

# The impact of competitive intelligence on quality of service delivery: The mediating role of open-book management in the hotel industry

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## Abstract

Today, the hotel industry is increasingly facing dynamic and changing environments that should adapt itself to environmental changes for survival and dynamism. Providing quality services based on competitive intelligence is a fundamental challenge for hotel managers. This study presented a structural model to evaluate competitive intelligence's effect on service delivery quality by explaining the mediating role of open book management in the hotel industry. This applied, and the descriptive-correlational study was conducted on all managers, assistants, and senior staff of three, four, and five-star hotels in East Azerbaijan province, of whom 180 people were selected as the sample size based on Cochran's formula with the proportional distribution. Data measurement tools were Goldstone's competitive intelligence questionnaire, Sajedi's open book management questionnaire, and Parasuraman et al.'s service delivery quality questionnaire. The face validity method and expert confirmation were used to determine the validity of the questionnaires. The internal reliability of the questionnaire was confirmed through Cronbach's alpha coefficient. The statistical description of research variables was performed using mean index and standard deviation. The research hypotheses were analyzed with the Pearson correlation coefficient, bootstrap, and Sobel test using SmartPLS software. The results of the correlation analysis showed a significant positive relationship between competitive intelligence and open book management ( $P < 0.001$ ). A crucial positive relationship was confirmed between open book management and service quality ( $P < 0.001$ ). The relationship between competitive intelligence and quality of service provision was positive and significant ( $P < 0.001$ ). The Bootstrap and Sobel test results showed that open book management significantly mediated the relationship between competitive intelligence and quality of service delivery ( $P < 0.001$ ).

Keywords: Competitive intelligence, Open book management, Service quality, Hotel industry  
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## 1 Introduction

Tourism is considered an industry without smoke, cause, and consequence in the process of globalization and a driving force in global development in today's world. This industry has become a pillar of business and brings much income to countries with tourist attractions [11]. Different countries have become tourist poles by taking advantage of natural gifts, ancient relics, ancient civilizations, new technology, tourist towns, and entertainment facilities. Every

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year, they invite people worldwide to bring income to their countries by selling goods and services. The hotel industry is one of the most critical components of tourism and hospitality [26]. The hotel industry is a part of the service industry that accommodates guests in residences. According to most definitions, the hotel industry refers to hotels and many other forms of overnight accommodation, including hostels, hotels, apartments, inns, and guesthouses. Hotel management is closely related to the travel and tourism industry due to the nature of the service. The quality of hotel services refers to the satisfaction of tourists and travelers with their services, considering their expectations. Measuring the quality of services in the hotel industry is very important for hotel owners and tourism industry activists. The competition in this industry is very high and should be distinguished with better services than other hotels [30].

Quality is a part of the nature of every phenomenon. Quality is referred to all the features that satisfy the customer's needs. Therefore, any product with features that meet customers' needs is quality [39]. Measuring the quality of goods of a physical nature is not difficult, and it is possible to determine and evaluate their quality by setting quantitative standards. However, it is quite challenging to raise the quality in the labor service sector, which is caused by the specific characteristics of the service. Service quality is meeting the needs of customers and clients and matching the levels of service provided with customer expectations [28]. The evidence shows that tourism industry operators can fulfill their duties if they are in a favorable situation regarding quality and quantity. For this reason, measuring Service Quality is considered one of the basic steps in developing quality improvement programs. Service quality is recognized as the primary determinant of an organization's success in today's competitive environment [35], and any decrease in satisfaction due to poor service quality is cause for concern [45, 54]. Organizations that achieve higher service quality will have higher satisfaction levels as a prelude to obtaining a sustainable competitive advantage [22]. Based on the literature, customers emphasize the technical or output dimension and the functional and process dimension in evaluating service encounters. In the first dimension, the tangible aspect of the product is considered, and in the second dimension, receiving the product is considered necessary. Although it may seem that the physical dimension of a product will have the most significant impact on consumer behavior, evidence shows that the functional components of the encounter, such as service quality and service location, are critical. In other words, service quality is perhaps the most studied in service marketing. The literature published in the late 1970s and early 1980s clearly understood service quality and its measurement criteria. For example, Shostak and Lovelock identified the "intangibility" characteristic of services and stated that many services are a function instead of being an objective thing (unlike tangible goods) [8]. Bowen and Cummings suggested that the general atmosphere of service in an organization is essential in shaping the attitude of customers and frontline employees toward the process and outcome of service delivery. In services that depend on the workforce, quality is created during the service delivery and encounters between employees and clients. Thus, there should be a tool for measuring the quality of services while receiving services [2] and examining the factors affecting the quality of service delivery.

During the past years, there has been an increase in business and service units with an innovative management philosophy called open-book management (OBM) [15]. This philosophy, coined by Jack Stack, CEO of Springfield, Missouri, offers a way to run companies where employees are empowered to make decisions. The basis of open book management is that the information received by employees should help them perform their duties effectively but should also help understand the company's overall performance [42]. John Case, one of the advocates interested in open book management, says, "Companies with open book management know their competitive advantage and superior performance in the ability to train employees and turn them into businessmen, as opposed to hired people who only do what they are told" [7]. The best phrase to understand the philosophy of open book management is summed up in the phrase "Unus pro omnibus, omnes pro uno," which means one person of the company itself. In other words, the conflict of interests disappears under the shadow of open book management, that is, my interests and your interests become our interests, which, according to the philosophy of open-book management, is the true meaning of success [7]. John Case states three basic principles that separate this method from the traditional way of doing business: 1) The company must provide its financial and vital data to the stakeholders and teach them how to understand this data; 2) its employees should be involved in pushing the numbers in a direction that will make the company progress; 3) Employees should contribute to the success of the company [1].

Today, creating effective and transformative changes in the business environment due to the increasing entry of new competitors, and providing new products and services by current competitors, is considered one of the main challenges of organizations [49]. Business units, services, and organizations must respond to the opportunities, challenges, risks, and limitations caused by the external environment to deal with this issue and provide an appropriate solution [17]. On the other hand, the abundance of information in today's world has made collecting as much information as possible and using data and turning it into practical intelligence to guide organizational decisions essential [44]. Meanwhile, competitive intelligence can support the decision-making process to increase the organization's competitiveness by collecting and using information about competitors, customers, suppliers, and competing industries [3]. Therefore,

organizations need to improve their competitive intelligence. Organizations with lower competitive intelligence will not be able to survive in the field of competition. After some time, they will undergo environmental changes and leave the field of competition [16]. Hence, business units and organizations can identify internal and external opportunities and threats by relying on competitive intelligence and making strategic decisions [13]. Competitive intelligence, one of the business intelligence components, seeks to gain strategic advantage. According to the definition of GTILAB, "Competitive intelligence is the art of finding, collecting, processing, and storing information and technologies, for access and use of personnel at all levels of the organization, to shape the future of the organization and support the current situation against competitive threats" [10]. The dimensions of competitive intelligence generally include market situation awareness, competitors' situation, technology and technique, and social strategy [31]. Therefore, in today's smart market, the information of buyers, distributors, suppliers, contractors, innovations, development of products, services, customers, and partners is collected and analyzed [32]. Good performance in these areas increases the effectiveness of small and medium organizations. In other words, the capacity to use and release the potential of big data tools and techniques as the two primary arms of successfully guiding competitive intelligence leads to adopting and implementing competitive intelligence strategies [44].

On the other hand, as one of the most important human activities in the present era, tourism has brought about tremendous changes in the face of the earth, the political, economic, cultural situation, character, and way of life of humans. Therefore, creating a competitive advantage in units that provide tourism services can include any factor of service characteristics, updating, pricing, or strategy that makes it difficult to repeat. Even an invisible factor can play a crucial role [11]. Since the tourism industry is considered one of the most competitive industries in the world, tourism service companies are continuously and increasingly entering this field of competition. Therefore, senior managers can increase satisfaction to stay in the circle of competition and increase customers using competitive intelligence components in services and changing the behavior pattern of travelers and tourists, and the possibility of more income for the hotel industry. Improving public insight through the appropriate use of information facilitates the process of competitive intelligence and establishes a positive relationship with the competitive advantage of the organization, and helps to better plan for business and improve decision-making. Therefore, investigating the factors affecting competitive intelligence among the leading operators of hotels and travel service offices responsible for providing welfare services to travelers and tourists during travel can effectively promote programs leading to increased income through more rational management.

A positive relationship was shown in previous studies on competitive intelligence in the hospitality industry, with environmental monitoring, competitor analysis, applied technologies, and the use of competitive intelligence with organizational performance and strategic planning. The management approach of tourism units in applying methods related to competitive intelligence, eliminating confusion, and developing a formal process and the need to analyze competitive intelligence at all organizational levels should be investigated. This study investigates the impact of competitive intelligence used by managers or supervisors of organizations that provide tourism services, including accommodation centers such as first-rate hotels, boutique hotels, and eco-tourism places. The current era is an era whose intellectual structure is based on deepening information and paying attention to the participation of innovative and knowledge-oriented human resources instead of functional ones. According to the theories of competitive intelligence, it is necessary to use knowledge as much as possible to create transparency in management and provide optimal services to expand your competitive field. This requires that the organization value the quality of service provision and open book management and places it among its priority programs as a strategic and necessary need for pioneering in the field of competitiveness. Therefore, the researcher seeks to investigate whether competitive intelligence affects the quality of service provision in the hotel industry. Another research question is whether open book management mediates the relationship between competitive intelligence and service quality in the hotel industry.

## 2 Theoretical foundations and research background

### 2.1 Competitive intelligence

Competitive intelligence (CI) enables all senior managers of the organization to make informed decisions in marketing research and development (R&D) and investment tactics to long-term strategies to show the competitive environment. Practical competitive intelligence includes the continuous process of legal and ethical information collection and the controlled transfer of operational intelligence to decision-makers [10]. Ben Gilad is one of the theorists of intelligence, "Competitive intelligence refers to a company's knowledge of the environment in which it competes and has at its disposal, and is the result of the analysis of countless amounts of information that bombards the company daily. In the light of this knowledge, complete pictures of the current and future situation of the competition scene are placed in front of managers so that they can make better decisions" [27]. According to Kahanar, there should

be a difference between information and intelligence. Information corresponding to facts includes numbers, statistics, and classified data about various cases, but intelligence is analyzed information. Managers need intelligence for the decision-making process, not information. Unlike knowledge management, which focuses on internal factors, competitive intelligence focuses on external events. A timely warning is one of the critical goals in competitive intelligence, which allows decision-makers to pursue goals that maintain their competitive advantage [14]. From GTILAB's point of view, the dimensions of competitive intelligence are divided into four main categories, including 1) awareness of the market situation, in which mainly information related to customers, suppliers, buyers, and distributors is collected and analyzed; 2) awareness of competitors' situation, which focuses on issues such as pricing policies, substitute products, and development policies of competitors; 3) Technological and technical awareness that deals with basic and applied research, processes and norms and creation of innovation; 4) Social strategic awareness that deals with issues such as laws, financial and tax issues, political and economic issues and social aspects and human resources. These four types of information, discussed in many organizations, mainly observe and analyze social behavior and procedures [20].

## 2.2 Quality of service delivery

There are different definitions of service quality, each of which has explained this concept from a specific dimension. Kahya defined the quality of service provision as the size and direction of the discrepancy between the customer's perception of the service and his expectations [29]. According to Mahapatra and Khan (2007), the customer's comprehensive judgment about the superior nature of the service compared to similar services or its prominent advantages is the quality of presentation [33]. The quality of service is stable compatibility with the customer's expectations and knowing the customer's expectations of a particular service [6]. In commercial literature, service quality is defined as a meta-consumer evaluation of services by consumers, in which consumers' expectations are compared with their observations of service performance. Service quality assessment is based on the functions in which these services are provided (practical quality) and the results that result from these services (technical quality). Most researchers use the service quality model of Seroquel for service quality. This model provides 44 measurement scale items (estimates) in which the difference between consumers' expectations of services is compared with their assessment of actual service performance. After that, 22 matching questions (same, similar) were raised to measure the actual performance of the provided services. Seroquel included five dimensions of service quality in its area of expertise, which customers use to judge the quality of services. Service quality dimensions include reliability, responsiveness, reassurance, empathy, and maintaining appearance [47]. 1) Reliability is the ability to perform and provide the promised service appropriately, accurately, and reliably. The customer expects reliable implementation of services, meaning that the service is provided to the customer at the appointed time, in the same way as promised, and without mistakes [4]. 2) Responsiveness means the willingness to help customers and provide prompt service. Keeping customers waiting, especially without a clear and convincing reason, creates dissatisfaction and negative impressions regarding the service quality. When good service is not provided, the ability to compensate immediately and skill in compensation can make customers' views and beliefs about services positive. 3) Having confidence is awareness and presence of mind as well as their ability to gain the trust and confidence of customers. This dimension includes the merit of providing services, being polite and respecting the customer, and communicating effectively with the customer. Believing in this principle that the customer's love and trust towards the servant is the best privilege and benefit for 4) Empathy means showing and applying special and warm attention to customers. Empathy includes some features such as being able to approach the client (being friendly and well-mannered), being sensitive to the client's needs, and trying to understand them. 5) Keeping the appearance, that is, the physical facilities and equipment of this place (for example, its cleanliness), is visible proof of the service provider's attention to the health and well-being of its customers [4]. This evaluation can be used precisely to evaluate the quality of services. The customers' judgment is based on comparing their expectations with the existing facts.

## 2.3 Open book management

The basis of open book management is that the information received by the employees should not only help them in the effective performance of their duties and should also be helpful in their understanding of the company's overall performance. [38] defined this term as sharing information between management and employees. Managers are always seeking to learn practical techniques to increase their benefits by increasing employees' productivity. Open book management is not a passing wave that can be ignored and is a growing movement that creates a significant challenge for companies and job opportunities. There are four essential elements in open book management, which include 1) distribution of financial and other information; 2) teaching business principles; 3) empowerment and trust; 4) participation and reward in case of success [5]. All these four elements are necessary for connecting the employees with the company's goals, on which open book management is formed. At first glance, open book management is an

accounting phenomenon due to its emphasis on financial information. Although accounting plays a significant role here, open book management is pivotal and fundamentally changes the traditional business process. In the open book management framework, managers should instill the contents to their employees so that they also act like owners [48]. According to the theoretical foundations presented, the conceptual model of the current research is as Figure 1.

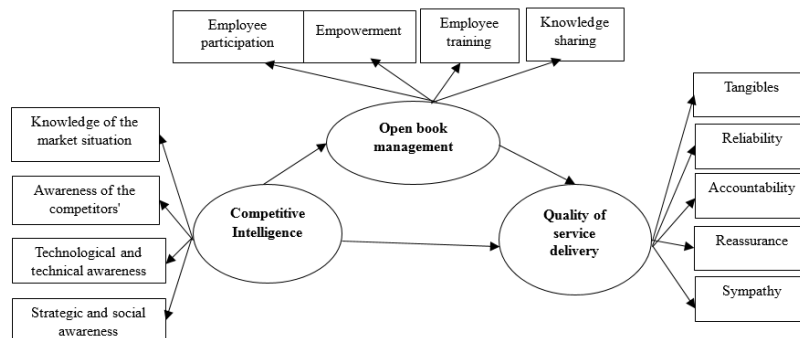


Figure 1: Research operational model

## 2.4 Experimental background of the research

Table 1 shows an overview of the research on the relationship between research variables.

## 3 Methodology

This applied, and the descriptive-correlational study was conducted on all managers, assistants, and senior staff of three, four, and five-star hotels in East Azerbaijan province (16 hotels). Then, a sample of 180 people was selected based on stratified random sampling with proportional distribution as the sample size using Cochran's formula. Cochran's formula is as follows:

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N} \left[ \frac{z^2 pq}{d^2} - 1 \right]}$$

$N$  is the population size, the  $p$ -value is the percentage distribution of traits in the population, and the proportion of people who have the trait under study.  $q$ -value donates the percentage of people who do not have the trait under study. Due to the uncertainty of  $p$  and  $q$ , their maximum value of 0.5 was used. The statistic is  $z=t$ , and at the 5% error level, the value of  $z$  is equal to 1.96, and  $Z^2$  is equal to 3.8418. The  $d$  value is also the difference between the real proportion of the trait in the society and the researcher's estimate for the presence of that trait in the society. The accuracy of sampling depends on this factor. For the highest level of accuracy, the maximum  $d$  value was considered equal to 0.05. Demographic questions and specific questions section were used to collect data from a two-part questionnaire. In the demographic questions section, questions including gender, level of education, and service history were asked. A questionnaire containing three sections described below was used to collect specialized data.

**Service quality questionnaire:** This questionnaire was designed by Parasuraman, Zeithaml, and Berry [41] with 22 questions, and the five main axes are tangibles (questions 1-4), reliability (questions 5-9), responsiveness (questions 10-13), assurance (questions 14-17), evaluates empathy (questions 18-22). The scoring method of the questionnaire is based on a five-point Likert scale from very high to very low. Parasuraman et al. evaluated formal and logical validity for a statistical population of 455 people. The reliability of the questionnaire was obtained by calculating Cronbach's alpha coefficient of 0.91. Different researchers evaluated the validity and reliability of the questionnaire in Iran, and the reliability coefficient was more than 0.8 [8], and [35] Cronbach's alpha coefficient was 0.89.

**Open book management questionnaire:** This questionnaire was designed by Al-Hassim [5], which contains 12 five-option Likert questions (very little, little, somewhat, much, and very much), and all questions are directly scored as very little (=1) and very much (=5). The lower limit of scores is 12, and the upper limit is 60, and the higher the range of scores, the more open book management has been implemented in the organization. The open book management questionnaire included four subscales of knowledge sharing, employee training, employee empowerment,

Table 1: Overview of related research

Reference	Subject	Finding
[40]	Identification of information behavior in the process of competitive intelligence: a paradigm model for universities of medical sciences	The purpose of obtaining information in competitive intelligence is to meet organizational and individual information needs actively and passively. The characteristics of information acquisition and its acquisition are different. Empowers include information sources, individual and organizational characteristics, and environmental pressures. Obstacles are individual, organizational, and environmental factors.
[24]	Determinants of sustainable competitive advantage from a resource-based perspective: Implications for the hospitality industry	Absorption capacity, team culture, and awareness of competitive intelligence significantly impact strategic flexibility and sustainable competitive advantage. Entrepreneurial behavior has a negligible effect on strategic flexibility and sustainable competitive advantage. Strategic flexibility has a significant impact on sustainable competitive advantage. Innovation actively moderates the relationship between strategic flexibility and sustainable competitive advantage.
[46]	A typology of competitive intelligence practices in an airline company in Turkey	Improvements should be made in the model's six fields: attitude, collection, use, location, technology support, and information technology support.
[44]	Big data analysis in creating competitive intelligence in organizations	It is necessary to provide a basis for developing big data frameworks and process models for CI in organizations.
[37]	The role of analytical CRM on a salesperson's use of competitive intelligence	The importance of CRM can be confirmed by analyzing the behavior of using the seller's information utilizing the framework of motivation, opportunity, and ability.
[16]	The role of marketing and competitive intelligence in the industrial revolution	The competitive intelligence process based on needs identification and collaborative approach was identified. Talent management enables the ability to adapt to changes.
[34]	Embedding competitive intelligence: drivers and performance consequences	Web-based competitive intelligence positively affects organizational performance, while CI alone has no direct effect.
[12]	Competitive intelligence and sustainable competitive advantage in the hotel industry	Environmental and organizational characteristics influence CI effort, and, in turn, CI effort affects CI use.
[36]	Evaluating the effect of marketing dashboard on organizational competitiveness by explaining the mediating role of marketing memory and competitive intelligence	The components of the marketing dashboard, marketing memory, and competitive intelligence each positively and significantly affect organizational competitiveness. The marketing dashboard positively and significantly affects organizational competitiveness by considering the mediating variables of marketing memory and competitive intelligence.
[19]	Designing a competitive advantage development model in the sports tourism industry in the north of the country Competitive resources and competitive strategy affect	competitive capability, and competitive capability is effective in competitive advantage.
[52]	Designing a competitive intelligence model with a combined approach of structural-interpretive modeling-fuzzy Delphi	The three levels of components as the basis of competitive intelligence in the food industry are institutional and social components, competitor and strategic components, technology, and market.
[53]	Analysis of factors affecting competitive intelligence in entrepreneurial food industry companies in Tehran province	Factors affecting competitive intelligence include market, strategic, competitors, technology, social, and institutional intelligence.
[25]	Designing a framework for acquiring 0.2 competitive intelligence using the best-worst (BWM) method.	Competitors' intelligence dimension 0.2, extraction of concepts and patterns, market intelligence 0.2, presentation and evaluation of competitive intelligence 0.2. Planning to gain competitive intelligence 0.2, business processes, people, and technology, monitoring, and gathering information from social media. Social/strategic intelligence 0.2, and technology intelligence 0.2 are essential dimensions of competitive intelligence.
[9]	Investigating the relationship between managers' competitive intelligence and the modernization of small industries	With the modernization of small industries, competitive intelligence, including commercial awareness, competitor status, and technical and strategic-social technology, has a positive and meaningful effect.

and employee participation, with three questions each. The validity and reliability of the tool were confirmed in [5], Cronbach's alpha coefficient was 0.791, 0.841, 0.811, and 0.91, respectively, for the questionnaire dimensions. Further, the coefficient of divergence was calculated as 0.774, 0.841, 9.698, and 0.779, respectively.

**Competitive intelligence questionnaire:** This questionnaire was designed and developed by Goldstone [21] based on 16 five-option Likert questions, all of which are directly scored as very low (=1) and very high (=5). Scores range from 16 to 80; the higher the score, the better the organization's competitive intelligence. This questionnaire consists of four dimensions: knowledge of the market situation, competitors' situation, technological and technical

knowledge, and strategic and social knowledge. In [21], formal and logical validity was evaluated for the statistical population of 455 people. The reliability of the questionnaire was obtained by calculating Cronbach’s alpha coefficient of 0.91.

Two methods of descriptive and inferential statistics were used to analyze the collected data. Open book management and quality of service provision descriptive statistics mean, standard deviation, lowest score, and highest score were used to provide an overview of the current state of competitive intelligence. Pearson’s correlation coefficient, bootstrap, and Sobel test were performed with SPSS-24 and SmartPLS software to check and test the research hypotheses. The Sobel test was used to test the effects of mediation on the relationship between two variables.

This test measures the effects of mediation in the relationship between two other variables, which is possible by using this test in data with a more significant number. The formula of the Sobel test is as follows, and the value obtained for the z-value is measured in different levels like the significant numbers of t.

$$z - value = \frac{a \times b}{\sqrt{(b^2 \times s_a^2) + (a^2 \times s_b^2) + (s_a^2 \times s_b^2)}}$$

The numerator was considered the coefficient of the mediation path (indirect effect) in this formula. In the above formula, a is the value of the path coefficient between the independent variable and the mediator, b presents the path coefficient value between the mediator and dependent variable, Sa donates the standard error of the path between the independent and mediator variable, and Sb represents the standard error of the path between the mediator and dependent variable.

### 4 Results

This study aimed to provide a structural model of competitive intelligence’s effect on service delivery quality by explaining the mediating role of open book management in the hotel industry. The demographic information of the respondents shows that 145 of the respondents were male, and 35 were female. In the study of the education of the participants, the results of the study showed that 95 people had a bachelor’s degree, 65 people had a master’s degree, and 15 had a doctorate. In examining the service history of the company’s employees, 35 people had less than 15 years of service, 100 people had 16 to 25 years of service, and the rest had more than 25 years of service. Table 1 presents the descriptive statistics of the research variables.

Table 2: Descriptive statistics of research variables

Variable	Component	Min	Max	Mean	Standard deviation	Skewness	kurtosis
Service quality	Tangible factors	4	19	11.73	3.10	-0.149	-0.151
	Reliability	4	18	10.95	3.16	-0.526	-0.012
	responsiveness	4	20	10.86	3.13	-0.169	-0.338
	guarantee	4	8	10.53	3.09	0.118	0.094
	Sympathy	5	21	12.47	3.89	0.003	-0.500
Open book management	knowledge sharing	3	13	7.57	1.79	0.135	0.375
	Training of employees	3	13	7.05	1.72	0.329	-0.056
	Empowerment of employees	4	14	7.69	1.68	0.417	0.388
	Employee participation	3	14	7.53	1.86	0.007	0.129
Competitive Intelligence	Knowledge of the market situation	10	20	16.83	2.56	-0.778	0.328
	Awareness of the competitors' situation	9	20	15.7	2.84	-0.697	0.327
	Technological and technical awareness	8	20	15.86	3.2	-0.566	-0.092
	Strategic and social awareness	9	20	16.5	2.93	-0.76	0.174

The data have a normal distribution when the skewness and kurtosis are between +2 and -2. According to the skewness and kurtosis values in Table 2, the data distribution of all research variables is normal. Bivariate analysis was used to investigate the two-by-two relationship of research variables. Pearson’s correlation coefficient showed the correlation between two ranking variables (such as Likert levels). The correlation between two variables showed that the increase or decrease of one variable affects the increase or decrease of another variable.

Table 3: Correlation between variables

Variable	1	2	3	4	5	6	7	8	9
1 knowledge sharing	1								
2 Training of employees	0.636**	1							
3 Empowerment of employees	0.255**	0.339	1						
4 Employee participation	0.233**	0.270**	0.355**	1					
5 Knowledge of the market situation	0.131**	0.22**	0.35**	0.54**	1				
6 Awareness of the competitors' situation	0.336**	0.245**	0.303**	0.375**	0.241**	1			
7 Technological and technical awareness	0.374**	0.334**	0.332**	0.444**	0.541**	0.413**	1		
8 Strategic and social awareness	0.88**	0.593**	0.274**	0.204**	0.148**	0.339**	0.331**	1	
9 Quality of service delivery	0.286**	0.280**	0.386**	0.424**	0.198**	0.390**	0.460**	0.252**	1

\*\* The significance level is 0.01.

It is impossible to rely only on correlation coefficients to investigate the causality and predict the dependent variables by the independent variable. Thus, structural equation modeling has been used to examine the general relationships of variables. In the structural model section, the relationships of the hidden variables with each other are examined to test the research hypotheses. Structural equation modeling evaluates the research model and explains the relationships between variables. In this research, SmartPLS software was used to model structural equations. This section is presented in two parts, structural pattern fitting and general pattern fitting.

The evaluation of the structural model includes the test of the model's prediction abilities and the relationships between the factors, which review was done in SmartPLS software. The essential criteria for evaluating the structural model are the path coefficient and the level of determination coefficients, which are examined below. Exogenous variables should be examined separately to assess the collinearity problem and determine whether a variable should be dropped or merged. The calculation of VIF for all items revealed that all values are less than 5, and there is no collinearity problem. The results of the VIF coefficients for the paths showed that this value was obtained for the path of competitive intelligence with open book management, competitive intelligence with quality of service provision, and open book management with quality of service provision, respectively, equal to 2.426, 3.34, and 2.712. According to the results, the VIF coefficients for all paths are less than 5, and there is no problem with collinearity. R Squares or  $R^2$  (determination coefficient) coefficients are used in the research to check the fit of the structural model with the PLS method. The  $R^2$  criterion connects the measurement and structural parts of structural equation modeling and shows the exogenous variable's effect on the endogenous variable. The critical difference between the coefficient of determination and the adjusted coefficient of determination (R Square Adjusted) is that the coefficient of determination assumes that each independent variable observed in the model explains the changes in the dependent variable. Therefore, the percentage shown by the coefficient of determination assumes the influence of all independent variables on the dependent variable. The percentage shown by the adjusted coefficient of determination is only the result of the actual effect of the model's independent variables on the dependent and not all the independent variables. The appropriateness of the variables for the model cannot be determined by the coefficient of determination even with a high value, and the estimated value of the adjusted coefficient of determination can be trusted. According to the structural model of the research, the numbers related to the coefficients of determination are given in Table 3.

Table 4: Determination coefficients of endogenous variables

Variable	Communality	$R^2$	$R^2$ adjusted	GOF
Open book management	0.55	0.526	0.525	
Quality of service	0.877	0.313	0.310	
Competitive Intelligence	0.850	-	-	
Average	0.759	0.419	-	0.563

The overall validity (fit) of the model is determined through the GoF criterion and is calculated through the  $GoF = \sqrt{\overline{Communalities} \times \overline{R^2}}$  equation.  $\overline{Communalities}$  is the sign of the average communal values of each structure and  $\overline{R^2}$  is also the average value of  $R^2$  values of the endogenous structures of the model. A GOF index greater than 0.36 indicates a strong fit for the model. Considering the value of 0.563, the fit of the overall model is strongly confirmed [50]. In the path analysis model, the significance of the path coefficient is determined using t (t-value). If the value of t is between 1.96 and 2.57, the relationship between the two constructs is significant at the  $P < 0.05$  level. If the value of t is more significant than 2.57, the significance of the relationship is at the  $P < 0.01$



level.

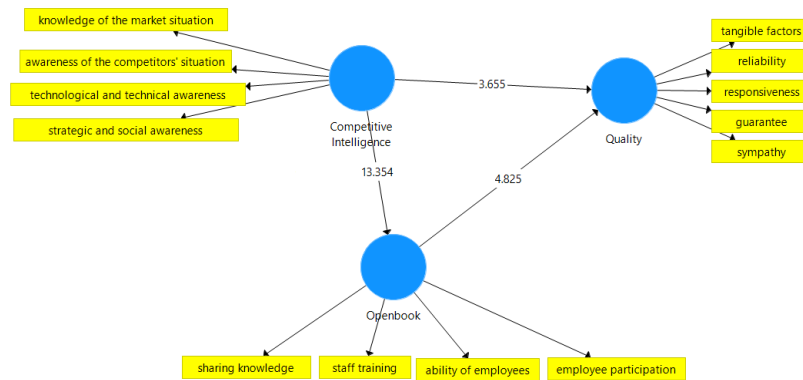


Figure 2: T statistic between research variables

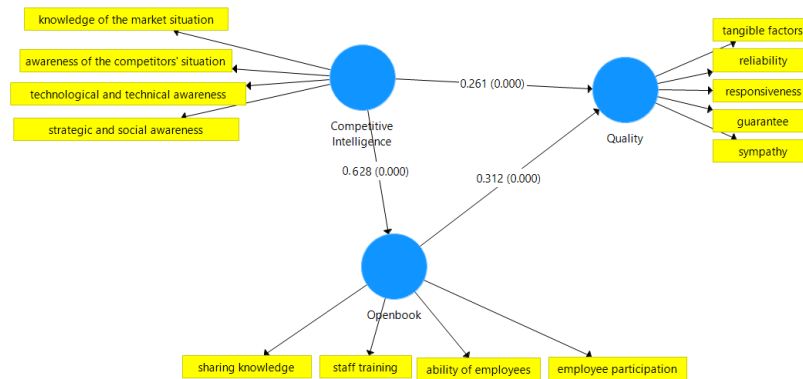


Figure 3: Path coefficient between research variables

The first sub-hypothesis of the research tested the effect of competitive intelligence on the quality of service delivery in the hotel industry. According to Table 5, the t-statistic for the relationship between competitive intelligence and service quality is 3.655, outside the range of -2.58 to +2.58. Therefore, competitive intelligence significantly affects the quality of service provision in the hotel industry ( $P < 0.01$ ). In addition, the path coefficient is 0.261, and its significance level is less than 0.01. Therefore, the significance level is acceptable. The second sub-hypothesis of the research examined the effect of competitive intelligence on open book management in the hotel industry. According to Table 5, the t statistic for the relationship between competitive intelligence and open book management was 13.354, outside the range of -2.58 to +2.58. Therefore, competitive intelligence significantly affected open book management in the hotel industry ( $P < 0.01$ ). Further, the path coefficient was 0.628, and the significance level of which was less than 0.01. Therefore, the significance level is acceptable. The third sub-hypothesis tested the effect of open book management on the quality of service delivery in the hotel industry. As shown in Table 5, the t statistic for the relationship between open book management and service quality was 4.825. Therefore, open book management significantly affected the quality of service provision in the hotel industry ( $P < 0.01$ ). Moreover, the path coefficient was 0.312, the significance level was less than 0.01, and the significance level was acceptable.

Table 5: Test of sub-hypotheses

Predictor variable	dependent variable	Path coefficient	Significance	t-statistics	Result
Competitive Intelligence	Service Quality	0.261	0.000	3.655	Confirmed
	Open book management	0.628	0.000	13.354	Confirmed
Open book management	Service Quality	0.312	0.000	4.825	Confirmed

It is impossible to directly analyze the software’s outputs to analyze the research’s central hypothesis. In other words, when the results of indirect effects cannot be directly analyzed by bootstrapping, other criteria should be used.

The Sobel test was used to obtain the results of the fourth hypothesis. This test measures the effects of mediation in the relationship between two other variables, which is possible by using this test in data with a more significant number.

**Main hypothesis:** Open book management significantly mediates the relationship between competitive intelligence and service quality. Since there is a rounding error in the calculation of this test, the numbers are rounded with five decimals to get more accurate results.

Table 6: Path coefficients of the mediation test

Independent variable	Mediating variable	Dependent variable	Path coefficient	z-value	Result
Competitive Intelligence	Open book management	Service quality	0.196	27.304	confirmed

According to the results of the central hypothesis, the path coefficient obtained from the Sobel test was 0.196, and the value of the z statistic was 27.304. Therefore, open book management plays a mediating role in the relationship between competitive intelligence and service quality because the z-value of the Sobel test is outside the critical range of the significant number t, i.e., more than 2.58, and the hypothesis is confirmed at the 99% level. The VAF statistic is used, which is  $VAF = \frac{a \times b}{(a \times b) + c}$  to measure the intensity of the mediation effect. The value range of this statistic is between zero and one. Values closer to one indicate the intensity of the influence of the mediating variable. In the measurement of this statistic, a value less than 0.2 means no mediation effect, a value between 0.2 and 0.8 means moderate mediation, and a value greater than 0.8 means complete mediation. The VAF index in this mediation test was obtained as 0.429, and the amount of open book management mediation was evaluated as average.

## 5 Conclusion and recommendation

People in the tourism or travel industry travel to a place far away from where they live for various reasons, such as enjoying leisure time, visit friends or family, business motives, or social activities. The tourism industry has an inseparable relationship with the hotel, transportation, hospitality, and other industries and sectors that meet the needs of travelers during the trip. The essential reason for the tourism industry's popularity, in addition to earning foreign currency and economic growth, is the experience of happiness and relaxation travelers want to get away from home. This industry improves employment in some areas, such as transportation and accommodations. Tourism makes tourists happy, brings welfare and education, significantly strengthens political and economic relations between countries, and creates opportunities for cultural exchange. Hotels are the most common and popular places for tourists, and the hotel industry is directly related to tourism. All hotels have rooms with beds and essential facilities, but they are entirely different in the details and quality of services they provide. In [43], the role of competitive intelligence in improving organizational management practices was emphasized, which aligns with the present study's findings. [51] showed that competitive intelligence increases flexibility and speed of response, which was also in line with the effectiveness of competitive intelligence on open book management. [23] indicated a positive and significant relationship between organizational culture, the effectiveness of knowledge management, and competitive intelligence. According to the findings, a significant relationship exists between official sources of managers' power and competitive intelligence with open book management [18]. The most critical challenge the hotel industry faces is rapid and continuous change. These changes include producing various products, customer communication, the business environment, the technology field, social conditions, and environmental laws. Therefore, hotels' dynamism and continuous movement depend on the speed of response or, in other words, on preparation. In hotels where people have a high action rate, they have high concentration power. Concentrating helps them focus their abilities on a specific task to do that task faster. These people also have good analysis and planning power and can allocate their time and energy to work optimally. People with a high speed of action are at a high level in terms of mental preparation and are usually highly skilled in several tasks. In different situations, they make the best decisions, process environmental messages well, and then perform the necessary reaction and action at the best possible time, they need skills to perform that action, which plays a role in improving organizational readiness as a whole [10]. Based on the results of competitive intelligence in every organization and company, especially hotels, the creation of innovation platforms in society, development of organizational capabilities, support for the creation and development of hotels, support for innovative research and engineering institutes and companies to develop technology and entrepreneurship can be mentioned. Other results are facilitating the process of transforming research and technology development into organized, technological research and development, creating a brand and mental image of friendly investment and business environment in the

tourism industry, and commercializing research results and technological achievements [13]. Competitive intelligence comprises specific steps and follows a set of policies. Competitive intelligence is considered a form of management for strategy design and decision-making and a product of a process, which analyzes information that can be presented in forms such as identifying key factors, searching, combining, analyzing, and communicating information. Finally, competitive intelligence is a part of the market information program, which causes awareness of the events of the external environment of the market to make better decisions. It is possible to evaluate the movements of competitors and long-term potential customers in the market using competitive intelligence methods. By doing this, valuable information is obtained, and forward-looking plans are made to reduce the probability of receiving unexpected news (such as the launch of a new competitor's product or a change in pricing strategy). Knowing the competitors will decide to provide better service quality with cost optimization.

This research was associated with limitations, including the lack of sufficient scientific support and localized knowledge about competitive intelligence in the hotel industry, the novelty of the subject in conceptualization, the dispersion of the previous studies in terms of content, and a limited number of internal studies to design a model of competitive intelligence in the tourism industry. Based on the results, it is suggested to the managers and experts of accommodation places and hotels to emphasize the management of customer communication levels. It is recommended to provide service information and how to give and receive it, provide support services, identify potential problems before they occur, create a user-friendly system for registering guest complaints, and design a service strategy for each customer based on the prediction of his needs and expectations. Paying attention to the critical role of human resources (employees) in promoting open book management, familiarizing hotel management with the concept of open book management and the open book management program in the form of resource allocation, revising organizational priorities, and improving tools such as setting up a virtual discussion forum and think tank to exchange experiences related to open book management is recommended.

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