# Multi - Criterion Decision Making Approach to Assess Retail Service Quality : A Market Perspective from Iraq

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## Abstract

**The objective of this research was to analyze the relative importance of different retail service quality (RSQ) criteria on customer satisfaction (CS) through multi-criterion decision making approach (Analytic Hierarchy Process). The organized retail food and grocery outlets were selected from four major cities of Iraq, that is, Baghdad, Basrah, Al Mawsil al Jadidah, and Erbil. Data were gathered from 13 experts in organized retail via specially designed AHP questionnaire and analyzed through pairwise comparison by AHP. Weights for RSQ criteria, that is, Physical Aspects, Convenience, Reliability, Problem Solving, Personal Interaction, and Technological Advancement were calculated. Internal pairwise comparison among different criteria and sub - criteria of RSQ was done. To reveal the relative importance of each criteria and sub-criteria of RSQ, the hierarchical framework was drawn. It was found that Technological Advancement of RSQ had maximum weightage on building CS ; whereas, Personal Interaction had minimum weightage. In sub-criteria comparison, 'mobile application for placing the order' had maximum weightage on CS, while 'no customers waiting because of retailer gossiping' had minimum weightage. It was concluded that a web based mobile application for online shopping and placing orders was an important parameter in building CS in organized retail food and grocery customers in the afore - mentioned cities of Iraq.**

***Keywords :*** **retail service quality, analytic hierarchy process, organized food and grocery retail, multi-criterion decision making, customer satisfaction**

**JEL Classification : M3, M14, M31, M140**

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Iraq is segmented into two distinct regions ; the Kurdistan Region, in North of Iraq, which is administered by the Kurdistan Regional Government (KRG) ; whereas, the central government administers the Central and South regions of the country. The retail sector in Iraq is majorly comprised by the public sector, especially for the food and grocery segment. The demand for strong economic growth catalyses the demand for modern and western-style supermarkets, especially in Iraqi Kurdistan. The Public Food Distribution System (PFDS) implemented by Iraq's Ministry of Trade (MOT) has the provision for five food commodities at subsidized rates.

There exist some 100,000 registered private food retailers in Iraq as per the figures declared by the Iraqi

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Chamber of Commerce, and around 200,000 unregistered small retailers who purchase mainly from wholesalers. The main retail players are : Carrefour Hypermarket, City Center Hypermarket (Hewa owned stores), Warda Supermaket, and World Mall Supermaket. The major wholesaler is Khudairi Group. Size of the GCC retail sector has been estimated to grow at a CAGR of 4.0% from US$ 253.2 billion in 2018 to US$ 308.0 billion in 2023. The GCC gross retail sales from 2018 to 2023 have been estimated at a CAGR from 2.2% to 5.1%, with UAE hitting the top followed by Qatar and Bahrain in the fastest growing countries. In GCC, Saudi Arabia and the UAE are the largest retail markets capturing 75.8% of the GCC retail market in 2016.

Retail service quality (RSQ) has gained interest in the recent past due to its linkage and relationship with customer satisfaction (CS) (Bolton & Drew, 1991), repeat purchasing behaviour (Taylor & Baker, 1994), increasing profits as well as cross-sell ratios and higher customer retention (Bennet & Higgins, 1988), and spreading market share (Bowen & Hedges, 1993). RSQ acts as one of the main determinants of CS, consequently increasing sales and customer retention. As quality is intangible and multifaceted, so its measurement is a challenge to retailers (Finn & Lamb Jr., 1991). Thus, measuring RSQ seems to be a difficult task for retailers because of intangible, heterogeneous, inseparable, and perishable characteristic features of the service (Bateson, 1995). In Iraq, customers experience poor customer satisfaction due to deficient RSQ. Retailers are thus striving to attain the state of provision of best service quality for their customers. Studies have assessed RSQ in different geographical locations, though scarce research has been done by applying multi-criterion decision making approach to assess RSQ specifically in Iraq. To fill this gap, there is a need to study the relative importance of RSQ dimensions on CS. The assessment of the relative importance of RSQ criteria and sub-criteria shall be helpful in building CS. Thus, the three most populous cities of Iraq (Baghdad, Basrah, Al Mawsil al Jadidah) were selected for the research. Moreover, Erbil, the capital city of Kurdistan, Iraq has most of the biggest retail outlet chains of the region, so it was also considered for the study. The pairwise comparison can yield results which are close to actual perception of RSQ criteria and sub - criteria, since in multi-criterion decision making approach, only those experts participate who have sound intellectual knowledge of organized retail food and grocery segment, consequently reducing the probability of occurrence of errors in the results.

## Literature Review

Since many decades, service quality has been studied by researchers in different business settings. Although, perceived service quality has been measured basically through two approaches. The first one involves comparing customers' expectations and their perceptions of the received service quality (Gronroos, 1984 ; Parasuraman et al., 1985). The second approach involves only customer perceptions instead of expectations minus perceptions. Nowadays, the theoretical background of service quality is moving from first approach to the approach of reasoned action according to which the behaviour of the individuals can be predicted from their loyalty intentions, which can be predicted from their attitudes about behaviour and subjective norms. Service quality and customer satisfaction are different constructs as found by Dabholkar et al. (1996), although service quality is an antecedent to customer satisfaction (Oliver, 1980) wherein customer satisfaction is a consequence of service quality. Thus, the human qualities like retailer personality can act as a determinant of customer satisfaction (Bodet, 2006). Perceived service quality is also seen as a direct antecedent of trust. Trust is founded on the anticipated capacity of the company to regularly satisfy customer expectations (reliability, credibility, general reputation). Positive service evaluations and satisfactory consumption experiences make future exchanges more predictable.

Trust is directly related to self-reported behaviors (Moorman et al., 1992) or behavioral intentions. Aurier and N'Goala (2010) created positive and significant links among perceived value, global satisfaction, trust, thus forming a relational chain. When customers perceive good service, this is percolated down to many of their

colleagues and friends. The retail managers also lay stress on societal responsibility aspect of CSR to construct a decent retailer personality which can indirectly enhance customer satisfaction, trust, and loyalty (Rashid & Rokade, 2019).

It is estimated that nearly one half of American businesses are built upon this informal, "word-of-mouth" communication, which is a determinant of customer loyalty (Gitomer, 1998). Increasing service performance is the key to increasing customer satisfaction. The results are derived from actually experienced service performances according to this approach. Though, further extension of this approach explains that good service quality leads to customer satisfaction, which in turn also enhances customer loyalty (Oliver, 1997).

Saaty (1987, 1990, 2008) pioneered the concept of Analytic Hierarchy Process (AHP) as a multi-criteria decision making method used to obtain ratio scales from paired comparisons. AHP is a theory of measurement of priority or relative pairwise comparison of expert's judgment. AHP helps decision makers in finding the best alternative for achieving the set goal. It is widely used in group decision making around the world in business, healthcare, and education. AHP decomposed the process of complex decision making in a hierarchy of criteria, sub-criteria, and attributes with the help of priority weights that gives the relative importance of the attributes. Finally, the ranking of different criteria and sub-criteria is done to choose the best from the given alternatives. Ramanathan (2001) assessed the perceptions of stakeholders on different socioeconomic impacts with the help of AHP. The results helped officials in prioritizing their environmental management plan and in the allocation of available budget for mitigating the adverse socioeconomic impact. Soon-Hoo and Kim (2006) studied the service quality of third-party logistics service providers using AHP. The study was based on four companies providing third-party logistics services in Korea. The five dimensions identified were : tangibles, reliability, responsiveness, assurance, and empathy. Results revealed that responsiveness out of the five service quality dimensions was the most important criteria for choosing third-party logistics service providers.

Chiouy et al. (2011) aimed at choosing the most sustainable supplier for Taiwanese electronics industry. Three main criteria chosen were environmental, social, and economy aspects and 15 sub-criteria were chosen. It involved prioritization and ranking of different performance evaluation criteria for the sustainable supplier selection. Outcomes revealed that the main criterion 'environmental performance' and sub-criterion 'quality' gained maximum priority weights in their respective categories. Kousalya et al. (2012) studied the decision-making process for selection of a student from an engineering college, who was eligible for All-Round Excellence Award. Seven criteria were identified for getting the award, and five branches of the engineering college were considered as the alternatives. After applying AHP, researchers reached on a decision that a student of the Electronics and Communication Engineering branch should receive the award. Erbıyık et al. (2012) used AHP in the selection of the most convenient retail store location. Main criteria identified were costs, competition conditions, traffic density, and location which included 15 sub-criteria. The findings suggested that the main criterion in the selection of most convenient retail store location was traffic density followed by competition conditions. Roig - Tierno et al. (2013) developed a methodology for selecting a retail site location by using Geographic Information Systems (GIS) and AHP. Criteria considered for retail site location were establishment, location, demographics, and competition. The results revealed that the most important criteria taken into consideration were those related to location and competition.

Li and Sha (2013) analyzed the retail industry's energy consumption with lighting, air-conditioning, and refrigerating & freezing as the primary criteria. Researchers also used AHP to assess contributions of finance, social responsibility, technology, and policy support to improve the efficiency of energy consumption. It was concluded that to enhance energy saving of the retail industry, financing approaches, technology adaptability, and policy support should be optimized. Biswas and Roy (2015) focused on the relationship between environmental issues and consumer choice in buying green products. The outcomes revealed that price sensitivity was high irrespective of customer choice preference. Consumption values of customers with green purchase experience got the higher weight than the other normal purchases of non-green products. Gopalan and Satpathy (2015) aimed at

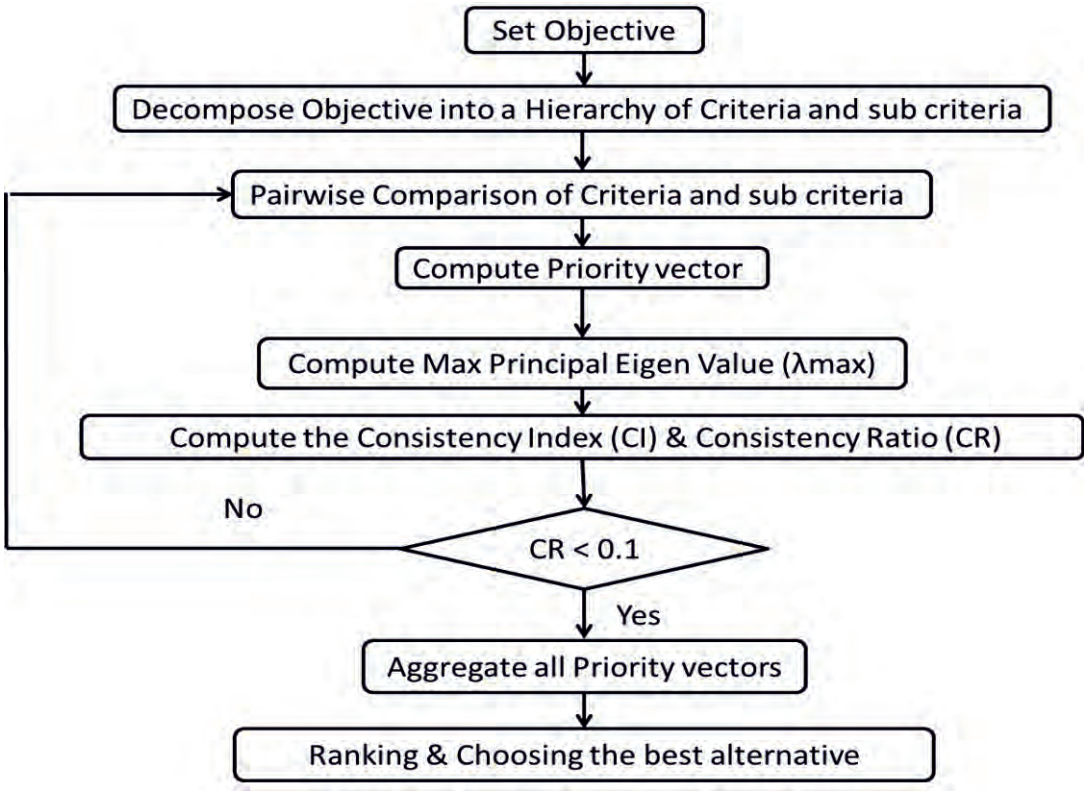
finding the most preferred retail service quality dimensions using AHP. Five basic dimensions of retail service quality scale proposed by Dabholkar et al. (1996) were adopted. It was revealed that the most crucial dimension affecting overall service quality of the retail store was merchandise followed by store's willingness to handle returns and exchanges. The perceived RSQ had a significant positive impact on sophistication and humbleness and negative impact on disingenuousness and introversion personality traits of the retailer. RSQ had direct links with customer reactions and indirect links with retailer personality (Rashid & Rokade, 2017).

## Methodology

Analytic hierarchy process (AHP) was introduced by Saaty (1987). Mullti-criteria decision-making methods (MCDM) is applied in AHP. It follows the weighing method by blending various themes into a single theme. For choosing the best possible alternatives, AHP implements the principle of ratio scale, yielded through paired comparisons to achieve the aim.

Hence, AHP supports in prioritization or ranking of criteria and sub-criteria. The quantitative data were gathered through expert opinion survey conducted in January 2020 from four major cities of Iraq, that is, Baghdad, Basrah, Al Mawsil al Jadidah, and Erbil. AHP prioritizes the intuitions, feelings, and logic in a structured way to decision-making, which is profitable in a surrounding with majority of intangible constructs (Sambasivan & Fei, 2008). Thus, the multi-criterion decision making approach was implemented, which can

**Figure 1.** ***Methodology for Analytic Hierarchy Process (AHP)***



analyze both quantitative and qualitative constructs with minimum errors on account of data gathered from retail experts. The AHP process has been exhibited in an organized and stepwise manner with the help of Figure 1.

### *Conceptual Framework of Analytic Hierarchy Process*

#### Step 1 : Defining the Objective

The AHP process commences with setting the objective for performing the AHP process. This is done to give concrete shape to the goal in the mind of the researcher. The objective of this study is to evaluate the relative importance of the criteria and sub-criteria of RSQ. This assessment shall help in ranking the most important retail service criteria and sub-criteria which have an impact on customer satisfaction as perceived by the food and grocery customers of organized retail stores in Iraq.

#### Step 2 : Decompose the Objective

A hierarchy of levels is developed to decompose the objective into criteria and sub-criteria. The connections are laid down to construct a hierarchy and relationships are drawn among the criteria and sub-criteria.

#### Step 3 : Pair - Wise Comparison & Priority Vector Computation

A pair-wise comparison is made among criteria and sub - criteria under consideration with the help of a specially designed AHP questionnaire, post hierarchical structure of criteria and sub-criteria. The criteria and sub - criteria are loaded with ratings from 1 to 9 on either side of the scale, where 1 denotes *equally important* and 9 denotes *extremely important*, according to the scale developed by Saaty (1977). A comparison matrix, which is a type of reciprocal matrix, is developed with the help of pair - wise comparison. The values of responses are noted for data analysis.

According to Saaty (1977), these values are the actual judgment values which represent the preference and ranking of one criterion over another by a respondent. Two rules have been followed for filling these values in a comparison matrix, which are as follows :

- If judgment value lies on left side of 1, then actual judgment value is considered.
- If judgment value lies on right side of 1, then reciprocal of actual judgment value is taken into account.

All values filled in the comparison matrix should be positive ($a_{ij} > 0$). The values filled on diagonal of comparison matrix are always 1 and only the upper triangular matrix has to be filled. So, the upper triangular matrix of the comparison matrix is filled first with judgment values. Reciprocal values $(a_{ji})$ of the upper diagonal are written in the lower triangular matrix. If $a_{ij}$ is the judgment value of row $i$ column $j$ of the matrix, then the lower triangular matrix is filled using the Equation 1 :

$$a_{ji} = 1 / a_{ij} \qquad \ldots. (1)$$

Next, the comparison matrix is completed for further calculations. The values of each column are added and each element in the comparison matrix is divided by its respective column sum, which will lead to a new matrix $(M_n)$. Note that the sum of all values in each column of matrix $M_n$ should be equal to 1. Now, every element is summed up row-wise and this sum is averaged $(a_i)$. This produces column vector $V$, which is the relative weight of importance of the $i^{th}$ criteria and is called as normalized principal Eigen vector or priority vector. Priority vector

represents the relative weights among the criteria that we are comparing. Priority vectors on summation yield 1.

**Step 4 : Checking Consistency of Responses**

Since inconsistencies cause errors in outcomes and can have unfavorable effects on the decision-making process, so consistency has to be checked, which is done by three steps :

↳ **Calculation of Principal Eigen Value ( $\lambda_{max}$ ) :** $\lambda_{max}$ is calculated by summation of products between each value of the Eigen vector and sum of columns of the reciprocal matrix. The largest Eigen value is known as principal Eigen value, which is approximately equal to the number of comparisons *(n)* in a $n \times n$ comparison matrix.

↳ **Checking the Consistency Index *(CI)* :** In judgmental responses, respondents may exhibit inconsistency judging the criteria. *CI* is thus the deviation or degree of consistency in responses. Creeping of these discrepancies may lead to errors in the model which have a bad impact on the decision-making process. Thus, *CI* is calculated to avoid this. At last, Consistency Ratio is calculated. *CI* can be calculated by following Eqn 2 :

$$CI = (\lambda_{max} - n) / (n - 1) \qquad \text{..... (2)}$$

where,

$n$ = number of comparisons in an $n$ by $n$ comparison matrix.

$\lambda_{max}$ = Principal Eigen value.

↳ **Checking the Consistency Ratio *(CR)* :** *CR* is a ratio between Consistency Index *(CI)* and Random Consistency Index *(RI)* used for making a reliable decision. It is essential that responses should be consistent in nature. Saaty proposed a scale for *RI* according to different values of $n$, as shown in Table 1. *CR* is calculated as eqn 3 :

$$CR = CI / RI \qquad \text{.... (3)}$$

**Table 1. *Saaty's Random Consistency Index (RI)***

| *n* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| *RI* | 0 | 0 | 0.58 | 0.9 | 1.12 | 1.24 | 1.32 | 1.41 | 1.45 | 1.49 |

Source : Saaty (1987)

According to Saaty (1987), the value of CR should be less than 0.1 or 10%. If the value of CR is greater than 0.1, then it is interpreted that there is inconsistency in the collected data and thus recollection of data is required.

**Step 5 : Aggregate the Local Weight of Factors Yielded at Different Levels**

Eigen vectors of each matrix are multiplied with the Eigen vectors of their respective categories to get the local-weightage of all the criteria. Local weights of elements of different levels are aggregated, and their geometric mean calculated. Geometric mean calculation gives the final priorities and ranks to criteria under consideration.

**Table 2.** ***Criteria and Sub-Criteria of RSQ***

| Criteria | Sub-Criteria |
|---|---|
| Physical Aspects | Clean & attractive physical facilities |
| | Parking space |
| | Cool ambience & proper lighting arrangements |
| Convenience | Multiple payment options |
| | Convenient distance from house |
| | Convenient work timings of the store |
| Reliability | Promise-keeping |
| | Guarantee for own brands |
| | Trustworthy and honest feedback about the products |
| Problem Solving | Display boards with directions to find products |
| | Sincere interest in solving customers' problems |
| | Power to handle & solve customers' problems directly |
| Personal Interaction | Quick and individual attention to each customer |
| | Healthy relations with customers |
| | No customers waiting because of retailer gossiping |
| Technological Advancement | Online and mobile app based bill payment |
| | Computerized billing system |
| | Own mobile app for placing the order |

### *Questionnaire Development and Data Collection*

A specially designed AHP questionnaire was developed considering the RSQ criteria and sub-criteria (Table 2). RSQ dimensions were identified through relevant past studies. The questionnaire comprised of all possible pairwise comparisons of RSQ criteria and sub-criteria on a nine-point scale, where 1 equals to *importance* and 9 equals to *extreme importance* (Saaty, 1977) (Table 3). Data were collected in January 2020 from experts to be used for assessing the relative importance of RSQ criteria and sub-criteria.

**Table 3.** ***Saaty's Scale for Pairwise Comparison***

| Intensity of Importance | Definition | Explanation |
|---|---|---|
| 1 | Equal importance | Two elements contribute equally |
| 3 | Moderate importance | Experience and judgment favor one element over another |
| 5 | Strong importance | An element is strongly favored |
| 7 | Very strong or demonstrated importance | An element is very strongly dominant |
| 9 | Extreme importance | An element is favored by at least an order of magnitude |
| 2,4,6,8 | Intermediate values | Compromise is needed between two judgments |
| Reciprocals | When activity *i* compared to *j* is assigned one of the above numbers, the activity *j* compared to *i* is assigned its reciprocal | |

Source : Saaty (1987)

### *Sample Size and Expert Opinion Survey*

In AHP, sample sizes range from small number of experts in respective field to hundreds of respondents. Increasing sample size significantly can lead to inconsistency (Cheng & Li, 2002). It is recommended to incorporate the experts from the relevant field of study so as to increase consistency in results. Only AHP allows and recommends a smaller sample size and its precise results are based on a few judgements which are concrete and consistent (Harker, 1987). Thus, a primary sample size of 20 experts from the retail domain was selected, keenly based on the number of years of experience in the retail domain as well as qualification and designation for assessing the relative importance of RSQ criteria and sub-criteria on retailer personality. The sample of experts consisted of organized retail managers, academicians specialized in retail management, and NGO members as shown in Table 4. A total of 13 accurately and completely filled AHP questionnaires which showed consistency were selected for pairwise comparison and subsequent analysis.

**Table 4.** ***Profession of Experts***

| S. No. | Profession of Experts | Number |
|---|---|---|
| 1. | Organized retail managers | 11 |
| 2. | NGO members | 5 |
| 3. | Academicians specialized in retail management | 4 |

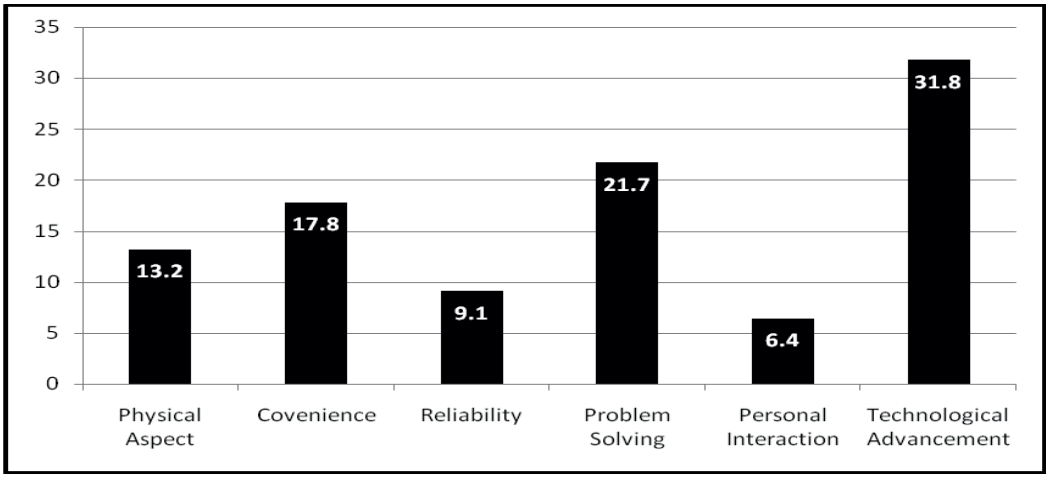
## Analysis and Results

Hierarchic structure for assessment of RSQ criteria and sub-criteria on retailer personality based on priority weights is shown in Figure 9.

### *Criteria Comparison Results*

In the criteria comparison, retail technological advancements criteria shows the highest weightage (31.8%) as shown in Figure 2. Thus, this shows that it has the maximum impact on customer satisfaction. Personal interaction

**Figure 2.** ***Ranking of RSQ Criteria Affecting Customer Satisfaction***



criterion of RSQ has minimum weightage (6.4%), which proves its minimal impact on RSQ. Thus, we can infer that the customers did not give priority to interaction with the sales personnel if they confronted any issues in shopping ; rather they preferred to solve their problems by themselves through signbords, direction boards, layout map of retail store, and display boards.

### *Sub-Criteria Comparison Results*

Graphs have been drawn for all sub - criteria, exhibited in Figures 3 – 8. In case of Technological Advancement, mobile application for shopping and placing order scored the highest weightage (73.2%) followed by online and mobile app based bill payment (18.5%) as shown in Figure 8. This depicts that customers gave most importance to the use of mobile application for shopping and placing orders to avoid the troubles of visiting the retail outlet and spare time in shopping. The sub-criteria in Personal Interaction, that is, no customer waiting due to retailer gossiping got the lowest weightage (6.3%).

**Figure 3.** ***Ranking of Sub - Criteria of Physical Aspects***

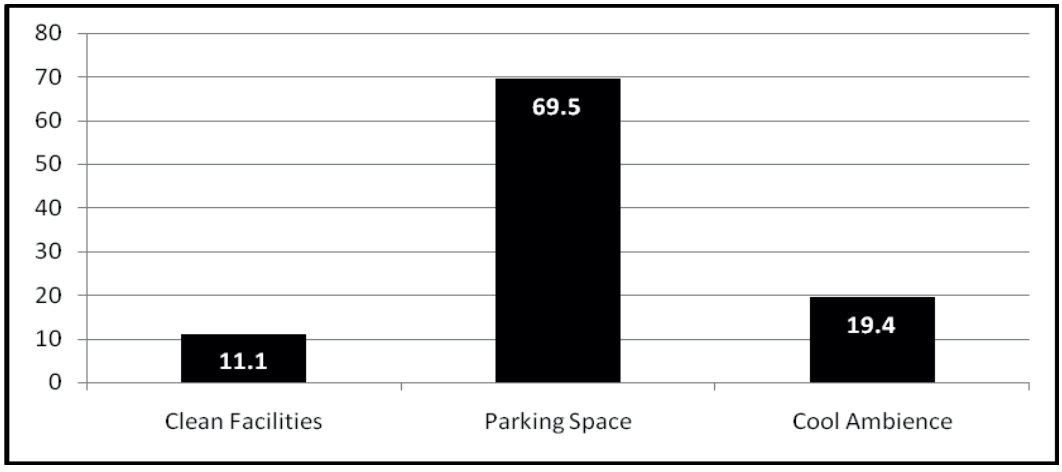



**Figure 4.** ***Ranking of Sub - Criteria of Convenience***

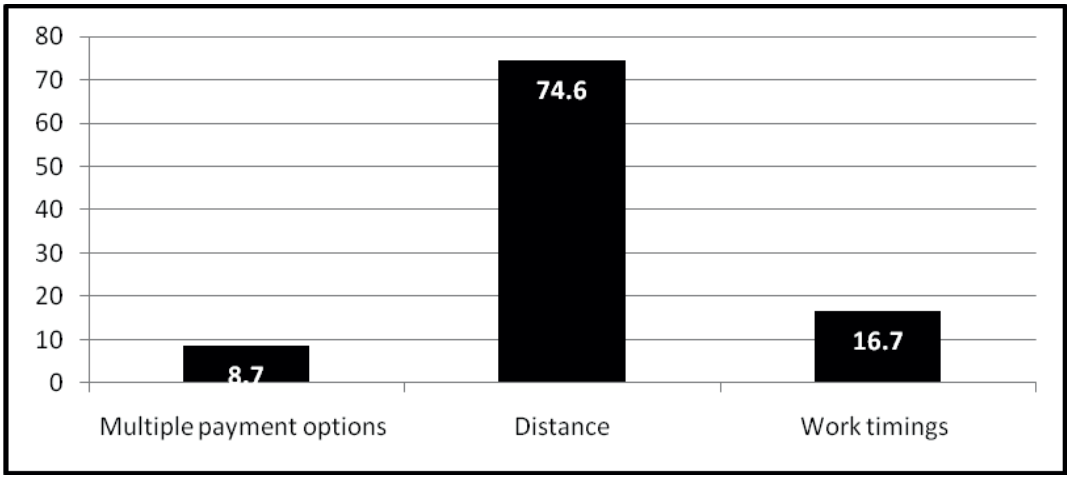


**Figure 5.** ***Ranking of Sub - Criteria of Reliability***

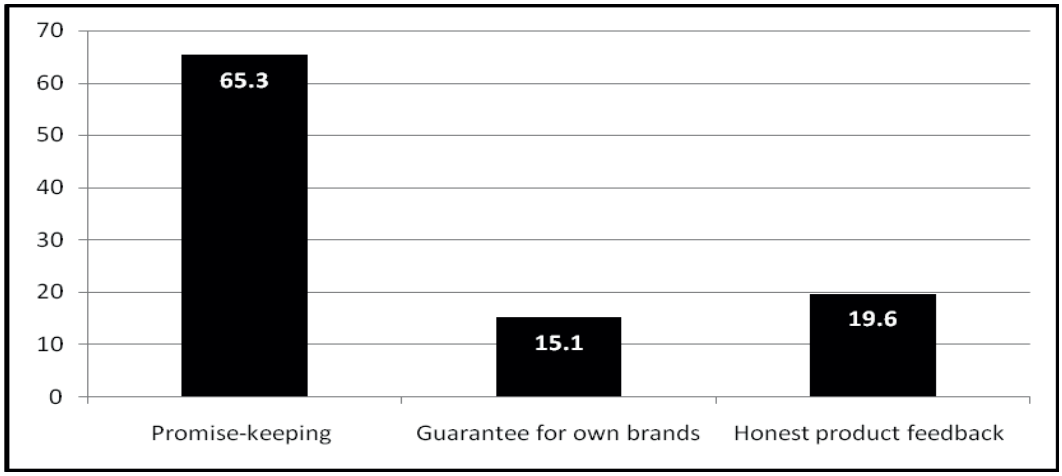



**Figure 6.** ***Ranking of Sub - Criteria of Problem Solving***

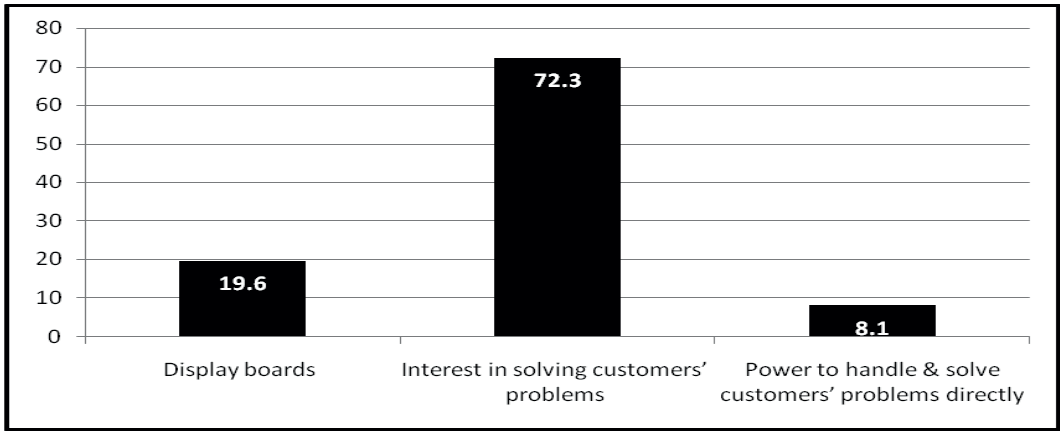



**Figure 7.** ***Ranking of Sub - Criteria of Personal Interaction***

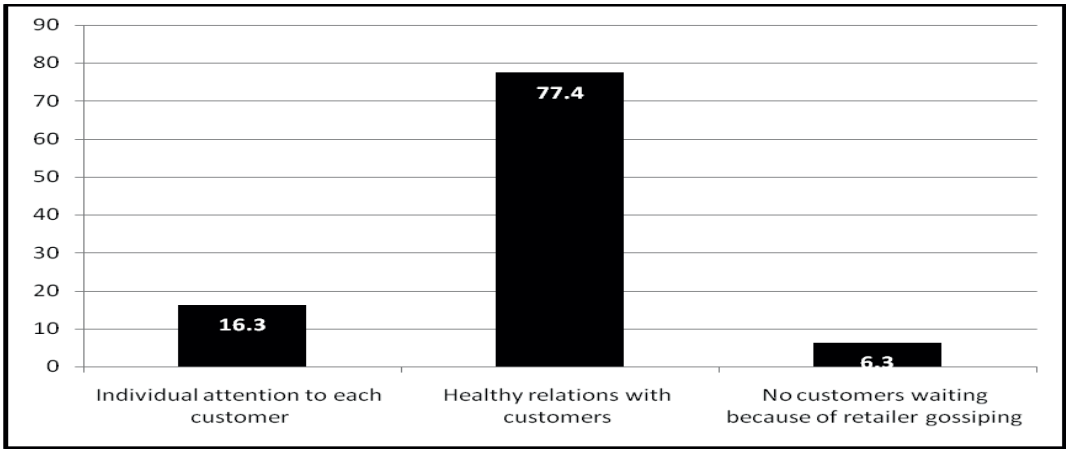


**Figure 8.** ***Ranking of Sub - Criteria of Technological Advancement***

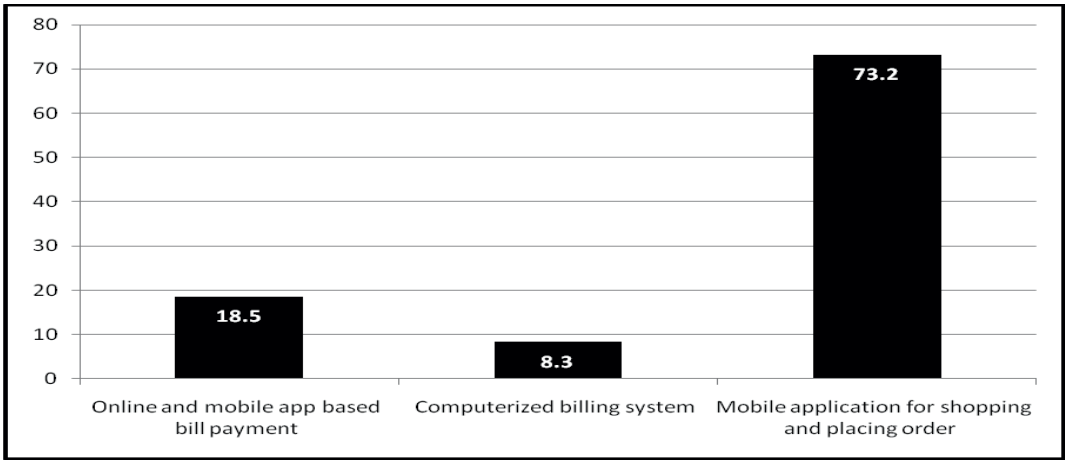
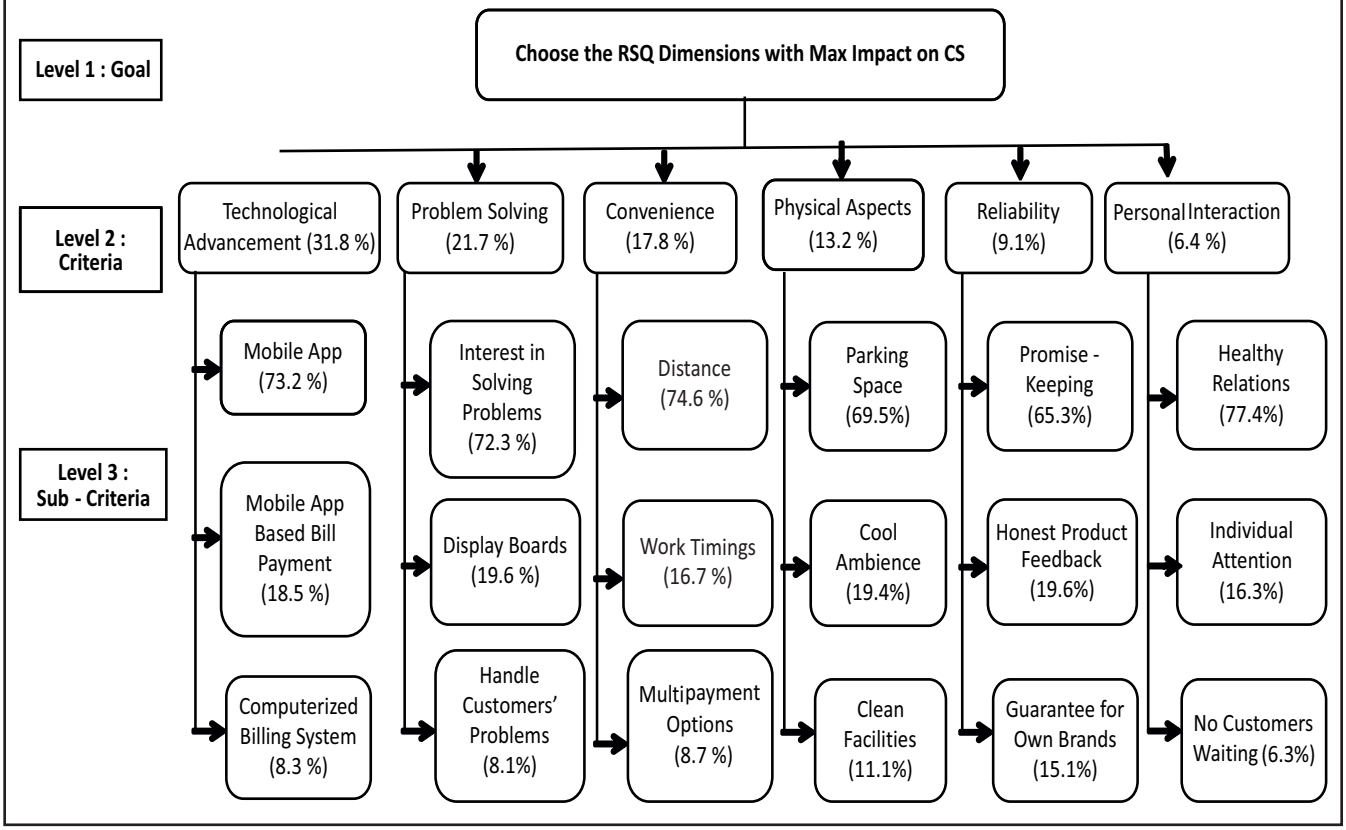



**Figure 9.** ***Hierarchic Structure for Assessment of RSQ Criteria and Sub-Criteria on CS***




## Discussion and Managerial Implications

The scale developed by Saaty (1987) was implemented for pairwise comparison of RSQ criteria and sub-criteria

and broadly applied to organized retail stores located in four major cities of Iraq. The study applied AHP, and consequently, a new framework was developed, which acts as a pioneer research in RSQ, especially in Iraq, which is one of the important Middle East Countries. The retail managers should lay stress on technological advancements in the operations of organized retail stores to gain enhanced CS and subsequent favourable customer reactions. Retailers should develop mobile applications and incorporate innovative features in older mobile applications like online bill payment and various other modes of bill payment, that is, credit cards, debit cards, internet banking, etc. The retail customers give weightage to e-retailers in the long term (Bhattacharya & Mishra, 2016). The value added features like online order placement and home delivery shall further prove to gain favourable customer reactions and enhanced CS (Bagla & Khan, 2017). The research outlets were seen to experience long queues on payment counters, consuming much of the time spent in the retail store. Apart from computerized billing system, the sales persons should have payment machines wherein they can bill the commodities, thus saving customers' time. The research outcomes thus furnish empirical evidence to strongly support the adoption of some latest techniques and web based selling in general through mobile phones.

## Limitations of the Study and Scope for Future Research

The study has limitations that evolve innovative avenues for future research. The expert opinion survey although supports the internal consistency and validity of the study, but still care has to be taken to conduct external validation of the results. Consequently, this study could be conducted in a more diverse population and in a cross cultural context. The results are suggestive only for the food and grocery segement, which limits its generalizability and applicability in other retail domains. Thus, the RSQ criteria and sub - criteria cannot be generalized as the study area is confined to Iraq.

The ranking of the RSQ criteria and sub - criteria for food and grocery shoppers of organized retail stores in Iraq shall help academicians, researchers, and retailers to prioritize the criteria and sub - criteria of RSQ, which plays an important role in building favourable CS. The significance and uniqueness of the current study lies in the fact that it has ranked the RSQ criteria and sub - criteria, which has an impact in enhancing CS, which has never been done before in organized food and grocery retail in Iraq. Thus, this study may motivate future researchers to explore the latent areas in pairwise comparison of RSQ criteria and sub-criteria of organized retail stores in Middle East countries.

## Authors' Contribution

Dr. Abdul Rashid conceived the idea and developed the muti-criterion decision making research framework to conduct the study while he was working as an Assistant Professor in Erbil, Iraq. Dr. Abdul Rashid and Dr. Varsha Rokade undertook a rigorous literature review from reputed journals in line with the research objective and proposed a research framework using AHP. Through his contacts, Dr. Abdul Rashid managed to meet the retail managers, NGOs, and academicians who had expertise in retail food and grocery segment in Iraq. Both the authors then analyzed the gathered data with the help of AHP and wrote the manuscript followed by proof reading by a language expert for rectifying grammatical mistakes and rephrasing, if needed.

## Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest, or non-financial interest in the subject matter, or materials discussed in this manuscript.

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