Proceedings of the 9th Annual World Conference of the
Society for Industrial and Systems Engineering,
2020 SISE Virtual Conference
September 17-18, 2020

A System Approach: Model Development of Employee Engagement Factors Which Impact an Organization's Productivity

S Zahraei and R Pitts Jr.

Morgan State University, Baltimore, MD, USA

Corresponding author's Email: sezah1@morgan.edu

Abstract: In recent years, the global employment market has been subject to a growing body of theories in favor of allocating resources in both an instructive and applicable structure as to meet an increased trend in employee workplace commitment and productivity. Such theories propose that an unhealthy working environment may cause employee disengagement. It is implied that disengagement rates among employees result in lower rates of productivity and profitability. As such, it is of no surprise that this topic is viewed as one of the most controversial matters among accredited companies and organizations.
On closer examination, with the help of the Gallup Employee Engagement Hierarchy pyramid, this paper will break down how distinguished and imperative factors such as workforce engagement, feelings of trust and happiness, and commitment to the workplace environment will bring about improvement, growth, and productivity to a company or organization.
This qualitative description study involves exploring employee engagement strategies that have been used within **Toyota Production Systems** (TPS) to implement programs which have encouraged and contributed towards solving employee engagement issues within the organization.
The conceptual framework of the study will utilize employee-focused design theory. The major purpose of this research is to conduct statistical analysis and evaluate the organizational productivity level, as well as how it is affected by the engagement of employees. More importantly, this research will determine if there is any correlation between engagement and productivity.

Keywords: Healthy Environment Workplace, Employee Engagement and Productivity, Trust and Happiness, Toyota Production System (TPS), Employee-Focused Design Theory, Statistical Analysis of Organizational Productivity, Gamification

1. Introduction

1.1 Lean Research and TPS implementation

The concept of “lean” was introduced in the 1990 (Womack et al.) and first referred to the deployment of a system which led to reduced costs and improved quality and efficiency at a Toyota automotive facility. Since its introduction, many organizations have attempted to replicate elements of the Toyota Production System (TPS) in order to achieve similar results. However, 74% of such companies were unable to make and sustain substantial progress throughout time (Pay, 2008).

TPS draws its inspiration from the traditional Japanese values of Monozukuri—“the process of making or creating” with an emphasis on creative thinking, beyond the mere repetition taught in some traditional schools (Saito et al., 2011)—and Hitozukuri—“education” or “a life-long passion for learning and development” (Saito et al., 1995). While most organizations attempting to optimize lean tools have adopted elements of the Monozukuri aspect of TPS, including standardization (i.e. visual management, standard work), continuous flow, and pull production, such companies have neglected to implement Hitozukuri elements of TPS, possibly explaining the difficulty in sustaining initial progress made through lean implementation over time (Mphanty et al., 2007). Furthermore, because Hitozukuri is the part of the lean system which educates employees on how to apply Monozukuri elements within their respective roles, Hitozukuri is a prerequisite for the implementation of Monozukuri; however, many companies have not properly implemented these elements in the correct sequence during the application of lean (Hines et al., 2004).

It is only through the implementation of Hitozukuri and Monozukuri in the proper order can the foundations be built for implementation of the upper parts of the TPS house, as shown below. For example, companies which have attempted to implement Kaizen, Jidoka, and Just In Time (JIT) before applying standardization have not been successful (Ōno & Mito, 1988).

ISBN: 97819384961-9-6

1.2 Happiness, trust, and training on employee engagement, productivity, and profitability

Happiness is an abstract concept defined by some psychologists as the state of being thrilled or satisfied with life (Fisher, 2010), and is two-fold: the “Health Model” focuses on generating happiness through positive feelings, while the “Disease Model” concentrates on minimizing possible inefficiencies and negative emotions such as dissatisfaction (Wright et al., 2002). An integral component of happiness is happiness at work (Gavin & Mason, 2004), which allows people to maximize performance and achieve full potentials. Enhanced collaboration with colleagues, creativity, goal achievement, learning, and success, accompanied by health, all spring from happiness (Pryce-Jones, 2010). Moreover, healthy and happy employees usually exhibit higher productivity and more quality connections in the long run, as happiness improves quality of the interactions between employees and motivates learning (Salas-Vallina et al., 2017). Most people who are happy in the workplace are also productive and responsible (Gavin & Mason, 2004). Furthermore, there was a strong correlation between greater wellbeing at work and an increase in a business’s profitability (Krekel et al., 2019).

The lack of happiness in the workplace can result from injustices committed by a leader (Fitness, 2000, cited in Rego & Cunha, 2008). Trusting managers and the opportunity for clear and open communication can boost the emotional support employees feel from superiors, resulting in higher well-being (Aycan & Eskin, 2005, cited in Rego & Cunha, 2008). A study by Saunders and Thornhill concluded that organizational justice had a significant impact on the trust of employees (2003). Another determinant of occupational happiness is the perception of having opportunities to learn and evolve. DeConinck (2010) found out that a supervisor's perceived support affects employee’s trust in the supervisor and the whole organization. Based on previous studies on happiness, variables like psychological capital, perceived collaborative justice, supervisor support, income satisfaction, and growth opportunities are considered as the defining factors for occupational happiness, directly and indirectly.

Maginnis (2012) indicated that standardization before implementing problem solving plays a large effect on operational performance and learning of team members. To reach consistency, documented standardized work, a method to identify wastes, and a workforce able to keep up with the standardization are required. Following the standardization, progressive improvement can happen via problem solving to increase the level of consistency. The production system would not be altered without related training and education (Zhu et al., 1994). Training, according to Noe (2017), is defined as "planned efforts to boost up the staff's learning of the job-related necessities". So, a standardized training process is vital to guaranteeing safety and quality.

1.3 Gamification and Operational/Organizational Excellence

Game mechanics are processes that offer players the opportunity to interact with a game world (Sicart, 2009), and gamification describes the application of such game mechanics in non-gaming environments (Deterding, 2012) like the business space. Games involve the recognition of a player and a mission and the player is then engaged in a core engagement loop (Robson, et al., 2016). Features that are included in all games include long term and short term goals; SMART goals which are specific, measurable, achievable, realistic, and timely (Deterding, 2012); a clear relationship between choices and achievements; a status feature which provides users with real-time feedback; and increasing difficulty which offers players the ability to advance through progressively more difficult tasks (Webb, 2013). Modern generation workers' interest in using knowledge, skills, and creativity, and pursuit of freedom, independence and personal potential application at work make gamification particularly important.

Gamification can be utilized to improve employee motivation (Gupta & S., 2017), attract people's attention, cement relationships, and boost creativity, which may in turn lead to increased productivity. The employer would enjoy motivated and efficient workers resulting in good results and profit for the employer and joy, raised income, and promotion for the workers. Gamification is used in recruitment, organizational problem solving, improvement of the corporate culture and maintenance of valuable employees. As opposed to function-based design, which maximizes only efficiency, the human-based design that arises from gamification takes into account human feelings, insecurities (Poth et al., 2017), and desires and optimizes human motivation over pure efficiency. The ability of gamification to account for distinctly human factors such as communication, education, engagement, and teamwork as described in ISO 10018:2012 (ISO, 2012) also allows for the harnessing of human motivation in order to overcome the challenge of achieving untimed outcomes out of people in quality management systems.

Furthermore, gamification is the tool which can facilitate bidirectional communications between employees and employers which would allow for the implementation of operational/organizational excellence methodology, as operational/organizational excellence requires constant employee feedback in order to successfully function. Operational excellence is a methodology used to enhance performance outcomes, especially in dynamic environments where change seems to be the only constant aspect of organizations (Carvalho et al., 2017). In this method, vulnerable, accepting, structured, disciplined, and innovate are the five steps of designing an operational excellence model. Each step in this model progresses toward lean production by minimizing risk, increasing profitability, maximizing business value, and focusing on business growth. The figure below depicts the development of this model.

1.4 Gallup Engagement Hierarchy

After interviewing 10 million employees, the Gallup team formulated a series of 12 questions which could be used to assess employee engagement in the workplace ("*Mountain Sickness"*, 2015). The questions are organized into four levels; from bottom to top: basic needs, individual, teamwork, and growth. These levels must be satisfied in the order of placement on the Gallup engagement hierarchy pyramid in order to most effectively address employee engagement ("*Mountain Sickness"*, 2015).

2. Methodology

This study aimed to develop an employee engagement model that will improve productivity in an organization or production unit by examining the interaction between the employee engagement factors of trust, workplace happiness, training and its subsequent correlation with organization productivity/profitability based on lean system implementation.

For this study, a mixed model research method was applied. Creswell (2009) defined a mixed model method as a mixed methods study which includes the collection or analysis of both quantitative and/or qualitative data in a single study with concurrent or sequential data collection and which involves integration of the data at one or more stages. The mixed model method is useful because it will take advantage of qualitative data that contributes to theory building (Laurent, 2000) and provides a better understanding of complex organizational systems (Deshpande, 1983) while maintaining the rigor of research by transforming the data into quantitative results which can be tested using traditional statistical methods (Srnka & Koeszegi, 2007). Limitations of this method include its high time consumption due to the multiple analysis phases and the difficulty that arises when explaining the transition between qualitative to quantitative data to the audience.

A correlation is the best-fitted regression line if the error of the estimation tends to zero. The coefficient of determination (R^2) parameter was calculated to determine the degree of goodness and accuracy of the proposed correlations. A regression method can be utilized to create empirical equations and predict the response according to experimental data. The dependent variable or response, *y* may be related to k independent or regressor variables as shown in Equation 1.

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + \epsilon \tag{1}$$

Surveys containing twenty-five questions were conducted through the SurveyMonkey Enterprise as part of data collection and were distributed minimum of three hundred participants, the majority of whom were craft employees in various manufacturing industries within the U.S. The questions focused on multiple factors that were hypothesized to change the employee engagement level, with a key question asking employees to rate on a numerical scale summing to 100 the relative importance of trust, happiness at work, training, opportunities to grow and be promoted, and other factors in contributing to employee engagement.

3. Results

This study focused on understanding the interaction between employee engagement factors and its correlation with productivity/profitability based on lean system implementation. This section details a model tested using the independent variable "Engagement Rate" as the best fit for the dependent variable of "Productivity". Not only was the independent variable of employee engagement studied but the specific factors that determine employee engagement such as trust, happiness at work, and training were also examined; a model evaluating the effects of multiple independent factors on employee engagement and the correlation of these factors with productivity was generated.

In order to protect the privacy of the company where the research was done, the company will be called AZ. During this study, a survey on employee engagement at the real entity, company AZ, was completed. Another factor that was assessed was the productivity rate during the period the engagement survey was performed. The collected results were analyzed in Minitab software to identify if there was any correlation between employee engagement and productivity at the surveyed production facility. The p-value for engagement rate tests the null hypothesis that the correlation coefficient is equal to zero (no correlation between engagement and productivity). A low p-value (< 0.05) indicates that the null hypothesis can be rejected. In other words, a predictor that has a low p-value is likely to be a meaningful addition to the model because changes in the predictor's value are related to changes in the response variable.

In the Minitab data output shown in Figure 1, it is shown that the predictor variables of engagement rate are significant because the p-value is 0.000. The normal probability plot shows these regression results graphically. The normal probability

plot is a graphical technique that evaluate whether a data set is approximately normally distributed. As appears in the Figure 2, the data closely follows the normal distribution.

Regression Analysis: Performance versus Engagement Rate

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	1	307.34	307.344	43.17	0.000
Engagement Rate	1	307.34	307.344	43.17	0.000
Error	14	99.67	7.119		
Total	15	407.01			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
2.66818	75.51%	73.76%	70.50%

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	-26.1	14.3	-1.83	0.089	
Engagement Rate	1.687	0.257	6.57	0.000	1.00

Regression Equation

Performance = -26.1 + 1.687 Engagement Rate

Fits and Diagnostics for Unusual Observations

Obs	Performance	Fit	Resid	Std Resid	
2	58.66	64.98	-6.32	-2.47	R
12	70.28	64.98	5.30	2.07	R

R Large residual

Normplot of Residuals for Performance

Residuals vs Fits for Performance

Residual Histogram for Performance

Residuals vs Order for Performance

Figure 1. Regression analysis of engagement rate vs. productivity

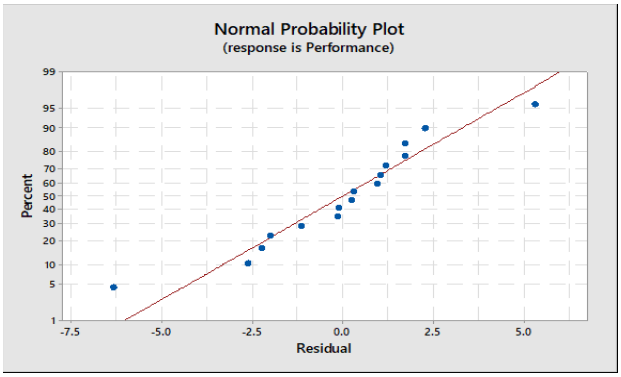

Figure 2. Normal Probability Plot

Equation (2) shows that the coefficient for an engagement rate in performance is 1.687 Engagement Rate. The coefficient indicates that for every additional point in engagement we can expect performance to increase by 1.687.

$$\text{Performance (Y)} = -26.1 + 1.687\ \text{Engagement Rate (X1)} \quad (2)$$

R^2 is a statistical measure of how close the data are to the fitted regression line. It is also known as the coefficient of determination, or the coefficient of multiple determination for multiple regression. The obtained value of 75.51% indicates that the generated model explains most of the variability of response data around its mean as shown in Figure 2. In general, the higher the R^2, the better the model fits the data.

One of the survey questions from participant evaluated the engagement factors of trust in employers, happiness at work, training, opportunity to grow and be promoted, and other factors. Based on 282 responses to the question and as appears in Table 1, trust and happiness were ranked by employees as being the most important factors for employee engagement, followed by the opportunity to grow and be promoted.

ISBN: 97819384961-9-6

Table 1. Survey responses of perceived importance of various employee engagement factors.

Trust	26%
Happiness at work	25%
Training	18%
Opportunity to grow and be promoted	21%
Other factors	10%

Two other questions that are related to trust and happiness at work are that gamification creates trust and increases happiness at work. The survey showed that only 9.22% of participants did not believe that gamification can create trust and only 6.03% of employees believed that gamification does not increase happiness at work. Based on survey results, gamification can be used as a human-focused design aiding in the achievement of Operational Excellence by developing, motivating, and engaging employees and supporting employee engagement factors.

4. Conclusion

Based on the results of this study, it can be concluded that promoting gamification as a means to forge trust in employees of employers and as a means to increase happiness at work is a viable method to increase employee engagement rates; these elevated engagement rates will also increase organization productivity. Survey results indicate that employees will likely be receptive to attempts to increase gamification within the company. It is possible that gamification increases workplace happiness and trust between employees and employers by encouraging friendly competition between employees and by lowering employees' stress levels within work environments. Moreover, due to the high rating of trust by employees as a factor of employee engagement, this suggests that when employees trust an employer, the level of engagement is likely to increase; consequently, productivity at the work unit will increase. Promoting gamification can empower employees by giving real-time feedback of training results, and hence can foster greater trust between employees and employer. Lastly, gamification can provide a communication system by which employees and employers can give each other feedback, setting the stage for further implementation of operational/organizational excellence strategies as a solution for improving workplace productivity.

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