

Talent Management an Effective Key to Manage Knowledgeable Workers to Fabricate Safer Steel Structure

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Abstract— People are the last weapon of competitive advantage in the global market today, and construction industry is not an exception. Safety in welding process comes from suitable instrument and proficiency of welders, providing appropriate devices has huge cost for firms. Construction firms should be aware of value creation shift in global market which there is a shift of 62% for tangible assets in 1982 to only 10% in 2004. Despite existing regulations, most of structures do not have suitable detailed execution process in both design and construction. Due to the nature of construction industry, the project cost, safety, and time extremely depends on workers. To study this problem in steel structures Statistical methods were used, and finally 4 main categories (Flexibility, Work Environment, Balance, and Accessibility) including 14 factors were obtained. The Work Environment and Balance have been identified as two important categories which affect the talent management.

Keywords; Talent Management, Welding Quality, Iranian Construction Industry, Steel Structure, Knowledgeable Worker

I. INTRODUCTION

The design and deployment of winning business strategy is done by people within organization. Over the past decade there has been a glut of management literature around the topic of talent management. The challenge of effective talent management to support business growth has been consistently identified as a top priority among global CEOs. [1]. The construction industry is facing numerous challenges; increasing competition, globalization of the construction market, increased demands from clients and society, the impact of new technology, and the requirement to maintain a highly skilled workforce at all levels [2]. Largely project-based, the construction sector is a complex, dynamic and changing environment [3]. The uniqueness of projects, fragmentation within the construction process, mobile staff and changing teams, the increasing need to become more customer-oriented and the high level of external knowledge required by construction companies all make the case for TM more compelling [4]. In today's business environment, knowledge is considered to be the most important driver behind sustained competitive advantage [5]. In this context, immunizing steel structures regarding workers expectation, skills, strengths, and working styles is the main subject of the paper. The research has confirmed the need for a more coherent approach to manage talent and has highlighted a

lack of understanding of TM and it's principles within the organizations involved.

II. THE NEW HR LANDSCAPE

Three trends are hindering companies as they define their HR strategy. They (Figuer1) are neither new nor unknown, but are coming together and amplifying one another, yet conjointly creating a radically new HR landscape. The first trend is ego -Growing role of the ego, and the decreasing scope of corporate loyalty in employees' career decisions-. While few companies offer lifetime employment, no employees demand it anymore. Workers seek their own careers and remain less to their employers than they once were. The second trend is globalization -Accelerating force of globalization-. At the same time that a global marketplace creates complexity for companies, it also opens up new labor and talent pools. Increasingly, then, companies will look to overseas markets not just for the cost advantage but also for new employees. The third trend is generation -Retirement of the baby boom generation-. Having spent the past two decades trimming their work forces, many Western companies –and Iranian Companies- will soon be struggling to find people to fill the critical positions vacated by retiring employees [19].

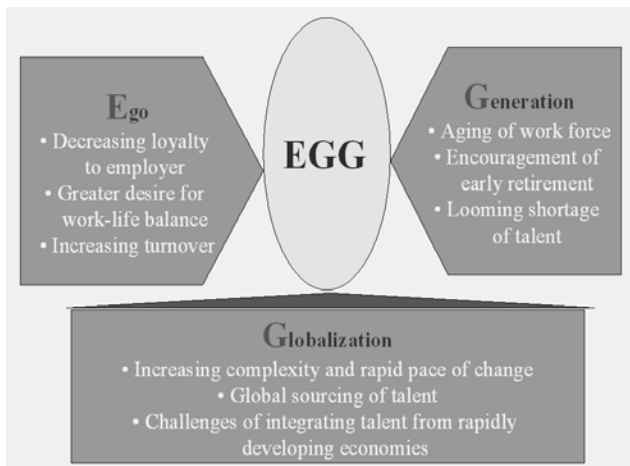


Figure 1. Three trends BCG Analysis

III. A BETTER APPROACH

Many companies have started to tackle some of the challenges presented by ego, globalization, and the retirement of the baby boom generation. But few are taking a comprehensive view of the HR dynamics resulting from these trends. A new era is coming. Today's perceived surplus of talent and human resources will rapidly morph into an actual shortfall. The need to identify, develop, and retain talent will rise on the corporate agenda and demand the attention of chief executives around the globe. As importance of talent management and our restriction to cover its content to the whole construction industry, we focused on exploring talent management indicators for knowledgeable workers and welders in the construction industry.

IV. IMPORTANCE OF TALENT MANAGEMENT

Many companies will not find the talent they need in order to thrive -or even survive- by visiting the same old fishing holes. They need to move outside their comfort zone and find and develop new pools of talent. This step can be especially difficult for managers accustomed to business as usual. The most persuasive evidence that new approaches are needed is hard numbers demonstrating that managers will not reach their business goals without the new approaches. While the idea of talent management is continually emerging it has not yet been applied in most industries. We have seen many management theories appearing and fading. In the 1980s, marketing reigned supreme as Porter's conception on competitive forces made strategists of us all. In the 1990s competitive edge was to be used through redeveloping and 'lean.' However, in both the 2003 and 2004 CEO challenge reports [6] challenges of leadership talent and employee involvement were recognized to be among primary CEO concerns. In DDI's 2005–2006 global leadership forecast, meanwhile, over 4,500 leaders from around the world cited

improving and leveraging talent as their second business priority (on a list of 14), preceded only by improving customer service relationships [7] (Table1).

In a recent DDI survey with the economist intelligence unit [8], where 20 CEOs were interviewed for the study said that talent management was their main responsibility, consuming as much as 50% of their working time—a considerable amount when one takes a top executive's crowded agenda into account. It's evident that it pays to leverage the resource on which companies spend, on average, one third of their revenues. But beyond this simple truth, there's an enormous amount of research that emphasizes the quantifiable connection between talent and business performance, and explains the increasing investor scrutiny this attracts:

- DDI's leadership forecast 2005–2006 [7], showed that companies with stronger leadership development systems yield higher returns on equity and profit in comparison to their competitors.
- A 1999 study by Sibson & company and McKinney [9] revealed a direct and proportional link between the quality of succession management programs and shareholder return.
- Hewitt associates reports that the enormous majority of top financial performing firms (85 percent of the top 20 in a field of 373 companies) hold their leaders accountable for developing talent, in comparison to just 46 percent of leaders from the other companies [10].

Moreover, talent is a fast growing source of value creation. In 1982, the Brookings institution found that 62 percent of an average firm's value could be related to its physical assets (e.g., equipment, technologies), with only 38 percent attributed to intangible assets (e.g., patents, intellectual property, brand, and, most of all, people). Yet just after 21 years in 2003, these percentages reversed, with 80 percent of value linked to intangible assets and just 20 percent related to tangible assets [11].

Finally, for some companies, the most urgent driver to engage with the talent agenda is CEO succession [12]. As it was mentioned in today's competitive area, talent management is among the highest priorities of leaders, and leaders in construction industry should be aware of its importance. In this research, according to globalization, world financial crisis and privatization trends in Iran, we try to give talent managements' factors tangibly to construction CEOs as a tool of competitive advantage.

TABLE I. Ranked leader priorities (by level)

Level				Priority
First	Mid	Higher	Senior	
1	3	4	6	Identify ways to improve quality
2	1	1	4	Improve customer relationships/service
2	2	3	3	Control costs
4	4	2	1	Improve or leverage talent
5	5	5	7	Improve technology/operating efficiency
6	6	6	2	Growth (increase revenue/sales)
7	7	7	5	Improve company culture

V. HOLISTIC APPROACH TO TALENT MANAGEMENT

In today’s highly competitive global economy, the increasingly fierce search for “the best and the brightest” is being waged on a global scale. Following a year-long study involving 77 companies, McKinsey & Company described this competition as “The War for Talent”. At the same time, the global shift to a knowledge-based economy and the worldwide demand for expert knowledgeable workers has put the spotlight on the value of Human Resource (HR). The biggest questions surrounding talent are: How do we attract talent? Develop talent? Spotlight talent? Leverage talent? And, how do we do all that in an ever-changing, demographically evolving, rapid-paced, global business environment? [13] While the phrase “Talent Management” is relatively new as a concept; however, as a management focus, it has always been at the core of strategic HRM. Expressed from a strategic business perspective, “Talent management may be defined as a core sub-system of an organization’s strategic management system, to develop a human resource asset base that is capable to support current and future organizational growth directions and objectives”. Talent management may be described as comprising three key components (Figure2):

- Talent identification
- Talent Development – Internal and external talent development
- Talent Engagement, motivation and retention

The first component talent identification is the process of identifying key positions and roles required to support the design and deployment of strategic and operational plans and initiatives. The second component, talent development is divided into internal and external development. Internal talent development relates to a variety of activities such as training, performance management, coaching, special projects, job design, career development, etc. External talent development is essentially recruitment and selection, where the organization goes out into the labor market to identify, attract, select and motivate required talent to join the organization. The third component, defined as “Talent EMR” is an acronym for employee engagement, motivation, and retention. Once the organization has the required talent, it needs to manage its investment, building required

commitment and strategic alignment to support the organization’s strategy [1].

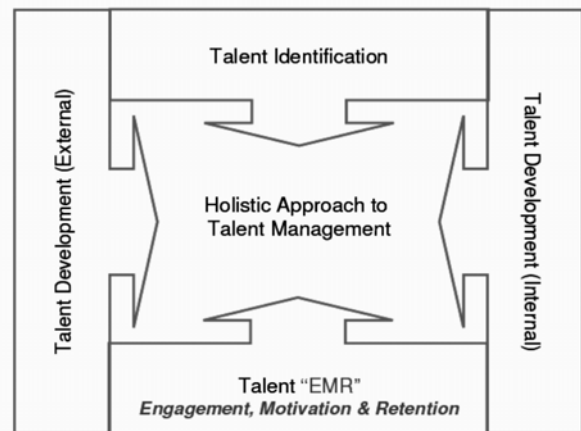


Figure 2. Three components of talent management

VI. RESEARCH METHODOLOGY

To satisfy research aims a survey study was done, also a Delphi technique was used to understand experts’ opinion, and the exploratory research method was used to identify the principal components that explain weld’s quality. The statistical method used for data reduction is principal component analysis (PCA). To use of talent management appropriately, first of all, problem statement and research objective of study was determined. Next, according to the “Holistic Approach to Talent Management”, two components including, “Talent Identification” and “Talent Development” were expanded. The third component which needs another research and further work is in progress by this paper’s researchers.

VII. PROBLEM STATEMENT AND PROJECT OBJECTIVE

Safety and security in welding process comes from suitable instrument and proficiency of welders, providing appropriate machines and devices has huge cost for firms, and it gets worth when net and maintenance costs are added. Attracting, developing and retaining professional welder is not only a cost, but it is also an investing on human capital recourses. Construction firms should be aware of value creation shift in global market as the others. In global area there is a shift of tangible assets (buildings, capital, fixed infrastructure, etc) to intangible assets (human capital, creativity, intellectual capital, etc) figure3 illustrates this global shift in percentages of market value from 1982 to 2004 [14].

In spite of existing codes and regulations, most of structures do not have suitable detailed execution process in both design and construction. Steel structure is a considerable part of the construction and most of its problems relate to different kinds of faults and weaknesses in

connections [15]. Welder has an enormous effect on welding quality and most of the faults in welding depend on the welder performance. On the other hand, control processes and tests could be destructive and costly for a construction firm. So the talent management competences promote the welder's performance and make him more effective for the firm, so by applying TM the quality of welding and safety of the structure will be increased. The main purpose of this research is to find the most important TM's factors which can affect welder performance to increase the weld quality and arrange them according to Internal and external talent development. At the end, it is decided to develop strategy according to these factors for EMR.

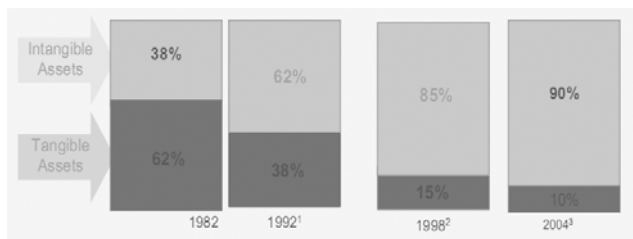


Figure 3. Global shift in value

VIII. TALENT IDENTIFICATION

Due to the nature of construction industry, the project cost, safety, and time extremely depends on workers. Thus, workers' skills and knowledge have a direct effect on sustainability growth in this industry. Because a wide range of factors in this article, we focused on particular workers of construction to address talent management challenges in this industry. Welders were chosen, as they are the last and the most important part of a weld connection in a steel structure (Figure 4) [15].

More than any previous workforce generation, young generation (birth years 1982-1993) balance idealism with pragmatism and demand flexibility, balance, respect, and accessibility. Specifically, Gen Yers tend to look for long-term career development, variety of experiences, a sense of purpose and meaning in their work, open social networks, and work/life balance [16-18]. According to experts' opinion, "work environment category" were replaced with "respect" to fulfill designed objects and operational plans. Two phases were developed to find the influencing factors on welder performance related to Talent management. At first, according to the 4 main categories and by Delphi technique an open questionnaire was designed to gather experts' opinion about phenomena. Questionnaires were sent to 5 Professional Welders, 4 Weld Supervisors, 3 Supervisor Engineers, and 3 Consultant Engineers (in all 15 persons). The initial components were discovered by Preliminary Study, Literature Review, and Logical Analysis, then this initial component were examined by PCA method and 25 rotations, 14 components were extracted from data. At the 2nd phase, sampling design was stratified. Sampling method

and a close questionnaire were referred again to gather opinion of a broader sample (survey).

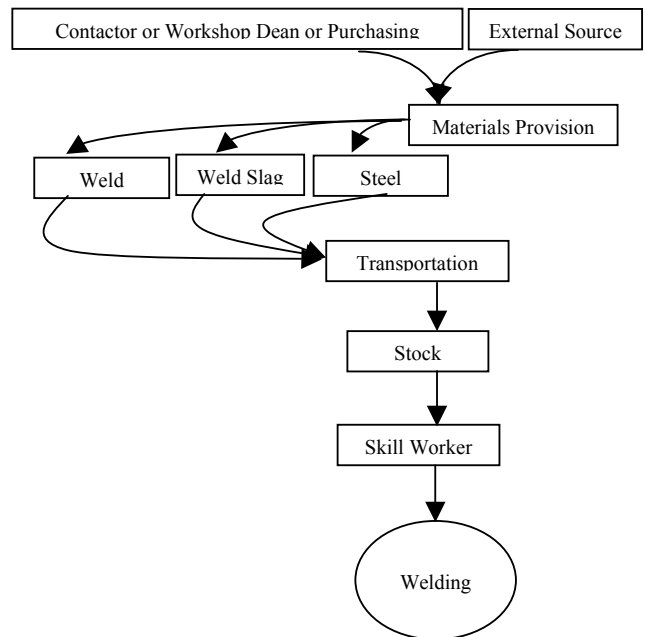


Figure 4. Welding process in Iranian construction firms

Questionnaires were sent to 150 experts and 117 of them responded, and consequently 30 factors were rated. To reduce and extract the data, according to 4 main categories including Flexibility, Work Environment, Balance, and Accessibility the 30 factors were extracted by PCA exam via SPSS program to 14 independent factors (this exam separates and extracts the factors that have a same effect and content on the result, but the factors should be in a same category). In Accessibility, Balance, and Work Environment categories 6,10, and 8 factors were identified, and at first step via KMO and Bartlett's test the significant level were determined which was lesser than 0.05, and it means the PCA exam could have been done correctly. The results have been illustrated at Table 2 and Figure 5 for Accessibility; furthermore, Table 3 and Figure 6 show the content for Balance category, and the outcome for Work Environment has been shown at Table 4 and Figure 7. For Flexibility categories due to significant levels which were more than 0.05, the PCA exam could not be used.

At the next step, PCA exam was done, and 3 components explain 82.34% of all total variance related to Accessibility category (Table 5), 3 factors describe 87.10% of total variance related to Balance category (Table 6), and 2 factors that explain 75.63% of all total variance for Work Environment (Table 7).

The 14 factors were composed of 6 factors which explain 100% of all total variance related to Flexibility, 2 factors that explain 75.63% of all total variance for Work Environment, 3 factors which explain 87.10% of all total

variance related to Balance, and 3 factors that explain 82.34% of all total variance for Accessibility. For Reliability Analysis the Cronbach’s α test was used to indicate the confidence level of questionnaire which was 0.834 which shows a great Confidence Level for questionnaire (Cronbach’s α indicates Confidence level and varies between 0-1 which 0 shows there is no Confidence Level for results in another same conditions, and 1 shows there is a complete relation and confidence level for results in other same conditions). To study the Validity of the questionnaire, the questionnaire was surveyed according to Preliminary Study and Literature Review. At last the final Influencing Factors have been depicted in Table 8. To find which factor is more important, Friedman’s Test was used (this exam ranks the factors according to their importance) and the result is shown in Table 8.

To understand that which category is more important to invest for construction firms, by computing mean of each category, including their factors, 4 dependent parameters has been calculated; as a result, by performing Friedman’s test, the importance of each category has been gained; further, the significant level were lesser than 0.05 that it shows the test can be done correctly. Due to negative mean of Flexibility and Accessibility, the current situation of construction industry is not proper to invest in these two categories; on the contrary, the construction firms should aim their strategies to enhance characteristics of Work Environment and Balance categories. As it is depicted at Figure 7 and Table 9, Flexibility and Accessibility categories are in the limitation area due to their negative mean; consequently, funding in these fields has not positive effect for managing the talent welders and knowledge workers. The important categories consecutively are Work Environment and Balance.

A specific dependant question has been designed for welders to examine their idea about the importance and effect of welding quality on steel structure’s safety, and 56 welders answered to the question with different work experience (From 5years to 25 years job experience in construction industry). Spearman test has been used to study that “is there any significant correlation between Work experiences (Proficiency) and understanding the importance of welding quality?”. Therefore, the test showed that the relation is meaningful due to significant level was .04 and lesser than 0.05 which it shows there is 95% certainty in correlation. This result indicates that the more professional welders attest the effect of high quality welding on safety of steel structures.

TABLE II. KMO and Bartlett’s Test for Accessibility factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.161
Bartlett's Test of Sphericity	Approx. Chi-Square	26.433
	Df	15
	Sig.	.034

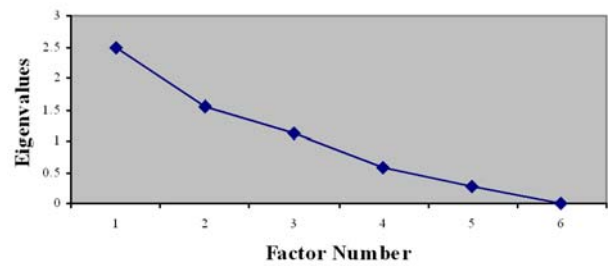


Figure 5. Eigenvalue’s Scree Plot according to Accessibility’s factors

TABLE III. KMO and Bartlett’s Test for Balance factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.177
Bartlett's Test of Sphericity	Approx. Chi-Square	21.237
	Df	15
	Sig.	.043

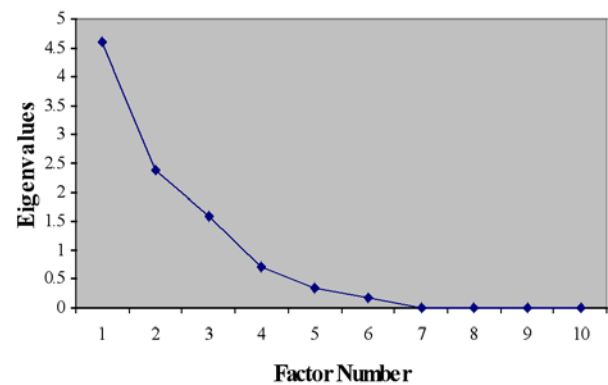


Figure6. Eigenvalue’s Scree Plot according to Balance’s factors

TABLE IV. KMO and Bartlett’s Test for Work Environment factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.189
Bartlett's Test of Sphericity	Approx. Chi-Square	20.013
	Df	15
	Sig.	.047

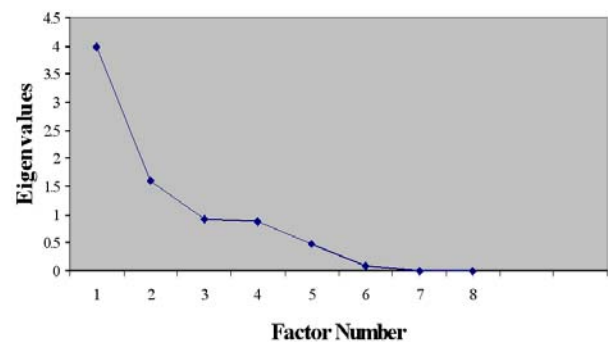


Figure7. Eigenvalue’s Scree Plot according to Work Environment factors

IX. TALENT DEVELOPMENT

To develop talent, the factors were divided into external and internal types. Internal talent development relates to a variety of activities such as training, performance management, coaching, special projects, job design, career development, etc. External talent development is essentially recruitment and selection, where the organization goes out into the labour market to identify, attract, select and motivate required talent to join the organization. (Fernando, 2008) Types of factors were determined by logical analysis, literature review and conducting interviewing with experts. The results have been depicted in Table 8. For using the table, according to importance priority; the managers should choose the factor of each category for talent development. It is recommended that managers start with internal development because of more ability to control and manage programs due to the lack of firms control on external environment. For example in “flexibility” category, “Skill welder tendency to share their experience” factor, managers should make the flexibility by giving welders some benefits and job security to share their experience and knowledge. “Income satisfaction” factor in “work environment” category is another example that could be adjusted according to the average income of labor market, inflation rate, and the proficiency of the workers.

X. CONCLUSION

Due to the lack of knowledge about HR in Iranian Construction firms, HR ordinary processes are done traditionally. Workers' Selection and retention are not systematical, and usually there is not a training or development plan in Iranian Construction Firms, and welders are not an exception. The article appraised talent management competences to increase the steel structure safety regarding welders. Four categories of Balance, Work Environment, Flexibility, and Accessibility were discovered to fulfill talent management concept in welder's construction segment. Eventually 14 main factors were found to satisfy the 4 mentioned categories. If HR department decides to cover all 4 categories, it can use these main factors to develop their TM strategies to attract, develop internally and externally, and retain professional welders to satisfy all 4 categories. Also, this process is applicable for the other skilled workers or any conditions related to HR talented workers. Construction firms by implementing these TM activities can gain their profits and safety advantages; furthermore, they can make a favorable image to society. The following conclusions can be concluded about using TM in construction firms:

- Safety and security in welding process comes from suitable instrument and proficiency of welders; however, appropriate machines and devices have huge costs for firms. Attracting, developing, and retaining professional welder is not only a cost but

also an investment on human capital recourses had Intangible assets.

- The construction firms' managers should develop their strategy for talent Engagement, motivation, and retention according to talent's external/internal factors and it was appraised for welding process in this article, but it is applicable for similar conditions.
- If an Iranian construction firm wants to invest in talent management, it is recommended the managers fund talent management strategies according to The Work Environment and Balance categories. On the contrary, investing on Accessibility and Flexibility categories does not promote talent management characteristics in current Iranian construction Industry.
- There is a significant correlation between job experience and understanding the importance of welding quality-consequently, steel structure safety-. The more professional and talented welders care more about welding quality.

By developing strategy, according to these 14 factors for covering all TM categories, the construction firms can use TM ability for welding process which explains Flexibility (100%), Work Environment (75.63%), Balance (87.10%), and Accessibility (82.34%) to promote welding quality and welder proficiency. For Iranian construction firms, it is recommended to managers that investing on two categories of Work Environment and Balance is profitable.

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Tables V, VI, VII, VIII, IX and Figure 8 are on the next pages

Factors	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	Cumulative %
1:Experience gaining or job promotion (like promotion a simple worker to joss) in worker's view	2.480	41.338	39.233	2.480	41.338
2:Vision of the welder about future of his job	1.550	25.832	64.560	1.550	67.170
3:Job opportunity to upgrade worker skill for increasing the welding quality and performance	1.109	18.479	82.340	1.109	85.648
4:Accessibility to reach manager during the work's time	.575	9.586	95.235	2.480	
5:Tendency to have overtime	.283	4.723	99.958	1.550	
6:To have pastimes in workshop	.003	.042	100.000	1.109	

TABLEV. Accessibility's Total Cumulative Variance Explained. Extraction Method: Principal Component Analysis (PCA)

Factors	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	Cumulative %
1:The effect of job satisfaction on weld quality	4.622	46.216	46.216	2.480	41.338
2:The effect of balance between work and life on choosing work time	2.437	24.370	70.586	1.550	67.170
3: The Worker knowledge about technology and new tools and their usage to increase welding quality	1.651	16.515	87.100	1.109	85.648
4: The effect of welder's Interest in job on quality of welding	.753	7.529	94.629	2.480	
5:The importance of learning courses to promote welders' proficiency	.353	3.534	98.163	1.550	
6:The importance of welder's perception of his or her work	.184	1.837	100.000	1.109	
7:The others' (like contractor, manager, spectator) perception of welder's work	0	0	100.000		
8: Welder's educational background	0	0	100.000		
9: Physical properties of welder (such as height, weight)	0	0	100.000		
10: The effect of employer on welding quality	0	0	100.000		

TABLEVI. Balance's Total Cumulative Variance Explained. Extraction Method: Principal Component Analysis (PCA)

Factors	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	Cumulative %
1 The income satisfaction	4.003	50.043	50.043	4.003	50.043
2: Welder insurance	1.612	20.145	70.188	1.612	20.145
3:The job attraction for welder	.916	11.445	81.633		
4:The importance of job versatility to increase welder's motivation and sprit	.895	11.183	92.816		
5:The effect of organizational culture on welders' concentration during the welding	.490	6.127	98.943		
6:The idea of job changing for a welder	.085	1.057	100.000		
7: The job safety for a welder	0	0	100.000		
8:The relation between workers and welders	0	0	100.000		

TABLEVII. Work Environment's Total Cumulative Variance Explained. Extraction Method: Principal Component Analysis (PCA)

Importance Priority	Talent Development (External/Internal)	Factor	Category
1	Internal	The effect of job satisfaction on weld quality	Balance
2	External	The effect of balance between work and life on choosing work time	Balance
2	External	The income satisfaction	Work Environment
3	External	The Worker knowledge about technology and new tools and their usage to increase welding quality	Balance
4	Internal	Fault acceptance of the welder when he has welded incorrectly or distractedly	Flexibility
5	External	Experience gaining or job promotion (like promotion a simple worker to joss) in worker's view	Accessibility
6	Internal	Vision of the welder about future of his job	Accessibility
6	External	Welder insurance	Work Environment
7	Internal	Contractor tendency to find the ways to increase quality of welding	Flexibility
8	Internal	Skill welder tendency to share their experience	Flexibility
9	Internal	Contractor and welder tendency to change the tools and welding methods	Flexibility
10	External	Job opportunity to upgrade worker skill for increasing the welding quality and performance	Accessibility
11	External	Time flexibility (specifying necessary time of welding but welding in the voluntary period)	Flexibility
12	Internal	The welder tendency to teamwork	Flexibility

TABLEVIII. Influencing Factors on Welding Quality and Their Importance Priority and Category

Category	Mean Rank	Mean	Importance Priority
Flexibility	1.94	-.2500	-
Work Environment	3.31	.1562	2
Balance	2.88	.3611	1
Accessibility	1.88	-.3125	-

TableIX. Influencing categories on Welding Quality and Their Importance Priority

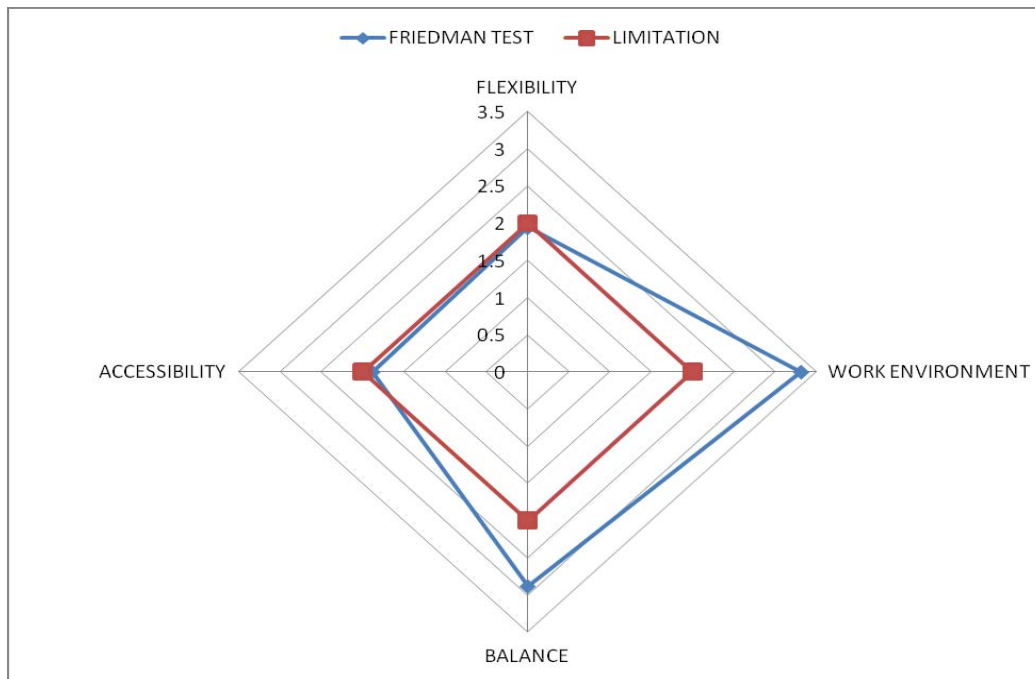


Figure 8. Radar Diagram of Friedman's Test for influencing categories