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# Integration of SEM to VIKOR for Benchmarking Repurchase Intentions in Gated Communities

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***Abstract***

*Aim of this study is to benchmark the repurchase intentions of residents in gated communities in Kurdistan Region of Iraq. to do this, we have collected data from the 320 residents of various gated communities. Secondly, we have used SEM and VIKOR multi methodology to propose benchmarking. The results have indicated the impact of each criterion on the repurchase intention while using those impact as importance weights to rank gated communities in the region. Lastly, the study contains managerial implications explained in the conclusion part.*

***Keywords:*** *Service quality, product quality, gated community, repurchase intention, perceived value, customer satisfaction*

## I. Introduction

Gated communities are residential neighborhood that are segregated or in other words fenced or gated, these communities have a certain level of security that obviously is higher than a typical community and resident in these communities have a different lifestyle and they are of the same Socio-economic class (Demir and Mukhlis 2019). Gated communities are housing development which have limited access and are separated by a fence or wall from the rest of the city (Kovacs and Hegedus 2014 and Blakely, E.J & Snyder, M.G 1997). Moreover, Gated Communities can be defined as a guarded place which is surrounded by wall or any kind of borders to be secured and controlled by security guards (Lai 2016).

Gated communities are demanded by peoples for various reasons such as protection, recreational facilities, ethnicity and services (Smigiel 2014). According to (Atkinson et, al 2004) the gated communities are the response to the fear of crime however looking for status, privacy and the potential investment are motivation to live behind the

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walls. They include private property, individual houses and collectively used common private property, for example clubhouse and sports facilities, moreover security is the important driver in these cities while has been controlled walls, fences, gates, barriers, alarms, guards and CCTV cameras and the high quality of infrastructure. These communities have been designed with the intention of providing security to their residents and prevent penetration by non-residents, (Sonia Roitman 2005). According to Greenberg and Rohe (1984) the communities with a boundaries or wall and less permeable to nonresident had a lower crime rate than the opened communities and that is supporting to the (Gregory 2013, Hope 2000, Low 2003 ) study that show one of the most important drivers that motivate peoples and satisfy to live in gated communities is security .

Many factors affect customer satisfaction according to these factors include service quality, billing clarity, good value, quick service and friendly and knowledgeable employee (Hokanson2019, Budur, 2018; Jaf, Muhammed, & Omer 2019) . Satisfaction is a feeling of acceptance, happiness, relief, excitement and delight (Demir 2019), Kotler (2000) defined satisfaction as a person's feeling of pleasure or disappointment resulting from an evaluation process comparing the product perceived performance in a relation to his/her expectation .Perceived service quality has a positive effects and significant impact on the level of customer satisfaction (Natalia and Subroto 1998).The higher level of service quality affect perception value and satisfaction also influence the repurchase intention of service or product directly(Cronin, Brady, & Hult 2000 , Kandampully & Juwaheer2009). According to Parasuraman et, al (1988) there is a positive relationship between perceived service quality and the behavioral intents such as word of mouth, intention to come back and eagerness to recommend to other,Likewise Satisfaction and perceived product quality has a direct positive effect on repurchase intentions(Tsiotsou 2006)

Product Quality is generally measured by the people who use the perceived product and evaluate (Bowen and Ford 2002), Product quality is an important element that help to gain the customer satisfaction and is a competitive advantage to the product provider (Zhang, Vonderembse & Lim 2003, Ayldinli and Demir 2015, Torlak, Demir and Budur, 2019), good product mean a satisfied customers and leading to build the trust between the customer and the provider ( Hilal and Top, 2019).High-quality products ( services included ) allow companies to command premium prices or sell more of their products at a given price, which leads to a higher profit (Porter, 1985).

Service quality is the understanding of the customers, and meet their needs accordingly by managing service and delivery to satisfy customers (Sidin et al. 2001).Service quality is a measure of how organization servs their customer and the result of customer evaluation to the perceived service (Nath and Zheng (2004),it is important for companies to understand their customer expectation to have better performance and make the business last longer ( Hilal and Top, 2019), Likewise parez (2007) for achieving sustainable development goals service are considered as financially of an organization important aspect of an organization, Therefor it is a need for organization to evaluate their service periodically and plan for improvement (Jaf, Muhammed, & Omer 2019).

Benchmarking is an important tool to evaluate the service and product quality in gated communities comparing to the other alternatives (Budur et al., 2019). By this way, managers can see where their position in the market is and develop further strategies to improve their position in the market. After that, continuous improvement is ensured, processes are improved, productivity and quality are improved, performance is improved, employee

motivation is increased, and ultimately, excellent customer service can be created as a starting point for superiority in today's global competitive conditions (Demir, 2019a).

Gated communities in Kurdistan region of Iraq has been increasing enormously (Demir, Ozmen, and Rashid, 2014; Ozmen, Demir, and Celepli, 2013) the reason may be renewing Kurdistan region. However, the number has increased more than 10 after (2008) in Sulaymaniyah, the electricity supply is one of the main problems of the region. According to the predictions of Demir (2014), while in the gated communities' electricity is provided seven-day 24 hour. Kurdistan region is suffering from different political problems which is affecting peoples lifestyle indirectly and the region recently has suffered from ISIS war in directly and this situation making peoples trying to live behind the gate for being secured from a sudden attack, the recent years number of gated community is increased and will continue in increasing because the gated communities provide a service that make their life easier and keep the privacy which is most families prefer (Budur and Demir, 2019; Demir and Budur, 2019; Mohammed et al., 2020).

In this regard, we have developed a special methodology to calculate the positions of each gated community in the real estate market. In the section 2, we have elaborated the prior studies in this field. In the section 3, we have explained the methodology of the current study. In the section 4, we have tested the hypothesis and calculated the benchmarking methodology via VIKOR method. In the section 5, we have given managerial suggestions to the managers of gated communities in the region.

## II. Literature Review

### 2.1 Service Quality

Service quality is consumer upon purchase of the service concerned (Demir and Aydinli 2016,Shahin 2010), Service quality is meeting customer needs (Demir 2019a),Moreover service quality can be defined by the difference between customer expectation of service to be received and the perception of the service actually received (Groonos 1984 ,Parasurman 1991, 1988), while the most common definition has been contributed by (by Parasuraman et al. (1985, 1998 and 1991) is the using of the technology and gathering data of customer demand and improve it to service to be competitive , Service Quality is a framework which can help one understand the reasons of customer satisfaction (Aydinli and Demir, 2015; Budur et al., 2018). Moreover, perceived service quality can be defined as the customer's judgment about superiority or excellent of a product (Zeithmal,1988; Demir, 2019b). Service quality is measuring as how well an actual service delivery matches with customer expectations, delivering quality service means conforming to customer expectations on a consistent basis (Torlak, Demir & Budur, 2019).

In service organization the customer is considered as one of the primary determinants in business performance Parikh (2006).Service quality brings certain benefit to the organization such as low turnover ,customer satisfaction and retention ,lower operating cost ,increase in share price ,positive word of mouth ,increasing in profit as well as improvement in overall financial performance(Ladhari 2009 and Aragchi 2008),Moreover Service quality

is the measurement of organization servs their customer and outcome of the expectation of perceived service (Nath and Zheng 2004).

Although there are several scales for measuring service quality. One of the most popular and capability is SERVQUAL (Nath and Zheng 2004), the scale is based on tangible and intangibles dimensions. Parasurman et.al (1985) introduced 10 determinants of service quality, however reduced the determinants to five, namely empathy, responsiveness, assurance, reliability, and tangibles (Parasurman et.al 1988).

Satisfaction is the perception between expectation and experience with the service or product (Demir and Mukhlis, 2017, Torlak, Demir & Budur 2019), Moreover Demir (2019) defined satisfaction as a positive feeling toward the service received and satisfied customer are more likely to pay for that service again. According to Nhat and Hau (2007) service quality has significant impact on customer satisfaction as well as is important component of customer perception about the service. Moreover, service quality is needed to create customer satisfaction (Kabir and Carlsson 2010)

2.2 Product Quality

Product quality can be defined as an extent to which a product succeeds to meet the needs of customer (Lemmink & Kasper, 1994 and Hussain& Ranabhat 2013),Moreover Product Quality is one of the most important elements which satisfies customers and in return firm obtains competitive advantage with it (Aydinli &Demir, 2015 and Torlak, Demir & Budur2019, Benson, 1991; Flynn 1994),property of service quality include color ,fit of use , style and price (Zeithaml (1981).

Product quality has been defined by a lot of researchers but the most comprehensive has been proposed by (Garvin 1984), Garvin has introduced five approach to product quality such as Transcendence based, product based, user based, value based and manufacturing. However Garvin (1988) has derived and identified eight dimensions as a basic of product quality, each dimension is self-contained and distinct, **1.*Performance*:** it is referring to products primary operating characteristics, in other word refer to the efficiency with a product to achieve its intended purpose, ***2.Features****:* the secondary characteristic of products ,the extra supplement of performance,***3.Reliability:*** the probability of product to failure free-performance ***,4.Conformance***: the degree to which product physical property meet the pre-established standard ***5.Durability*** : A measure of useful product life, the amount of use a customer gets from a product before it deteriorates or must be changed, ***6.Serviceability :*** refer to the speed ,ease ,courtesy and competence of service ***, 7.Aesthetics:*** the products look ,feel , sound and taste ,the matter of personal preference ***, 8:Preceived quality :***quality based on image ,brand name and overall consumer feeling experiment while using the product .

Sebastianelli and Tamimmi (2002) has studied product quality in different way, while the aim of the study was to find the relation between the product quality and quality definition approach which was both of them has been proposed by Garvin (1984,1988).Quality approaches as mentioned in previous paragraph are (Transcendent ,Product based, User based ,Manufacturing based, Value based).this has been modified into four approaches

***1.Transcendent Quality:*** Here "quality" is defined as innate excellence. The product or service will have unequalled properties (Pirsig 1992) and related to the durability of product, service ability and reliability of product, **2-product based Quality**: is defined as the units of goodness packed into a product or service (Garvin 1984) ,product is evaluated according to perceived quality ,aesthetics , feature conformance and performance of the product ,***3-Manufacturing based*** "quality" is defined as "conformance to requirements (Crosby 1979, conformance to specification and performance of product,***4-User based (Customer based):*** "Quality" is defined as "satisfying customer's requirements" or "fitness for purpose, is extent to perceived quality ,aesthetics and feature of product.

Gated communities is considered as a constructed product quality, and has become a trend of study,many researchers proposed a construction field as a product quality (Castledine and Bannister 1996, Abdul-Rahman 1997, Kam and Tang1997, Low and Omar 1997, Low and Yeo 1998, Shammas Toma 1998) .According to Hilal &Top (2019 ) study shows that the product quality has significant effect on repurchase intention , while product quality is more important to house holders compared to the service quality , However (Demir & Mukhlis 2017) study on gated community in Kurdistan Iraq show that the perceived quality of product has significant influence on repurchase intention from the same gated communities also serviceability is more important to the householders compare to the other dimensions of product quality , likewise Saadoon and Othman (2019) study show that the serviceability and reliability is an important parameter for satisfying gated communities residents .

Product quality is enhancing the customer satisfaction and loyalty ,and these has been approved by (Gallego 2008, Chai 2009 , Bloemer 1995) .According to Pilkington and Chai b2008 study show that high quality of products lead to customer satisfaction and increase customer loyalty .There is positive relation between product quality and customer satisfaction while it influences customer satisfaction (Jahanshahi, et al 2011).Likewise Tsiotsou (2006) revealed that the high perceived product quality has result in customer satisfaction and more likely to purchase again . High quality of products create unique market images that enable companies to achieve high level of customer loyalty and satisfaction (Porter, 1985)

### 2.3 Satisfaction, Value, and Repurchase intention

There are expectations of customers from every service or product. Meeting those expectations results pleasure while it results disappointment if the product or service doesn't meet the expectation. Pleasure of a service or product after experience is called as satisfaction (Kotler, 2000) and client intends to repurchase it and suggest to others in case they are satisfied of a product (Kuo et al. 2018). Therefore, Kuo et al., (2018) suggested that satisfaction

is a strong reason why customer purchase a product again. Besides, customer behave inversely in case the good or service doesn't meet the expectations (Andaleeb and Conway 2006).

Another repurchase intention driver is called as value (Olaru et al., 2008). Value is considered as trade off between what customer receives as benefit comparing to what s/he sacrifices to get it (Lin et al., 2005). In this concept, Lin et al., (2005) defined sacrifices as direct costs, acquisition costs, and operational costs, time, effort, energy while benefits were social, psychological, and direct benefits. Thus, when the benefits exceed costs, customer calls it valuable and that results with the repurchase in case the product or service needed again (Wathne et al., 2001).

In this study, we have tested the impact of product and service quality in gated communities on the satisfaction, value, and repurchase intention of the residents.

### 2.4 Structural Equation Modeling (SEM)

Structural equation modeling is a multivariate statistical analysis technique that is used to analyze structural relationships. This technique is the combination of factor analysis and multiple regression analysis, and it is used to analyze the structural relationship between measured variables and latent constructs(Wright 1921). This method is preferred by the researcher because it estimates the multiple and interrelated dependence in a single analysis.

SEM provide a very general and convenient frame work of statistical analysis that includes several traditional multivariate procedures, for example factor analysis, regression analysis and canonical correlation as special cases (HOX & Bechger 1998), The purpose of structural equation modeling (SEM) is to define a theoretical causal model consisting of a set of predicted covariances between variables and then test whether it is reasonable when compared to the observed data (Jöreskog 1970,Wright1934), In other word SEM can be used to test the theory (A mental trait is a habitual pattern of behavior, thought and emotion (Senharay 2010). he advantages of SEM is that one can identify directionality in the influence of activity from one region to that of another. In addition, SEM allows the researcher to test the validity of a theoretical model regarding network interactions among regions supporting the task under investigation (Beharelle & Small, 2016).

### 2.5 VIKOR Method

VlseKriterijumska OptimizacijaI Kompromisno Resenje (VIKOR) is a multi-criteria optimization and compromise solution (Demir et al., 2019). VIKOR method is one of the multi criteria decision-making analysis that aim to solve problem encountered, compromise solutions for complex problems, and the weight stability intervals for choice stability of the compromise solution obtained with the initial given weights (Opricovic, 1998; Opricovic & Tzeng, 2002,2004). The model gives the best solution obtained close to the ideal solution by comparing the distance to the ideal solution (Opricovic, 1998). Steps for the VIKOR calculation are as follows (Opricovic & Tzeng, 2004; Sennaroglu & Celebi, 2018, Demir 2019):

1. Determine the best ($fi^*$) and the worst ($fi^-$) values among all alternatives (j= 1,2,3,……m) and by each criterion (i= 1,2,3,……n).

a. If it is a benefit criterion that is to be maximized: $fi^* = Max_j f_{ij}$

b. If it is a benefit criterion that is to be minimized: $fi^- = Min_j f_{ij}$

2. Compute $S_j$ (Eq. (1)) and $R_j$ (Eq. (2)) for j= 1,2, 3…m. $S_j$ and $R_j$ respectively represent utility and regret measures for alternative.

$$Sj = \sum_{j=1}^{n} \left[ wi \left( \frac{fi^* - f_{ij}}{fi^* - fi^-} \right) \right] \quad (1)$$

$$R_i = \sum_{j=1}^{n} max_j \left( wi \left( \frac{fi^* - f_{ij}}{fi^* - fi^-} \right) \right) \quad (2)$$

Where wi is the weight of the criterion

3. Compute $Q_j$ (Eq. (3)) for j = 1, 2, 3…, m a. where $S^* = \min S_j$ , $S^- = \max S_j$ , $R^* = \min R_j$ , $R^- = \max R_j$ , v is the weight for the decision making strategy of the maximum group utility and (1-v) is the weight of the individual regret; generally v is assumed equal 0.5 corresponding to by consensus.

$$Q_i = \sum_{j=1}^{n} \left[ V \left( \frac{Si^* - Si^-}{Si^* - Si^-} \right) + (1 - v) \left( \frac{R_i - R^-}{R^* - R^-} \right) \right] \quad (3)$$

4. Rank the alternatives by the values S, R and Q in ascending order by forming three ranking lists such that the lower the value the better the alternative.

5. Propose the alternative a′ as a compromise solution which is ranked the best by the minimum value of Q if the following two conditions are satisfied:

i. Condition 1. Acceptable advantage: $Q(a'') - Q(a') \geqslant DQ$ where a″ is the alternative which is ranked second by Q and DQ = 1/(m−1).

ii. Condition 2. Acceptable stability in decision making: Alternative a′ must also be the best ranked by S or/and R.

6. If one of the conditions in Step 5 is not satisfied, propose a set of compromise solutions which include:

a. Alternatives a′ and a″ if only Condition 2 is not satisfied, or

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b. Alternatives a′, a″…, a(n) if only Condition 1 is not satisfied; the closeness of the alternative a(n) ranked nth by Q is determined by $Q(a(n))-Q(a') < DQ$.

## III. Methodology

3.1 Model of the study

Based on the aforementioned literature, we have developed the following hypotheses;

H1 Product quality of houses in gated community affects customer satisfaction positively

H2 Product quality of houses in gated community affects customer value perception positively

H3 Service quality of houses in gated community affects customer satisfaction positively

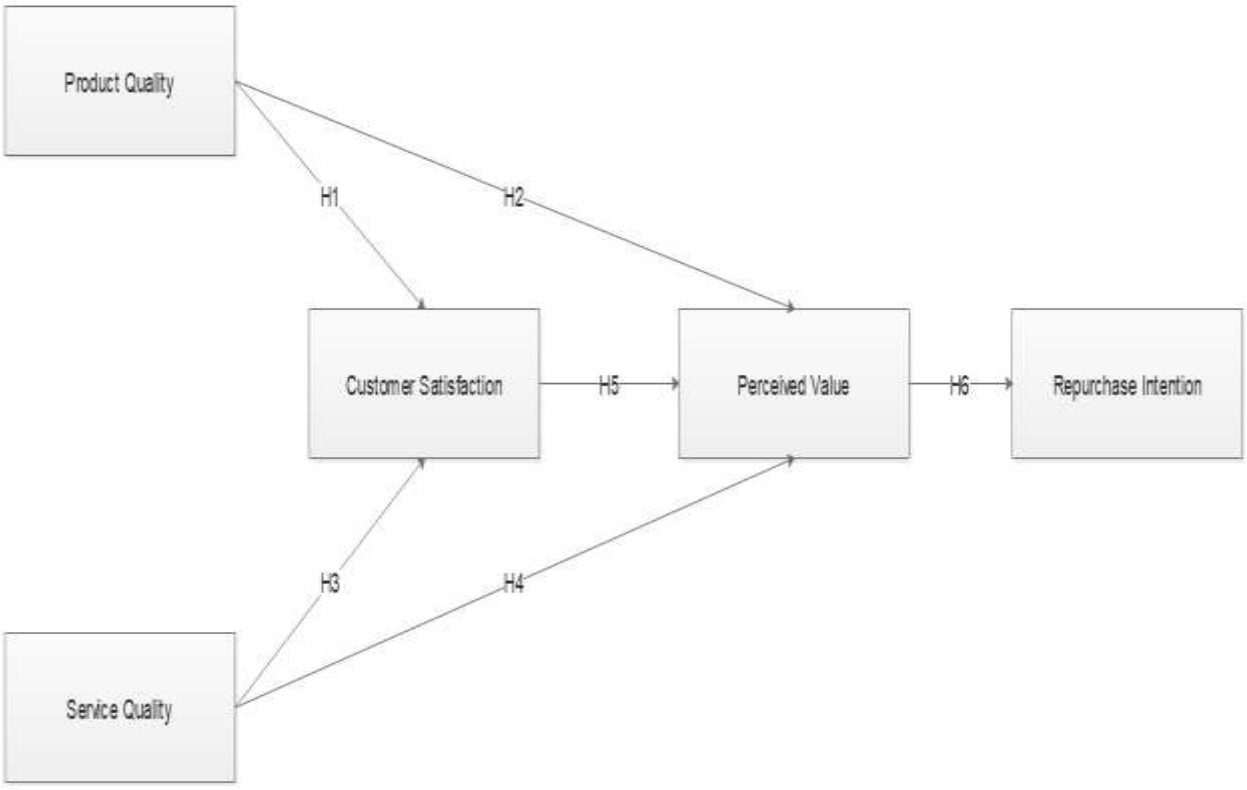
H4 Service quality of houses in gated community affects customer value perception positively

H5 Customer satisfaction of houses in gated community affects customer value perception positively

H6 Customer value perceptions of houses in gated community affects customer repurchase intention positively

Hence, the model of the study is shown on the Figure 2 as;

*Figure 1 Research framework*



### 3.2 Sample

The sample of this research was collected from various gated communities in Kurdistan Region of Iraq. Respondents were house owners or lessees of houses in those gated communities. Data was collected via survey questionnaire. Questions were asked to the residents asking questions to them face to face. In total, we have collected 320 responds from the residents.

### 3.3 Instrumentation

Survey questionnaire contained questions under product quality (nine items), service quality (seven items), Customer satisfaction (three items), perceived value (three items), and repurchase intention (three items). Product quality questions were adopted and modified from the study of Sebastianelli and Tamimi (2002), service quality questions were developed by the authors, customer satisfaction, repurchase intention and value questions were adopted and modified from Demir and Mukhlis (2017).

Likert scale was used to rate each item in the questionnaire where as 1 represented strongly disagree and 7 represented strongly agree.

### 3.4 Procedures

In this study, we have initially checked the validity and reliability of the collected data. To do this, we have employed factor analysis and Cronbach's alpha analysis. Secondly, we have proposed convergent and discriminant validity analysis for the finalization of the validity.

After the validity was achieved, we have used structural equations modeling for obtaining the importance weights of each criterion that effects the repurchase intentions of the residents in the gated communities. We have normalized and integrated those importance weights with the VIKOR methodology as normalized importance weights for each criterion. Lastly, we have used VIKOR method to find the ideal gated community comparing to other gated communities considered in this study. We have ranked those alternatives from 1 up to 5.

## IV. Findings

### 4.1 Demographic analysis

Respondents predominantly were females (61%) while only 39% of them were males. Among the respondents, there were equal number of lessees (55%) as many as house owners (44%). From each age group equally data collected while only 3% were above 56 years old. Most of the respondents were living in that gated community up to three years (55%) and between 3 and 5 years (32%). Lastly, most of the houses were three bedrooms (81%) only a few were more than three bedrooms or less than three bedrooms.

*Table 1 Demographic information of the respondents*

| **Gender** | | **Ownership** | | **Age** | | **Living there** | | **House width** | |
|---|---|---|---|---|---|---|---|---|---|
| **Male** | 9.1 | Owner | 4.1 | 8-25 | 3.8 | -3 years | 5.2 | one bedroom | .0 |
| **Female** | 0.9 | Rent | 5.2 | 6-35 | 2.5 | -5 years | 2.0 | two bedroom | 2.6 |
| | | | | 6-45 | 7.7 | -7 years | 1.8 | three bedroom | 0.6 |
| | | | | 6-55 | 2.9 | 8 + years | .0 | four bedroom | .5 |
| | | | | 6+ | .9 | | | five bedroom | .3 |

4.2 Validation of the questionnaire

Exploratory factor analysis was employed to test the initial validity and Cronbach's Alpha for the initial reliability of the data set. Initially, Kaiser-Meyer-Olkin test result is important for the sufficiency of the data collected for this study. It must hold minimally 0.5 value. Secondly, Barlett's test of sphericity test result must be significant at $p<0.05$. the results of the EFA in the current study shows that KMO was 0.86 and Barlett's test of sphericity was significant therefore, the collected data is sufficient to be evaluated further.

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*Table 2 Initial validity and reliability*

| Questionnaire | ean | .D. | unality | Comm | oading | L | lpha |
|---|---|---|---|---|---|---|---|
| **Product Quality** | | | | | | | |
| Overall performance of pipelines inside the gated community, sewage system, internet, telephone…etc., heat and sound isolation, and air conditioners are sufficient overall sufficient in this gated community. | .64 | .94 | | 0.51 | .59 | 0 | .769 |
| Features such as socialization facilities, sport facilities, car parking facilities, shopping facilities, existence of preinstalled features (kitchen, air conditioner, bath…etc.), are sufficient | .54 | .94 | | 0.56 | .64 | 0 | |
| Quality of the painting among the apartments and houses, materials used for each house and apartments of the gated community, materials executed inside the houses are all standard (sufficient quality in every house). | .85 | .94 | | 0.54 | .54 | 0 | |
| Building quality, gardening, roads…etc. fits the design conforms my expectations | .55 | .95 | | 0.57 | .68 | 0 | |
| The durability of the tiles, paintings , materials used inside the house and the gated community, | .46 | .91 | | 0.58 | .69 | 0 | |
| There are sufficient warranty conditions for houses and products which are pre-installed | .66 | .00 | | 0.51 | .65 | 0 | |
| How stylish, modern, exclusive the plan, aesthetics the gardening , aesthetics the materials and colors chosen inside the gated community and the houses. | .82 | .98 | | 0.52 | .60 | 0 | |

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| | | | | | |
|---|---|---|---|---|---|
| The materials (AC, Paint, Concrete…etc.) used in these houses are harmless for human, harmless for nature, and energy saver. | .73 | .90 | 0.51 | .60 | 0 |
| Image and name of this gated community are very positive | .57 | .12 | 0.73 | .70 | 0 |
| **Service Quality** | | | | | |
| Cleaning services are good | .54 | .15 | 0.74 | .79 | 0 .787 |
| Garbage collection services are good | .64 | .96 | 0.58 | .69 | 0 |
| Water supply services are good | .90 | .02 | 0.67 | .75 | 0 |
| Electricity supply services are good | .85 | .01 | 0.55 | .65 | 0 |
| Security services are good | .60 | .03 | 0.59 | .65 | 0 |
| Gasoline supply services are good | .77 | .88 | 0.55 | .69 | 0 |
| When there is a problem, management handles and solves problems | .76 | .97 | 0.63 | .62 | 0 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| Management communicates and evaluates every household equally | .54 | .96 | | 0.50 | 0<br>.55 | |
| **Satisfaction** | | | | | | |
| This gated community highly satisfaction to me | .47 | .96 | | 0.52 | 0<br>.50 | .829 |
| I feel good experience of staying here | .28 | .01 | | 0.55 | 0<br>.57 | |
| I like living here for long time | .36 | .99 | | 0.53 | 0<br>.64 | |
| **Value** | | | | | | |
| I feel I got money's worth at this gated community | .19 | .00 | | 0.53 | 0<br>.65 | .868 |
| This gated community offers good value for the money | .31 | .92 | | 0.59 | 0<br>.65 | |
| The value this gated community deserves its price | .26 | .66 | | 0.52 | 0<br>.61 | |
| **Repurchase Intention** | | | | | | |
| If I have opportunity, I would buy/rent from the same gated community | .81 | .20 | | 0.54 | 0<br>.69 | .725 |

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| | | | | | |
|---|---|---|---|---|---|
| I advise this gated community to my acquaintances | .68 | .86 | 0.51 | .63 | 0 |
| If I sell/leave renting this house, I would buy/rent a house from the same gated community | .02 | .96 | 0.54 | .62 | 0 |

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For any survey questionnaire, it is required that extracted variance for it overall must be above 50%. Secondly, Eigen values for each group of questionnaires must hold 1 in order to call that group of question as dimension. In this study, extracted variance of questionnaire was 61% at five construct that hold sufficient Eigen value each. Table 2 shows the details about items under each construct.

Initial reliability of the questionnaire was checked by Cronbach's Alpha level. For each construct, Cronbach's Alpha must hold minimum 0.7 value to be considered as reliable. Given in the Table 2, each dimension held alpha level above 0.7 thus, initial reliability of the questionnaire was achieved.

After the factor analysis, discriminant and convergent validity must be checked in order to validate the questionnaire. Convergent validity shows how reliably each construct was grouped and is measured by two determinants; composite reliability and average variance extracted. However, discriminant validity is measured by the distance between square root of average variance extracted by a latent variable and the correlation of that latent variable with the other constructs. In this manner, square root of average variance extracted must be above the correlation values.

*Table 3 Discriminant and convergent validity*

| | CR | CAVE | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| Service Quality | 0.812 | 0.518 | **0.647[a]** | | | | |
| Customer Satisfaction | 0.733 | 0.563 | 0.583[b] | **0.681** | | | |
| Perceived Value | 0.710 | 0.539 | 0.515 | 0.617 | **0.662** | | |
| Repurchase Intention | 0.766 | 0.621 | 0.354 | 0.398 | 0.606 | **0.788** | |
| Product Quality | 0.790 | 0.536 | 0.568 | 0.558 | 0.620 | 0.386 | **0.622** |

Given in the Table 3, composite reliability of each construct is above 0.7 and average variance extracted for each latent variable is above 0.5. Therefore, convergent validity was achieved. Secondly, square root of average variance extracted is above the correlation of that construct comparing to other dimensions. Hence, discriminant validity is achieved.

### 4.3 Testing hypotheses

We have used structural equations modeling to test the hypotheses of the research. To do this, we have used IBM AMOS software. Model fit values play important role in accepting the results of the model as accurate. There are mainly two model fit variables as; comparative fit values and absolute fit values. In this study, we have used comparative fit index (CFI) for the comparative fit value determination and $x^2$/df, RMSEA, GFI, and AGFI for the absolute fit values.

Given in the Table 4, CFI value was 0.92, $x^2$/df was 2.281, RMSEA was 0.057, GFI was 0.87 and AGFI was 0.85. thus, both comparative fit values and absolute fit values were sufficient to measure the aforementioned model of the study.

It was indicated that service and product quality in the gated communities explained 58% of the overall variance on customer satisfaction. Further, service quality, product quality, and customer satisfaction explained 76% of the variance on the perceived value. Lastly, service quality, product quality, customer satisfaction, and perceived value explained 65% of the variance on repurchase intention.

*Table 4 Results of the hypotheses*

| | | | **Direct effects** | | |
|---|---|---|---|---|---|
| **Dependent Variable** | | **Independent Variable** | **Estimate** | **S.E.** | **C.R.** |
| **Customer Satisfaction** | <--- | Service Quality | 0.225 | 0.104 | 2.16 |
| **Perceived Value** | <--- | Service Quality | 0.028 | 0.095 | 0.29 |
| **Customer Satisfaction** | <--- | Product Quality | 0.623 | 0.159 | 3.93 |
| **Perceived Value** | <--- | Product Quality | 0.490 | 0.164 | 2.98 |
| **Perceived Value** | <--- | Customer Satisfaction | 0.543 | 0.131 | 4.16 |
| **Repurchase Intention** | <--- | Perceived Value | 0.790 | 0.12 | 6.65 |
| **$X^2$/df= 2.281** | | | SMC $_{\text{customer satisfaction}}$ = 58% | | |
| **CFI= 0.92** | | | SMC $_{\text{perceived value}}$ = 76% | | |

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| | | | | |
|---|---|---|---|---|
| **GFI=** | **0.87** | | | SMC $_{\text{repurchase intention}}$ = 65% |
| **AGFI=** | **0.85** | | | |
| **RMSEA=** | **0.057** | | | |

**Total Effects**

| **Dependent Variable** | | **Independent Variable** | **Estimate** | **p value** |
|---|---|---|---|---|
| **Repurchase Intention** | <--- | Product Quality | 0.555 | <0.01 |
| **Repurchase Intention** | <--- | Service Quality | 0.123 | <0.05 |
| **Repurchase Intention** | <--- | Customer Satisfaction | 0.732 | <0.01 |
| **Repurchase Intention** | <--- | Perceived Value | 0.790 | <0.01 |

The results of the model shows that product quality in the gated communities affect the customer satisfaction (β= 0.623, t= 3.926, p<0.01) and perceived value (β= 0.490, t= 2.982, p<0.01) positively and significantly. Hence, H1 and H2 were accepted. Moreover, service quality in the gated communities influenced customer satisfaction (β= 0.225, t= 2.161, p<0.05) positively and significantly while it didn't have any significant impact on the perceived value (β= 0.028, t= 0.292, p>0.05) of the residents in gated communities. Therefore, H3 was accepted and H4 was rejected.

Given in the Table 4, customer satisfaction was a strong influencer on the perceived value (β= 0.543, t= 4.157, p<0.01) and repurchase intention (β= 0.790, t= 6.650, p<0.01). Thus, H5 and H6 was accepted. For the further details, see Table 4 and Figure 2.

### 4.4 Normalizing weights

Represented in the Table 4, there are total impacts of independent variables on the repurchase intention. In order to integrate SEM with VIKOR method, we need the total impacts rather than direct standardized effects. Thus, we have taken total effects into account for calculating the VIKOR method. However, raw total effects are not ready to start calculations with. Procedures of multidimensional decision making analysis require that the total effects should be normalized so that the sum of them would equal to 1. Hence, we have divided the total effects of each independent variable by the sum of total effects of all variables on repurchase intention. Table 5 shows the details.

*Table 5 Normalization results*

| Dependent Variable | | Independent Variable | Estimate | Normalized estimates |
|---|---|---|---|---|
| **Repurchase Intention** | <-- | Product Quality | 0.555 | 0.252 |
| **Repurchase Intention** | <-- | Service Quality | 0.123 | 0.056 |
| **Repurchase Intention** | <-- | Customer Satisfaction | 0.732 | 0.333 |
| **Repurchase Intention** | <-- | Perceived Value | 0.790 | 0.359 |
| | | Sum | 2.200 | 1.000 |

4.5 Integrating VIKOR method

VIKOR method was conducted to benchmark the repurchase intention of residents among the gated communities. There were 5 alternatives, which were major gated communities in the region, evaluated in this study. Each alternative was evaluated by four criterions those significantly impacted the repurchase intentions in the gated communities. Table 6 indicates the best ($f^*$) and the worst ($f^-$) performing gated communities from the concerning criterion point of view. Based on the mean values, normalized weights, $f^*$, and $f^-$ values, $S_i$ values were calculated that represent distance rate of each alternative from the ideal solution for each criterion. Comparatively ideal alternative for each criterion was shown in 0 and other alternatives are ranked comparing to the ideal solution. Table 6 shows the further details.

*Table 6 elaborating the descriptive results for each gated community*

| Criterion | City Name | Mean | Normalized Weights | F* | F- | Si |
|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Product Quality** | Gozha III | 75 | 3.5687 | 0.252 | 4 | 3 | 0 |
| | Gozha II | 42 | 3.1589 | 0.252 | 4 | 3 | 0 |
| | Char Chra | 67 | 3.6645 | 0.252 | 4 | 3 | 0 |
| | Garden City | 86 | 3.8092 | 0.252 | 4 | 3 | 0 |
| | Doctors City | 50 | 4.1086 | 0.252 | 4 | 3 | 0 |
| **Service Quality** | Gozha III | 75 | 3.4901 | 0.056 | 4 | 3 | 0 |
| | Gozha II | 42 | 3.1597 | 0.056 | 4 | 3 | 0 |
| | Char Chra | 67 | 3.7783 | 0.056 | 4 | 3 | 0 |
| | Garden City | 86 | 3.8288 | 0.056 | 4 | 3 | 0 |
| | Doctors City | 50 | 4.1425 | 0.056 | 4 | 3 | 0 |
| **Customer Satisfaction** | Gozha III | 75 | 3.1997 | 0.333 | 3 | 2 | 0 |
| | Gozha II | 42 | 2.9200 | 0.333 | 3 | 2 | 0 |
| | Char Chra | 67 | 3.1528 | 0.333 | 3 | 2 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Garden City | 86 | 3.7344 | 0.333 | 3.734 | 2.920 | 0.000 |
| | Doctors City | 50 | 3.7000 | 0.333 | 3.734 | 2.920 | 0.014 |
| **Perceived Value** | Gorizha III | 75 | 2.9758 | 0.359 | 3.204 | 2.412 | 0.103 |
| | Gorizha II | 42 | 2.4124 | 0.359 | 3.204 | 2.412 | 0.359 |
| | Char Chra | 67 | 2.6539 | 0.359 | 3.204 | 2.412 | 0.249 |
| | Garden City | 86 | 3.2035 | 0.359 | 3.204 | 2.412 | 0.000 |
| | Doctors City | 50 | 3.1336 | 0.359 | 3.204 | 2.412 | 0.032 |

After the initial calculations, Table 7 represents the results of VIKOR calculation. General $S_i$, $R_i$, and $Q_i$ values were calculated deriving from the Table 6. In this regard, Sj represents distance rate of each alternative to the possible ideal solution at all criteria together, Rj represents distance rate of each alternative to the possible worst solution at all criteria together, and Qj represents the best ideal solution among all alternatives. VIKOR calculations were proposed using formula (3) where vector coefficient (v) estimated to be 0.5 for each criterion. The results were shown in the Table 7.

*Table 7 VIKOR results*

| | **Sj** | **Rj** | **S-** | **S+** | **R-** | **R+** | **Qj** | **Rank** |
|---|---|---|---|---|---|---|---|---|
| **Goizha III** | 0.502 | 0.219 | 0.000 | 1.000 | 0.046 | 0.359 | 0.032 | 0.525 | 0 | 3 |
| **Goizha II** | 0.000 | 0.359 | 0.000 | 1.000 | 0.046 | 0.359 | 0.032 | 0.000 | 1 | 5 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Chara** | .5 | 0<br>.626 | 0<br>.249 | 1<br>.000 | 0<br>.046 | 0<br>.359 | 0<br>.032 | 0<br>.637 | 4 |
| **Garden City** | .5 | 0<br>.097 | 0<br>.079 | 1<br>.000 | 0<br>.046 | 0<br>.359 | 0<br>.032 | 0<br>.100 | 2 |
| **Doctors City** | .5 | 0<br>.046 | 0<br>.032 | 1<br>.000 | 0<br>.046 | 0<br>.359 | 0<br>.032 | 0<br>.000 | 1 |

Given in the Table 7, Doctors city was the city which customers intended to repurchase another house in case they had an opportunity. Therefore, it can be said that Doctors city is the best performing city after consideration of all criterions together for each alternative. Ranks are shown in the Table 7 further.

## V. Conclusion

Repurchase intention is one of the most important determinants of business success in gated communities. Investors continue selling real estates to the purchasers in case the previous experiences of them are positive. From this point of view, the current study aimed to elaborate the antecedents of repurchase intention in gated communities. To do this, we have collected data via questionnaire from various residents of the gated communities in Kurdistan Region of Iraq. Secondly, we have tested the impact of product quality, service quality, customer satisfaction, and perceived value on the repurchase intention in the gated communities.

The results of the analyses showed that repurchase intention among the residents are below the average. Therefore, it is suggested to management of the gated communities to develop a strong strategies to increase the repurchase intentions of the residents.

It was observed that perceived value was the strongest influencer of the repurchase intention in the gated community. Secondly, customer satisfaction was an important determinant on the perceived value. Satisfaction of the residents were tested over the service and product quality. It was observed that product quality was stronger influencer on the customer satisfaction rather than service quality. Besides, importance of service quality on the customer satisfaction was undeniable due to the significant impact on it. Therefore, managers in the gated communities are suggested to increase the product quality of the houses in the gated communities and develop strategies in the gated communities to increase the services to the residents.

Day by day number of gated communities are increasing in Kurdistan Region of Iraq. Hence, competitiveness among the investors also increase. From this point of view, new strategies should be developed to keep the residents

loyal to that gated community. Hence, service quality in the gated community plays more important role than it has been ever. From this point of view, managers should care about the services they provide for their residents.

Only based on the each alternative separately, one city was better than other cities while another city was performing better considering other criterions. Therefore, it is very hard to estimate the best performing alternative through structural equations modeling. In this point, we needed to employ extra methodology to make a combination for calculating the ideal alternative for repurchase intentions. Based on the VIKOR calculations, it was observed that Doctors city was performing better than other gated communities. Second alternative was garden city while Goizha III, Char Chra, and Goizha II was the other alternatives ranked respectively.

There are limitations of the current study. We have collected data from the residents in Kurdistan Region of Iraq. it can't be generalized to all Iraq and Middle East. Hence, further studies should be conducted in all Iraq and various countries in all over the Middle East. Secondly, the study didn't test the impact of house prices and switching cost of a house in a gated community on the repurchase intentions. Thus, future studies may take house prices and switching cost in gated communities into account to test the impact on the repurchase intentions.

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