill-over has to be evaluated from a segmentation perspective in order to identify rate opportunities.

4.10 Use of OTA distribution in addition to Airbnb

OTA4 explains that using an additional channel can help the efficiency of promoting a host’s apartment, “which may be more expensive, but have a wider reach”. OTA3 mentions the commission base for “independents” ranges “from 18-25%” for booking.com or Expedia. Airbnb commissions are much lower but covered by the host and primarily the guest. This may be a reason that OTAs are less focused on independent listings and a reason that only a few hosts “are using multiple channels” (OTA4).

In contrast, OTA1 observed “more and more OTAs getting into this apartment product” and “home owners are probably more and more trying to sign up to OTAs”. In terms of future development, she asks “why would an OTA miss out on that”, meaning to expand business into individual listings and targeting “similar customers”.

4.11 Knowledge transfer from OTA to Airbnb

Similar to hotel benchmarking, Airbnb hosts can analyse “how they price compared to their compset” (OTA1), when evaluating performance against sets of competitors in the market. Owners that manage more than one listing and therefore use Airbnb to a more professional level may benefit from other OTA distribution and services, as “they have a bigger need to really sell these apartments at the best possible rate”. OTA2 introduces rate scraping insights that can be purchased from specialized third-party data providers.

OTA2 concludes that channel distribution depends on the demand situation: “put more availability on Airbnb on higher demand, as you have lower commissions, and on lower demand days you could actually throw them on Booking.com, Expedia and meta-search engines, if you want to build that cash on hand”.

Summary: Perspective 4 – Online Travel Agencies

- Participants describe Airbnb as a disruptor to the hotel industry, due to the supply competition. However, this competition concerns mainly the limited service sector.
- OTAs can be used as an alternative source of research for Airbnb hosts, in order to get a better understanding for pricing, market demand and market availabilities.
- Compset benchmarking can be applied to apartments by comparing to alternative accommodation and therefore have a better understanding of demand and price changes.
- OTAs can be used as an alternative distribution option, especially during low demand periods, to increase the likelihood for reservations.
- Understanding different guest segments (such as young & price sensitive travellers, young business travellers, older generation leisure travellers and event seeking visitors) can result in better targeting and therefore higher rate/occupancy opportunities. This knowledge can differentiate a listing from competitors.

5.0 Discussion

This study has identified that users running Airbnb as a professional business differ in motivation from those simply seeking for some extra revenue. Being booked at the desired dates is often more important than maximising revenue opportunities. The qualitative research has also shown that price setting and dynamic pricing are generally used and applied through trial and error. Even though hosts identified Airbnb rate suggestions as too low, the effort required for in-depth market analysis and planning appears challenging for some hosts. Airbnb's pricing tool seems to be aiming for higher likelihood of securing a reservation, rather than achieving higher yields. Discounting rates is therefore a more common practice than using rate restrictions, a practice which is less effective for price maximisation. The data examples found that dynamic pricing is not always applied in general and that benchmarks did not consistently follow hotel trends.

6.0 Limitations and Further Research

The sample was representative with respect to the intended diversity of answers within the four knowledge groups. However, the small size of the sample means that findings are not generalizable; to confirm the findings of this study a larger or different sample of interviewees is needed.

It was not possible to investigate the experience that each interviewee brought into the interviews. There is a potential bias in the experience available amongst the

interviewees. Future research should consider actual market averages taken from a larger sample, in order to identify rate actuals compared to hotel performance levels.

References

- Airbnb. (2015) "Can I pay with any currency?" (Online) Available from: www.airbnb.com/support/article/95 (Accessed: 22 July 2017).
- Blog.atairbnb.com. (2017) "Using Data to Help Set Your Price" (Online) Available from: <http://blog.atairbnb.com/using-data-to-help-set-your-price/> (Accessed: 18 July 2017).
- Bloomberg Technology. (2015) "Airbnb said to be raising funding at \$20 Billion valuation" (Online) Available from: <https://www.bloomberg.com/news/articles/2015-03-01/airbnb-said-to-be-raising-funding-at-20-billion-valuation>. (Accessed: 22 July 2017).
- Burnett, S. (2017) "Yield Management adopted by Airbnb" (Online) Airbnb hosts forum!, Available from: <http://airhostsforum.com/t/yield-management-adopted-by-airbnb/5059> (Accessed: 16 July 2017).
- Choi, S., & Mattila, A. S. (2009). "Perceived fairness of price differences across channels: the moderating role of price frame and norm perceptions". *Journal of Marketing Theory and Practice*, 17(1), 37-48
- Cleophas C. (2016) "Special issue robust revenue management". *Journal of Revenue and Pricing Management*. 15 (6) pp. 423-242.
- Denning, S. (2014) "An economy of access is opening for business: five strategies for success" (Online) *Strategy & Leadership*. 42 (4) pp. 14 – 21.
- Edelman, B., Luca, M. (2014) "Digital Discrimination: The Case of Airbnb.com" (Online) Harvard Business School NOM Unit Working Paper No. 14-054. Available from: <http://hbswk.hbs.edu/item/digital-discrimination-the-case-of-airbnb-com> (Accessed: 19 July 2017).
- Guttentag, D. (2017) "Airbnb: disruptive innovation and the rise of an informal tourism accommodation sector" (Online) Taylor & Francis, Available from: <http://www.tandfonline.com/doi/full/10.1080/13683500.2013.827159> (Accessed: 16 July 2017).
- Haywood J., Mayock, P., Freitag, J., Owoo, K., Fiorilla B. (2017) "Airbnb & Hotel Performance - An analysis of proprietary data in 13 global markets" (Online) STR. Available from: <http://str.com/research1> (Accessed: 20 July 2017)
- Henten, A.H., Windekilde, I.M. (2016) "Transaction costs and the sharing economy" (Online) *Emerald Database. Info*. 18 (1) pp. 1 – 15. Available from: <http://www.emeraldinsight.com>. (Accessed: 19 July 2017).
- Hooijer, P. (2017) "The Relationship between Airbnb and the Hotel Revenue: Evidence from The Netherlands" (Online) *Scriptiesonline.uba.uva.nl*. Available from: <http://scriptiesonline.uba.uva.nl/document/636968> (Accessed: 16 July 2017).
- Kimes, S. (2010) "The Future of Hotel Revenue Management" (Online) *Cornell Hospitality Report* 10 (14) pp. 6-15. Available from: <http://scholarship.sha.cornell.edu/cgi/viewcontent.cgi?article=1068&context=chrrpubs>
- Lee, N. (2015) "Airbnb rolls out a pricing recommendation tool for hosts" (Online) *Engadget*, Available from: <https://www.engadget.com/2015/06/04/airbnb-price-tips/> (Accessed: 18 July 2017).

- Lehr, D. (2017) "An Analysis of the Changing Competitive Landscape in the Hotel Industry" (Online) Scholar.dominican.edu. Available from: <http://scholar.dominican.edu/masters-theses/188/> (Accessed: 16 July 2017).
- Hwang, J., Lockwood, A. (2006) "Understanding the challenges of implementing best practices in hospitality and tourism SMEs" *Benchmarking: An International Journal*, 13 (3) pp. 337 – 354.
- Li, J., Moreno, A., Zhang, D. (2015) "Agent Behavior in the Sharing Economy: Evidence from Airbnb" *Ross School of Business Working Paper Series Working Paper No. 1298*, (Online) Available from: <https://pdfs.semanticscholar.org/9cb2/e1ad853d8cec5cb2ccd6eb3df951aa2733ac.pdf> (Accessed: 16 July 2017).
- Loescher, S. (2017) "Uber and Airbnb – Revenue Management and Parallels with the Ski Industry" (online) *Liftoptia/the lift line*. Available from: <https://liftoptia.com/2016/07/26/uber-and-airbnb-revenue-management-and-parallels-with-the-ski-industry/> (Accessed: 16 July 2017).
- McGuire, K., Pinchuk, S. (2009) "The Future of Revenue Management" *SAS Global Forum 2009*, Paper 342-2009
- Neumann, J., Gut, D. (2017) "A homeowner's guide to Airbnb: Theory and empirical evidence for optimal pricing conditional on online ratings" (Online) *Aisel.aisnet.org*, Available from: http://aisel.aisnet.org/cgi/viewcontent.cgi?article=1064&context=ecis2017_rp (Accessed: 18 July 2017).
- Oskam, J., Boswijk, A. (2017), "Airbnb: the future of networked hospitality businesses", *Journal of Tourism Futures* 2 (1)
- Rohani, A. (2012) "Impact of Dynamic Pricing Strategies on Consumer Behavior" *Journal of Management Research* 4 (4).
- Rusteen, D. (2017) "Let's Talk About Revenue - Airbnb Revenue Management" (Online) *OptimizeMyAirbnb.com*. Available from: <https://optimizemyairbnb.com/airbnb-revenue-management/> (Accessed: 16 July 2017).
- Smith, B. C., Leimkuhler, J. F., & Darrow, R. M. (1992). Yield management at American airlines. *interfaces*, 22(1), 8-31.
- Staff, F. (2017), "More than a third of Airbnb listings outside Dublin aren't lived in by their owners", (Online) *TheJournal.ie*. Available from: <http://www.thejournal.ie/airbnb-ireland-2-2-3224946-Feb2017/> (Accessed: 16 July 2017).
- Stoessel, E. (2012) "Independent Hoteliers Share Best Practices" *Lodging Hospitality* (Penton).
- Ststays.com, (2015) "Ways to Successfully Manage Your Airbnb Revenue" (Online) *Short Term Stays*, Available from: <http://www.ststays.com/ways-to-successfully-manage-your-airbnb-revenue/> (Accessed: 16 July 2017).
- Taylor, T. (2016) "On-Demand Service Platforms" (Online) *SSRN*, Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2722308 (Accessed: 16 July 2017).
- Teubner, T., Hawlitschek, F., Dann, D. (2017) "Price determinants on Airbnb: How reputation pays off in the sharing economy" *Journal of Self-Governance and Management Economics* 5(4), pp. 53-80.
- Trento, C., Stüker, T., Pereira, G., Borchardt, M., Viegas, C. (2016) "Strategic benchmarking of service pricing based on the value added" *Benchmarking: An International Journal*, 23 (4) pp. 754 – 767

- Weber, T. (2016) "Product Pricing in a Peer-to-Peer Economy" *Journal of Management Information Systems*, 33:2, 573-596
- Weed, J. (2015) "Airbnb Grows to a Million Rooms, and Hotel Rivals Are Quiet, for Now" (Online) *The New York Times Business day*, Available from: https://www.nytimes.com/2015/05/12/business/airbnb-grows-to-a-million-rooms-and-hotel-rivals-are-quiet-for-now.html?_r=0 (Accessed: 22 January 2017)
- Yeoman, I., McMahon-Beattie, U. (2017), "The turning points of revenue management: a brief history of future evolution", *Journal of Tourism Futures* 3 (1)
- Zervas, G., Proserpio, D., Byers, J. (2017) "The Rise of the Sharing Economy: Estimating the Impact of Airbnb on the Hotel Industry" (Online) Available from: <http://people.bu.edu/zg/publications/airbnb.pdf> (Accessed: 16 July 2017).
- Zheng, C., & Forgacs, G. (2017). The emerging trend of hotel total revenue management. *Journal of Revenue and Pricing Management*, 16(3), 238-245