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Organizational Strategy development using MADM and risk benefit analysis in fuzzy environment

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In third world countries, organizational leaders rarely have figured out to consider happiness and joy of work as a part of the system they are managing. Usually, happiness in organizations is not considered as a management style. Gradually, it became obvious that joy and fun at the workplace will decrease the health care costs, enhances the customers' loyalty, and increases productivity and profits as a result. Most research on this subject matter relied upon very specific case studies. No research exits dealing with the risks and benefits of Joyful organization. The objectives of this paper are twofold: (1) to utilize hierarchical fuzzy technique for order preference by similarity to ideal solution (TOPSIS) to determine the most suitable type of Joyful Organization (JO), and (2) to list key risks and benefits of Joyful Organization. This researcher explains the importance of selection criteria for evaluation of Joyful organizations. It provides key elements on JO, Quantitative strategic planning matrix (QSPM), and fuzzy hierarchical TOPSIS methodology. Since QSPM is used with SWOT by many practitioners and researchers in various fields of study, it was selected as a tool for validation purposes. A case study is taken under consideration and results are explained for both approaches. The finding of this research points to the suitability of semi conventional organization strategy which means implementing about 50% of the rules of main cultural organizations. A sensitivity analysis was performed on TOPSIS using the weights generated by the hierarchical fuzzy TOPSIS approach, Shannon entropy weight, and TOPSIS approach. The ranking results obtained are identical for all these three cases.

Keywords: *Hierarchical Fuzzy TOPSIS, QSPM, Multi Criterion Decision Making, Joyful organization, Happy workplace.*

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1. Introduction

Imagine an organization where every employee of that enjoys being there to work on a daily basis. It is an organization with low level of employees' absenteeism and sick days. People are happy and they are allowed to talk openly about the company's policies, speak out about unspoken problems, work very hard to complete their tasks on time, come to work at a flexible time and leave any time that they want. Therefore, not much specific rules and restrictions are applied on these employees. This happy people work hard and share their ideas. They are innovative, share times with each other, as well as their foods and snacks, and care for the productivity, the goods that they produce, and their customers. They pay attention to the company's competitors in the market and live with the decisions

they make to take their organization to a higher level of competition. With all these goods and attractive features that this organization has, it sometimes falls into its knees because of the simple problems that arise in this company; things like little lies that people say, bad and ugly tricks that some employees make on each other, misusing of materials and times, social misconducts, behavioral problems of some employees for not playing the rule of the company truly and

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accurately. These are the high points of such a company that surely makes the news and is accused of breaking apart sooner rather than latter because of not following common strict business rules. Do you like to be a part of such organization and have fun working with some of those workers there?

About one third of human's life is spending in a disinterested situation, at work. In such a situation having joy at workplace would play a significant role in making their whole life happier. Psychologists search for the ways to create and nurture happiness for people and families in their day-to-day life. They found that optimistic and happy people are more flexible and satisfied with their life and works. The growing number of publications on happiness in last 6 decades shows the increasing importance of this subject. Davis [7] has proved that positive emotions can lead people to creatively think for ways to improve their effectiveness. In a happy workplace, people have positive emotions about their work, their co-workers, their boss and all things related to work. In such a workplace, employees try to achieve the organization's goals. It is illustrated that happy employees and organizations are more creative, innovative, satisfied, flexible and productive (Geounuppakul et al. [10]).

In addition to that, researchers have shown that joy and fun at the workplace will decrease health care costs, enhances the customers' loyalty, and increases productivity and profits as a result (Freyermuth & Schonewille [9]). Therefore, happiness becomes crucial for both employees and managers. Although the criticality of happiness at workplace is known in researches and papers, until now organizational leaders rarely have considered it as a part of the system they are managing. But gradually, it can be seen in some of the most successful business leaders' missions, visions and manners that they strive to create a happy/joyful organization with high performance.

The rest of this article is organized as follow. Section 2 describes background on the research under study. Research contribution and methodology are the topics of section 3, and 4 respectively. Selection of criteria for evaluation of Joyful Organization is the topic of section 5. Risks and benefits of joyful organizations are discussed in sections 6.1 and 6.2, respectively. Fuzzy Hierarchical TOPSIS method and case studies are discussed in sections 7 and 8, respectively. Validation of results is discussed in section 9 while further analysis is discussed in section 10. Author' conclusion is given in section 11.

2. Background

2.1 Joyful Organization (JO)

A Chinese proverb says that happiness is having someone to love, something to do and something to hope for. It can be a comprehensive definition for happiness as stated by Vries [31]. Similarly, Seligman [28] introduces three components of happiness; (1) experiencing positive emotion in life, (2) engaging in life activities and (3) finding a sense of purpose or meaning in life (Schiffrin & Nelson [27]). "Something to do" as the second base of happiness in the Chinese proverb and engaging in life activities in Seligman's definition does not mean that doing anything can bring about happiness. As Nadkami et al. [20], Vries [31] and Schiffrin & Nelson [27] and McShane [18] believe, a work brings happiness when it gives the employees a sense of purpose and mattering.

Baker [4] identifies happiness as a way of living in a meaningful, purpose-focused, satisfying manner both in one's own situation and in relationship to others. He considers that as a side effect of living [4]. Some researchers use subjective well-being (SWB) as a synonym for happiness

(Akgunduz et al. [2]; Ute Stephan et al. [29]; Veenhoven [30]. SWB is a comprehensive term that contains several empirically different concepts. Veenhoven [30] defines happiness as the subjective enjoyment of one's life and as a synonym for life-satisfaction and subjective-well-being. McShane et al. (2008) have defined happiness as a positive emotion that creates medium activation. As stated by Grant and Sonnentag [12], social psychologists have shown that voluntary helping others can bring about joy and happiness for human being [12].

Bahrami et al. [3] studied the development of a comprehensive model for redesigning the organizational structure based on business intelligence with the case study on Esfahan Steel Company. Zare Mehrjerdi and Moubed [40] studied the concept of joyful organization using system dynamics and simulation approach for trend identification and analysis of results. Salvadorinho and Teixeir [24] studied happy and engaged workforce in industry 4.0: a new concept of digital tool for human resources based upon the theoretical and practical trends. Akgunduz et al. [2] conducted a study on happiness, job stress, job dedication and perceived organizational support: a mediating model. Authors concluded that Job stress is negatively related to employee happiness but positively related to job dedication. Job dedication partially mediates the relationships between job stress and happiness, and perceived organizational support and happiness. Zare Mehrjerdi and Bakhshandeh [41] proposed a new model for evaluating the systems thinking level of the organization with a case study on Iranian oil company. Rafael Ravina Ripoll et al. [22] studied happiness management: key factors for sustainability and organizational communication in the age of Industry 4.0. Carole Liske [16] concentrated on the topic of joy at work place and vocational identity during COVID- 19 using a structural equation model. This study explored the interrelations between joy at work constructs, vocational identity, and COVID- 19- impact variables as perceived by multinational nurses. Authors concluded that achieving an internal state of joyful equilibrium in professional work in all professional domains is essential to the creation and mitigating risk to the sustainment of an external culture of joy. Robin Peeter et al. [23] performed a literature review on the topic of “So happy together: a review of the literature on the determinants of effectiveness of purpose-oriented networks in health care”. Safwat Adel El-Sharkaw et al. [25] studied human resource management and organizational learning in knowledge economy: investigating the impact of happiness at work on organizational learning capability. Authors concluded that happiness at work has a significant positive total effect on organizational learning capability. Ute Stephan et al. [29] concentrated on the topic of “Happy entrepreneurs? everywhere? a meta-analysis of entrepreneurship and wellbeing”. authors hinted that it is now time to adopt a more refined approach that is mindful of wellbeing components and institutional contexts. Table 1 shows a number of researches conducted on joyful organizations. Some researchers refer to joyful organization as “cheerful organization” or “happy organization” as well.

Table 1: review of articles on joyful organizations

	Author and Year of publication	***Aim of Study***	***Solution methodology***	***finding***
1	Ghaffari and Ghanbari Garmsari [11]	Demonstration of excellent Islamic organizations features and its impacts on cheerful	Structural equation modeling, LISREL software	Cheerful organization, organizational virtue

		organizations		
2	Najjari, R., et al. [21]	A model for cheerful organization	Qualitative approach, Interview, applied in Payame Nour University	Organizational justice, participation in group decision making, trust
3	Andrew, J. [1]	Showing the role of happiness on organizational productivity	Qualitative approach	Organizational productivity is positively impacted by its employees. happiness
4	Waal, A. [32]	The role of happiness at work framework	Qualitative approach, interview. Case location is Hospital	Organizational position, sufficient income, good co-workers and suitable activities at the work
5	Salas [26]	Happiness at work and organizational citizenship behavior	Qualitative approach, questionnaire, regression	Happy employees at work are better citizen as well
6	Yammarino, F. et al. [33]	A new kind of organizational behavior	Qualitative approach	Discusses organizational behavior and structure
7	Moubed, M., and Zare Mehrjerdi, Y. [19]	Systems thinking and joyful organization	Holism and systems thinking approach. Feedback loops and archetype analysis	Job satisfaction, productivity enhancement, team making
8	Dutton, M. and Edmund, D. [8]	A model of workplace happiness	Qualitative approach	Conceptual frmaework
9	Gray, R. S., Kramanon, R., and Thapsuwan, S., [13]	determinant of happiness among Thai people	Survey of people. Data analysis. Multiple regression analysis	Level of happiness of people of one province was 5.8 and other state 5.7 on the scale of 0-10
10	Schiffrin, H.H., and Nelson, S.K. [27]	Investigating the relationship between happiness and	Linear correlation	Stress measure and happiness measures are provided.

11	Kemakorn, C., and Santidhirakul, O., [15]	perceived stress Happiness at work of employees	Regression analysis	Should work on three elements of relationship, leadership, and quality of work life

2.2 MCDM and Fuzzy set

Multi criterion decision making is comprised of two broad fields of decision making known as multiple objective decision making (MODM) and multi-attribute decision making (MADM). By using MADM, it is possible to obtain the most attractive solution with the highest degree of satisfaction considering all alternatives and utilized criterions into consideration. In TOPSIS, the logic is based upon two solution points namely, positive ideal solution point (PISP) and negative ideal solution point (NISP). Alternatives to be ranked are evaluated based upon the relative similarity to these ideal solution points in such a way that alternative have largest distance from the NISP and smallest distance to PISP. Kahraman and his co researchers [14] introduced a hierarchical fuzzy TOPSIS method with the ability of considering the hierarchy among the attributes and alternatives. Zare Mehrjerdi [37] developing a Fuzzy TOPSIS method based on interval valued fuzzy set. Baykasoglu and Golcuk [5] proposed a novel multiple-attribute decision making model via fuzzy cognitive maps and hierarchical fuzzy TOPSIS. Zare Mehrjerdi [36] proposed a group decision making process for RFID-based system selection using fuzzy TOPSIS approach. In 2015, Zare Mehrjerdi [39] conducted research on grey theory, VIKOR and TOPSIS approaches for strategic system selection with linguistic preferences: a stepwise strategy approach.

For the first time, Zadeh [34] introduced the concept of fuzzy logic into the literature in 1965. Since then, new theories and many new approaches are developed and applied into real world problems. These new concepts are mainly based upon the knowledge of fuzzy sets, linguistic variables, membership functions, and fuzzy if-then else rules. By now, there are many researches that are conducted using fuzzy set and arithmetic operations. Since all real-life problems cannot be modeled with crisp data only, therefore linguistic variables are used to describe the degree of a criterion under consideration. Today, the use of linguistic variables is very common in the decision-making situations for dealing with uncertainty. In this way, we can apply words or sentences in a natural or artificial language to describe its degree of value, and we use this kind of expression to compare each criterion by linguistic variables in a fuzzy environment as ‘‘extremely important”, ‘‘very important”, ‘‘important”, ‘‘very unimportant”, and ‘‘extremely unimportant” with respect to a fuzzy five level scale.

In order to show application of MADM methods in joyful organizations, this author searched the literature and no work was found to be close to the type of the problem defined here. The fact that this is a new problem and demanding the attention of researchers hence, literature review on the joyful organization taking MCDM methods is not possible. Most of reported researches on joyful organizations are based upon the statistical tools and a few are based upon the systemic approaches using systems thinking and system dynamics. In Table 2, this author uses “X” to indicate that such decision-making approach was not used in the joyful organization field as literature review indicates.

Table 2: Reported use of decision-making approaches with risks and benefits analysis and strategies prioritization associated with Joyful Organization studies

	MADM approaches	*MODM approaches*	*Statistical approaches*
(1) Risks and benefits analysis for JO	Hierarchical fuzzy TOPSIS (HFTOPSIS) (this study)	X	X
(2) Assessment of Strategies and prioritization of JO	QSPM (this study)	X	X
Joyful organization study by integrating (1) and (2) above	HFTOPSIS and QSPM (this study)	X	Regression, multi regression, Structural-mathematical modeling, statistical methods for specifically defined JO

3. Research contributions

Taking above discussions into consideration and contents of Tables 1 and 2 as our source of information, literature gap and contributions of this article can be stated as below:

1. Joyful organization is in demand, to be offered as a flexible working environment, for employees' satisfaction. There are not too many leaders in the third world countries believing in providing joyful organizations as an efficient working environment. To this end, it is necessary to introduce this subject as a new research area, however.
2. The use of partial joyful organization is an alternative to whole JO instead of just waiting for its full implementation at the work place.
3. A hierarchical MCDM approach is not used for this type of problem in the literature before.
4. The type of problem for decision making is new demanding high priority consideration.
5. With the help of Table 2, researchers can perceive how much the joyful organizational field of study is ill-treated and is in real need of serious attention using MCDM approaches for decision making.

4. Research Methodology

The study process in this article is as listed below:

1. A group of experts are consulted to list the most significant strategies for relating joyful organizations to the needs and growth of the organization and industry.

2. Giving and getting appropriate consultation to the team of experts as needed to make the study process smooth and manageable.

3. Consulting the organizations' experts for finalizing the lists of risks and benefits, weights, determining attractive scores, and process validation.

4. Developing a hierarchical fuzzy TOPSIS approach for Risk-benefit analysis of the joyful organization.

5. Identifying the ranking of strategies by the QSPM technique.

6. Comparing the results of QSPM and Hierarchical fuzzy TOPSIS.

7. Validating the results and suggesting the most appropriate strategy to the organization for implementation purposes.

The solution approach followed for joyful organization is schematically presented by Figure 1.

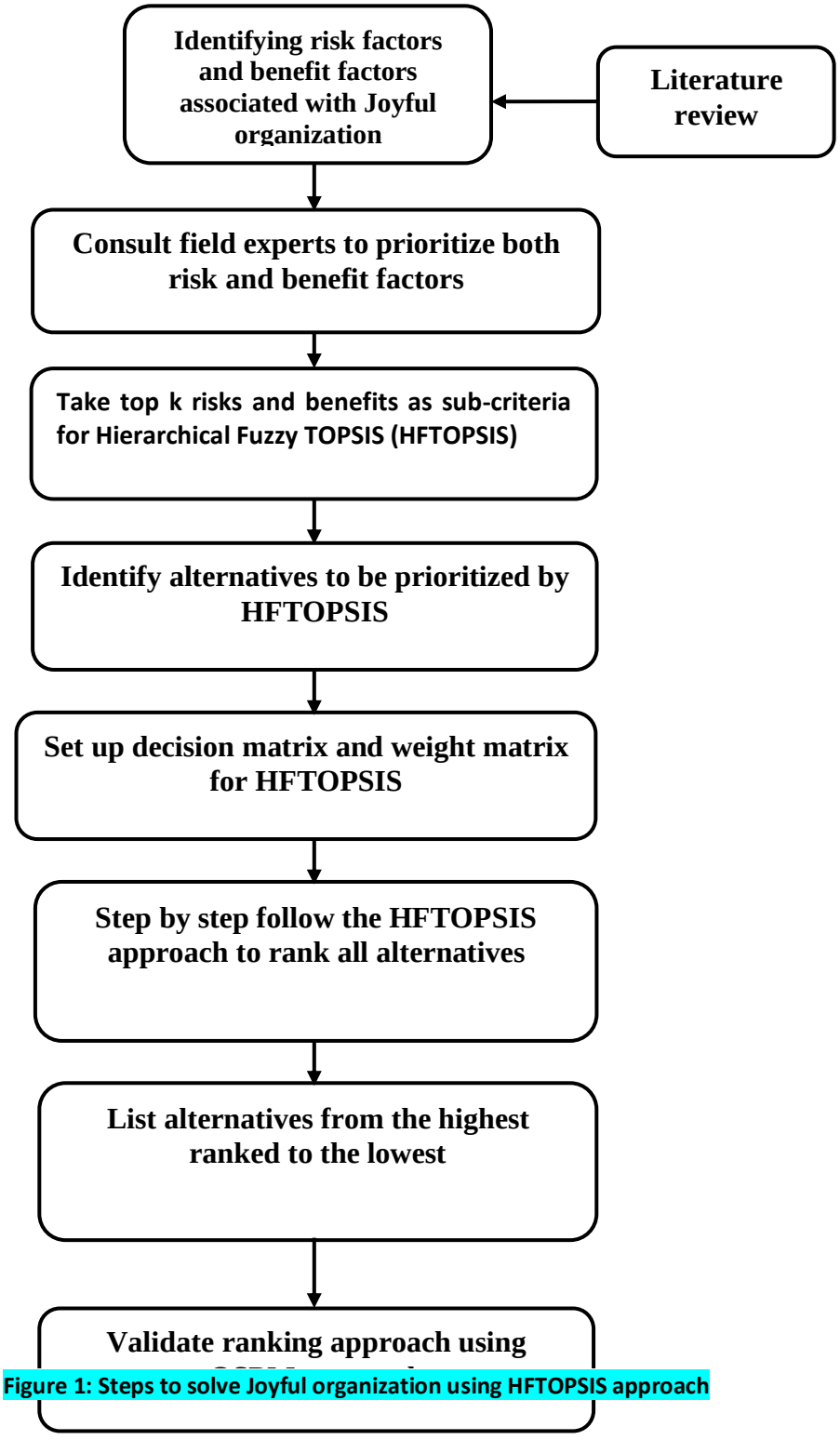

Figure 1: Steps to solve Joyful organization using HFTOPSIS approach

5. Selection criteria for evaluation of Joyful Organization

A happy workplace, as defined by Freyermuth & Schonewille [9], is a natural fun place with happy interactions that employees wait for the morning to come and go to work joyfully. In such an environment, creativity takes place, extraordinary results arise and fun naturally arises from natural

tasks of organization [9]. In this definition, fun and joy are not the goal but the outcomes of working environment. It is somehow like the first definition for happy workplace; a group of happy people working together in a happy place.

Baker et al. [4] introduce some characteristics for happy companies, which just one of them is about mental happiness and other criteria are related to performance and profitability. The five characteristics of happy companies, suggested by Baker, et al. [4] are:

1- Having leaders who invite all the stakeholders to share their ideas and find the answers;
2- Enthusiastic and passionate employees who love to go to work every morning;
3- Behaving toward clients, customers and vendors as marketing personnel;
4- Being an acclaimed and constructive citizen in the society;
5- Being financially beneficial (Profitability).

In the same way, Nadkami et al. [20] in their book use the phrase "joyful organization" and argue that it needs to be designed and is an objective for organizations to achieve. They demonstrate that just like a healthy lifestyle, which involves balance; an organization is most healthy when it properly provides balance of satisfying its customers' needs, satisfying its employees' needs, and its economic needs. An organization may be successful at facilitating the objectives, but this does not necessarily mean the healthy organization. Therefore, for an organization to be in good health it must be a joyful organization. The six criteria for joyful and healthy organization as defined by Nadkami et al. [20] are:

1- Balancing the main objectives of the organization (satisfying customers' needs, employees' needs and economic needs);
2- Creating a sense of belonging;
3- Minimizing entropy;
4- Creating satisfied customers;
5- Organizational growth;
6- Harmony with the environment.

The joy and happiness concept as defined by Nadkami et al. [20] and Baker et al. [4] is wider than just management of happy employees and contains some performance measures. However, this does not mean that happiness can be ignored in these models, but the percent of performance measures is higher than happiness measures. A weakness of these definitions is that they are not much different from excellence models. As another shortage, these models did not determine the weight of different criteria for happy organizations.

6. Risks and Benefits Identification

Attributes related to the "risks in joyful organization" and "benefits in joyful organizations" are considered in this study. There are many factors that impacts happiness at work. Research conducted in literature indicate that some of the factors having impacts on happiness of employees are: (1) organization's shared value, (2) acceptance by other employees through bonding and good relationship, (3) quality of work life, and (4) job inspiration. A joyful organization should provide an environment with all these opportunities for their employees to stay at the mid-level of happiness. There are other factors that can have positive and negative impacts on the happiness of employees, however. a book called "Fish" and authored by Lundin, Paul, and Christensen [17] had

positive impacts on this author in conducting this research on this subject matter. However, author consulted and closely worked with a group of three experts to come up with a list of risks and benefits that are associated with the joyful organizations. In addition to that, author used inter library searches, internet searches, weekly publishing local journals, newspapers, and scientific journals worldwide to identify such important lists. Once these two lists were complied, author selected a list of 8 risks and 8 benefits associated with the joyful organizations and then asked a group of experts in the field to rank them using five criterions of (1) cost to the organization, (2) being in accordance with law and labor's rules, (3) Job satisfaction and enrichment, (4) stress generator, and (5) being energizer. Experts are asked to provide the final lists for risks and benefits. Their results are presented below in sections 6.1 and 6.2, respectively.

6.1 Risks of Joyful Organizations

1. Resistance to special policies
2. Working wickedness insurgences
3. Employee's interdependency on one another
4. Lack of accepting personal responsibility
5. Asking for equal pay
6. Social working chaos
7. Group misconducts
8. Organizational distortions

6.2 Benefits of Joyful Organizations

1. Team making and working habits
2. Productivity enhancement
3. Group responsibility acceptance
4. Group decision making
5. Social and group thinking
6. Group capabilities
7. Innovation
8. Paying attention to organization's main goal.

7. Fuzzy Hierarchical TOPSIS method (FHTOPSIS)

Kahraman and his working team [15] developed hierarchical fuzzy TOPSIS methodology. This approach is used by some researchers for making appropriate decisions. Zare Mehrjerdi [36] employed this approach for studying risk benefit analysis of RFID technology in the modern library systems. However, let us assume that we have m alternatives, n main criterions, s sub-criterions, and K persons answering our questionnaires. Without loss of generality, let us assume that each main criterion has z_i sub-criteria.

7.1 Hierarchical Fuzzy TOPSIS Method

The steps to follow are discussed below.

Step1: Start with linguistic variables of Triangular Fuzzy Numbers (TFN) type, weighting vector of $W_j = (\lambda_j \,.\, \beta_j \,.\, \Psi_j)$ and fuzzy variable $X_{ij} = (a_{ij}.b_{ij}.c_{ij})$. Now go to step 2.

Step2: Construct decision matrix of $D = [x_{ij}^{\sim}]$ using following formula to determine normalized fuzzy decision matrix of $D' = [r_{ij}]$ where:

$$r_{ij}=\begin{cases} x_{ij}(+)x_j^*=\left(\frac{a_{ij}}{c_j^*},\frac{b_{ij}}{b_j^*},\frac{c_{ij}}{a_j^*}\right) \\ \bar{x}_{ij}\ (-)x_{ij}=\left(\frac{\bar{a}_j}{c_{ij}},\frac{\bar{b}_j}{b_{ij}},\frac{\bar{c}_j}{c_{ij}}\right) \end{cases} \quad (1)$$

Step 3: Now, obtain fuzzy weighted normalized decision Matrix of $v=[v_{ij}]$ where,

$$v_{ij}=\begin{cases} r_{ij}(.)w_j^*=\left(\frac{a_{ij}}{c_j^*}\lambda_j,\frac{b_{ij}}{b_j^*}\beta_j,\frac{c_{ij}}{a_j^*}\varphi_j\right) \\ r_{ij}\ (.)\ w^*_j=\left(\frac{\bar{a}_j}{c_{ij}}\lambda_j,\frac{\bar{b}_j}{b_{ij}}\beta_j,\frac{\bar{c}_j}{c_{ij}}\Psi_j\right) \end{cases} \quad (2)$$

Step 4: Determine PIS (Position Ideal Solution) and NIS (Negative ideal solution) of A* , $\bar{A}$, respectively.

$$A^*=[v_1^*,v_2^*,....,v_n^*] \quad (3)$$

$$A^-=[v_1^-,v_2^-,....,v_n^-] \quad (4)$$

Where,

$$v_j^*=\max_i v_{ij} \quad (5)$$

$$v_j^-=\min_i v_{ij} \quad (6)$$

Step 5: Using following formula, calculate mean value for fuzzy number of v_{ij} as shown below:

$$M(v_{ij})=\frac{-a_{ij}^2+d2_{ij}-a_{ij}b_{ij}+b_{ij}c_{ij}}{[3\ (-a_{ij}+d_{ij})]} \quad (7)$$

Step 6: Now calculate

$$S_i^*=\sum_{j=1}^n D_{ij}^* \quad (8)$$

$$\bar{S}_i=\sum_{j=1}^n \bar{D}_{ij} \quad (9)$$

Where, D_{ij}^* and $\bar{D}_{ij}$ are calculated by formula (10) and (11), respectively.

$$D_{ij}^{*}=\begin{cases}1-\dfrac{c_{ij}-a^{*}}{b^{*}+cij-a^{*}-b_{ij}} & \forall b_{ij}<b^{*}\\ 1-\dfrac{c^{*}-a_{ij}}{b_{ij}+c^{*}-a_{ij}-b^{*}} & \forall b_{ij}>b^{*}\end{cases} \quad (10)$$

$$\overline{D}_{ij}=\begin{cases}1-\dfrac{c^{-}-a_{ij}}{b_{ij}+\bar{c}-a_{ij}-\bar{b}} & \forall \bar{b}<b_{ij}\\ 1-\dfrac{c_{ij}-\bar{a}}{\bar{b}+c_{ij}-\bar{a}-b_{ij}} & \forall \bar{b}>b_{ij}\end{cases} \quad (11)$$

Step 7: calculate

$$C_i=\frac{s_i}{s_i+s_i^{*}} \quad (12)$$

Rank alternatives in ascending order of C_i index.

With the help of data from table 3, for the importance degrees for triangular fuzzy numbers (TFN) as well as data scoring for the alternatives, we make necessary computations for our case study.

Table 3: The importance degrees and scores

Importance degrees	
Very Low	(0,0,0.2)
Low	(0,0.2,0.4)
Medium	(0.3, 0.5, 0.7)
High	(0.6, 0.8, 1)
Very high	(0.8,1,1)
The scores	
Very Low	(0,0,20)
Low	(0,20,40)
Medium	(30, 50, 70)
High	(60, 80, 100)
Very high	(80,100,100)

8. Case Study

Picture an organization where everybody enjoys to come there to work. People work happily and are allowed to talk, speak, work hard, come to work any time that they want to work and any time that they want to leave, and there are not too much restrictions applied on the employees of this company. These happy people work hard and share their ideas with one another. They are innovative, share time with each other, their foods and snacks and do care greatly for each other's

family. They care for the productivity, the goods they produce, and their customers. They pay attention to their competitors and live with the decisions that they make to take their organization to a higher level of competition. With all attractive features that these organizations have it falls into its knees sometimes. This is because of simple problems as such as small lies, bad and ugly tricks people have on each other, rudeness, misusing of the materials and times, social misconducts, behavioral problems, and not truly playing for the rule of the company. These are not new to organizations. Organizational cultures play a significant role in constructing such behaviors and then cultivate them to its ultimate level of acceptance.

Such an organization is ideal to have and work with. When others hear about such organization with the ultimate Jealousy they want to work for that. When my coworkers heard about an insurance company that cares for its employees and pay them well, they searched for the job there. The number of such ideal working areas is not too many these days but they are increasing. Since this sort of ideal organizations are at the verge of developing and experiencing managements are interested in taking their organization in this direction, even if it is a hard task to accomplish over-time. These organizations have their risks and benefits as are discussed in the section below. Risks expecting from joyful organization (used in this study) are:

1. Resistance to special policies (C1)
2. Working wickedness and insurgences (C2)
3. Employee's interdependency on one another (C3)
4. Asking for equal pay (C4)
5. Social working chaos (C5)
6. Group misconducts (C6)

The benefits expecting from joyful organization (used in this study):

1. Team making and working habits (C7)
2. Productivity enhancement (C8)
3. Group responsibility acceptance (C9)
4. Group decision making (C10)
5. Social and group thinking (C11)
6. Innovation (C12)

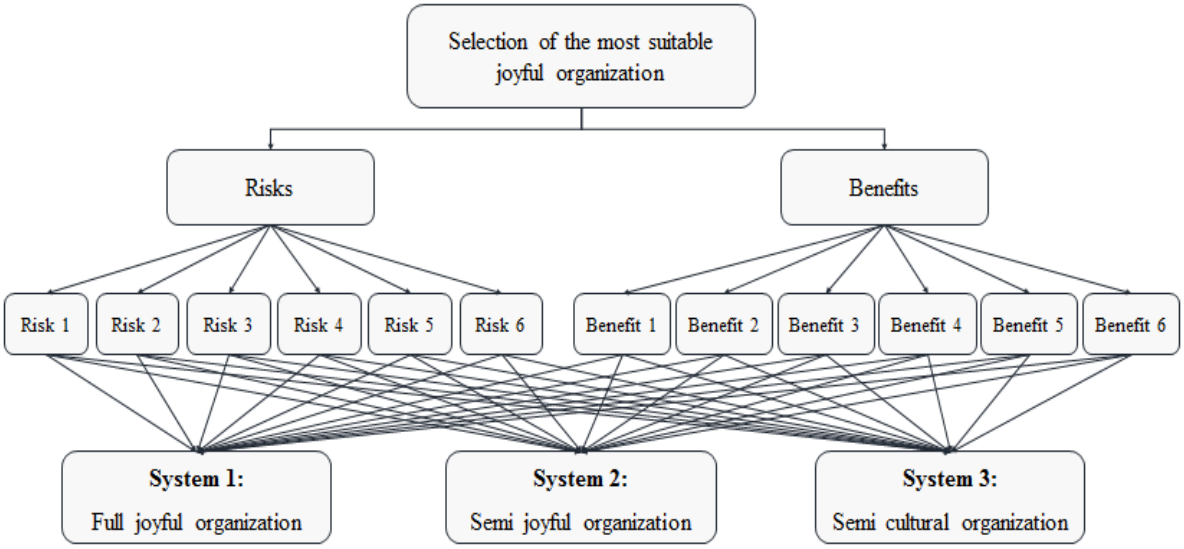

Figure 2: The hierarchy for the selection of the most suitable organizations

8.1 Alternative Organization Types

Three types of organizations are under investigation as they are described below:

1. True happy organization, employing free rules for organizational management
2. Semi happy organizations, employing some organizational rules for managing the firm
3. Semi conventional organizations, implementing about 50% of the rules of cultural organizations.

Weight by main objectives

Risks	(0.31, 0.49, 0.65)
Benefits	(0.09, 0.24, 0.44)

The results of Fuzzy hierarchical TOPSIS calculations are shown by Tables 4 to 10 below.

Table 4: weights by main objectives

	Risks	***Benefits***
Resistance to specific policies	(0.38, 0.56, 0.73)	0
Working wickedness and insurgences	(0.41, 0.58, 0.74)	0
Employees independency on one another	(0.52, 0.71, 0.84)	0
Asking for equal pay	(0.58, 0.78, 0.89)	0
Social working chaos	(0.35,0.54, 0.72)	0
Group misconducts	(0.37, 0.52, 0.68)	0
Team working and working habits	0	(0.51, 0.71, 0.85)
Productivity enhancement	0	(0.59, 0.79, 0.92)
Group responsibility acceptance	0	(0.55, 0.75, 0.88)
Group decision making	0	(0.46, 0.66, 0.81)
Social and group thinking	0	(0.44, 0.64, 0.80)
Innovation	0	(0.60, 0.80, 0.91)

Table 5: Decision matrix for Joyful Organization

	Risk1	Risk 2	Risk3	Risk4	Risk5	Risk6
System 1	(43, 63, 80)	(44,64,84)	(54,74,91)	(66,86,99)	(56,76,92)	(62,82,96)
System 2	(47, 67, 84)	(34,53,73)	(40,60,78)	(58,78,91)	(41,60,77)	(63,73,90)
System 3	(11, 24, 44)	(13,26,48)	(19,34,54)	(43,62,77)	(24,39,58)	(29,47,65)
	Ben 1	Ben 2	Ben 3	Ben 4	Ben 5	Ben 6
System 1	(58,78,94)	(50,70,87)	(55,75,93)	(63,83,96)	(63,83,97)	(61,81,98)
System 2	(49,69,87)	(47,66,76)	(51,71,87)	(45,65,82)	(47,67,83)	(39,59,78)
System 3	(20,36,56)	(27,43,87)	(21,38,58)	(18,33,52)	(25,43,61)	(21,38,58)
X--	(11,24,44)	(13,28,48)	((19,34,54)	(43,62,77)	(24,39,58)	(29,47,65)
X*	(58,78,94)	(50,70,87)	(55,75,93)	(63,83,96)	(63,83,97)	(61,81,98)

Table 6: weighted normalization table (vij) for Joyful Organization

Risk1	Risk 2	Risk3	Risk4	Risk5
(0.01,0.08,0.42)	(0.01,0.10,0.45)	(0.02,0.10,0.42)	(0.04,0.16,0.49)	(0.02,0.11,0.43)
(0.01,0.08,0.39)	(0.01,0.12,0.59)	(0.02,0.13,0.57)	(0.04,0.18,0.56)	(0.03,0.14,0.59)
(0.02,0.22,1.63)	(0.02,0.22,1.52)	(0.03,0.22,1.20)	(0.05,0.22,0.74)	(0.03,0.22,1.01)
Ben 1	**Ben 2**	**Ben 3**	**Ben 4**	**Ben 5**
(0.05,0.12,0.49)	(0.04,0.13,0.55)	(0.06,0.12,0.52)	(0.05,0.12,0.46)	(0.05,0.12,0.46)
(0.01,0.11,0.45)	(0.02,0.12,0.48)	(0.02,0.12,0.49)	(0.01,0.09,0.39)	(0.01,0.10,0.39)
(0.01,0.06,0.29)	(0.01,0.08,0.47)	(0.01,0.06,0.32)	(0.01,0.05,0.25)	(0.01,0.06,0.29)

Table 7: Table of m(vij) for Joyful Organization

	Risk1	Risk 2	Risk3	Risk4	Risk5	Risk6
System 1	0.17	0.19	0.18	0.23	0.19	0.20
System 2	0.16	0.24	0.24	0.26	0.25	0.23
System 3	0.62	0.59	0.48	0.33	0.42	0.40

	Ben 1	Ben 2	Ben 3	Ben 4	Ben 5	Ben 6
System 1	0.22	0.24	0.23	0.21	0.21	0.21
System 2	0.19	0.21	0.21	0.17	0.17	0.16
System 3	0.12	0.19	0.13	0.10	0.12	0.11

Table 8: Table of distance D*ij for Joyful Organization

	Risk1	*Risk 2*	*Risk3*	*Risk4*	*Risk5*	*Risk6*
System 1	0.2512	0.2224	0.2305	0.1213	0.2101	0.1882
System 2	0.2747	0.1536	0.1470	0.0783	0.1188	0.1395
System 3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Ben 1	**Ben 2**	**Ben 3**	**Ben 4**	**Ben 5**	**Ben 6**
System 1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
System 2	0.0321	0.0155	0.0165	0.0737	0.0619	0.0855
System 3	0.2109	0.1028	0.1862	0.2744	0.1925	0.2059

Table 9: Table of distance D^{--}_{ij} for Joyful Organization

	Risk1	*Risk 2*	*Risk3*	*Risk4*	*Risk5*	*Risk6*
System 1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
System 2	0.0000	0.0433	0.0568	0.0373	0.0694	0.1882
System 3	0.2747	0.2224	0.2305	0.1213	0.2101	0.1822
	Ben 1	**Ben 2**	**Ben 3**	**Ben 4**	**Ben 5**	**Ben 6**
System 1	0.210	0.100	0.190	0.27	0.190	0.210
System 2	0.160	0.080	0.150	0.130	0.110	0.100
System 3	0.000	0.000	0.000	0.000	0.000	0.000

Table 10: Final ranking for Joyful Organization

	S^*_i	S^-_i	$S^*_i + S^-_i$	C_i	Rank
System 1	1.2236	1.1727	2.3963	0.4894	3
System 2	1.1971	1.1626	2.3597	0.4927	2
System 3	1.1727	1.2472	2.4199	0.5154	1

Using the result of hierarchical multi criterion approach we can conclude that

Strategy 3 > Strategy 2 > Strategy 1 (13)

9.Validation of Results

For validity purpose, this author uses the QSPM technique to identify the best alternative in a manner used by many strategists in the past. QSPM approach is used by many practitioners and researchers in the past for decision making in various fields.

9.1Conventional QSPM

SWOT framework which is an indication of Strengths, Weaknesses, Opportunities, and Threats, is used by many practitioners and researchers for system analysis. This analytical tool is used for internal and external factors that are important to the organization for conducting study. One assessment technique for strategy evaluation and its reliability study is QSPM. This technique which is used by many researchers in management and strategic situations determines which strategic alternatives are possible. The results are the prioritization of strategies. Steps to make QSPM matrix are:

1. The first column of matrix comprises of strategies to be evaluated.
2. The second column considers the quadric factors of strengths, weaknesses, opportunities and threats for each strategy.
3. Attributes' signals are placed in the third column in accordance with SWOT analysis.
4. Column four is used for describing each attribute used in column three.
5. Column five shows the weights that decision makers assigned to each attribute of each strategy.
6. Attractive scores for each attribute are used in column six.
7. In column seven, the multiplication of weight of each attribute by its attractive score is determined and located in this column.
8. By adding the scores obtained for each strategy, we can determine which strategy gained the highest score.
9. Strategy with highest score is ranked top and then the one with the second highest score is ranked next to top, and the process continues this way until the list is exhausted.

To obtain scores for our strategies regarding joyful organizations, we have asked our five experts, in the field, to provide us the vectors of weights associated with these twelve attributes as listed in the following table. The vector of attributes used in this problem is shown as (C1, C2,…, C12). To help our experts on this regard, SWOT analysis was executed in advance and those attributes associated with the Strengths, Weaknesses, Opportunities, and Threats were determined.

Strengths

1. Team making and working habits (C7)
2. Productivity enhancement (C8)
3. Group Decision Making (DM) (C10)

Weaknesses

1. Working wickedness and insurgences (C2)
2. Asking for equal pay (C4)
3. Group misconducts (C6)

Opportunities

1. Employee's interdependency on one another (C3)
2. Group responsibility acceptance (C9)
3. Social and group thinking (C11)
4. Innovation (C12)

Threats

1. Resistance to special policies (C1)
2. Social working Chaos (C5)

The results of QSPM matrix calculation are shown by Table 11.

Table 11: QSPM Matrix in association with SWOT

Strategies	*SWOT*	*Attribute's Signals*	*Attribute's Descriptions*	*Weights*	*Attractive Scores*	*Weighted/ or Total attractive scores*
System type 1	Strengths	**C7**	Team working	0.10	2	0.20
		C8	Productivity Enhancement	0.08	2	0.16
		C10	Group DM	0.07	2	0.14
	Weaknesses	**C4**	Equal Pay	0.05	2	0.10
		C2	Working insurgences	0.10	3	0.30
		C6	Group misconduct	0.10	3	0.30
	O	**C**	Innovation	0	2	0.2

	pportunities	**12**		.10		0
		C3	interdependencies	0.08	2	0.16
		C9	Group responsibilities	0.05	3	0.15
		C11	Social Thinking	0.03	2	0.06
	Threats	**C1C5**	Resistance Social Chaos	0.150.10	22	0.300.200
	Weights					2.27
System type 2	Strengths	**C7**	Team working	0.10	2	0.20
		C8	Productivity Enhancement	0.08	2	0.16
		C10	Group DM	0.07	1	0.07
	Weaknesses	**C4**	Equal Pay	0.05	2	0.10
		C2	Working insurgences	0.	2	0.20

		C6	Group misconduct	0.100	2	0.20
	Opportunities	**C12**	Innovation	0.10	4	0.40
		C3	interdependencies	0.08	3	0.24
		C9	Group responsibilities	0.05	3	0.15
		C11	Social Thinking	0.03	4	0.12
	Threats	**C1** **C5**	Resistance Social Chaos	0.150 0.10	2 2	0.30 0.10
	Weights					2.34
System type 3	Strengths	**C7**	Team working	0.10	1	0.10
		C8	Productivity Enhancement	0.08	2	0.16
		C10	Group DM	0.07	1	0.07

	Weaknesses	**C4**	Equal Pay	0.05	1	0.05
		C2	Working insurgences	0.10	1	0.10
		C6	Group misconduct	0.10	2	0.20
	Opportunities	**C12**	Innovation	0.10	2	0.10
		C3	interdependencies	0.08	1	0.08
		C9	Group responsibilities	0.05	1	0.05
		C11	Social Thinking	0.03	1	0.03
	Threats	**C1** **C5**	Resistance Social Chaos	0.150.10	22	0.300.20
	Weights					1.44

Using the result of QSPM table, we can conclude that

Strategy 2 > Strategy 1 > Strategy 3

Author took the results of these two techniques to the group of decision makers and asked them for their opinions on the findings of these approaches with regard to the problem under study. A body of consultants who had problem with the current cultural organizations, with its form and shape and believing that changes are a must, they suggested the QSPM results is better than the hierarchical multi criterion approach. The second body of consultants taught the hierarchical multi criterion fuzzy approach had produced better results solely because it takes turtle approach to improving the current featured of organizations. The third group of consultants taught both approaches were not good and we should convert quickly to the first strategy to enhance productivity and care for the customers by producing better quality products.

10. Further analysis

To further analyze the results of this research, author employed TOPSIS approach for evaluation purposes. For this case, two set of weights are used:

(1) Weights used for the hierarchical fuzzy TOPSIS
(2) Weights calculated using Shannon entry approach

10.1 Shannon Entropy Weight

Using Shannon entropy approach presented below, we calculated the weight vector based upon the data gathered in the original decision table. Shannon's weighting approach is based upon the dispersion of the data in the decision-making matrix. Due to the fact that W_j is calculated directly from Dj, there is a direct relationship between the weight and data dispersion. Steps to follow are as discussed below:

Step 1: Use following formula to calculate P_{ij} values.

$$P_{ij} = \frac{x_{ij}}{\sum_{i=1}^{m} x_{ij}} \tag{14}$$

Step 2: Calculate E_j using following formula:

$$E_j = -k \sum_{i=1}^{m} [P_{ij} \cdot Ln\ P_{ij}] \quad ; \forall j \tag{15}$$

Where k = 1/Ln (m).

Step 3: Now calculate Wi using formulas (16-17) given below:

$$d_j = 1 - E_j \quad ; \quad \forall j \tag{16}$$

$$W_j = \frac{d_j}{\sum_{j=1}^{n} d_j} \quad ; \quad \forall j \tag{17}$$

10.2 Calculation and Verification

To verify the ranking of the strategies obtained by the hierarchical fuzzy TOPSIS approach, fuzzy TOPSIS approach was used finding the results given in Tables 13 and 14, using the Shannon entropy weight vector and the weight vector used for the Hierarchical fuzzy TOPSIS before.

Table 12: Shannon entropy weight

Sum	***-3.929***	***-3.675***	***-3.560***	***-3.330***	***-3.462***	***-3.436***
Ej= - K *	3.57	3.34	3.24	3.03	3.15	3.12

SUM	6	5	0	1	1	8
Dj=1-Ej	-2.576	-2.345	-2.240	-2.031	-2.151	-2.128
=SUM(Dj)	-25.94					
Wj = Shannon	0.099	0.090	0.086	0.078	0.083	0.082

10.3 TOPSIS results using Shannon entropy weight

After obtaining weights using Shannon entropy approach, TOPSIS was employed for prioritization purposes. The results of these calculations are presented in Table 13.

Table 13: TOPSIS results with Shannon entropy weight vector

	Si*	Si-	Sum	C*i	Ranking
System 1	0.089174316	0.000313389	0.089487752	0.004	3
System 2	0.084300566	0.000827617	0.085128175	0.010	2
System 3	0.000282855	0.091953865	0.092236715	0.997	1

10.4 Using HFTOPSIS weight

For sensitivity analysis purposes, the weight vector used for the hierarchical fuzzy TOPSIS was used and the results presented in Table 14 were obtained. Table 15 compares the results of the hierarchical fuzzy TOPSIS, QSPM, and TOPSIS using Shannon entropy weight vector and HFTOPSIS weight. The results of Table 15 shows only the ranking of the systems obtained by QSPM is different with the rankings of other approaches discussed.

Table 14: TOPSIS results using HFTOPSIS weight vector

	Si*	Si-	Sum	C*i	Ranking
System 1	0.139769518	0.037953643	0.177723222	0.214	3
System 2	0.123597227	0.034002003	0.157599275	0.216	2
System 3	0.037922929	0.140526937	0.178449835	0.787	1

Table 15: Comparison of ranking results

	TOPSIS using Shannon weight	***TOPSIS using HFTOPSIS weight***	***Using HFTOPSIS approach***	***QSPM***

System 1	3	3	3	2
System 2	2	2	2	1
System 3	1	1	1	3

11. Conclusion

Maxim Gorky once said, "When work is pleasure, life is a joy. When work is duty, life is slavery." It gets more meaningful today that we live more than one third of our life in a disinterested situation, at work. Therefore, it would be nice to spend that at a job that really makes us happy and at the place that we want to be. Until now, organizational leaders rarely have figured out and considered happiness and joy as a part of the system they are managing. Hence, happiness in organizations is not considered as a part of management style. Gradually, it became obvious that joy and fun at the workplace will decrease the health care costs, enhances the customers' loyalty, and increases productivity and the profits.

There are ways to implement a working approach into an organization. Full implementation of a strategy may have severe kick back sooner than later for many reasons. Variety of risks may appear in different possible forms and hence the system may collapse by the passage of time for cultural reasons or for not being adaptable with belief of the people. However, as time goes on, changes in working environment and the way of managing employees becomes a necessity. Therefore, a new strategy or a partial implementation of that would become a requisite. Hence, the questions are: what is management decision about that? What they want to do? Should management start now or wait and stay behind the competitor? However, there exits some alternatives for the management. Instead of taking an initiative of going all the way of having a full joyful organization, a partial joyful organization can be taken into consideration at the beginning. This means concentrating on having a portion of the organization managed by the Joyful organization philosophy or let a semi joyful organization to be implemented instead.

There are some factors having severe impacts on management and its leadership in converting their organization into a joyful organization. These factors are: employees' job satisfaction, productivity enhancement, employee bonding, care for the success of organization, customers' requirements management, and the environment. In all organizations, leadership proposes new strategies and ask managers to enforce them all over the organization. In this case, leadership, managers, and organizational experts must work hand in hand for the success of its human capital which is most valuable and priceless for the company.

The proposed problem was solved using two different methodologies of (1) hierarchical fuzzy TOPSIS, and (2) QSPM approach - that is highly practical, customary, and acceptable among managers and strategists. The first approach is able of grasping the vagueness existing in information and the fuzziness appears in the human judgments and preferences. The QSPM methodology uses the SWOT approach for better scoring and prioritization of each strategy. Our calculations indicate that hierarchical fuzzy TOPSIS and QSPM approaches are not generating similar results. The first approach points to the suitability of semi conventional organization strategy which means implementing about 50% of the rules of main cultural organizations. The second approach indicates that the best strategy is strategy 2 which is semi happy organization. A sensitivity analysis was performed on TOPSIS using the weights generated by the hierarchical fuzzy TOPSIS approach, Shannon entropy weight, and TOPSIS approach. The ranking results obtained are identical for all these three cases. This study can be expanded using the holism concept, and its approaches of systems thinking and system dynamics to deal with this unstructured and ill-defined problem. Studying the long-term effects of these strategies on management goals of (1) employee's satisfaction, (2) company's overall performance, (3) team working, and (4)

innovations, to mention a few, is highly demanding. Using information from table 2, various MCDM methods can be used for problem solving and decision analysis, however.

Reference list:

[1]	Andrew, J., et al. (2010), Happiness and productivity, Department of economics university of Warwick.
[2]	Akgunduz, Y., Ovunc Bardakoglu, Gaye Kizilcalioglu, (2022), Happiness, job stress, job dedication and perceived organizational support: a mediating model, Journal of Hospitality and Tourism Insights. DOI 10.1108/JHTI-07-2021-018.
[3]	Bahrami, M., A. Etebarian Khorasgani and R. Ebrahimzadeh Dastjerdi, (2022), Development of a comprehensive model for re-designing the organizational structure based on business intelligence (case study: Esfahan Steel Company). Iranian Journal of Operations Research Vol. 13, No. 1, pp. 61-82
[4]	Baker, D., Greenberg, C. L., & Hemingway, C. (2006), What Happy Companies Know: Discovering.
[5]	Baykasoglu, A. & Golcuk, I., (2015), Development of a novel multiple-attribute decision making model via fuzzy cognitive maps and hierarchical fuzzy TOPSIS, Information Sciences 301, 75-98.
[6]	Baykasoglu, A. & Golcuk, I., (2017), Development of an interval type-2 fuzzy sets based hierarchical MADM model by combining DEMATEL and TOPSIS, Expert Systems with Applications, 70, 37-51.
[7]	Davis, M. A. (2009), Understanding the relationship between mood and creativity: A meta-analysis, Organizational Behavior and Human Decision Processes, 108, 25-38
[8]	Dutton, M. & Edmund, D., (2007), A model of workplace happiness, Journal of selection and development review, 23, 9-14.
[9]	Freyermuth, P. A., & Schonewille, R. J., (2009), Happy Workplaces! Happy? Are You Nuts? The Journal of The Conference for Global Transformation, 9 (1), 1-10.
[10]	Geounuppakul, M., Tounprommarat, A., & Prinpijarn, A., (2008), Factors Influencing Happiness in Personnel Working at Boromarajonani College of Nursing.
[11]	Ghaffari, A. & Ghanbari G., (2019), The features of excellent Islamic organizations by the inspiration of organizational virtue and religious affectionate: the archetypes of cheerful organizations, Islamic Management, Vol.26, pp.105-126.
[12]	Grant, A. M., & Sonnentag, S., (2010), Doing good buffers against feeling bad: Prosocial impact compensates for negative task and self-evaluations, 111, 13-22.
[13]	Gray, R. S., Kramanon, R., & Thapsuwan, S., (2008), The determinant of happiness among Thai people: some evidence from Chai Nat and Kanchanaburi, Thommasat economic journal. Vol. 26.
[14]	Kahraman, C., C¸ Evik, S., Ates¸, N.Y. & Gu¨lbay, M., (2007), Fuzzy multi-criteria evaluation of industrial robotic systems", Computers & Industrial Engineering, Vol. 52 No. 4, pp., 414-33.
[15]	Kemakorn, C., & Santidhirakul, O. (2011). Happiness at work of employees in small and medium-sized enterprises, Thailand. Procedia social and

	behavioral science, 25, pp.189-200.
[16]	Liske, C., Tutticci, N. & Diño, M. J. S., (2023), Joy at work and vocational identity during COVID- 19: A structural equation model. Journal of Nursing Scholarship, 00, 1–10. https://doi.org/10.1111/jnu.1288
[17]	Lundin, S.C., Paul, H. & Christensen, J., (2000), Fish, a remarkable way to boost morale and improve results, Hyperion, 77 West 66th street, New York, NY 10023-6298.
[18]	McShane, S. L., Glinow, V., & Ann, M., (2008), Organizational Behavior (4th ed.), McGraw-Hill.
[19]	Moubed, M. & Zare Mehrjerdi, Y., (2014), Joyful organization: a system thinking approach. International Journal of Happiness and Development 1 (4), 369-383.
[20]	Nadkami, M. S., Lovey, I., & Erdelyi, E., (2003), The Joyful Organization: Understanding Organizational Health, Diseases and Joy.
[21]	Najjari, R., (2015), Happiness at work. Journal of studies on Organizational behavior. Vol. 2, pp.77.98.
[22]	Ravina Ripoll, R., Luis M. Romero-Rodríguez and Eduardo Ahumada-Tello, (2022), Happiness management: key factors for sustainability and organizational communication in the age of Industry 4.0, corporate governancevol. 22 No. 3, pp. 449-457.
[23]	Robin Peeters, Daan Westra, Arno J. A. van Raak, and Dirk Ruwaard, (2023), So happy together: a review of the literature on the determinants of effectiveness of purpose-oriented networks in health care, medical care research and review, Vol. 80(3) 266 –282.
[24]	Salvadorinho, J.; Teixeira, L. Happy and Engaged Workforce in Industry 4.0: (2023), A new concept of digital tool for hr based on theoretical and practical trends, Sustainability, 15, 2781. https://doi.org/10.3390/su15032781
[25]	Safwat Adel El-Sharkawy, Muhammad Salah Nafea and Emad El-Din H. Hassan, (2023), HRM and organizational learning in knowledge economy: investigating the impact of happiness at work (HAW) on organizational learning capability (OLC), El-Sharkawy et al. Future Business Journal, 9:10 https://doi.org/10.1186/s43093-023-00188-2
[26]	Salas, A., Alegre, J. M. & Fernandez, R., (2017), Happiness at work and organizational manpower, Vol. 38, pp. 470-488.
[27]	Schiffrin, H. H., & Nelson, S. K., (2010), Stressed and happy? investigating the relationship between happiness and perceived stress, Journal of Happiness Studies , 11, 33-39.
[28]	Seligman, M.E.P., & Csikszentmihalyi, M., (2000), Positive psychology: An introduction. American Psychologist, 55, 5-14.
[29]	Ute Stephan, Andreas Rauch, and Isabella Ha, (2023), Happy entrepreneurs? everywhere? a meta-analysis of entrepreneurship and wellbeing, entrepreneurship theory and practice, Vol. 47(2) 553 –593 © The Author(s) 2022, DOI: 10.1177/10422587211072799
[30]	Veenhoven, R., (2009), World database of happiness, tool for dealing with the ‘data-deluge’. first conference of the international positive psychology association. Philadelphia.
[31]	Vries, K. D., (2000), The business graduation speech: reflections on happiness. European Management Journal, 302-311.
[32]	Waal, A., (2018). Increasing organizational attractiveness: the role of HPO and happiness at work frameworks. Journal of organizational effectiveness, Vol. 10, pp.122-132.
[33]	Yammarino, F. & Dansereau, F., (2019), A new kind of organizational behavior, in Francies, J. Yammarino, Fred Dansereaeu (ed). Multi-level

	issues in organizational behavior and leadership, Vol.8., pp.13-60.
[34]	Zadeh, L. A. (1965). Fuzzy sets. Information and Control, 8, 338–353.
[35]	Zangi Abadia, A. & Ahmadib, D. (2012). Strategic planning for waste management: A case study of Shiraz waste management, Management Science Letters 2 (2012) 1563–1570.
[36]	Zare Mehrjerdi, Y., (2013), Hierarchical multi-criteria risk-benefit analysis in fuzzy environment, Applied Soft Computing 13 (1), 590-599.
[37]	Zare Mehrjerdi, Y., (2012), Developing a fuzzy topsis method based on interval valued fuzzy set, International journal of computer applications, 42, 7-18.
[38]	Zare Mehrjerdi, Y., (2013), Group decision making process for RFID-based system selection using fuzzy TOPSIS approach. Artificial Intelligent Research 2 (3), 1-15.
[39]	Zare Mehrjerdi, Y., (2015), Grey Theory, VIKOR and TOPSIS Approaches for Strategic System Selection with Linguistic Preferences: a Stepwise Strategy Approach. Iranian Journal of Operations Research Vol. 6, No. 2, pp. 36-57
[40]	Zare Mehrjerdi, Y. and Moubed M, (2023), Joyful organization: simulation and analysis. Journal of decision making: theory and practice (to appear)
[41]	Zare Mehrjerdi, Y., Bakhshandeh, M., (2023), evaluation model of the systems thinking level of the organization (case study: iranian oil company), journal of systems thinking in practice, vol 2, no. 2, pp. 56-77.