

# Modelling Employees' Suggestion-Making Behavior

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## Abstract

The paper outlines a model of employee participation in suggestion systems that builds on the Theory of Planned Behavior (TPB; Ajzen, 1991). According to the proposed model, employees' suggestion-making behavior is primarily explained by TPB's antecedents. The model was tested by administering a questionnaire to line workers in an automotive plant (Toyota Motor Manufacturing, Kentucky Inc.). Participation rates in the suggestion system were assessed three-months after the main data collection. The model was tested using structural equation modelling (SEM). Overall, the findings supported the proposed model. Structural model A, which included the TPB variables only, accounted for 5% of explained variance in participation in the suggestion system and 46% of explained variance in intention to submit suggestions. Structural model B, which considered the indirect effects of other relevant constructs (proactive personality, organizational trust, perceived rewards, and supervisory support for continuous improvement activities) accounted for 4% of explained variance in participation in the suggestion system, 38% of explained variance in intention to submit suggestions, and 29% of explained variance in attitudes toward submitting suggestions.

**Keywords:** Suggestion systems; Employee involvement; Discretionary Work Behavior; Theory of Planned Behavior; Toyota Manufacturing System.

## Introduction

Organizations that are able to foster employee participation tend to perform better on several performance indexes, such as profitability and perceived quality. Employee participation also plays a critical part in supporting innovation by facilitating the development of new or improved products, services, and processes (Appelbaum, Bailey, Berg, & Kalleberg, 2000; Mumford & Licuanan, 2004). Although the importance of fostering employee participation to support innovation is widely recognized, commentators argued for more empirical research on specific practices that may have a positive impact on workers' participation. Suggestion systems, the focus of several investigations in recent years, are one of the most studied of such practices (Axtell et al., 2000; Buech, Michel, & Sonntag, 2010; Clegg, Unsworth, Olga, & Parker, 2002; Frese, Teng, & Wijnen, 1999; Lipponen, Bardi, & Haapamäki, 2008; Oldham & Cummings, 1996; Rapp & Eklund, 2002; Verworn, 2009).

Previous studies have identified a list of key factors in the process of suggestion-making; however, some researchers have called for a more “theory-driven” approach in the field because mostly *ad hoc* models have been created from eclectic collections of constructs so far (Anderson, De Dreu, & Nijstad, 2004). The present study extends the existing literature by outlining and testing a model of employee participation in suggestion systems. This study differs from previous contributions by taking a “theory-driven” approach: The core of the model derives, in fact, from the Theory of Planned Behavior (TPB; Ajzen, 1991). The indirect effects of constructs derived from previous research have also been considered in the model. The major potential contributions of the present study include the opportunity to test: a) whether TPB can be applied in a novel context to explain suggestion-making behavior; b) whether TPB does better than approaches used in the past to study employee participation in suggestion systems; and c) whether previous findings can be integrated under a unifying theoretical model.

### **Background and Literature Review**

Suggestion systems are formal communication channels that management implements to foster a continuous and regulated exchange of information with employees. Suggestion systems date back to 1898, when Eastman Kodak established the first suggestion system (Robinson & Schroeder, 2004). Over the years, the basic procedure for submitting suggestions has remained largely unchanged. Typically, employees are required to write their suggestions on specially-designed forms and post them in “suggestion boxes.” More recently, suggestions can also be filed electronically (Fairbank, Spangler, & Williams, 2003). The person or the committee in charge of the suggestion system assesses the value of a suggestion according to predefined criteria. Suggestions that meet the criteria are implemented and the employee receives compensation that is normally based on a percentage of the sum that the organization has gained or saved by implementing the employee’s idea.

Suggestion systems serve several important functions: 1) they allow the transformation of employees’ tacit knowledge into explicit knowledge; 2) they facilitate the creation of new routines (innovative suggestions) and the improvement of existing routines (corrective suggestions); 3) they channel “employee voice,” through which employees can express concerns and grievances to management; and 4) they promote participation and involvement, raising workforce morale and productivity (Buech et al., 2010; Fuller, Helbling, & Cooley, 2002). Well-implemented suggestion systems can have a significant impact on the organizational bottom line. Successful suggestion programs can provide an estimated €6,022 benefit in cost savings per implemented idea (Buech et al., 2010). Many commentators consider the suggestion system in place at the car manufacturer Toyota as the most successful example. On average, employees at Toyota submit 1.5 million suggestions company-wide each year, generating \$300 million in annual savings (Robinson & Schroeder, 2004).

Recent empirical research offered valuable insights on factors that influence employees’ suggestion-making behavior. Buech et al. (2010) identified three main research streams: The first stream focuses on variables that relates to the *characteristics of the work environment*; the second stream on specific *characteristics of the suggestion system*; the third stream on *characteristics of the individual* that may affect idea generation or implementation. Despite the interesting findings, some shortcomings can be highlighted. From a theoretical perspective, previous research--with the exception of Lipponen et al., 2008, and Buech et al., 2010--has generally adopted an “eclectic approach” (Axtell et al., 2000, p. 267), namely the relationships

among different constructs have been explored in the absence of a comprehensive theoretical framework. However, the mere crunching of data obtained from a list of variables cannot be considered a significant theoretical contribution (Sutton & Staw, 1995). These *ad hoc* models are also problematic because they can hinder the ability to compare different employee involvement practices in search of commonalities. For instance, it is not clear how Frese et al.'s (1999) three "process" parameters and Axtell et al.'s (2000) two phases in suggestion-making can be compared with each other or be applied to other involvement practices, such as participation in quality circles. Given these concerns, scholars have called for a more "theory-driven" approach in the field of innovation studies (Anderson et al., 2004).

From a methodological perspective, previous studies have adopted cross-sectional research designs. Cross-sectional studies do not provide enough evidence for the causal relations implied by the proposed models. It is also important to point out that participation in suggestion systems has been operationalised in past research using either archival data or self-reported measures of past performance. Past behavior can be a predictor of future behavior; however, commentators have called for additional longitudinal studies, which are more appropriate to support causal or predictive claims (Anderson et al., 2004).

The aim of the present study is to address both these theoretical and methodological limitations. Firstly, this investigation is theory-driven: it outlines and tests a model of suggestion-making (Figure 1) that is grounded in the TPB (Ajzen, 1991). TPB applies to any specific human behavior under volitional control. It has been successfully applied in several fields, such as health psychology, sports, and marketing, generating an extensive literature (Armitage & Conner, 2001). Secondly, instead of merely explaining past behavior, the proposed model has been tested to predict future participation in suggestion systems. Therefore, from a methodological standpoint, this study moves from the traditional cross-sectional design and includes an element of longitudinal data.

### **A Model of Employees' Suggestion Making Behavior: Theory Development**

The goal of the proposed model is to explain and predict employee participation in suggestion systems. Instead of defining arbitrary subdivisions in the processes of suggestion-making, the basic idea of the model stems from the consideration that suggestion-making behavior shares a fundamental characteristic with employees' other extra-role behaviors. Submitting suggestions is, in fact, one of the possible change-oriented discretionary behaviors (Morrison & Phelps, 1999).

TPB considers five constructs: behavior, behavioral intentions, attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991). According to TPB, the likelihood of the occurrence of a specific behavior under volitional control is positively related to the strength of an individual's *intention* to perform such behavior. In the present study, submitting suggestions is a function of an employee's intention to do so.

*Hypothesis 1: The likelihood that an employee submits suggestions is a function of the strength of the employee's intention to submit suggestions.*

Intention to perform a specific behavior is a function of three constructs: attitudes, subjective norms, and perceived behavioral control. *Attitudes* are defined as an individual's

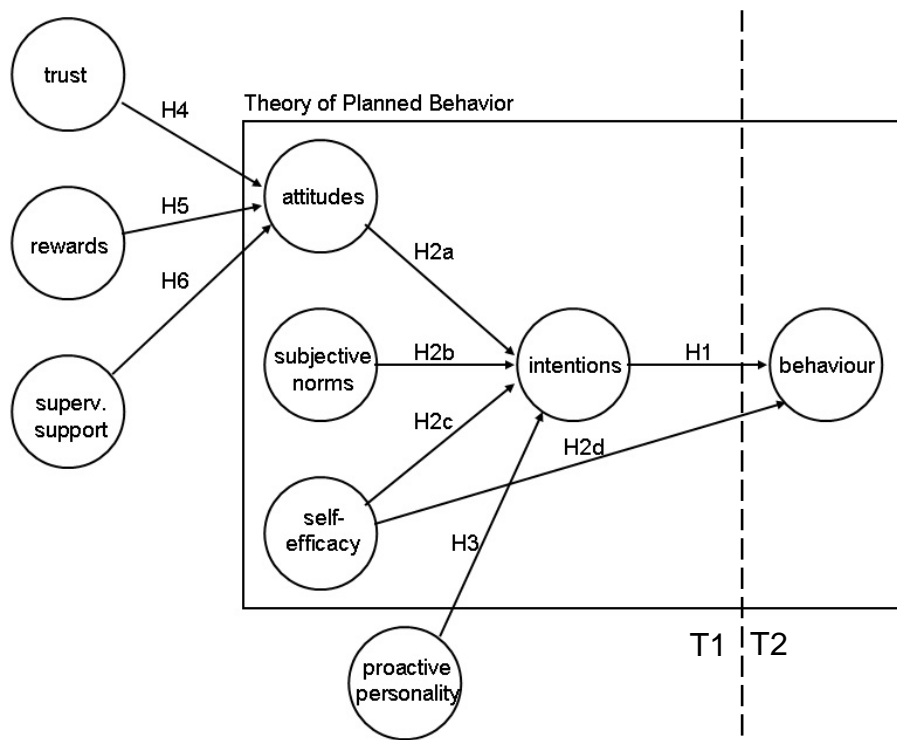
overall evaluation regarding action. The more an employee feels that submitting suggestions is important, useful and rewarding, the more likely he or she will actually do so (Ajzen, 1991).

*Hypothesis 2a: The strength of an employee's intention to submit suggestions is a function of the employee's attitudes toward submitting suggestions.*

**Subjective norms** refer to an individual's perceived pressure to perform a specific behavior. If an employee perceives that his or her peers (e.g., members of the same team) support his or her suggestion-making behavior, then he or she will more likely submit suggestions (Ajzen, 1991).

*Hypothesis 2b: The strength of an employee's intention to submit suggestions is a function of the employee's subjective norms regarding submitting suggestions.*

Figure 1. A model of employees' suggestion-making behavior



**Perceived behavioral control (PBC)** is the third antecedent of intention and refers to the individual's perceived control over the target behavior (Ajzen, 1991). PBC shares some similarities with Bandura's (1997) concept of self-efficacy, which encompasses an individual's perceived ability to perform a specific task. The relationship between PBC and self-identity has long been debated. PBC includes not only the individual's perceived control over his or her internal resources or abilities, but also his or her perceived control over possible external constraints in the environment. Self-efficacy only covers the internal aspects of PBC. Recent

meta-analysis has found PBC's "internal component" to be a strong predictor of intention and behavior, while its "external component" was weak in this regard (Armitage & Conner, 2001). Therefore, Bandura's (1997) concept of self-efficacy was used in the present study.

*Hypothesis 2c: The strength of an employee's intention to submit suggestions is a function of the employee's self-efficacy in submitting suggestions.*

PBC can also predict behavior together with intentions under certain conditions, such as when an individual's perceptions of control accurately reflect his or her skills or resources. Similarly, self-efficacy has been found to be positively related with actual behavior (Stajkovic & Luthans, 1998).

*Hypothesis 2d: The likelihood that an employee submits suggestions is a function of the employee's self-efficacy in submitting suggestions.*

**Expanding the TPB model.** TPB is a complete theory of behavior under volitional control (Ajzen, 1991). Therefore, the previous set of hypotheses is expected to be sufficient to explain and predict suggestion-making behavior. At the same time, it is also relevant to assess the possible indirect effects of other factors that have been identified in the literature on suggestion systems. It is beyond the reach of this study to consider every single variable in the literature—extensions of the model are left for future investigations. The present research is limited to a selection of constructs, which have shown a statistically significant impact on suggestion-making behavior in past studies. To have a comprehensive selection of predictors, variables from different levels of analysis were selected. The final model includes four variables that refer to previous research streams (similar to Buech et al., 2010) on suggestion systems: proactive personality (characteristics of the individual); trust and supervisory support (characteristics of the work environment); and rewards (specific characteristics of the suggestion system).

It is important to highlight a significant difference between past and current research on suggestion-making behavior. Previous research assumed that these other factors (proactive personality, trust, rewards, and supervisory support) had a direct impact on behavior, whereas in the present study the influence of these factors on behavior is expected to be mediated by TPB constructs. This integration is also intended to provide evidence of the organizing power (ability to organize existing knowledge) of the proposed model.

**Proactive personality.** Both Oldham and Cummings (1996) and Frese et al. (1999) have included in their studies personality level variables: the former considered "creative personality" and the latter "personal initiative at work." Instead of using Frese et al.'s (1999) original "personal initiative at work," a similar trait named "proactive personality" (Crant, 2000) was used in the present study. "Proactive personality" refers to a person's tendency to scan the environment for opportunities, to show initiative, and to take action. This personality trait has been correlated with outcomes such as job performance, career success, leadership effectiveness, membership in voluntary continuous improvement groups, and team performance (Crant, 2000). Past studies have included personality traits in TPB as predictors of behavioral intention (Conner & Abraham, 2001). A similar relationship is hypothesised in the present study: proactive

employees are expected to have a stronger intention to participate in the suggestion system because of their tendency to improve the environment around them.

*Hypothesis 3: Intention to submit suggestions mediate the relationship between an employee's degree of proactivity and his or her suggestion-making behavior.*

**Trust.** Clegg et al. (2002) considered two types of trust: “trust that heard” (an expectation that the organization will take a suggestion into serious consideration) and “trust that benefit” (an expectation that the organization will fairly compensate suggestions—this aspect will be discussed in the next section on rewards). Instead of the more specific “trust that heard,” a more traditional conceptualization of “interpersonal trust” has been employed to assess employees’ trust toward management (Cook & Wall, 1980). Studies have found that trust impacts the degree of communication openness between management and employees (Dirks & Ferrin, 2001). It is here hypothesised that attitudes toward submitting suggestions and intention to submit suggestions mediate the relationship between trust and actual behavior.

*Hypothesis 4: Attitudes toward submitting suggestions and intentions to submit suggestions mediate the relationship between an employee's trust toward management and his or her suggestion-making behavior.*

**Rewards.** Rewards and incentives can be strategically used to elicit employees’ discretionary effort (Coyle-Shapiro, 2002; Hackman & Wageman, 1995). In the case of suggestion systems, research has shown that rewards can reinforce employee participation (Arthur & Huntley, 2005; Schuring & Luijten, 2001). Clegg et al.’s (2002) study on “trust that benefit” also emphasized the positive role of fairness in the compensation of suggestions. In the same manner, it is here assumed that if employees perceive that their discretionary effort to submit suggestions is not adequately recognized, they will more likely refrain from submitting suggestions. Considering that the notion of attitudes also addresses the degree to which an individual perceives an action as being rewarding (Ajzen, 1991), it is hypothesised that attitudes toward submitting suggestions and intention to submit suggestions mediate the relationship between rewards and actual behavior.

*Hypothesis 5: Attitudes toward submitting suggestions and intention to submit suggestions mediate the relationship between an employee's perceived fairness of the rewards of the suggestion system and his or her suggestion-making behavior.*

**Supervisory/management support.** Previous research pointed out the crucial role of management and supervisory support in fostering employee participation in suggestion systems (Axtell et al., 2000; Frese et al., 1999; Rapp & Eklund, 2002). It is here expected that employees will more likely submit suggestions if they perceive that managers and supervisors encourage the continuous improvement of work routines. In particular, attitudes toward submitting suggestions and intention to submit suggestions mediate the relationship between supervisory support for continuous improvement activities and actual behavior.

*Hypothesis 6: Attitudes toward submitting suggestions and intention to submit suggestions mediate the relationship between an employee's perceived*

*supervisory support for continuous improvement activities and his or her suggestion-making behavior.*

### **Research Design and Procedures**

**Research site.** The Toyota Motor Manufacturing, Kentucky Inc.'s (TMMK) plant in Georgetown, KY was the chosen research site. Established in 1989, the plant employs over 7,000 people and has the capacity to produce 500,000 vehicles and engines annually.

**Research design.** The study follows a *single-time-point observational research design with follow-up*. A questionnaire was first administered to participants (T1 in Figure 1). Three months *after* the administration of the questionnaire, archival data were retrieved to assess whether behavioral intention translated into actual behavior (*follow-up*; T2 in Figure 1).

**Research procedures.** A survey package containing a consent form, a four-page questionnaire, and a self-addressed, pre-stamped return envelope was mailed to the entire population of TMMK's line workers ( $N = \text{approx. } 5,500$ ). Two versions of the questionnaire with the same items but in different positions were prepared to control for response-order effect. Employees randomly received one of the two versions. A drawing, with a chance to win one of five \$100 cash prizes, was used as financial incentive. Participants were asked to read the consent form, sign the form, fill in the attached questionnaire, and return all materials to the research team within two weeks. Participants were also required to provide their TMMK identification number and to authorize the research team to access archival data regarding their past and future participation in TMMK's suggestion system.

**Respondents, response rate, and final sample.** A total of 503 employees returned the questionnaire, which translated into a response rate of approximately 9.1%. In absolute terms, the total number of respondents is relatively large in comparison to the samples used in previous research on suggestion-making behavior. However, a 9.1% response rate may be problematic because of a possible selection bias. Listwise deletion of entries with one or more missing variables resulted in  $N = 446$  (79.3% of the respondents). To check for possible differences between the entries that were dropped and the entries that were used in the final sample, a series of *t*-tests were run. Both control and study variables were analyzed. The analysis showed a significant difference only in terms of ethnic composition, with the final sample including more Caucasians ( $M = .92$  vs.  $M = .80$ ),  $t(501) = 2.99$ ,  $p < .01$ . Ethnicity was recoded as 1 = Caucasian and 0 = other ethnicities. The average age of the respondents fell in the 40 to 44-year range (composite average: 43.8 years,  $SD = 7$ ). 76.2% of the respondents were males. The ethnic composition of the sample consisted of 92.8% Caucasians, 5.8% African-Americans, 0.7% Native Americans, 0.2% Latinos, and 0.4% other/mixed ethnicity. The average number of years of employment at TMMK was 11.9 years ( $SD = 3.4$ ). 21.7% of the respondents held a four-year college degree, 16% a junior or community college degree, 23.3% a vocational school degree, 31.4% a high school degree, and 7.7% an unspecified degree. Follow-up analyses were conducted to compare the characteristics of the sample to the characteristics of the entire population at TMMK. In comparison to the entire population, participants in the final sample were significantly older ( $Z_{\text{Significance test for means (Gauss test)}} = 11.46$ ,  $p < .001$ ). Caucasians were also significantly more represented in the final sample ( $Z_{\text{Significance test for proportions}} = 3.37$ ,  $p < .001$ ). In

terms of participation rates, it was not possible to verify a selection bias in the final sample. A cumulative 5.8% of participants in the sample submitted at least one suggestion during the three months before the data collection. As for the entire population, TMMK provided only an average participation rate for each month (2%). Therefore, the cumulative participation rate for the entire population during the three month period before the data collection, can only be estimated between 2% (same participants every month) and 6% (different participants every month). A possible “Hawthorne effect” was taken into account. A comparison of the participation rates three months before and after the data collection showed an actual decrease: 5.4% (before) vs. 4.7% (after).

**Measures.** Study variables were measured with the following scales. The *intention to submit suggestions* three-item scale was based on Ajzen (1991;  $\alpha=.99$ ). *Attitudes toward submitting suggestions* was operationalised with a five-item scale based on Ajzen (1991;  $\alpha=.90$ ). *Subjective norms* were measured with a scale developed by Armitage and Conner (1999), which originally included four items ( $\alpha=.72$ ). A four-item scale adapted from Midgley et al. (2000) was used to measure self-efficacy ( $\alpha=.78$ ). The five highest-loading items of the original scale by Bateman and Crant (1993) were used for proactive personality ( $\alpha=.78$ ). Four of the highest-loading items of the *organizational trust* scale developed by Cook and Wall (1980) were included in the questionnaire ( $\alpha=.90$ ). A three-item *satisfaction with rewards for submitting suggestions* scale was adapted from the “pay satisfaction” and “contingent reward” subscales of Spector’s (1997) “Job Satisfaction Survey” ( $\alpha=.82$ ). A six-item scale developed by Coyle-Shapiro (2002) was used to measure *supervisory support for continuous improvement activities* ( $\alpha=.94$ ). Socio-demographic information (age, ethnicity, education, and number of years of employment at TMMK) was collected at the end of the questionnaire.

**Target behavior: Submitting suggestions.** In the follow-up phase, data for participation in the suggestion system were retrieved by consulting the company’s records three months after the administration of the questionnaire. Archival data were available only for “approved suggestions,” namely employees’ recommendations that were recognized as being worth implementation by TMMK. The raw number of suggestions that was approved 3 months after the main data collection was recoded into a dichotomous variable. If an employee had at least one suggestion approved over the three month period after completing the questionnaire, the variable was recoded with value 1; otherwise the variable was recoded with value 0. The recoded variables were used in the final analysis. Each scale used in the study was factor analyzed to check for unidimensionality and Harman’s One-factor Test was conducted to check for common method bias. No anomaly was found. A full correlation table including all study and control variables is reported in Table 1.

## Analysis

The model was tested using structural equation modelling (SEM). The goal was to verify whether TPB can be applied to explain suggestion-making behavior (hypotheses 1 to 2d) as well as whether the TPB variables mediate the relationship between behavior, on one hand, and rewards, organizational trust, and supervisory support on the other hand (hypotheses 3 to 6). Maximum likelihood was used as the method of estimation. The following variables were used as control variables: gender, age, years of employment at TMMK, education (recoded as 1 =



college degree and 0 = other degrees), ethnicity (recoded as 1 = Caucasian and 0 = other ethnicities). Questionnaire version was used to check for response-order effect. When testing the validity of TPB only, the estimated model included direct paths from the control variables to intention and behavior. When testing for the validity of the entire model, the estimated model also included a direct path from the control variables to attitudes.

**Normality Checks, Power, and Estimation Procedure.** Continuous variables were assessed for normality. No anomalies were found. Sample sizes of the tested models suggested sufficient statistical power to support analyses at  $\pi = .80$  (McQuitty, 2004). The analyses were run according the following procedure. An initial model was computed by entering all exogenous, endogenous, and control variables into a structural model according to the hypothesized structure (initial model). Any variable that did not demonstrate a significant path was then dropped, beginning from the most proximal to the exogenous variable to the most distal. To improve overall model fit (final model), measurement and residual errors were allowed to be correlated, but only if they did not modify the results of the structural model. To assess mediation, it was verified whether a previously significant relation between two variables approached zero, once controlling for a third variable (Baron & Kenny, 1986).

Table 1. Correlation table.

Variables	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Age <sup>a</sup>	43.80	7.00														
2. Gender <sup>b</sup>	.76	.43	.02													
3. Education <sup>c</sup>	.22	.41	-.18	.13 <sup>†</sup>												
4. Ethnicity <sup>d</sup>	.92	.27	.09	.02	.03											
5. Years of employment	11.09	3.41	.40 <sup>‡</sup>	-.02	-.01	.01										
6. Questionnaire version	.54	.50	.04	-.11 <sup>†</sup>	-.25	.06	-.04									
7. Target behaviour (submitting suggestions)	.05	.21	-.06	.05	.04	.02	-.02	-.07								
8. Intentions	3.00	1.95	-.14 <sup>‡</sup>	.00	.01	-.02	-.24 <sup>‡</sup>	-.14**	.23**							
9. Attitudes	4.08	1.45	-.11 <sup>†</sup>	-.05	.00	-.10 <sup>†</sup>	-.22 <sup>‡</sup>	-.12**	.17**	.63**						
10. Subjective norms	2.36	1.22	-.11 <sup>†</sup>	-.03	-.04	-.06	-.20 <sup>‡</sup>	-.19**	.08*	.50**	.42**					
11. Self-efficacy	3.44	1.17	-.13 <sup>‡</sup>	.03	.04	-.05	.05	-.05	.10*	.14**	.10*	.07				
12. Proactive personality	5.04	.96	-.07	.00	.03	-.03	-.04	-.14**	.08*	.33**	.21**	.24**	.10*			
13. Organizational trust	3.23	1.57	-.05	-.05	-.06	-.10 <sup>†</sup>	-.19 <sup>‡</sup>	-.04	.08	.29**	.49**	.25**	.03	.19**		
14. Rewards	2.79	1.43	-.06	-.17 <sup>‡</sup>	-.07	-.09	-.15 <sup>‡</sup>	.01	.08	.33**	.52**	.34**	-.02	.01	.41**	
15. Supervisory support	4.50	1.57	-.07	-.08	.01	.01	-.08	-.03	.10*	.21**	.35**	.21**	.02	.14**	.47**	.28**

<sup>†</sup>  $p < .05$ ; <sup>‡</sup>  $p < .01$ . N = 446. Note: Two-tailed Pearson's correlations.

\* $p < .05$ ; \*\* $p < .01$ . N = 446. Note: One-tailed Pearson's correlations.

<sup>a</sup> Compound mean.

<sup>b</sup> 1 = male, 0 = female.

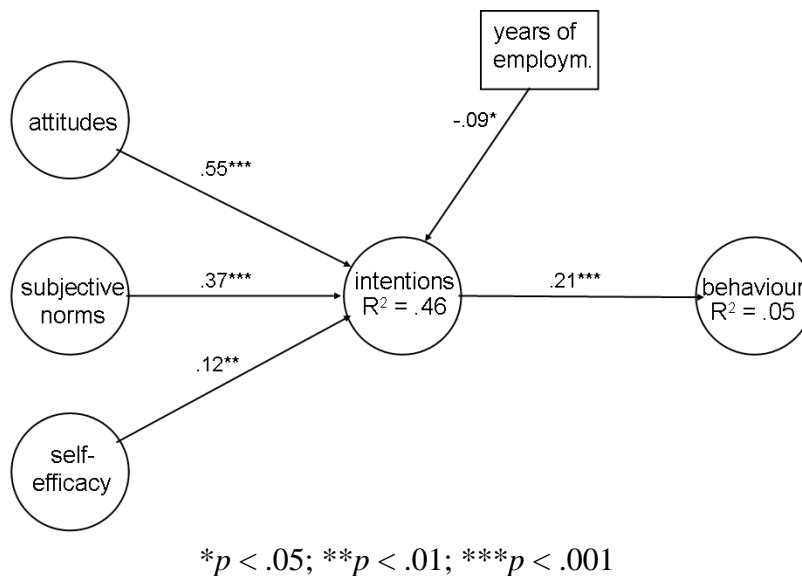
<sup>c</sup> 1 = college degree, 0 = other degrees.

<sup>d</sup> 1 = Caucasian, 0 = other ethnicities.

## Results

**Model A (TPB only).** According to hypotheses 1 to 2d, suggestion-making behavior is predicted by the TPB. Initial model A was estimated using behavior as an exogenous variable; intention, attitudes, norms, and self-efficacy as endogenous variables; and gender, age, years of employment at TMMK, education, ethnicity, and questionnaire version as controls. Overall, the initial model fit was adequate,  $\chi^2(220, N = 446) = 720.24, p < .001, CFI = .91, RMSEA = .07$  (Hu & Bentler, 1999). Hypothesis H2d (self-efficacy- behavior) was not supported ( $\beta = .04, n.s.$ ). Of the control variables, none was related to behavior, and only “years of employment” was found significantly related to intention ( $\beta = -.08, p < .05$ ). The final model A fit (Figure 3) was adequate,  $\chi^2(122, N = 446) = 461.28, p < .001, CFI = .94, RMSEA = .08$ . The following hypotheses were supported: H1 (intention-behavior;  $\beta = -.21, p < .001$ ), H2a (intention-attitudes;  $\beta = .55, p < .001$ ), H2b (intention-norms;  $\beta = .37, p < .001$ ), H2c (intention-self-efficacy;  $\beta = .12, p < .01$ ). In terms of percent variance accounted for ( $R^2$ ), the model predicted 46% of the variance in intention and 5% of the variance in behavior. Figure 2 presents final structural model A and its standardized regression weights.

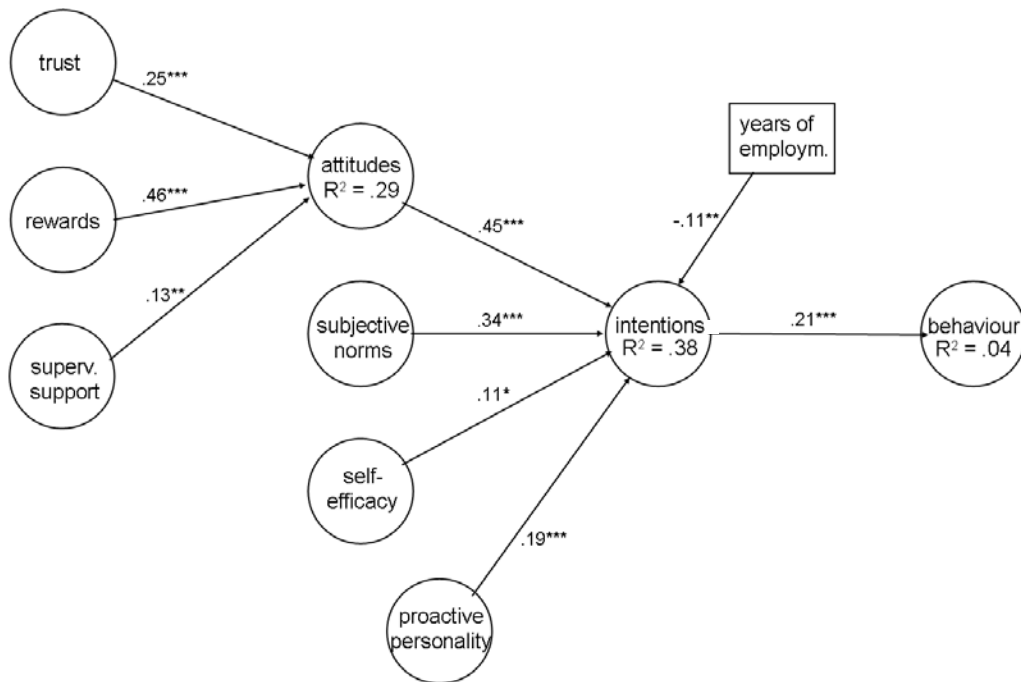
Figure 2. Final model A (TPB only): Standardized path coefficients.



**Model B (full model).** Initial model B was estimated using behavior as an exogenous variable; intention, attitudes, norms, self-efficacy, proactivity, trust, rewards, and supervisory support as endogenous variables; and gender, age, years of employment at TMMK, education, ethnicity, and questionnaire version as controls for behavior, intention and attitudes. To check for mediation, direct paths from proactivity to behavior and intention were included (H3), as well as direct paths from trust (H4), rewards (H5), and supervisory support (H6) to attitudes, intention, and behavior. The initial model fit was fair,  $\chi^2(748, N = 446) = 2019.52, p < .001, CFI = .89, RMSEA = .06$ . Of the control variables, none was related to behavior and attitudes, and only “years of employment” was found to be significantly related to intention ( $\beta = -.12, p < .01$ ). The direct path from proactivity to behavior was found not significant ( $\beta = -.00, n.s.$ ). The path from proactivity to intention was found significant ( $\beta = .19, p < .001$ ). The direct path from trust to

attitudes was found significant ( $\beta = .25, p < .001.$ ), but the path from trust to intention ( $\beta = -.05, n.s.$ ) and the path from trust to behavior ( $\beta = -.02, n.s.$ ) were found not significant. Similarly, the direct path from rewards to attitudes was found significant ( $\beta = .45, p < .001.$ ), but the path from rewards to intention ( $\beta = -.02, n.s.$ ) and the path from rewards to behavior ( $\beta = -.02, n.s.$ ) were found not significant. The same pattern worked with supervisory support. The direct path from supervisory support to attitudes was found significant ( $\beta = .14, p < .01.$ ), but the direct paths from supervisory support to intention ( $\beta = -.02, n.s.$ ) and to behavior ( $\beta = .06, n.s.$ ) were found not significant. The results provided support to hypotheses H3, H4, H5 and H6. The final model fit was adequate,  $\chi^2(580, N = 446) = 1671.49, p < .001, CFI = .90, RMSEA = .07.$  Overall, the model predicted 29% of the variance in attitudes, 38% of the variance in intention and 4% of the variance in behavior. Figure 3 reports final structural model B and the standardized regression weights.

Figure 3. Final model B (full model): Standardized path coefficients.



\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

### Conclusions

The present study was designed to test a model of employees' suggestion-making behavior. In model A (Figure 2), the direct antecedents of suggestion-making behavior was examined using the TPB (Ajzen, 1991). In model B (Figure 3), the indirect effects of other constructs were assessed. The results of the analysis of model A indicated that TPB can only be used to explain and to predict employee participation in suggestion systems. As expected, intention to submit suggestions predicted actual participation in the suggestion system. Although the percent of variance accounted for was slim ( $R^2 = .05$ ; final model A), it should be reminded

that the model was put to a very narrow test. In fact, “approved suggestions” was used as exogenous variable, namely employees’ recommendations that were recognized as being worth implementation. Attitudes, perceived norms, and self-efficacy explained a more substantial percent of variance in intention to submit suggestions ( $R^2 = .46$ ).

Model B provided evidence to support the idea that TPB offers a good theoretical framework that can integrate previous contributions on suggestion-making behavior. It was beyond of the scope of this study to take into consideration each variable used in past research. The present exploration was limited to four constructs: proactive personality, perceived adequacy of the rewards, trust toward management, and supervisory support for continuous improvement activities. While these four constructs were previously assumed to have a direct effect on employees’ behavior, it has been shown here that TPB variables mediate the effects of these constructs on suggestion-making behavior. As hypothesized, the effect of proactive personality on behavior was fully mediated by intention. Similarly, the effects of supervisory support, organizational trust, and perceived rewards on behavior were mediated by attitudes.

**Limitations, unexpected findings, and managerial implications.** Several limitations need to be addressed in future research. First, the response rate was quite low (9.1%). One of the possible reasons of such low return rate was that participants were required to provide identification information to assess the predictive power of the model by connecting data at different points in time. This requirement may have been perceived by employees as a way to collect personal opinions on management’s behalf. Second, data were collected in one company (Toyota) and in one country (United States). Future research is needed to test for cross-national generalizability and cultural differences, as Rank, Pace, and Frese (2004), and Fay and Sonnentag (2010) have recommended in their reviews of discretionary behaviours in organizations. Third, other industries should also be considered for wider hypothesis contrasts. Fourth, it was not possible to verify a possible selection bias, because the monthly participation rate for the entire population was not comparable with the available three-month participation rate of the sample. Therefore, the risk that the final sample may have overrepresented employees who are more active in the suggestion system cannot be ruled out. More effective checks for selection bias should be implemented in future research.

The percentage accounted for by the present model was also slim ( $R^2 = .05$ ; final model A). However, as Buech et al. (2010) have shown, if we consider an average €6,000 benefit for an implemented suggestion, even a small increase in participation rate and accepted suggestions translates into considerable savings especially in large companies. The use of “approved suggestions” as an exogenous variable was nonetheless problematic. It is expected that more variance can be accounted for in future research that will use the mere “number of suggestions” as an outcome variable. The difference between “suggestions” and “approved suggestions” is an important topic where more research is needed. During some informal interviews, some participants reported that the procedure for evaluating employees’ recommendations changed at TMMK a couple of years earlier. Because of this change, many employees complained that fewer recommendations are now implemented and consequently rewarded. This may explain the major unexpected finding of the present research, namely that years of employment at TMMK contributed in a negative manner in explaining intention to submit suggestions ( $\beta = -.09, p < .05$ ). It is generally taken for granted that suggestions are evaluated in a fair and rational manner. Nonetheless, this is a major management-biased assumption (Deetz, 2001) and this case shows instead that management and employees may actually have conflicting perceptions on what

constitutes “a suggestion.” Future research should provide insights on the decision-making process involved in the selection of employees’ recommendations that are worth implementation by management.

**Managerial implications.** The results of the present research contributed to improve our theoretical understanding of employees’ participation in suggestion systems by addressing some of the major limitations of past research on this topic. This study also has relevant implications for managers and practitioners that seek to design interventions to improve suggestion systems in their companies. First, an increase in the overall attitudes toward submitting suggestions appears to be the most effective way to stimulate employee participation. Therefore, it is pivotal to increase employees’ positive attitudes toward the suggestion system by emphasizing the benefits that suggestion systems can bring to both employees and organizations using, for instance, “staff magazines, notices or management speeches” (Buech et al., 2010, p. 519).

Second, our findings suggest that participation increases a) when an employee perceives his or her team members’ support and b) when an employee feels that he or she has mastered the required procedure to submit suggestions. Based on those findings, organizations can implement mentoring programs, where more experienced team members can teach less experienced members how to successfully submit suggestions.

Third, employees’ personal initiative also appears to play a role in predicting employees’ suggestion-making behavior. Therefore, Human Resources should include some type of assessment in that sense in the selection process of the workforce.

Fourth, in line with Arthur and Huntley (2005), and Buech et al. (2010), our findings suggest that the reward system associated with the suggestion system has a major role in shaping employees’ attitudes toward submitting suggestions. Therefore, it is crucial that organizations make a great effort in designing an effective reward system that can provide an adequate and fair stimulus to support workers’ discretionary effort. Employees must clearly perceive that their extra effort is fairly compensated by their companies.

By offering useful information to pinpoint the strengths and weaknesses of a suggestion system, it is hoped that the model that has been here outlined will both support organizations in enhancing their suggestion schemes and provide a relevant contribution in making workplaces more open to employees’ opinions and ideas.

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English Abstract

# Modelling Employees' Suggestion-Making Behavior

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## Abstract

The paper outlines a model of employee participation in suggestion systems that builds on the Theory of Planned Behavior (TPB; Ajzen, 1991). According to the proposed model, employees' suggestion-making behavior is primarily explained by TPB's antecedents. The model was tested by administering a questionnaire to line workers in an automotive plant (Toyota Motor Manufacturing, Kentucky Inc.). Participation rates in the suggestion system were assessed three-months after the main data collection. The model was tested using structural equation modelling (SEM). Overall, the findings supported the proposed model. Structural model A, which included the TPB variables only, accounted for 5% of explained variance in participation in the suggestion system and 46% of explained variance in intention to submit suggestions. Structural model B, which considered the indirect effects of other relevant constructs (proactive personality, organizational trust, perceived rewards, and supervisory support for continuous improvement activities) accounted for 4% of explained variance in participation in the suggestion system, 38% of explained variance in intention to submit suggestions, and 29% of explained variance in attitudes toward submitting suggestions.

**Keywords:** Suggestion systems; Employee involvement; Discretionary Work Behavior; Theory of Planned Behavior; Toyota Manufacturing System.

French Abstract\*  
Modelling Employees' Suggestion-Making Behavior

# Le comportement des employés et des systèmes de suggestions

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## Résumé

Cette recherche décrit un modèle de participation des employés, dans des systèmes de suggestion, qui s'appuie sur la théorie du comportement planifié (Ajzen, 1991). Selon ce modèle, faire des suggestions par les employés s'explique principalement par les antécédents du comportement planifié. Le modèle a été testé par un questionnaire auprès des travailleurs à la chaîne d'une usine d'automobile (Toyota Motor Manufacturing, Kentucky). Le taux de participation dans le système de suggestions a été évalué trois mois après la collecte de données. Le modèle a été testé par équation structurelle (SEM). Dans l'ensemble, les résultats appuient le modèle proposé. Un modèle structurel A, qui comprenait les variables de la théorie du comportement planifié seulement, expliquait 5% de la variance dans la participation au système de suggestions et 46% de la variance dans l'intention de soumettre des suggestions. Un modèle structurel B, qui a examiné les effets indirects d'autres concepts pertinents (la personnalité proactive, la confiance organisationnelle, les récompenses perçues et le soutien aux activités d'amélioration continue) expliquait 4% de la variance dans la participation au système de suggestion, 38% de la variance dans l'intention de soumettre des suggestions, et 29% de la variance dans les attitudes à l'égard des suggestions soumises..

**Mots-clés:** systèmes de suggestion; participation des employés; comportement au travail discrétionnaire; théorie du comportement planifié; système Toyota production

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German Abstract\*  
Modelling Employees' Suggestion-Making Behavior

# Modellierung des Vorschlagsverhaltens von Mitarbeitern

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## Abstract

Diese Arbeit beschreibt ein Modell der Mitarbeiterbeteiligung im Vorschlagssystem, das auf der „Theory of Planned Behavior“ (TPB; Ajzen, 1991) basiert. Nach diesem aufgestellten Modell wird das Vorschlagsverhalten von Mitarbeitern vor allem durch die TPB Vorgeschichte erklärt. Die Grundlage des Modells bildet ein Fragebogen, der durch Fließbandmitarbeiter in einem Automobilwerk (Toyota Motor Manufacturing, Kentucky Inc.) beantwortet wurde. Die Beteiligungsrate in dem Vorschlagssystem wurde drei Monate nach der Hauptdatenerhebung bewertet. Das Modell wurde mit Hilfe von „structural equation modelling“ (SEM) getestet. Insgesamt unterstützen die Ergebnisse das aufgestellte Modell. Das Strukturmodell A, welches nur die TPB Variablen enthält, berücksichtigt 5% der erklärten Varianz bei der Beteiligung in dem Vorschlagssystem und 46% der erklärten Varianz bei der Absicht Vorschläge einzureichen. Das Strukturmodell B, welches die indirekten Effekte der anderen relevanten Konstrukte berücksichtigt (proaktive Persönlichkeit, organisatorisches Vertrauen, wahrgenommene Belohnungen und überwachende Unterstützung für kontinuierliche Verbesserungsaktivitäten) berücksichtigt 4% der erklärten Varianz bei der Beteiligung in dem Vorschlagssystem, 38% der erklärten Varianz bei der Absicht Vorschläge einzureichen und 29% der erklärten Varianz bei der Einstellung gegenüber der Vorschläge einzureichen.

**Keywords:** Vorschlagssystem, Mitarbeiterbeteiligung, beliebiges Arbeitsverhalten, Theory of Planned Behavior, Toyota Manufacturing System

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Spanish Abstract\*  
Modelling Employees' Suggestion-Making Behavior

# Modelización sobre el Comportamiento de los Empleados en los Sistemas de Sugerencias

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## Resumen

El documento presenta un modelo de participación de los empleados en sistemas de sugerencias que se basa en la Teoría del Comportamiento Planificado (TPB; Ajzen, 1991). De acuerdo con el modelo propuesto, el comportamiento de los empleados sobre las sugerencias se explica principalmente por los antecedentes de la TCP. El modelo fue probado mediante la administración de un cuestionario a una línea de trabajadores de una fábrica de automóviles (Toyota Motor Manufacturing, Kentucky Inc.). Las tasas de participación en el sistema de sugerencias se evaluaron tres meses después de la recolección de datos principal. El modelo fue probado mediante un modelo de ecuaciones estructurales (SEM). En general, los resultados confirman el modelo propuesto. El modelo estructural A, que incluyó solamente las variables de la TCP representó el 5% de la varianza explicada en la participación en el sistema de sugerencias y el 46% de la varianza explicada en la intención de presentar sugerencias. El modelo estructural B, que considera los efectos indirectos de otras construcciones relevantes (personalidad proactiva, confianza en la organización, recompensas percibidas, y apoyo en la supervisión para las actividades de mejora continua) representó el 4% de la varianza explicada en la participación en el sistema de sugerencias, el 38% de la varianza explicada en la intención de presentar sugerencias, y el 29% de varianza explicada en las actitudes hacia las sugerencias que presenten.

**Palabras Clave:** sistemas de sugerencias; participación de los empleados; comportamiento del trabajo discrecional; teoría del comportamiento planificado; sistema de producción Toyota.

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Arabic Abstract\*

Modelling Employees' Suggestion-Making Behavior

## نمذجة سلوك تقديم الاقتراحات لدى الموظفين

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### المخلص

تبين الورقة أنموذجاً لمشاركة الموظفين في أنظمة الاقتراحات المبنية على نظرية السلوك المخطط (TPB; Ajzen, 1991). حسب النموذج المقترح، إن سلوك تقديم الاقتراحات لدى الموظفين يفسر بشكل أولي عن طريق أسباب TPB. تم اختبار النموذج عن طريق إدارة توزيع استبيان على عمال الخطوط في مصنع سيارات (Toyota Motor Manufacturing, Kentucky Inc.). تم تقييم معدلات المشاركة في نظام الاقتراحات بعد ثلاثة أشهر من عملية جمع البيانات الرئيسية. تم اختبار النموذج باستخدام نمذجة المعادلة الهيكلية (SEM). بشكل عام، تؤيد النتائج النموذج المقترح. يفسر النموذج الهيكلية الأول (أ)، الذي ينظم متغيرات TPB فقط، 5% من التباين في المشاركة في نظام الاقتراحات و يفسر 46% من التباين في نية تقديم الاقتراحات. النموذج الهيكلية الثاني (ب)، الذي يأخذ بعين الاعتبار التأثيرات الغير مباشرة للأمور الأخرى ذات العلاقة (الشخصية المبادرة، الثقة التنظيمية، المكافآت المدركة، و الدعم الإداري للتحسين المستمر) يفسر 4% من التباين في المشاركة في نظام الاقتراحات، و 38% من التباين في نية تقديم الاقتراحات، و يفسر 29% من التباين المواقف اتجاه الاقتراحات المقدمة.

**الكلمات الرئيسية:** أنظمة الاقتراحات، اشراك الموظفين، سلوك العمل التقديري، نظرية السلوك المخطط، نظام التصنيع لدى تويوتا

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Italian Abstract\*

Modelling Employees' Suggestion-Making Behavior

# Un modello di analisi di comportamenti suggeriti dai collaboratori

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## Abstract

Il presente studio descrive e testa un modello per spiegare la partecipazione del personale aziendale nei sistemi di suggerimenti (suggestion systems). Il modello si basa sulla Teoria del Comportamento Previsto (Theory of Planned Behavior; Ajzen, 1991). Secondo il modello, il comportamento di un collaboratore che propone un suggerimento attraverso il suggestion system può essere descritto secondo gli antecedenti della Teoria del Comportamento Pianificato. Il modello è stato testato somministrando un questionario a degli operai di linea in una fabbrica di automobili con sede a Georgetown, nello stato del Kentucky, Stati Uniti (Toyota Motor Manufacturing, Kentucky Inc.). Nei tre mesi successivi alla somministrazione del questionario sono stati raccolti dati sull'effettiva percentuale di partecipazione nel sistema di suggerimento. I dati sono stati analizzati usando dei modelli ad equazioni strutturali (structural equation modelling). Complessivamente, i risultati offrono un primo supporto al modello proposto. Il modello strutturale A, che comprende solo i fattori principali della TPB, spiega il 5% della varianza in partecipazione nel suggestion system e il 46% di varianza nell'intenzione di proporre un suggerimento. Il modello strutturale B, che prende in considerazione anche gli effetti indiretti di altri fattori (proactive personality, organizational trust, perceived rewards e supervisory support to continuous improvement activities), spiega il 4% della varianza in partecipazione al suggestion system, il 38% di intenzione di proporre un suggerimento e 29% di varianza in attitudini verso il proporre suggerimenti.

**Parole chiave:** sistema dei suggerimenti; coinvolgimento dei lavoratori; comportamento lavorativo discrezionale; teoria del comportamento pianificato; Toyota Manufacturing System.

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Chinese Abstract\*

Modelling Employees' Suggestion-Making Behavior

## 为员工建议行为建模

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### 摘要

本文以计划行为理论为基础，提出了一个建议系统中的员工参与模型。根据该模型，员工的建议行为主要以计划行为理论的前因变量解释。通过向一家汽车制造公司（肯塔基州丰田汽车制造公司）的生产线工人发放调查问卷对模型进行了测试。在主要数据收集完成三个月后，作者评估了建议系统中的员工参与率，采用了结构方程模型对模型进行测试。总体上，测试结果证明了该模型的可行性。结构模型A只包含了计划行为理论的变量，在建议系统参与度的可释方差比例为5%，在提交建议的意愿度的可释方差比例为46%。结构模型B考虑了其它相关因素（主动性格、组织信任、预期回报、管理层对持续改善活动的支持）的间接影响，在建议系统参与度的可释方差比例为4%，在提交建议的意愿度的可释方差比例为38%，在提交建议态度的可释方差比例为29%。

**关键词：**建议系统；员工参与；自愿性工作行为；计划行为理论；丰田制造系统

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