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Joyful Organization: Simulation and Analysis

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Abstract

Happiness is primarily studied in psychology and sociology to enable people to create and maintain happiness in their lives. However, it is ignored in management studies. Joyful organization, as a broad concept in management studies, tries to contemplate this subject to influence nearly one-third of human life. Researchers demonstrate that happier workers are more productive and satisfied with their jobs. The current paper tries to examine joyful organization by a system dynamics approach. We plan causal loop and flow diagrams to clarify the concept and its precedents and proceedings in an organization. Then, developing two scenarios, we simulate the impact of productivity gain sharing on future productivity trends and joy within the workplace. The result of our paper emphasizes the critical effect of productivity gain sharing on maintaining joy within organizations.

1 | Introduction

There is a big gap between the actual organizational level of happiness and the true joy of working in the workforce, as expected in almost all countries worldwide. Some researchers have conducted research on happiness at work and in organizations (Kemakorn Chaiprasit, 2011; Freyermuth and Schonewille, 2009; Dutton and Edmonds, 2007; Moubed and Zare Mehrjerdi, 2014; Chawsithiwong, 2007) and numbers of works are relatively trivial. Most of the research conducted on happiness and joyful working areas are related to family happiness, schools as an organization, students as participants, or specific groups of people as beneficiaries of certain events. Happiness can energize workers of an organization. Researchers Geounuppakul et al. (2008) showed that happy employees and organizations are more creative, innovative, satisfied, flexible, and productive. Because of the increasing importance of happiness in the workplace, this exciting subject deserves more attention both from the business world and from the academic researchers to be investigated.

Baker et al. (2006) introduce five characteristics of happy companies: leading stakeholders to share their ideas, enthusiastic and passionate employees, close relationship with clients, customers, and vendors, a constructive citizen in society and Profitability (Baker et al., 2006).

The joy and happiness concept (Nadkami et al., 2003; Baker et al., 2006) is much broader than just managing happy employees, as Freyermuth and Schonewille (2009) described. These concepts contain performance measures and psychological measures. To provide a conceptual model for joyful organization in this paper, these broader concepts are used. Comparing the concepts with the subjects of total quality and excellence, we can conclude that a happy organization covers a long distance in an excellent way. However, an excellent organization is not necessarily a joyful one.

Taking all said above and a deep investigation of the literature, we found factors/variables such as workers' happiness, joy in the workplace, productivity, employee welfare, quality of work life (QWL), workforce relationships, friendship at the workplace, stress, sense of belonging, customer satisfaction, subjective wellbeing, satisfying economic needs, self-concept, and job satisfaction. The interrelationships among these factors are investigated using related articles from the literature as reviewed and reported in the remaining body of the paper.

Taking all these into consideration, these authors were unable to find articles proposing an integrating approach considering the impacts of joy in the workplace on the employees' satisfaction at the workplace in a manner that is essential to this research. Hence, the main contribution of this research is identifying factors of joy and happiness as a part of an organization's strategy to let its workforce taste the freedom of work and f making decisions at the right time for the proper purpose. For integrating key factors of the problem, the system dynamics approach is used to examine employees' behavior in contrast to what they may have expected of the general working organization. There has been little quantitative research on this subject matter using the system dynamics approach. Hence, this research novelty finds all critical factors for building a joyful organization within a working area considering logical and ethical working rules. Additionally, a system dynamics model is used to consider the interrelation impacts of factors on each other.

The remainder of this article is designed as described below. The research background is discussed in Section 2. Literature review and criteria extraction is the topic of Section 3. The solution methodology is discussed in Section 4. Simulating the level of joy in the workplace is the topic of Section 5. Sections 6 and 7 are dedicated to sensitivity and scenario analysis, respectively. The conclusion of the paper is given in Section 8.

2. Research Background

2.1. Happiness and joyful organizations

Work is a source of happiness, as the Chinese proverb says, happiness is having someone to love, something to do, and something to hope for. "Something to do", as the second base of happiness in this proverb, does not mean that doing anything can bring happiness. However, for a beginner doing any new work may be fascinating and joyful, but this will not cause happiness for an expert with some experience. As Nadkami et al. (2003), Vries (2000), and Schiffrin and Nelson (2010) stated, a joyful organization gives its employees a sense of purpose and matter. Since people spend a long time at the workplace, these positive emotions will help them to have a better personal life. Alternatively, the interrelationship between personal and work life will bring about their happiness at the workplace. This understanding helps create different hypotheses to study joyful organization concepts.

Baker and Stauth (2004) defines happiness as a way of living in a meaningful, purpose-focused, satisfying manner both in one's situation and in relationship to others. Some researchers use subjective well-being (SWB) as a synonym for happiness (Zelenski et al., 2008; Veenhoven, 2009). Subjective well-being is a broad term that contains several empirically different concepts. Veenhoven (2009) defines happiness as the subjective enjoyment of one's life and a synonym for life satisfaction and subjective well-being. Freyermuth and Schonewille (2009) describe a happy workplace as a natural fun place with happy interactions where 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 ocurrs from natural tasks of organization (Freyermuth and Schonewille, 2009).

2.2. System thinking and dynamics

System thinking, as another thinking style, is "a way of understanding the reality that emphasizes the relationships among a system's parts, rather than the properties of the parts themselves". In other words, if we break up the elephant into its parts, we will not have some little elephants. An elephant is the result of relationships between its different components. This is the process of understanding how different things influence each other. In problem-solving, it works as a specialized language that enables us to understand and simplifying complexities to address chronic problems of everyday life and work (Hjortha and Bagheri, 2006). By this kind of thinking, people and social institutes can be positioned in a suitable way for development and expect them to improve and develop (Hjortha and Bagheri, 2006). This is why management studies recently view organizations from a system perspective. Organization systems consist of different components such as organization structure, human resources, materials, machines, and processes. The balance between these components helps in balancing the whole system and makes the organization a joyful one.

Usually, researchers use causal loop diagrams (CLD) to demonstrate the structure of the problem. CLD can demonstrate the interrelationships that exist between variables considering two variables at a time. Variables are connected by arrows showing the relationship between them. Two types of loops named reinforcing loop and balancing loop, are developed in constructing the CLD. Each loop has a "polarity nature" shown by a plus or negative sign which is the multiplication of all signs used in the loop. In a positive causal link, two nodes change in the same direction.

3. Literature review and criteria extraction

Perhaps the best way to study an ill-structured problem within a complex system is through relationship examination between the main factors of the problem. A mental model can be used as a basis for thinking through relationship identification. To study joyful organization, the system thinking approach is employed as our guide for model development. The system dynamics approach is adopted to present the interactive relation among factors of a joyful organization in a general manner. The primary step in this process is to identify the loops and keep them functional. In the initial model for happiness and joy at work, we identified influencing factors that affect joy and happiness within the organization using the literature, mainly the definitions by Nadkami et al. (2003), Freyermuth and Schonewille (2009) and Baker et al. (2006). These factors are constructive citizenship, customer satisfaction, entropy minimization, happy workers, harmony with the environment, organizational growth, profitability, satisfying economic needs, satisfying customer needs, satisfying employees' needs, reaching specific goals, a sense of belonging and teamwork. We identified other influencing parameters that impact happiness at the workplace or the influencing factors from the literature. By a pairwise comparison of basic causes of happiness, we select the seven most essential variables. The casual loop illustrated in Figure 2, consists of the most important and related items.

In a study accomplished by Schiffrin and Nelson (2010), the authors claimed that "linear correlations between happiness and perceived stress were significant, indicating that there was an inverse relationship between these variables." In a study conducted by Maizatul Akmar Binti Mohd Rasli et al. (2017), the authors pointed to the fact that five factors contribute to the level of happiness. In highlight, three out of five have been identified as the most dominant happiness factor among SMEs employees. The factors are leadership, quality of work life, and job inspiration. Meng et al. (2015) highlighted the dimensions of the happiness index in descending order of their contribution to the nurses' comprehensive happiness levels as health concerns, friendly relationships, self worth, altruism, vitality, positive emotions, personality development, life satisfaction, and negative emotions. Four variables (positive feeling, life satisfaction, negative feeling, and friendly relationships) jointly explained 47.80% of the total variance of the happiness index; positive emotions had the most significant impact on the happiness index. In a study conducted by Gudivada Venkat Rao et al. (2017), the authors highlighted that the happiness factors were categorized into intrinsic factors with items associated with self-esteem, self-actualization which derives happiness to the individual from the inner self, extrinsic factors with items such as compensation, work environment, health and work-life issues with connected with flexibility, adjustment, and counseling between work and family which derive happiness to the individual at the workplace. Since there is no precise definition for 'happiness', researchers use different phrases such as subjective well-being (Wright & Cropanzano, 2004), job satisfaction (Wright, 2004; Mcshane and Glinow, 2008; Ozdemir, 2009; Zelenski et al., 2008; Suppramaniam et al., 2009; Bangkoedfol, 2007) and quality of work life (Bangkoedfol, 2007; Suppramaniam et al., 2009) as synonyms. We used these items as variables in our model to perceive their relationship with a happy workplace. The main variables and loops of the model are described later. Table 1 lists identified criteria and their description for more elaboration purposes.

Table 1. Main criterion and their descriptions.

	Criteria	Description and sources used
1	Worker happiness	Happy personality as a psychological in management studies changes to happy worker. In other words a happy person that transfers his/her sense of joy into the workplace, would be a happy worker.
2	Joy at workplace	In our model it is separated from worker happiness and regarded as a wider subject than just having happy personnel. The components of this variable are derived from literature and summerized to simplify the analysis. The selected inflencing variables are customer satisfaction, job satisfaction, satisfying economic needs, sense of belonging and worker happiness.
3	Job satisfaction	Wright (2004) stated that happiness has been defined in organizational literature as job satisfaction, presence of positive effect, absence of negative effect, lack of emotional exhaustion and psychological well-being (Wright T. A., 2004). Ozdemir (2009) considered happiness as a component of job satisfaction.
4	Quality of working life (QWL)	Bangkoedfol (2007) consider QWL as equal to organizational effectiveness, which is a result of personnel well-being. She suggests that QWL would enhance the personal life, happiness at work, self-esteem and work satisfaction of employees.
5	Freindship at Workplace	Morrison and Nolan (2007) in their research show that friendship despite its value for employees and organizations sometimes might cause difficulties for both of them. They differ between having friends at work and working in a friendly environment. Ingram and Zou (2008) show that business friendships beside its benefits for organization performance, is a potential threat to employees' self-concept.
6	Self Concept	Organizational identity (individual's self-concept), employee engagement (using full capacity of employee), measurement (the amount and quality of work and social media, which changed the way communication occurs), and the changed relationship between employers and employees are among the challenges in today's organizational settings (Moyer, 2011). Selfconcept is a person's perception of himself. These perceptions are formed through his experience with his environment, perhaps in the manner suggested by Kelly (1973), and are influenced especially by environmental reinforcements and significant others.

7	Stress	In a study completed by Holly H. Schiffrin, A. S. Katherine Nelson (2010) authors claimed that "linear correlations between happiness and perceived stress were significant indicating that there was an inverse relationship between these variables."
8	Job inspirition	In a study conducted by Maizatul Akmar Binti Mohd Rasli et al. (2017) authors points to this fact that five factors contribute to the level of happiness. In highlight, three out of five factors are leadership, quality of work life and job inspiration.
9	Employee Wefare	Chartered Management Institute (2022) discusses the well-being of employess at their Ckecklist of 279 as: "Well-being is an individual's state of comfort, happiness, fortunes and health. The higher the levels are, the more productive, engaged, motivated and happy an employee is likely to be. Staff welfare concerns itself with providing the right support to enhance well-being; ensuring a positive and healthy individual employee team and/or organisation. The well-being of staff includes their physical, emotional and mental states. It is the responsibility of line managers to seek the best ways of making certain none of these are compromised, and if they are, to offer the right support to redress the situation."
10	Productivity	The Wellbeing Agenda report (2018) found that 97 per cent of HR decision makers agree that employee happiness leads to higher productivity. Theory Y management suggests that happier people will be more productive, and many empirical findings are consistent with this idea. According to Cropanzano and Wright (2001), less happy employees are more sensitive to threats, more defensive around co-workers, and more pessimistic. Conversely, happier employees are sensitive to opportunities, more helpful to co-workers, and more confident.

Using criteria from Table 1, more exploration of articles relating to this study are identified and listed in Table 2. Most research conducted on this topic is concentrated on one or a few of the key variables used in this study. We could not find research using all key variables in an integrated manner in the way this research is dealing with. Systems thinking as a tool for problem analysis was employed by Moubed and Zare Mehrjerdi (2014) to develop a causal diagram of the problem. However, no simulation study was used to expand the problem further and analyze the results. As shown in Table 2, most solution techniques used by researchers are of statistical and data analysis types.

Table 2. Related studies.

	Criterion	Author's name	Solution approach
1	Sense of belonging	Jaitli, R. and Hua, Y. (2013)	Statistical data analysis
2	Self-concept and self regulation	Moyer (2018)	Statistical data analysis
3	Job Satisfaction on Employees Motivation	Qadar Bakhsh Baloch (2010) K. Mushtaq, M. Umar (2015)	Statistical data analysis
4	Quality of working life	Mitra Moubed, Yahia Zare Mehrjerdi (2014)	Systems thinking (ST)
5	Friendship at workplace	Mitra Moubed, Yahia Zare Mehrjerdi (2014)	ST
6	Life satisfaction and happiness	Erdem Seçilmiş (2021)	Statistical data analysis
7	Subjective Well-being	Reza Nadimi & Shiori Tanaka & Koji Tokimatsu (2021)	Statistical data analysis
8	Work and leisure	Sidrah Khalil & Hoda Mansour (2021)	Statistical data analysis
9	Happiness and economic growth	Zahra Fotourehchi & Habib Ebrahimpour (2019) Mohsen Golparvara and Hassan Abedini (2014)	Statistical data analysis
10	Satisfaction in the workplace and corporate	Ruohan Wu & Xueyu Cheng (2016) Roos W, Van Eeden R. (2008)	Statistical data analysis
11	Worker happiness, welfare and ethics	Greg Clydesdale (2015) Wang, S., & Yi, X. (2011)	Statistical data analysis

12	Dynamic models of happiness	S. Sepehr Tabatabaei & Mohammad Javad Yazdanpanah & Sajad Jafari & Julien Clinton Sprott (2014)	Statistical data analysis
13	The productive and happy agent	Danilo Garcia & Max Rapp Ricciardi & Trevor Archer (2015)	Statistical data analysis
14	Happiness policy and economic needs and development	Bruno S. Frey & Jana Gallus, (2012)	Statistical data analysis, and ST
15	Job Satisfaction and Customer Satisfaction	Malik MI, Safwan MN, Sindhu AG (2011)	Statistical data analysis, and ST
16	Job satisfaction and absenteeism	Ulleberg P, Rundo T. (1997)	Statistical data analysis
17	Job Performance and satisfaction	Ma VA, Koh HW, Kuek (2012)	Statistical data analysis
18	Joy at workplace	Moubed & Zare Mehrjerdi (2014)	Statistical data analysis
19	Job satisfaction and Occupational stress	Moubed & Zare Mehrjerdi (2014) Sahukar Madhura, Pailoor Subramanya, and Pradhan Balaram (2014)	A cross-sectional survey design. Email questionnaire, systems thinking
20	Employee welfare and hygiene factors	Nguyen Ngoc Duy Phuong, Mai Ngoc Khuong, Le Huu Phuc, Le Nguyen Thanh Dong (2018)	Data collection and statistical analysis
21	Communication quality and Job Satisfaction	Sharma, Priti R. (2015)	Data collection and statistical analysis

The research gaps are presented in Table 3, which shows no research reported on the application of system dynamics in joyful organization and happiness in the way these authors are considering. Most researchers employed statistical methods and regression analysis for the purpose they had conducted research. On this finding, we can say that this article can make significant contributions to the organizational research as far as employes' happiness is concerned and to the nature of the newly structuring organizations of the future.

Table 3. Use of system thinking and system dynamics approaches in joyful organizations and happiness research.

	System thinking approach	System dynamics approach	Simulation and analysis	Statistical data analysis
Joyful organization	Yes	This study	This study	Yes
Happiness	This study and others	This study	This study	Yes
Scenario analysis	X	This study	This study	X
Sensitivity Analysis	X	This study	This study	X

4. Solution methodology

With this research, the authors try to find different components of happiness and joy within the workplace to design a joyful organization to determine the relationship between happiness and such features. We search for the effects of happiness on organizational performance and the effects of organizational performance on happiness. As a starting point, the impact of productivity gain sharing and income on joy within the organization will be studied. To achieve this goal, we design a model of joyful organization using a system dynamic modeling approach. The steps to follow are listed below.

Step 1: Use appropriate literature review to identify critical factors/variables associated with joyful organizations.

Step 2: Determine system boundary by classifying factors/variables obtained in step 1 into endogenous and exogenous types.

Step 3: Develop causal diagrams using endogenous and exogenous variables.

Step 4: Draw stock-and-flow diagrams using a causal diagram.

Step 5: Develop a mathematical model of the problem and simulate that with Vensim computer software.

5. System dynamics modeling

5.1. Dynamic hypothesis

The depiction of a cause-and-effect diagram demonstrating the interrelationships among key variables using feedback loops is known as the dynamic hypothesis. The dynamic hypothesis (DH) of the problem is shown in Figure 1 using variables identified and discussed above. One may verbally define proposing DH by the hypothesis listed below for more clarification purposes.

H1: Joy at the workplace has significant impact on productivity,

H2: Productivity has substantial effects on employee welfare,

H3: Quality of work life has positive impacts on workplace relationships between workforces,

H4: Friendship at the workplace has negative effects on employees' self-concept,

H5: there is an inverse relation between happiness and perceived stress.
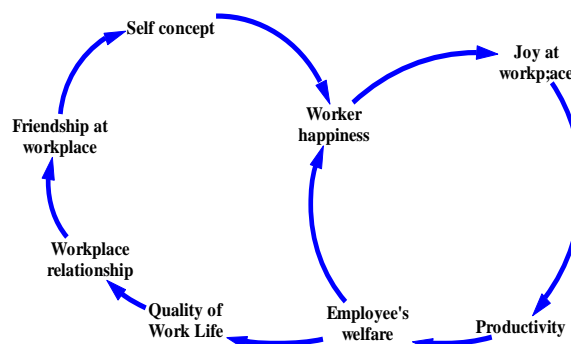

Figure 1. The dynamic hypothesis of the problem (From this research).

5.2. System boundary

The key variables used in this study were gathered from literature, as they are discussed in the body of the article. Using these variables, we were able to identify the exogenous and endogenous variables. These variables are shown in Table 4 under the heading of exogenous and endogenous columns. After identifying all variables from the literature, the final list was presented to the experts on the subject matter for finalization purposes. The model boundary is summarized by listing endogenous and exogenous variables

as customary in SD literature. For the problem under discussion, the model boundary is determined by the variables in Table 4.

Table 4. Endogenous and exogenous variables.

Endogenous	Exogenous	Other variables
Workers' happiness	Hygiene factors	Working environment
Joy at workplace	Friendship at workplace	Communication quality
Productivity		Motivating factors
Employee welfare		Salary
Quality of work life (QWL)		Teamwork
Workforce relationships		Leadership
Friendship at workplace		Health insurance
Stress		Respect
Sense of belonging		
Customer satisfaction		
Subjective well being		
Satisfying economic needs		
Self concept		
Job satisfaction		

5.3. Cause and effect diagram

As Peter Senge (2016) says, "There is no one-sided action". Systematic thinking considers actions with both cause and effect phenomena. By definition, when the impact of variable A on variable B is in the same direction (increasing both or decreasing both), then a positive sign (+) is used. On the other hand, when the impact of variable A on variable B is in the opposite direction (one increasing and the additional decreasing) then a negative sign (-) is used. These principles must be followed to develop the cause-and-effect diagram presented in Figure 2.
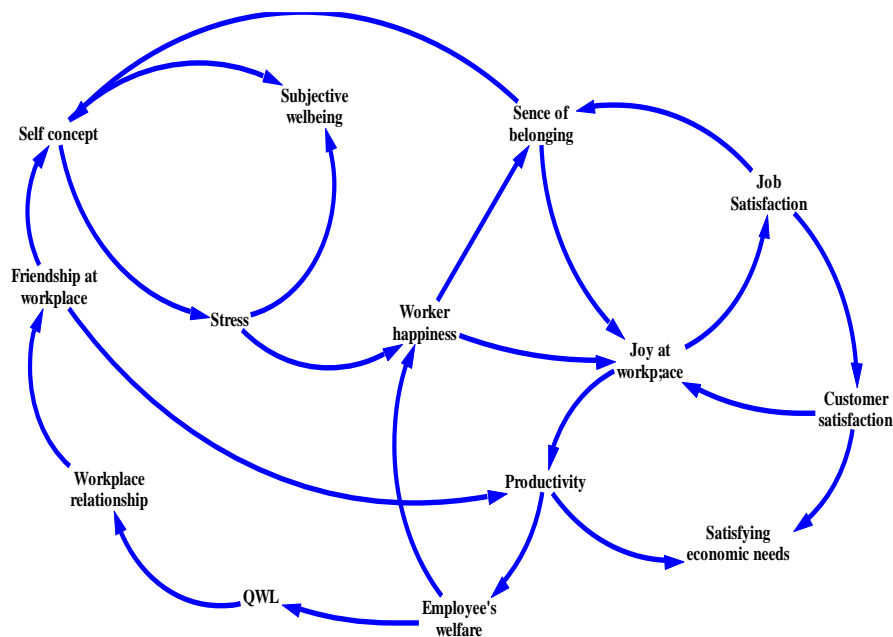

Figure 2. The casual loop for joyful organizations.

Several reinforcing and balancing loops can be recognized in the causal-loop diagram for the joyful organization. The balancing loops control reinforcing loops and guarantee the everlasting work of the system. Most loops of the model are supporting ones. This leads to an inference that happiness and joy in organizations tend to increase everlastingly. Some balancing loops also work next to the reinforcing ones that make limits to growth loops. In the next paragraph, we will introduce a loop that works as limit to growth and will simulate the behavior of joy at the workplace using the loop.

The loops in Figure 2 start from worker happiness that causes joy at the workplace. Productivity is one of the consequences of worker happiness. Improving productivity by growing an organization's profits will increase employees' income and welfare which result in a higher quality of work life. Quality of work life is a result of work-life balance, and improving that helps in improving workplace relationships. Through better relationships in the workplace, employees will have more friends with their coworkers in the organization. As described by Ingram and Zou (2008), more friendship at work leads to decreasing self-concept. A low self-concept harms subjective well-being and worker happiness as a result.

Using Figure 2, we can identify seven loops presented in Table 5 with details and the type of feedback structure discussed.

Table 5. Feedback structures and reinforcing loops.

Loops	Description	Feedback structure
Loop 1	This loop goes through: Job satisfaction-customer satisfaction-Joy at work place-Job satisfaction.	Reinforcing
Loop 2	This loop goes pass the variables of: Job Satisfaction-Sense of belonging-Joy at workplace-Job satisfaction	Reinforcing
Loop 3	This loop is comprised of variables of: Joy at work place-Productivity-Employees welfare-Workers' happiness-Joy at workplace	Reinforcing
Loops 4	This loop is passes through: Sense of belonging-Self Concept-Stress-Worker Happiness-Sense of belonging.	Balancing loop
Loop 5	This loop is comprised of variables of: productivity-Employee's welfare-QWL-Workers Relationship-Friendship at workplace-productivity.	Reinforcing
Loop 6	This loop is identified by variables of: Self Concept-Stress-Worker Happiness-Joy at work place-Job Satisfaction-Sense of belonging-Self Concept.	Reinforcing
Loop 7	This loop is identified as: Joy at workplace-Productivity-Employee's welfare-QWL-Worker Relationship-Friendship at workplace-Self Concept-Stress-Worker happiness-Joy at workplace.	Balancing loop

5.4. Stock-and-flow diagram

After designing the causal-loop diagrams, the basic mechanisms of joyful organization can be mapped by stock-and-flow diagrams. Since these diagrams are more complex, detailed, and informative than causal-loop diagrams, they need more specific thinking about system structure. In addition, the relationships between components of a stock-and-flow are more strictly defined than those in a causal-loop diagram. Consequently, many mistakes will be avoided by these diagrams (Albin and Forrester, 1998). Figure 3 shows the flow diagram of the presented model. The level variable is employees' welfare. To shape a flow diagram, we need rate variables that are not introduced in a causal-loop diagram. Additional variables and parameters are inserted in this model to clarify the computational process. We defined a variable for costs that depends on income too. By the new variable, employees' welfare will be equal to income-costs.
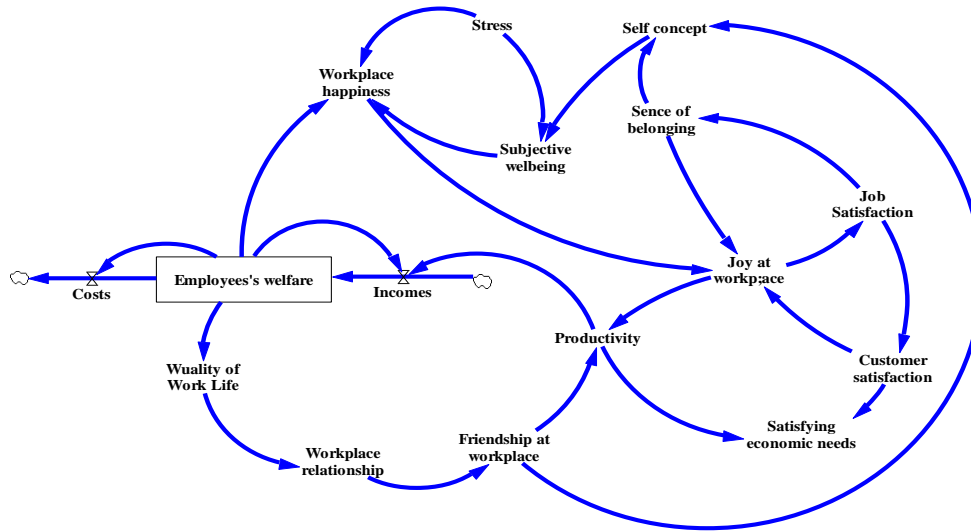
Figure 3. Stock and flow diagram for Joyful organization.

6. Simulating the level of joy at the workplace

We separate the part of the stock-and-flow diagram that contains the loop in Figure 4 to simulate this loop. **Error! Reference source not found.** shows the stock-and-flow model for the described loop. This chart shows the "limits to growth" archetype. Two main loops of this model are reinforcing and a balancing loop. In this model, "joy at the workplace" and "employees' welfare" is level variables that our research's aim is first. For the level of joy at the workplace, we define a rate of joy that is influenced by customer satisfaction, job satisfaction, sense of belonging, and worker happiness. The first three parameters are considered constant variables that we change in different scenarios to examine the results. Other variables of the model are auxiliary ones that help in analyzing the model.
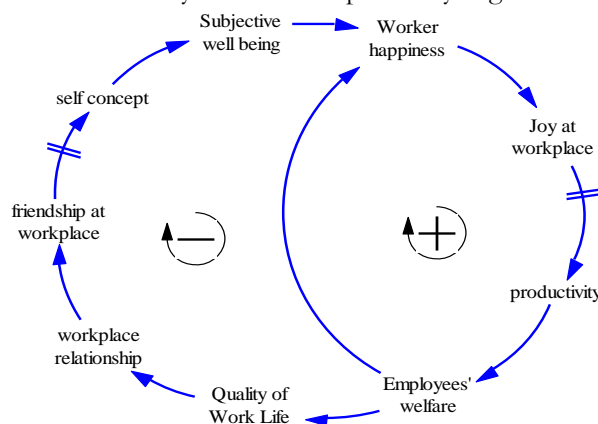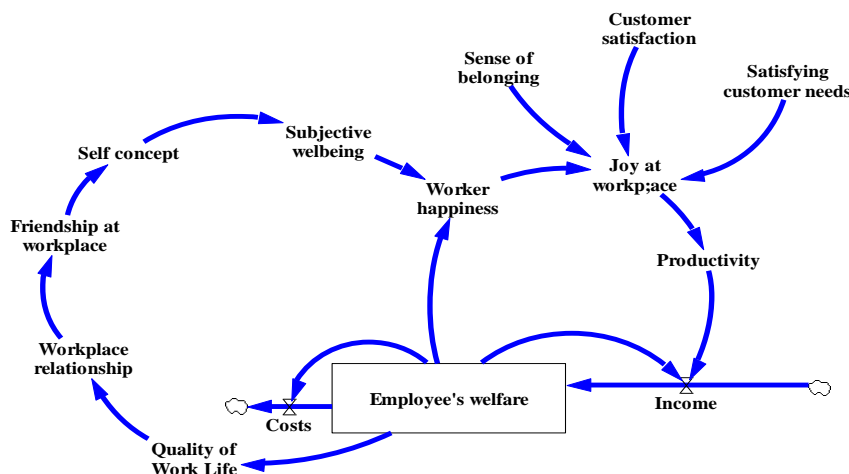

Figure 4. The "limits to growth" archetype loop.

Figure 5. Stock and flow diagram for "limits to growth" loop.

6.1. Dimension consistency test

For the dimension consistency test, we should respond to the question: are all variables in all equations in balance at both sides of the equation? This test was performed for the model, and because all variables are ratios and are unit-less, so we concluded that the equations are balanced.

6.2. Border adequacy test

After extracting key variables, the variables were categorized as endogenous and exogenous factors and presented to experts for consultations. In comparison with the extent of the problem statement, it was determined by the experts that the importance of the border is sufficient enough for model building. Then, all criteria to be studied as problems' variables (i.e., workers' happiness, joy at the workplace, productivity, employee welfare, quality of work life (QWL), workforce relationships, friendship at the workplace, stress, sense of belonging, customer satisfaction, subjective wellbeing, satisfying economic needs, self-concept, and job satisfaction) were considered in the modeling structure. After that, the system of the problem using such variables was built and then simulated.

6.3. Mathematical formulation test

This test is emphasized by Muhammad Aman Ullah and Tiru Arthanari (2011) in their research. In this regard, the researcher should check that the equations correspond to the causal loop diagram; in particular, the '+' and '-' sign in the equations must match the signs in the causal loop diagram. This test is performed at the time of our mathematical formulation of the problem.

7. Sensitivity analysis

The model time boundary is 2010-2020, with a 1-month time step. For modeling in system dynamics, we formulate level variables by differential equations. Equations for other variables (rate and auxiliary) are built upon their relationships with other variables. Since there is no data to determine the coefficients in formulas, we run the sensitivity analysis to find out the amount of change in some variables by adjusting the model's coefficients. Sensitivity analysis is one of the different checking tools for testing the reality of models. It is the process of changing assumptions about the value of constants in the model and examining the output for change in values (Zhao et al., 2008). By this definition, Zhao et al. (2008) presented the following formula for testing the sensitivity of parameter x to variable Q in time t:

$$S_Q = \left| \frac{\Delta Q(t)/Q(t)}{\Delta X(t)/X(t)} \right|$$

Table 6 shows the results of varying the coefficients of job satisfaction, customer satisfaction, worker happiness, and sense of belonging from 0.1 to 0.9 and computing the corresponding quantity for our purpose, joy at the workplace. To simplify the calculations, in sensitivity analysis, we consider one year as a time step and try the model for ten years. The table is sorted by sensitivity from largest to smallest and shows that worker happiness is the most sensitive variable in the model. To determine the coefficients of the model, we use these amounts and normalize them to define the coefficients that are shown in the last column of Table 6. Comparing the sensitivity and coefficients for studied variables in the model, the importance of worker happiness is clarified again. Since the other three variables have minimal impact on Joy, we delete them from the model to develop the scenarios.

Table 6. Sensitivity analyses for variables affect joy at workplace.

Control variable	Joy at 2020 for 0.1	Joy at 2020 for 0.9	Sensitivity	Coefficient
Worker happiness	87.91	6807.61	9.5	0.96
Satisfying economic needs	296.94	59.67	0.1	0.13
Sense of belonging	296.94	59.67	0.1	0.13
Customer satisfaction	296.94	59.67	0.1	0.13

8. Scenario analysis

Four main scenarios are developed to examine the importance of productivity gain sharing on joy within the workplace and productivity trends in the future. To have a better understanding, besides gain sharing, we consider the initial income and cost of employees in our scenarios. The studied systems are:

- Scenario 1: Productivity does not influence employees' income, and income remains table. Initially, costs are a little (10%) more than income.
- Scenario 2: Income is equal to a constant plus a function of productivity. Initially, costs are a little (10%) more than income.
- Scenario 3: Productivity does not influence employees' income and income remains stable. Initially, costs are equal to income.
- Scenario 4: Income is equal to a constant plus a function of productivity. Initially, costs are equal to income.

The simulation results for these scenarios are illustrated in Figure 5. It is obvious that regardless of initial income, when it is a function of productivity (scenarios 2 and 4), joy at the workplace and productivity have ascending behaviors. It means that even if employees' income fails to comply with the costs, they will be happier and more productive in the case that their income depends on productivity. Inversely, in the first and third scenarios, the initial productivity and joy at the workplace will remain constant or decrease in future years. The relation between income and other variables and their final influence on happiness in Figure 4, supports this finding.

In all these scenarios, to define the relationship between friendship and self-concept, we consider an inverse U function. When someone has no friends, the self-concept level is medium. At first, when they start finding friends, their self-concept increases, but having more than a level, results in decreasing self-concept. In addition, we specify that by several friends, finding more friends has no impact on an individual's self-concept. In the current settings, the results indicate that friendship between employees, finally has little effect on joy at the workplace. However, since culture has a specific effect on human behavior, it may be different from real data on other cultures.

9. Discussion and conclusion

Joy and happiness within organizations, despite their importance in organizations' productivity and improvement, have been ignored widely in managerial studies. In this paper, we study this subject with a different approach, system thinking. Through this approach, we identified some influencing factors that affect workplace happiness directly or indirectly. Afterward, using various tools of system dynamics, we provide a schematic model for joyful organizations. The causal diagram shows that the main loops of the model are reinforcing ones. It leads us to the understanding that in ideal situations, happiness has an ever-growing nature. However, friendship is the only variable of the model that makes the loops harmful.

Many loops of the "limits to growth" archetype is detected in the model, that friendship takes part in all the balancing loops of them. However, simulating one of these loops shows the little impact of friendship on joy in the workplace. By these results, we conclude that while its negative effects on happiness is detected in causal diagrams, regarding other influencing factors, friendship will have little effect on workplace happiness. Another important finding of the simulation is the high dependency between productivity gain sharing and happiness at the workplace. This relation is the same for gain sharing and future productivity. Previous research revealed that happier workers are more productive. The current paper shows that if the employees' productivity gains do not share with them, their happiness will not continue a long time. Consequently, the trend of productivity will decrease.

Since the joyful organization concept and modeling it via a system thinking approach is in its primary steps, it may raise many questions. Complementary information about productivity and its relationship with happiness at the workplace and other variables may help in making the system a more real one. Identifying other variables influencing productivity and friendship at the workplace and modeling the whole model helps in better understand the subject. Furthermore, using system thinking, it is possible to develop hypotheses to create and maintain happy organizations.
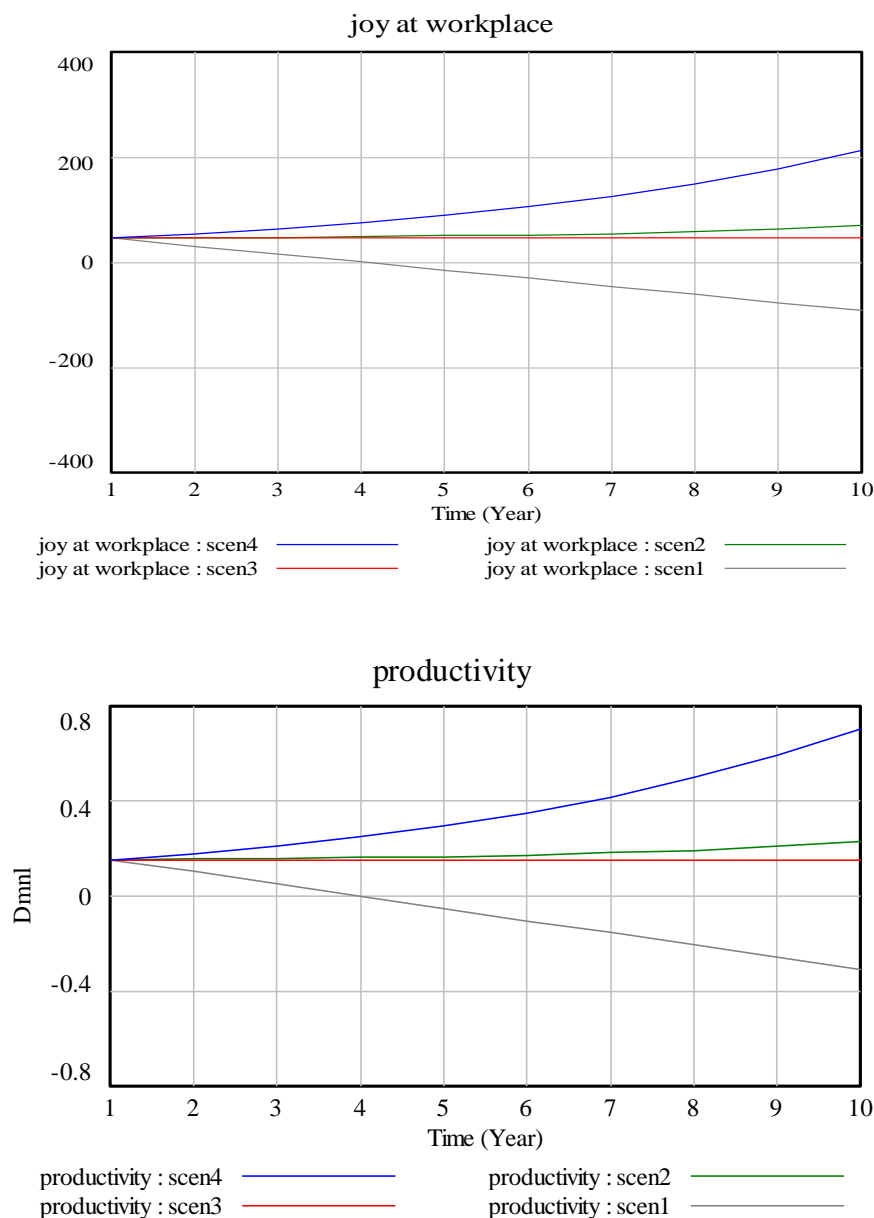

Figure 5. The influence of different scenarios.

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