

Assessing the Impact of Mergers and Acquisitions on Operational Efficiency: A DEA Approach

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Abstract

The present study examined the impact of mergers and acquisitions (M&As) on the operational efficiency of companies within the manufacturing sector, focusing on a period from 2013 to 2023. Employing a quantitative research methodology, the analysis encompasses a decade of financial data for six manufacturing companies, divided into pre-merger (2013-14 to 2017-18) and post-merger (2018-19 to 2022-23) phases. This study employs Data Envelopment Analysis (DEA) to evaluate operational efficiency based on one output variable (revenue) and nine input variables, including operating costs, debt level, capital expenditure, and others. The findings reveal significant variations in efficiency scores, indicating that M&As have a heterogeneous impact on the operational efficiency of companies. Specifically, the study identifies shifts in the efficiency rankings of companies post-M&A, with some firms demonstrating marked improvements in operational performance. The research underscores the utility of DEA as a tool for analysing and enhancing the success of M&As in the manufacturing sector, highlighting the importance of strategic planning and operational efficiency in achieving favourable M&A outcomes.

Keywords: Data Envelopment Analysis (DEA), manufacturing sector, mergers and acquisitions, operational efficiency, corporate performance, and strategic planning.

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Introduction

In the dynamic realm of mergers and acquisitions (M&A), stakeholders constantly seek innovative methods to evaluate and enhance potential deals' strategic and operational alignment. The Data Envelopment Analysis (DEA) model is a sophisticated tool that transcends traditional financial metrics, offering a deeper dive into the operational efficiency of companies involved in M&A transactions. This Non-parametric method assesses the performance of Decision-Making Units (DMUs) by comparing them against a best-practice frontier, thus identifying the most efficient entities and setting a benchmark for others. Through the lens of DEA, companies contemplating mergers or acquisitions can meticulously analyse potential targets, evaluating their capability to transform inputs into outputs efficiently relative to peers. The application of the DEA model in M&A activities facilitates a multi-dimensional analysis, incorporating various inputs (such as capital, labour, and technology) and outputs (like sales, profits, and market share), which are crucial for understanding a company's operational stance. This approach is particularly beneficial in identifying companies that, despite their suboptimal financial performance, possess robust operational processes that could significantly contribute to the efficiency of the combined entity post-merger. By generating efficiency scores, the DEA model quantitatively highlights areas where a company excels or lags, offering actionable insights into potential synergies or redundancies that a merger or acquisition could exploit or eliminate.

Moreover, the DEA model's adaptability to different sectors and its ability to handle multiple inputs and outputs without requiring a predefined functional relationship between them make it an invaluable asset in the heterogeneous world of M&A. It allows for a tailored analysis that respects each deal's unique characteristics and strategic objectives, enabling a more nuanced decision-making process. In the pre-merger phase, this can guide the selection of targets by aligning operational capabilities with strategic goals, while in the post-merger phase, it can direct integration efforts towards areas promising the greatest efficiency gains and value creation. Furthermore, by establishing a benchmark for operational efficiency, the DEA model aids in setting

realistic and achievable post-merger integration goals, facilitating a smoother transition and helping to realise the full potential of the merger or acquisition. This is particularly crucial in a landscape where many M&A transactions fail to meet their stated objectives due to overestimating synergies or underestimating integration challenges. Ultimately, incorporating DEA into the M&A evaluation process represents a shift towards a more comprehensive, operationally focused perspective on value creation, highlighting its pivotal role in steering companies towards successful mergers and acquisitions that are financially and operationally sound.

Need of the Study

The study is essential to address the critical gap in understanding the impact of mergers and acquisitions on the operational efficiency of manufacturing companies. Given the mixed outcomes of M&As reported in existing literature, there is a compelling need for detailed analysis to guide companies in making informed strategic decisions. By leveraging the Data Envelopment Analysis (DEA) model, this research aims to provide empirical insights into how M&As affect operational performance pre and post-integration. Such insights are crucial for manufacturing firms aiming to utilise M&As as a growth strategy, ensuring they achieve the desired operational efficiencies and competitive advantages. Ultimately, this study seeks to contribute to the broader academic and practical understanding of M&As' role in enhancing operational success within the manufacturing sector.

Review of Literature

Lin et al. (2020) introduced a fresh approach to matching companies for mergers and acquisitions (M&As) using DEA, focusing on scale and technical efficiencies. It proposes a unique combination of inverse and conventional DEA models to better match firms and enhance their overall performance post-merger. A case study on Turkish energy firms showcases the method's effectiveness, highlighting its potential to improve M&A outcomes.

Aamir et al. (2017) examined the effects of M&A on the banking and textile sectors in Pakistan from 2004-2012, using DEA to assess the efficiency changes pre- and post-M&A. It highlights the critical economic

roles of these sectors, with banking as a key finance provider and textiles as a primary manufacturing and export sector. The results indicate a varied impact on efficiency, with certain banks and textile companies showing improvement post-M&A while others fail to enhance their performance.

Salleh et al. (2016) studied the effects of M&A on the technical efficiency of ASEAN telecommunication companies utilising DEA from 2000 to 2011. It innovatively assesses performance through asset utilisation rather than conventional financial metrics. Findings notably highlight a negative correlation between the sequence of M&As and a negative relationship between efficiency and firm size.

Chaudhary et al. (2016) explored the impact of M&As on bank efficiency in Pakistan, using the DEA method under the Constant Returns to Scale (CRS) assumption. Calculating the technical efficiency (TE), scale efficiency (SE), and pure technical efficiency (PTE) for each bank through different models reveals a notable decline in efficiency scores post-M&A for the majority of the banks analysed.

Salleh et al. (2013) investigated the technical efficiencies of mergers and acquisitions among Malaysian telecommunications companies, utilising a dual-phase approach combining the CCR model and regression analysis over the 2005-2010 period. It uncovers nuanced relationships between acquisition sequences, company size, and technical efficiency, revealing both positive and negative correlations. The study highlights a gap in understanding the role of external factors, such as government-linked corporations and regulatory environments, suggesting these as avenues for future inquiry to deepen the understanding of M&A efficiency dynamics.

Statement of the Problem

Mergers and acquisitions often do not deliver the expected benefits because companies struggle to assess how well different businesses will work together correctly. Traditional methods to evaluate these deals might miss important details about how efficiently a company operates. This makes it hard to figure out which companies should merge or how to combine them to save money and improve performance successfully. Furthermore,

using advanced techniques like Data Envelopment Analysis (DEA) to get a clearer picture is challenging due to limited data and difficulty choosing the right factors to analyse. Solving these problems is key for companies to benefit from mergers and acquisitions.

Objective of the Study

To Assess the Impact of Mergers and Acquisitions on Operational Efficiency Using the Data Envelopment Analysis Approach

Research Methodology

This study employs a quantitative research methodology utilising secondary data to analyse the impact of mergers and acquisitions on the operational efficiency of six manufacturing companies. Data was collected from various sources, including company annual reports, Securities and Exchange Board of India (SEBI) filings, financial websites like Moneycontrol.com, and specific M&A deal information from 2018-19. The analysis spans ten years of financial data, segmented into pre-merger (2013-14 to 2017-18) and post-merger (2018-19 to 2022-23) periods. DEA is used in this paper to compute the efficiency and super-efficiency scores of M&A companies. R 4.0.3 version is run using benchmarking and psych package for analysis.

The Data Envelopment Analysis (DEA) model is a non-parametric method used to assess the efficiency of decision-making units (DMUs), such as companies or organisations, by comparing the inputs they use to produce outputs. It operates on the principle of creating an efficiency frontier against which the performance of each DMU is measured, allowing for the identification of those operating at or near optimal levels of efficiency. The model's flexibility allows for multiple inputs and outputs, making it suitable for evaluating complex processes across diverse sectors.

Variable selection: one output (dependent) and nine input (independent) variables

One output (dependent) Revenue, used as an output variable, quantifies a firm's financial performance by measuring the total income generated from its operations. It is a key indicator of its efficiency and effectiveness in resource utilisation.

1. **Operating Cost** measures the total expenses involved in running a business day to day. This variable is critical for assessing how efficiently a company uses its resources to maintain operations.
2. **Debt Level:** Indicates the total amount of long-term and short-term company borrowing. High debt levels can affect a company's efficiency by increasing its financial burden. Analysing the debt level helps understand the financial leverage and its impact on operational efficiency.
3. **Capital Expenditure:** Reflects the funds a corporation uses to acquire, improve, and maintain tangible assets such as real estate, industrial buildings, and equipment. This input is essential for evaluating how effectively a company invests in its operational capacity and long-term growth.
4. **Inventory Level:** The overall worth of a company's assets in raw materials, work-in-process, and finished commodities. Efficient inventory management can minimise holding costs while increasing cash flow, making it essential to operational efficiency.
5. **Cash and Cash Equivalents:** Consists of a company's most liquid assets, including currency, short-term investments, and other securities easily convertible into cash. This variable is critical in determining a company's liquidity and ability to satisfy short-term obligations without extra financing.
6. **Size of the Firm:** This is typically measured by total assets and reflects the overall scale of a company's operations. It indicates how the magnitude of resources available might influence operational efficiency in a DEA model.
7. **Dividend Payout Ratio (DP Ratio):** As an input, it represents the company's financial strategy regarding dividend distribution, suggesting how this allocation of profits might impact the firm's operational resources and efficiency.
8. **Employee Expenses** encompass all costs related to employing staff, including wages, benefits, and training costs. This input is crucial for understanding how labour costs contribute

to the production process and the company's efficiency.

9. **Return on Assets (ROA):** When considered as an input, ROA measures the effectiveness of a company's asset utilisation in previous periods, providing insight into how past profitability influences current efficiency levels.

Empirical Analysis

Efficiency is evaluated based on the ratio of one output (dependent) variable to nine input (independent) variables across pre, post, and overall periods.

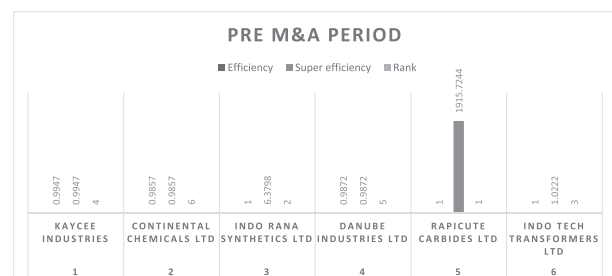
Ranking of the Companies

DEA, a non-parametric linear programming technique, evaluates and ranks companies by their efficiency and super-efficiency scores, offering insights crucial for performance evaluation and benchmarking in diverse industries.

Table 1: Ranking of Companies (Pre-M&A Period) based on Efficiency and Super Efficiency Scores

Sl. No.	M&A Companies	Sector	Efficiency	Super efficiency	Rank
1	Kaycee Industries	Electric Equipment	0.9947	0.9947	4
2	Continental Chemicals Ltd	Detergents & Soaps	0.9857	0.9857	6
3	Indo Rana Synthetics Ltd	Textiles & Apparel	1	6.3798	2
4	Danube Industries Ltd	Paper & Forest Products	0.9872	0.9872	5
5	Rapicute Carbides Ltd	Engineering - Industrial Equipment	1	1915.7244	1
6	Indo Tech Transformers Ltd	Electric Equipment	1	1.0222	3

Figure 1 Graphical presentation of Ranking of Companies (Pre-M&A Period) based on Efficiency & Super Efficiency

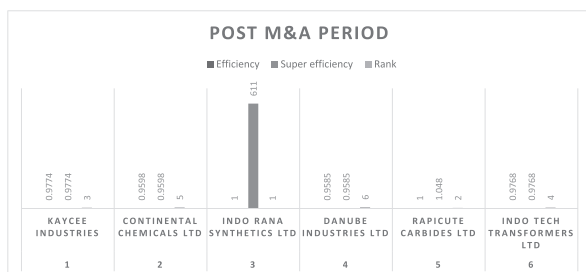


In the pre-merger and acquisition analysis presented in Table 1, applying efficiency and super-efficiency scores yields insightful distinctions among companies across various sectors. Among the selected companies, Rapicute Carbides Ltd emerges as the standout performer, achieving a perfect efficiency score and an exceptional super efficiency score of 1915.7244, securing the top rank. This indicates a significant differentiation in operational excellence, especially compared to other companies with perfect efficiency scores but substantially lower super efficiency scores, such as Indo Rana Synthetics Ltd, which ranks second with a super efficiency score of 6.3798.

Table 2: Ranking of Companies (Post M&A Period) based on Efficiency and Super Efficiency Scores

Sl.No	M&A Companies	Sector	Efficiency	Super efficiency	Rank
1	Kaycee Industries	Electric Equipment	0.9774	0.9774	3
2	Continental Chemicals Ltd	Detergents & Soaps	0.9598	0.9598	5
3	Indo Rana Synthetics Ltd	Textiles & Apparel	1	611	1
4	Danube Industries Ltd	Paper & Forest Products	0.9585	0.9585	6
5	Rapicute Carbides Ltd	Engineering - Industrial Equipment	1	1.048	2
6	Indo Tech Transformers Ltd	Electric Equipment	0.9768	0.9768	4

Figure 2 Graphical presentation of Ranking of Companies (Post-M&A Period) on the basis of Efficiency & Super Efficiency



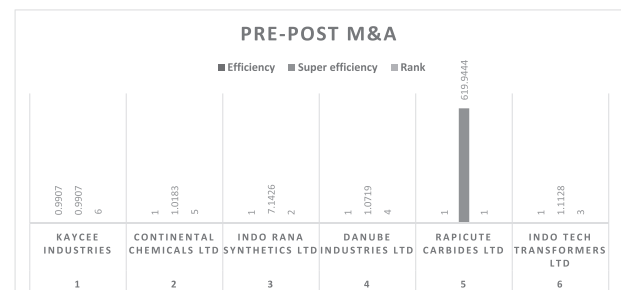
In the post-merger and acquisition period, as depicted in Table 2, the analysis of efficiency and super-efficiency scores discovers notable shifts in company performance across different sectors. During the study period, Indo Rana Synthetics Ltd emerges as the top performer, achieving an impeccable efficiency

score of 1 and a remarkable super efficiency score of 611, exhibiting its superior operational capabilities. In contrast, Danube Industries Ltd is positioned at the lower end of the performance spectrum, with an efficiency score of 0.9585 and a matching super efficiency score, indicating a relatively lower operational effectiveness level than its peers.

Table 3: Ranking of Companies (Pre-post M&A Period) based on Efficiency and Super Efficiency Scores

Sl.NO	M&A Companies	Sector	Efficiency	Super efficiency	Rank
1	Kaycee Industries	Electric Equipment	0.9907	0.9907	6
2	Continental Chemicals Ltd	Detergents & Soaps	1	1.0183	5
3	Indo Rana Synthetics Ltd	Textiles & Apparel	1	7.1426	2
4	Danube Industries Ltd	Paper & Forest Products	1	1.0719	4
5	Rapicute Carbides Ltd	Engineering - Industrial Equipment	1	619.944	1
6	Indo Tech Transformers Ltd	Electric Equipment	1	1.1128	3

Figure 3 Graphical presentation of Ranking of Companies (Pre-Post M&A Period) based on Efficiency & Super Efficiency



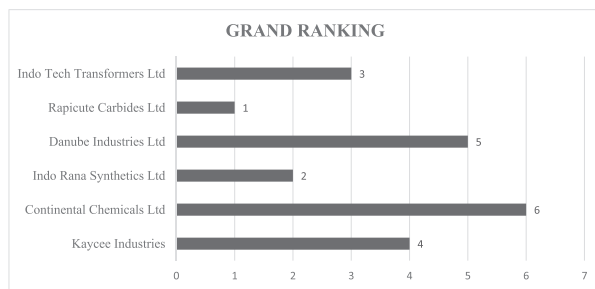
In the detailed evaluation of company performance spanning the pre-post-merger and acquisition period, as outlined in Table 3, Rapicute Carbides Ltd emerges as the leader, boasting a perfect efficiency score and an extraordinary super efficiency score of 619.944, securing the first position. Notably, Indo Rana Synthetics Ltd also achieves a perfect efficiency score but with a super efficiency score of 7.1426, which places it in the second rank, highlighting the significant variation in super efficiency among top-performing companies. With an efficiency score of

0.9907, Kaycee Industries finds itself at the bottom of the ranking, underscoring the competitive edge that super efficiency analysis provides in evaluating company performance post-mergers and acquisitions.

Table 4: Grand Ranking of Companies Based on Super Efficiency Ranks Across The Pre, Post and Pre-Post M&A Period

Sl.No	M&A Companies	PRE	POST	PRE & POST	GRAND RANKING
1	Kaycee Industries	4	3	6	4
2	Continental Chemicals Ltd	6	5	5	6
3	Indo Rana Synthetics Ltd	2	1	2	2
4	Danube Industries Ltd	5	6	4	5
5	Rapicute Carbides Ltd	1	2	1	1
6	Indo Tech Transformers Ltd	3	4	3	3

Figure 4: Graphical Presentation of Grand Ranking Based on Super Efficiency Ranks Across The Pre, Post and Pre-Post M&A Period



Rapicute Carbides Ltd secures the highest grand ranking, indicating its sustained competitive strength in pre-, post, and pre&post mergers and acquisitions (M&A). Conversely, Continental Chemicals Ltd holds the lowest grand ranking, signalling a significant decline in its overall competitive positioning of M&A. Meanwhile, the remaining companies, including Kaycee Industries, Indo Rana Synthetics Ltd, Danube Industries Ltd, and Indo Tech Transformers Ltd, exhibit varying degrees of fluctuation in their grand rankings, reflecting the diverse impacts of M&A on their competitive landscapes.

Findings of the Study

The empirical analysis, focusing on the pre-merger, post-merger, and combined periods, highlights significant variances in company performances as measured by efficiency and super-efficiency scores. Before the mergers, Rapicute Carbides Ltd distinguished itself with an unparalleled super-efficiency score of 1915.7244, indicating exceptional operational excellence. In contrast, although efficient, Indo Rana Synthetics Ltd had a considerably lower super efficiency score of 6.3798, positioning it second, yet far behind Rapicute in terms of operational leverage. Following the mergers, the landscape shifted notably. Indo Rana Synthetics Ltd catapulted to the forefront with a super efficiency score of 611, showcasing a remarkable improvement in operational capabilities, possibly benefiting significantly from the merger.

On the other hand, Danube Industries Ltd found itself at a disadvantage, with its efficiency score dropping to 0.9585, indicating a relative decline in operational effectiveness within its sector. The pre-post-merger analysis further cemented Rapicute Carbides Ltd's dominance, maintaining its top position with a super-efficiency score of 619.944, underscoring its consistent operational superiority. Meanwhile, Indo Rana Synthetics Ltd secured the second rank with a super efficiency score of 7.1426, demonstrating its sustained performance excellence across periods. Rapicute Carbides Ltd tops the grand ranking with sustained strength across all M&A phases. At the same time, Continental Chemicals Ltd ranks lowest, reflecting a significant decline, with other companies displaying diverse impacts on their competitive positions.

These findings illustrate the critical role of efficiency and super-efficiency scores in assessing company performances in the context of M&A and the varying impacts of these strategic moves across different companies and sectors. The data reveal that while some companies like Rapicute Carbides Ltd enhance their operational dominance, others may experience shifts in their competitive positioning, emphasising the nuanced effects of M&A on corporate performance.

Conclusion

The empirical analysis presented through the efficiency and super efficiency scores before, after, and across the pre& post-merger and acquisition periods unveils significant insights into the operational dynamics of companies within different sectors. Rapicute Carbides Ltd and Indo Rana Synthetics Ltd have emerged as consistent leaders, showcasing remarkable operational excellence and adaptability in response to M&A activities. The stark contrast in their super efficiency scores, especially in Rapicute Carbides Ltd's exceptional performance pre&post-M&A, underscores the profound impact of strategic integration and operational optimisation post-mergers and acquisitions. The lowest ranking, held by Continental Chemicals Ltd, indicates the challenges or difficulties the company faces in adapting to the changes brought about by M&A. The intermediate rankings of Kaycee Industries, Indo Rana Synthetics Ltd, Danube Industries Ltd, and Indo Tech Transformers Ltd indicate varied responses to M&A activities, highlighting the complex nature of competitive dynamics in the corporate arena.

Research Implication

The present study demonstrates that evaluating a company's performance through efficiency and super-efficiency scores is essential for understanding the real impact of M&As. It shows that the success of M&As can differ greatly across different industries, suggesting that there is no one-size-fits-all approach to M&A strategy. The study also finds that companies with higher super-efficiency scores after M&As are likely to achieve a competitive advantage, highlighting the importance of careful strategic planning and maintaining operational efficiency during the M&A process. These insights are crucial for business leaders and policymakers who aim to make the most out of M&As.

Limitations of the Study

A notable limitation of this study is its analysis based on a limited number of companies, which may not fully represent the broader spectrum of merger and acquisition outcomes across various sectors. Additionally, the reliance on efficiency and super-efficiency scores may overlook critical aspects of company performance, such as market positioning,

brand value, and customer satisfaction. This sector-specific analysis might also restrict the applicability of the findings to different industries with unique competitive environments and market challenges.

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Pilot Study Analysis-Influence of Customer Reviews on Online Hotel Booking Intentions of Indian Consumers

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Abstract

This article outlines a conceptual framework for comprehending the variables affecting hotel visitors' online booking choices. As stimuli, the following five independent variables have been suggested: 1) perceived interaction, 2) information quality, 3) safety and privacy, 4) price and promotion, and 5) e-WOM. Survey data was collected from 100 respondents who had experience booking hotels online. The perceived value construct was the mediating variable affecting hotel guests' intention to make an online reservation. The study results show that perceived value influences online booking intention, with a statistically significant level of 5%.

Key Words: Customer Reviews, Indian Consumers, Online Hotel Booking, Perceived Interaction Information Quality, Safety & Privacy, e-WOM

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Introduction

Travelling is discovering new places through personal exploration (Falk et al., 2012). People travel for many different reasons, depending on their circumstances and past. Social and psychological concepts provide alternatives for this aspect. (Lundberg, 2015). Initially, communications were employed to secure most of the people's reservations for lodging. Travel booking websites have become an essential medium of information and communication for the hospitality sector because of technological innovations' continued development (Park et al., 2018). This seems as though searching for hotels while comparing lodging prices is best done online. Tourists use the internet to compare prices for hotels and accommodations instantly. Many examine numerous sites looking for the best purchases and think the internet is the ideal location to obtain the most affordable deals. Travellers are provided with greater choices and a quicker, more effective method to search for and retain hotel rooms, which is advantageous to the buyer. Online booking is still heavily influenced by hotel websites. Opinions about the elements that influence hotel options show that low room rates, alongside hotel convenience, service excellence, room preparation, and prior experience, are crucial (Toh et al., 2011).

According to Toh et al. (2011), hotel web pages need to contain a lot of substance, including visuals and maps specifically targeting women more inclined to search for more extended stays. Businesses should also provide bonus hotel rewards and best-rate guarantees. A significant part of the buying procedure occurs when the decision to buy occurs.

In order to positively impact customers during the pre-booking phase, hoteliers must comprehend the most significant determinants and facilitators of purchase intentions. Perceived value is important in predicting people's buying choices; this is particularly relevant for those who would like to reserve hotels using third-party internet making reservations (Dong & Ling, 2015). For instance, as perceived value has a strong association with price and quality, Krasna (2008) argues that consumer choices regarding the choice of hotel and booking intent can be affected by experienced value (Chiang & Jang, 2007). It is frequently acknowledged that, even before making

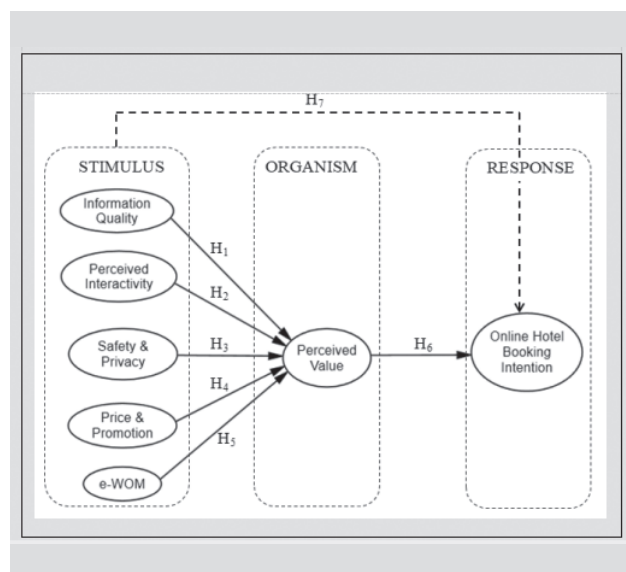
final choices, pricing and promotion can partly affect people's perception of value (Zeithamel, 1988).

Earlier research (Browning et al., 2013) considers people's perceptions of their value as a factor influencing their decision to make a hotel reservation. Consequently, this study intends to determine how individuals' experiences of hotel perceived interaction, information quality, safety and privacy, price and promotion, and e-WOM affect their propensity to book an online hotel room. The researchers present an overview of the literature on the criteria and their use in online hotel booking. A discussion of a conceptual research model and associated hypotheses comes next. The instrument development plan, data collection, and data analysis are in the research methodology section.

Conceptual Framework of the Research Study and Literature Review

A hypothesised model is conceptualised to achieve the objectives of the present research study, and the same is depicted in Figure 1.

Figure1: Conceptual Framework of the Research Study



Source: Abdullah.D. et al,2016

Information Quality

Wang et al. (2015) defined reviewer expertise as information regarding the particular goods provided by an individual with extensive knowledge and reliable

information. Customers are more inclined to buy travel-related goods on websites that offer adequate data, enabling them to judge the worth of what they buy (Dolnicar & Otter, 2003). Understanding travel products impacts the extent to which consumers search for information, and the information users look for on the internet (Lehto et al., 2006).

H1: Information Quality as a Stimulus component significantly influences/impacts the Perceived value of online content.

Perceived Interactivity

This idea has been considered essential to efficient online advertisement (Lee, 2005). According to Srinivasan et al. (2002), interactivity is "the degree to which two-way communication with customers is facilitated, as well as the accessibility and efficacy of customer support tools on a web." Lee (2005) listed the following as essential components of interactivity: (1) user control, (2) response, (3) personalisation, and (4) connection. The research revealed a favourable relationship between perceived utility and simplicity of use regarding web interactivity on mobile websites (Coursaris & Sung, 2012). In the same way, Pai and Yeh's (2014) research on social media networks discovered favourable impacts of interactivity on users' perceptions of their usefulness and ease of use.

H2: Perceived Interactivity as a Stimulus component has a significant influence/impact on the Perceived value of the online content.

Safety and Privacy

Applications for online travel intermediaries are accessible to all users. As a result, hotel visitors have concerns about the privacy and security of the data they provide on the application itself. For instance, to make an online reservation, clients could have to give up personal details such as name, gender, address, age, and credit card number. Various hazards might compromise the information, including internet attacks (Emir et al., 2016). As such, applications must offer significant protection to ensure that users' private information is secure. Clients who trust the hotel booking website will use it online (Emir et al., 2016).

Consequently, applications should offer sufficient safety while protecting users' data privacy. Tan (2015) stated that a hotel's website should ensure guests' privacy by restricting access to all personal information to permitted personnel only. When clients trust the hotel booking website, they are prone to use it online (Emir et al., 2016).

H3: *Safety and privacy* as a Stimulus component significantly influence/impact the Perceived value of online content.

Price and Promotion

Customers occasionally forget the actual price of a certain thing. As an alternative, they effectively express prices (Zeithaml, 1988). Whenever consumers purchase online, they typically check reference prices—pricing supplied by other vendors—with actual prices—prices offered by the current vendor—before establishing an opinion (Kim et al., 2012). It is easier to see price as a heuristic cue than quality (Yoon et al., 2014). Low or fair prices give hotels a lasting lead in their product marketplaces in an increasingly competitive environment (Bojanic, 1996). When choosing what to purchase, price is one of the most critical factors in determining value. Customers discover the more reasonable choice by comparing the prices provided by online retailers with reference prices (Gupta & Kim, 2009). It seems that hotel customers' views and decisions are greatly influenced by promotions (Lee et al., 2015). Chang (2017) found a substantial relationship between intent to purchase and promotions. According to Christou (2011), customers' inclination for price reductions and rewards had an important impact on when and how they would book. According to Shoemaker et al. (2007), price has a significant impact on consumer loyalty in addition to capturing attention and rising occupancy.

Meanwhile, hotel e-commerce sales promotions use various forms, including price reductions, discount codes, premiums, and additional loyalty program points (Christou, 2011). Online sales promotions entice customers to use travel applications with appealing features and creative approaches (Sigala, 2013). As an illustration, the growing trend to boost online offers (available for a limited time and with limited stock) has gained popularity.

H4: *Price and promotion* as a Stimulus component significantly influence/impact the Perceived value of online content.

e-WOM.

Consumers in the age of technology usually employ word-of-mouth (WOM) using electronic word-of-mouth (e-WOM) through online interaction (Chakraborty & Bhat, 2018). According to Ismagilova et al. (2020), the most commonly employed description of EWOM is any online positive or negative feedback from individuals and organisations shared by past, present, or potential customers about a company or a product.

H5: *e-WOM*, as a Stimulus component, significantly influences the perceived *value* of online content.

Perceived Value

Worth-for-money, or the trade-off between price and quality, is a common definition of perceived value. It has been recognised as a prominent element that significantly impacts customers' decision-making processes and plays a major role in influencing customer satisfaction, decision-making, and purchasing behaviour. Most research on perceived value has discovered an association between value and online purchase intention. This study also anticipates a link between perceived value and intention to book rooms online in the context of online hotel booking.

H6: *Perceive value* has a significant influence/impact on the intention of making online hotel bookings.

Intentions to book online Consumers consider that using the web to book hotel rooms can be advantageous in various ways, as it enables them to compare prices and gather the necessary qualitative data. Online reservations provide quick transactions, cost savings, and instant booking confirmations. (2019, Aeknarajindawat). According to Baltescu (2015), most users browse different hotel websites or use online travel agencies to compare prices before deciding. Online booking also allows customers to interact directly with hotels anytime and anywhere. Consequently, Emir et al. (2016) believe that it is possible for a website user for a hotel or travel-related intermediaries to buy or book accommodation using applications of travel intermediaries.

H7: Overall Stimulus factor mediates (Partial/Full) the relationship between the Perceived value of the online content and the Intention of online Hotel booking.

Research Methodology

The research survey questionnaire for the present research was designed based on literature reviews. In the present study, 30 Likert-based questions were designed, asking the respondents to rank their importance of agreement on a scale of 1 to 5, with '1 as Strongly Disagree' and '5 as Strongly Agree'. Regarding data collection, 100 respondents were interviewed through a structured online questionnaire from randomly selected people for online hotel booking. A simple random technique was adopted to collect the data.

Results and Analysis

Descriptive Statistics

In depicting the sample respondents' characteristics, 75 % of respondents belong to the group less than 40 years old. In comparison, 9 % of the sample representation is in the age group 40 to 50 years old, and 16 % are above 50 years old. Furthermore, 44% of the respondents have an annual income of fewer than two lakhs, 29 % have an income between Rs 2.0 to R 5.0 lakhs, and 27 % have more than 5 lakhs per annum. Regarding educational status, 37.0 % are post-graduates, 56 % have completed their graduation, and 7 % have completed their primary education. Finally, 91 % of respondents reside in the urban sector, 7 % in the semi-urban localities and 2 % in rural areas.

Table 2: Reliability and Item Loading of Constructs influencing online Hotel Booking Intentions

Factor	Item/Indicators	Loading	CR	CA	AVE
Information Quality	I book a hotel if the information that is clear, accurate, complete and in a concise manner (INF_QUL_1)	0.518			
	My intention to book a hotel increases based on the websites' characteristics of visual appearance, clarity and useful content increases my intention to book a hotel online (INFQUL_2)	0.657			
	In a situation where there is conflicting information about a hotel from different sources, I look for review content and regency before I book a hotel online (INF_QUL_3)	0.660	0.727	0.729	0.402
	I think about the logical reasons behind a review , mark them credible and act towards a hotel booking intentions (INF_QUL_4)	0.688			
Perceived interactivity	I check the customers' and hoteliers ' messages at time of booking a hotel online (PERC_INT_1)	0.614			
	I check for reviews that are in contrast or similar in nature (PERC_INT_2)	0.683			
	I prefer those reviews that have text, videos, pictures etc. (PERC_INT_3)	0.648	0.745	0.746	0.423
	I prefer websites where it is easy for me to choose the content and the sequence of communication is in order (PERC_INT_4)	0.654			
Price and Promotion	I think price is the most important factor to book a hotel online (PRC_PRM_1)	0.673			
	I check hotel prices on travel websites to be sure of best value (PRC_PRM_2)	0.904			
	I spend time comparing prices on different websites (PRC_PRM_3)	0.837			
	I rely on reviews to check whether price ensures a quality (PRC_PRM_4)	0.857	0.904	0.906	0.617
	Price reductions ,coupon codes, premiums and extra loyalty points lead my intention to book a hotel online (PRC_PRM_5)	0.758			
	Promotional deals like room availability for a specific period and restricted availability raise my impulse hotel booking intentions (PRC_PRM_6)	0.652			
Safety and privacy	I am worried about the privacy of my data throughout the hotel booking and the information I share is exposed to risk (SAF_PRIV_1)	0.588			
	I believe that hoteliers implement security standards to protect me from various internet issues (SAF_PRIV_2)	0.685			
	The thought of booking a room through the internet gives me an unwanted feeling of anxiety (SAF_PRIV_3)	0.687	0.766	0.767	0.452
	I use online booking when I trust the hotel booking website (SAF_PRIV_4)	0.722			

Factor	Item/Indicators	Loading	CR	CA	AVE
E-WOM	I read online reviews before I book a hotel online (E_WOM_1)	0.772	0.858	0.860	0.552
	I feel that online reviews reduce uncertainty and risk when I make a decision to book a hotel (E_WOM_2)	0.757			
	I consider online reviews important because they mention about experienced goods rather than goods that have been searched (E_WOM_3)	0.830			
	I consider both positive and negative reviews before I make up my mind to book a hotel online (E_WOM_4)	0.766			
	I consider negative reviews more informative and diagnostic while taking decisions (E_WOM_5)	0.560			
Perceived Value	I consider value as a salient factor in the decision making process (PER_VAL_1)	0.599	0.643	0.645	0.377
	I consider the monetary savings at the time of intending to book a hotel online (PER_VAL_2)	0.552			
	I consider the non monetary benefits like convenience ,service excellence and emotional factors while deciding to book the hotel online (PER_VAL_3)	0.683			
Online hotel booking intention	My intention to book a hotel room online factors such as price and promotion, e-WOM, perceived values and so on are high (ON_BKG_INT_1)	0.595	0.833	0.835	0.559
	I decide to book a hotel where I get online reviews and feel that they are complete and accurate (ON_BKG_INT_2)	0.757			
	A few issues difficulties faced during the check in time has led me to book the hotel online rather than online (R) (ON_BKG_INT_3)	0.736			
	I would recommend my friends and relatives to have a high intention for online booking as it would be reliable information about the hotel in advance (ON_BKG_INT_4)	0.875			

Note: CR - Composite Reliability, CA - Cronbach Alpha, AVE – Average Variance Explained

Table 2: Discriminant Validity of independent dimensions:

	INF_QUL	PERC_INT	PRC_PRM	SAF_PRIV	E-WOM
INF_QUL	0.634*				
PERC_INT	0.579	0.650*			
PRC_PRM	0.361	0.427	0.785*		
SAF_PRIV	0.409	0.249	0.136	0.672*	
E-WOM	0.641	0.916	0.381	0.129	0.743*

* Square Root of AVE values shown in Table 2

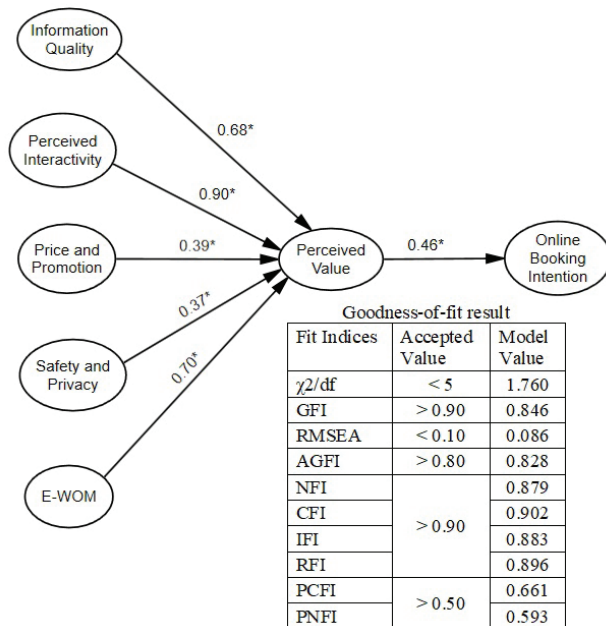
First, the Cronbach's alpha reliability coefficient was calculated to assess the questionnaire's psychometric properties. Cronbach's alpha value ranges from 0 to 1, with a value closer to 1 indicating greater stability and consistency; however, for basic research, the cutoff value is 0.60 (Nunnally, 1978) [Kalthom Abdullah & Others, 2012]. The results of Cronbach's alpha are depicted in Table 1, indicating the acceptable consistency and stability of the instrument. Secondly, concerning composite reliability, Table 1 shows that most items demonstrated a loading greater than 0.50, which validates the convergence. Also, the Cronbach alpha values of each dimension are above 0.60, more than the accepted value. Similarly, the Discriminate Validity result depicted in Table 2 establishes the discriminant validity among the latent variables in that they do not statistically overlap each other [since the inter-item correlation values are less than the square root of

the AVE value] and are free from the problem of multidisciplinary.

SEM analysis result:

After running the CFA to check the reliability and validation of the items (questions), the defined research hypotheses shown in the conceptual framework (Fig 1) are tested for path analysis, and the results are shown in Figure 2 and Table 3.

Fig 2: SEM result of dimensions influencing online Hotel Booking Intentions



* Significant at 5 % level

Table 3: Standardized Regression weights for direct relationship between dimensions of online hotel booking intentions

			Standard Estimate	C.R.	P	Remark
Perceived Value	<---	Information Quality	0.676	3.398	0.000*	H ₁ Supported
Perceived Value	<---	Perceived Interactivity	0.902	4.276	0.000*	H ₂ Supported
Perceived Value	<---	Price and Promotion	0.389	2.397	0.017*	H ₃ Supported
Perceived Value	<---	Safety and Privacy	0.373	2.148	0.032*	H ₄ Supported
Perceived Value	<---	E-WOM	0.696	3.405	0.000*	H ₅ Supported

			Standard Estimate	C.R.	P	Remark
Online Booking Intention	<---	Perceived Value	0.457	2.612	0.009*	H ₆ Supported

* Significant at 5% level

The findings of SEM indicated that the research model almost satisfied the requirement of model fit with chi-square/df showing a value of 1.760 (Figure 2). The GFI, CFI and AGFI are close to the standard cutoff of above 0.90. RMSEA, with a value of 0.086, fulfilled the cutoff value of 0.10. On the regression analysis result depicted in Table 3, *Information Quality* has a significant (with a p-value of 0.000, $p < 0.05$) influence on Perceived Value. Thus, hypothesis H1 is accepted at a 95 % level of confidence. The regression ($\beta = 0.676$) indicates that for every additional ten respondents agreeing on the statements under Information Quality, one would expect an average of seven respondents rating in agreement on the perceived value dimension.

Similarly, the remaining four independent dimensions, *Perceived Interactivity*, *Price and Promotion*, *Safety and Privacy* and *e-WOM*, significantly influence perceived value and the hypotheses are accepted at a 5 % significance level. Likewise, the perceived value is 50% ($\beta = 0.457$) influence on online booking intention, with a statistically significant level of 5%. This suggests that one in every two people expect perceived value when booking hotels online.

Discussion and Conclusion

By examining the information quality, perceived interactivity, price and promotion, safety and privacy, and e-WOM on customers' intentions to book rooms online in Indian hotels, this study investigates the customers' perceptions regarding factors influencing hotel booking intentions via the applications of online hotel intermediaries. The study also discusses and assesses an updated model consisting of six hypotheses. In order to address the variables that affect an individual's decision to book a hotel on an online booking site, this study provided a research model. This study uses an online survey as its approach to obtain accurate data from 100 respondents in order to test the proposed hypotheses.

The study's results on price and promotion show a significant relationship between those factors and consumers' intentions to make an online hotel reservation. This is likely because most travel intermediaries rely on discounts to draw clients, create exclusive price packages to entice clients to book through them and carry out marketing campaigns by providing multiple days at competitive rates through travel intermediaries.

The study's main topic is the importance of perceived security and privacy of online travel middlemen. The findings complement H4 by illustrating the beneficial impact of perceived privacy and security on online booking intentions.

Customers value the privacy of their bank accounts and personal information about their families, so perceived privacy and security rank highest among customer concerns. This is especially true for applications that take credit card payments. Therefore, maintaining privacy and perceived security is crucial to customers' intentions to book online.

Online travel intermediaries' applications should verify that client privacy is maintained and that only permitted workers may access personal data. Customers are more likely to use online booking when they believe in hotel booking applications. The study highlights the importance of internet reviews. The findings complement H5 by demonstrating the beneficial influence of internet reviews on intentions to make online reservations.

An online review is a major factor influencing booking intentions, particularly since users can readily access comments on these applications. While internet travellers rate each hotel with a star, hotels must improve their quality to enhance their rating on their applications. The research concluded that internet reviews are among the most significant factors influencing a customer's intention to book since they allow them to examine all the comments for the hotel of their choice and select the best offer. The findings of this study indicate that perceived value is the most important factor in online hotel booking. Consumers are more likely to book a hotel online if they believe in the benefits of more affordable pricing and higher quality hotels. Managers and hoteliers need to be aware of how introducing the advantages that customers prioritise—price and quality—can

promote the perception of value. Knowing how customers view their value enables managers to effectively craft operational offerings that balance price and quality.

Limitation and Suggestions for Future Research

There are several limitations to this study. Initially, the sole tools used in this study were customer-distributed online questionnaires. In order to learn more about the expectations and perceptions of restaurant patrons regarding online food delivery applications (FDAs) and how they make decisions at Indian restaurants regarding online hotel booking environments, additional research might potentially employ the qualitative method to conduct more interviews with patrons. The study's data was obtained in India. This aligns with the goal of Indian hotel environments. However, it does not reflect cross-cultural consumer behaviour in any way or reflect similar research or data analysis from other cultures. Therefore, to achieve generality, future research must gather a more extensive data set with a broader participation across different demographic segments.

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