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Design Road Map of Leadership Attitudes Based on Leadership Quality Framework (LQF), Rembrandt Method and Radar Concept

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Abstract: This paper is looking for the main factors of effective Leadership based on LQF model and prioritizing them based on Rembrandt method. In today's complicated world, organizational success highly depends on Leadership as one of the main phenomena and without leadership solving the problems seems to be impossible. Leadership Quality Framework (LQF) model is one of the latest Leadership models which illustrate competencies of a Leader. Now, we are looking for finding the main characteristics of a Leader in the private hospitals of Tehran. In this paper we are going to design an applied model of Leadership competencies by prioritizing its factors based on LQF model. Rembrandt method is the optimized method of AHP method. For the purpose of secure decision making by decision makers, the weakness of the AHP model was removed. This model is used for ranking leadership attributes for creating original model of leadership, after evaluation of all hospitals by Shannon Entropy method to compare them with original model based on RADAR concept. This ranking helps hospitals to find out more effective factors of leadership which are in their organization and focus on that.

Key words: Leadership · Rembrandt · LQF · Leadership Characteristics · RADAR concept · Shannon Entropy

INTRODUCTION

Leadership concept is one of the most complicated concepts in the world [1,2]. There are many definitions for leadership.

Despite several different definitions and various disagreements about definitions, all researchers agree on this point that organizations cannot be successful without the leadership [3-5].

Every organization needs strong leadership to manage its staff and success.

When the conflicts preferences prevent organizations from achieving the targets, leader, as a sole person, can stop these conflicts.

People who are chosen as leaders should have unique characteristics in order to be different from other people in the organization. Moreover staff should accept his/her characteristics. For this purpose many models related to the leadership characteristics have been developed by researchers. One of these models is Leadership Quality Framework.

Since the model has been introduced recently there are not enough researches about it [1, 3, 6].

In this research we have tried to recognize and categorize factors of LQF through Rembrandt method which is a Multi Attribute Decision Making (MADM) method in order to introduce an applied leadership quality framework for the private hospitals of Tehran and after that they are compared with the applied model based on Shannon entropy and RADAR concept.

This article consists of six parts. In the second part we go through Literature review, third part will introduce Rembrandt and Shannon Entropy Methods, in the fourth part Methodology is depicted. In Part five the descriptive model will be explained and the summary will be demonstrated in the sixth part.

Literature Review

Leader Ship: Leader ship is one of the most important phenomena in the world. Fortunately there have been a lot of researches on leader ship models [7,[8].

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In many of these researches it has been expressed that the leaders do different things when facing different behaviors [9-13]. These researches have demonstrated that leaders can design the organization as an innovative organization from outside and lead it towards targets.

Due to the great changes in the world, the definition for leadership and ideal leadership has been changed, because leaders have to respond to beneficiaries based on their own understanding about the environments and conditions [14].

So the leader ship should have a technical view or public effects.

Nowadays doctors, psychologists, economists and computer engineers are working on leadership theories. For example, in recent years there have been researches in order to have better understanding on leadership and finding effective leadership. However leaders are able to control the staff's behavior. But leadership methods are penetrated and helped other people in the organization in order to achieve targets [15].

Recent researches have been focused on the effective leaders' behaviors [16].

In some preliminary researches about the leadership, there was told that the leadership should focus on relation-duty with the staff. For example, in Ohayo researches, the primary structure is based on staff and their emotions.

Michigan research has studied relation-Guide behavior and Guide-duty [17-19]. For example,about the role of leadership in organizations in UK, demonstrates that due to weak leadership in England, productivity of organizations in the UK is 30% less than USA and the difference is 88 billion pounds a year [20-22].

LQF Model: Leadership in health care systems is very challenging. Leaders in health care systems face complicated problems and for solving these problems leaders have to have special qualities.LQF is one of the leadership models for health care systems. LQF was introduced by National Health Services (NHS) in England. This institute introduced some standards for better understanding of Leadership. The institute expressed that the expected qualities will be welcomed by now and future leaders. This information developed and examined and recently improved by NHS. This model initially was introduced for hospitals and then LQF model were widely accepted and used by NHS. Increasing competency model of leaders in hospitals are raised questions which led to introduction of this model.

The executive model has 3 main factors and each have five sub factors.

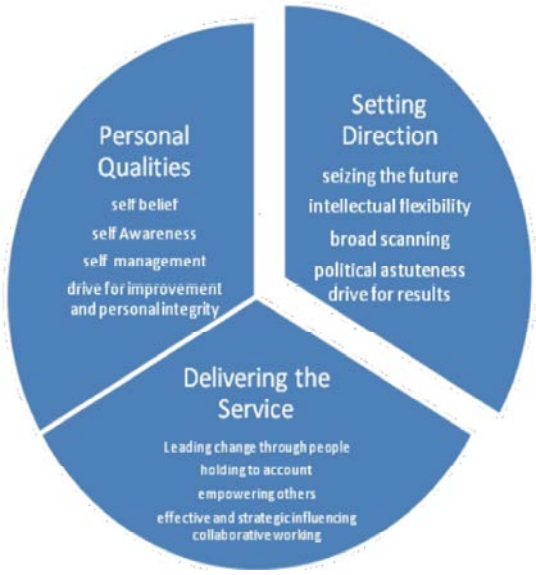

Fig. 1: .LQF framework

Three main factors of LQF are Personal Qualities, Setting Direction and Delivering the Service.

The sub criteria of personal qualities are self belief, self Awareness, self management, drive for improvement and personal integrity.

The sub criteria of setting direction are seizing the future, intellectual flexibility, broad scanning, political astuteness and drive for results.

Leading change through people, holding to account, empowering others, effective and strategic influencing and collaborative working are the sub criteria of delivering the service criterion [23].

MADM Methods

Rembrandt Model: The Rembrandt Model is the improved method of the analytical hierarchy Process (AHP) and the weaknesses of this model have been removed in order to work properly. The method was introduced by Lootsma in 1989.Advantages and disadvantages of AHP have always been one of the issues among the multi criteria decision making methods' experts.

For these reasons some Decision Makers (DMs) believe that AHP must be used for cases which have low alternatives. But some others have attempted to focus on strength points solely.

The most applicable and suitable way for hierarchical method is the Rembrandt method which uses a logarithmic method instead of 9 scale of the analytical hierarchical process and also uses a geometric method instead of arithmetical average for analysis of estimated weights. In 1993 Lootsma and Rej used Rembrandt as a substantial

option for AHP. Most of researchers observe that geometric methods for question of the important factors which are compared with others are more convenient. Rembrandt has a software package to run this technique.

In first step considering a group of g DMs ($g \geq 1$) which is formulated by evaluating m attributes ($m \geq 1$). Attributes are $C_i, i = 1,....,m$ have unknown subjective value (V_i) and these V_i are the same for all DMs in the groups, m-vector of V_i values from the DMs are estimated by the Rembrandt method to estimated the verbal subjective judgments. Each DM is instructed her/his score to pairs of attributes for judgment on, C_l and C_j, in the decision matrix $D_{m\times n}$. The process requires between (m-1) and m (m-1)/2 pair wise comparisons for a set of m attributes under evaluation. That is, each DM records his/her indifference between the two attributes as a weak, definite, strong, or very strong preference for one attributes over the other. Incomplete pair wise comparisons are handled using a general procedure proposed by Lootsma [24]. The subjective are normalized the attributes weights because of the ratio information are $1\left(\sum_i V_i = 1\right)$. The DM's pair wise comparison judgments are based on Table 1. Each verbal response is converted into an integer-valued gradation index δ_{jid} using the scale presented in Table 1.

The gradation index δ_{jid} are converted into a value of geometric scale and described by a scale parameter γ Thus we define, r_{jid}. the numeric estimate of the preference ratio V_j/V_l, which are given by decision maker d as follow:

$$r_{jld} = \exp(\gamma\delta_{jld}); \quad j,l = 1,...,m; \quad d = 1,...,g. \tag{1}$$

There is no unique scale for human judgment; a plausible value of γ for the group is $\sqrt{2}$ implying a geometric scale with progression factor $\sqrt{2}$ [25]. Next, we approximate V by the normalized vector of v of group weights which minimizes:

$$\sum_{j<l}\sum_{d=1}^{g}\left(\ln r_{jld} - \ln v_j + \ln u_l\right)^2; \quad l = 2,...,m. \tag{2}$$

Assume that all DMs offer a complete set of pariwise comparisons. Now let ρ_{jid} & r_{jid}. Then the vector of v is found by minimizing Eq. (3) as a fuction of $w_j (j = 1,,....m)$:

$$\theta = \sum_{j<l}\sum_{d=1}^{g}\left(\rho_{jld} - w_j + w_l^2\right); l = 2,...,m. \tag{3}$$

Table 1: The Rembrandt category scale

Comparative judgment	Gradation index δ_{jid}
Very strong preference for G_i over G_j	-8
Strong preference for G_i over G_j	-6
Definite preference for G_i to G_j	-4
Weak preference for G_i to G_j	-2
Indifference for G_i to v	0
Weak preference for G_j to G_i	+2
Definite preference for G_j to G_i	+4
Strong preference for G_j over G_i	+6
Very strong preference for G_j over G_i	+8

The set dependence of normal questions are found from:

$$\frac{\partial\theta}{\partial w_j} = \sum_{j<l}\sum_{d=1}^{g}\left(\rho_{jld} - w_j + w_l\right) = 0; \; j = 1,...,m; l = 2,...,m. \tag{4}$$

Hence $\rho_{jid} = \rho_{jid}$ and $\rho_{jid} = 0$ for any j, we can write Eq. (4) as

$$\gamma\sum_{l=1}^{m}\sum_{d=1}^{g}\delta_{jld} = \sum_{l=1}^{m}\sum_{d=1}^{g}w_j - \sum_{l=1}^{m}\sum_{d=1}^{g}w_l; \; j = 1,...,m. \tag{5}$$

There is no unique solution to this set of normal equations and we set the sum of the variables $(\sum w_l)$ equal to zero for a particular solution and reduce Eq. (5) to the following unnormalized solution:

$$w_j = \frac{1}{g}\frac{1}{m}\gamma\sum_{l=1}^{m}\sum_{d=1}^{g}\delta_{jld}; \; j = 1,...,m. \tag{6}$$

Therfore:

$$v_j = \exp\left(w_j\right) = \exp\left(\frac{1}{g}\frac{1}{m}\gamma\sum_{k=1}^{m}\sum_{d=1}^{g}\delta_{jld}\right) \tag{7}$$

and

$$v_j = \sqrt[m]{\prod_{l=1}^{m}\prod_{d=1}^{g}r_{jld}^{\frac{1}{g}}}; \; j = 1,...,m. \tag{8}$$

Where Eq. (8) implies that the criteria weights of v_j are calculated by a sequence of geometric means. The result of v_j in (Eq. 8) is multiplied by the degree of freedom to determine the normalized solution vector v. In addition, since $v_j = f((\exp(\gamma\delta_{jid}))$ the normalized criteria weights will depend on the scale parameter γ, without changing the rank ordering of v_j.

Shannon Entropy: Entropy is a very important concept in physics, information technology and others science. Shannon Entropy is one of MADM methods which works based on decision matrix. In this method, if variance of

each indicator is more, this indicator has a more important from other indicators. Shannon Entropy is an uncertainly indicator in information technology. It is measured by this formula. $E_i = S(p_1,p_2,....,p_n) = -k\sum_{i=1}^{n}[p_i * \text{In } p_i]$

K is a fix number and E_i is number between 0 and 1.K is calculated based on this equation.

$$K=\frac{1}{\text{In}(m)}$$

Decision matrix has information that used for evaluation indicators.

Indexes / Items	X^*_1	X^*_2	....	X^*_n
A_1	r_{11}	r_{12}	....	r_{1n}
A_2	.	.	.	.
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
A_m	r_{m1}	r_{m2}	....	r_{mn}

By using this matrix, p_{ij} is calculated as follow

$$p_{ij} = \frac{a_{ij}}{\sum_{i=1}^{m} a_{ij}} : \forall i, j$$

Entropy of indicator's j are calculated as follow

$$E_j = -k\sum_{i=1}^{m}[p_{ij} In\ p_{ij}]$$

Uncertainly for J indicator (d_j) from obtained information depicts that how much this indicator give the useful information to DM. This quantitative (d_j) is calculated as follow

$$d_j = 1 - E_j : \forall j$$

Then the weights w_j are calculated [26].

$$W_j = \frac{d_j}{\sum_{j=1}^{n} d_j} : \forall j$$

The Reason for Execution of this Model and the Research Methodology: The organization cannot achieve their goals without leadership. So having a leadership who has qualifications to lead the organization to their goals is vital.

Nowadays many qualification models for the leadership have been studied. In nowhere in the world you can find leadership with all qualification of a successful leader, if it happens, the number will be very low.

In this research the LQF model as one of the most modern leadership models has been studied and we have attempted to create an application model based on Rembrandt and Shannon entropy model as the MADM methods and RADAR concept are used for comparing these hospitals with the applied model.

The application of LQF model explains the main factors in leadership model in the private hospitals of Tehran and the leader of these hospitals should have these characteristics which are important.

Then these hospitals are compared with the applied model based on Shannon entropy and RADAR concept.

In order to find out the priority of the factors and sub factors of LQF model, we designed the questionnaires based on Rembrandt model and distributed them among all hospitals managers[1] which are 40 and after collecting filled questionnaires, we analyzed them by Rembrandt model. Then send questionnaire of LQF based on Shannon entropy to Experts in Health Ministry (Deputy of care) to allocated score. Finally these 40 hospitals are compared by the applied model based on RADAR concept for finding gap points and then allocate limited resource to training leaders of hospitals.

Data Analysis: As was demonstrated in above, LQF model has 3 factors and 5 sub factors.

Sub criteria of personal qualities are self belief, self Awareness, self management, drive for improvement and personal integrity.

The sub criteria of setting direction are seizing the future, intellectual flexibility, broad scanning, political astuteness and drive for results.

Leading change through people, holding to account, empowering others, effective and strategic influencing and collaborative working are sub criteria of delivering the service criterion.

Now based on these factors and sub factors of the model, questionnaire are distributed between all private hospitals mangers in Tehran and after completion, they were collected and analyzed based on Rembrandt- Model for designing an applied model. Now the results are as follows:

[1]The names of hospitals are confidential.

In ranking the main factors of LQF model the priority of factors are as follows;

- Personal Qualities
- Delivering the Service
- Setting Direction

Now the ranking of sub criteria of these main factors are demonstrated as follows:

In personnel qualities which have the first priority among the main factors the first priority is self belief. It means that the leadership has to believe on his technical skills, humanities, understanding and belief that he/she can guide the company towards the vision.

Without confidence, leaders won't be able to direct the organization.

The next factor is drive for improvement. It means that the leadership of the private hospitals in Tehran will be as a sponsor and supporter and they should attempt to support staff to do works as well as guiding them to achieve organization's vision.

The third priority is self awareness of the leader about the changes in internal and external environment in order to have suitable and exact reaction. If leaders don't do this work, obviously, organizations cannot survive in the turbulent and competitive environment.

The fourth priority is self management. It means that the leader should be able to decide and guide the organization based on his qualifications. And also be able to manage time and human resources.

The final priority is personal integrity. This sub criterion depicts that leaders have to have high personality.

Among the main factors, delivering the service has the second priority. It shows that the leader of the company should be capable in terms of delivering the service.

Regarding the sub factors the leader should be able to empower others. It means that the leader should let personnel to decide and avoid power concentration in merely higher level of the organization.

The next factor is leading change through people. The leader of this organization should be able to change the personnel when needed. For example if the leader feels that the environment is changing and the organization needs to apply new technology or new strategy in order to reach goals, they should attempt to adopt personnel with these changes.

Holding to account to the partners and beneficiaries is the next priority of this part.

Table 2:Main factor of LQF model

Priority	Weight	Criteria
1	0.674	Personal Qualities
2	0.192	Delivering the Service
3	0.134	Setting Direction

Table 3:Sub criteria of Personal Qualities Priority

Priority	Weight	Criteria
1	0.4	Self belief
3	0.162	Self Awareness
4	0.1	Self management
2	0.276	Drive for improvement
5	0.062	Personal integrity

Table 4:Sub criteria of Delivering the Service

Priority	Weight	Criteria
2	0.275	Leading change through people
1	0.403	Empowering others
4	0.125	Collaborative working
5	0.065	Effective and strategic influencing
3	0.132	Holding to account

Table 5:Sub criteria of Setting Direction Priority

Priority	Weight	Criteria
3	0.122	political astuteness
1	0.420	drive for results
2	0.306	broad scanning
5	0.062	intellectual flexibility
4	0.088	seizing the future

Table 6: Shannon Entropy Weights

Priority	Weight	Sub criteria of delivering the Service based on Shannon entropy
2	0.24	Leading change through people
1	0.15	empowering others
4	0.27	collaborative working
5	0.22	effective and strategic influencing
3	0.12	holding to account
Priority	**Weight**	**Sub criteria of Personal Qualities based on Shannon entropy**
1	0.24	self belief
3	0.28	self Awareness
4	0.15	self management
2	0.31	drive for improvement
5	0.02	personal integrity
Priority	**Weight**	**Sub criteria of Setting Direction based on Shannon entropy**
3	0.31	political astuteness
1	0.21	drive for results
2	0.15	broad scanning
5	0.23	intellectual flexibility
4	0.1	seizing the future

This means that a successful leader by checking the financial accounts can understand the position of the organization in the market, customer attraction, keeping the customer and satisfying their needs.

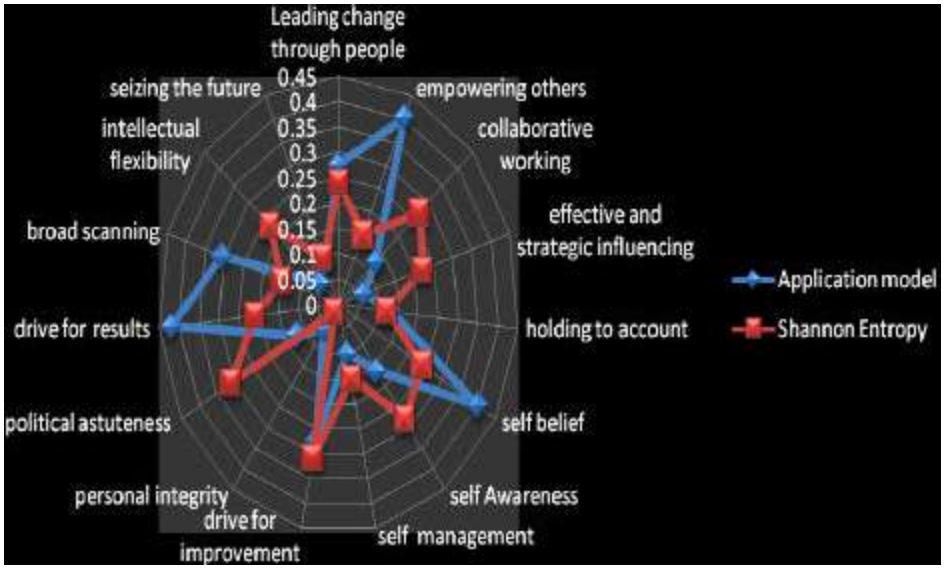

Fig. 2: Comparison of the Application model and reality based on RADAR concept

He can understand the situation in his organization and competitors and have right reaction.

Here is an example about the difference between leadership and management, the marketing manager of the company by checking the financial accounts and the low profit assumes that the main reason would be the top management and he was not able to attract new customers but in reality lies in the low quality of the products which has been the main reason for low profit. Actually the leader with a systematic thought can run the organization with the changes in financial accounts.

The next priority is collaborative working. It means that the leader should be able to have good and friendly relationship with the personnel in order to create incentives.

The leaders know that they won't be able to run the organization without experienced and skilled personnel. So the human resource is one of the main success factors for the leader.

The previous sub factor has effective and strategic influence. It means that the leader should be able to influence on personnel to do the works and should have the highest efficiency.

The leader should attempt to use organization resources for the personnel to reach the goals.

The preceding factor is setting direction. The first important sub factor is to drive for results.

The leader by the personnel assistance and limited resources should attempt to reach targets. If he/she cannot do this, achieving to vision will be impossible.

The next sub factor is broad scanning. Actually the board of directors connects line and staff managers, personnel and customers and the leader should have good relationship with the board of directors in order to be able to find out the strength and weak points together with the opportunities and treats in the organization.

The next important sub factor is the political astuteness. The political astuteness means that how a leader should decide to put the right persons in the right positions in order the jobs to be done well and also the staffs accept the directors as their boss.

In fact the cleverness of the leader distinguishes him from the others. The leader's cleverness can make the price of the shares go up or down. The leader should know how to negotiate with the government authorities to acquire special permissions for the company and distinguishes it from the competitors.

The next priority of the application leader model for private hospitals among the sub factor of setting direction is seizing the future. In fact the leader should know and also plan for the future of the company in respect of for example market share inside and outside the country, type of the technology to be adopted for the company, improvement of the staff and should know how to create a learning company. The final sub factor is intellectual flexibility. It allows leader to think about all aspects of his decisions and correct or complete them by consultation with the DMs.

After creating the application model of LQF for private hospitals, the questionnaire of Shannon entropy were distributed among experts of Health ministry for

comparing of private hospitals with the application. This work shows the gap of reality of hospitals and the application model.

Figure 2 shows that in the sub criteria of LQF, 40 leaders of hospitals in the collaborative working, effective and strategic influencing, self Awareness, self management, drive for improvement, political astuteness, intellectual flexibility and seizing the future have better performance of the application model and there are no gaps between the application model and reality but these hospitals have not suitable performance in Leading change through people, empowering others, holding to account, self belief, personal integrity, drive for results and broad scanning and these hospitals have to focus on these sub criteria. Hence, mangers of these hospitals have to attempt to eliminate these gaps

CONCLUSION

This paper is explained some viewpoints about the leadership and its role in the organizations. Then it is attempted to create the application model of LQF as the leadership model in the private hospitals of Tehran by Rembrandt model and then compared with performance of hospitals based on Shannon entropy and RADAR concept.

Unfortunately there are not many researches about this model. This model contains three factors and five sub factors which analyzes the leader from all aspects.

Rembrandt model is one of the multi factor methods for decision making which lead to an acceptable response when using geometric method for hierarchical analysis. Unfortunately there is not many printed paper for it too.

This paper illustrates that performance of leadership in 18 hospitals are better in eight sub criteria of LQF model than the application model. However, in the other seven sub criteria of the private hospitals of Tehran, these are needed to be improved.

For further research, the application model of this paper can be created by other MADM methods.

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