# Effects of TQM on Perceptual HRM

By

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*Abstract:* *This paper examines the effects of TQM practices practiced by software organizations on perceptual HRM within India. The study sample consisted of 324 employees, resulting in a response rate of 81 percent. A questionnaire was developed and administered to ascertain the level of influence by TQM practices on perceptual HRM outcomes. Data were analyzed by employing multiple regressions.*

*The results revealed that HRM, organization culture, employee empowerment are high involvement TQM practices and have strongest impact on employee's perceptual outcomes.*

*The findings make a significant contribution to software industry that can be used to track the extent of TQM effects on perceptual HRM. An organization could use this instrument for pre-test baseline, and periodically re-administer it to identify changes associated with TQM efforts.*

**Introduction:**

The relationship between Total Quality Management (TQM) and Human Resource Management (HRM) with respect to business excellence or performance of the organization is the concerned area for many researchers. There are many theories and research, which explain these relationships and provide the practices, which are relevant for business excellence.

**Review of Literature:**

**Human Resource Management, Total Quality Management and Business Performance**

2

Paauwe and Richardson (1997) provided overview of earlier research on the relationship between HRM and business performance, and gave a clear distinction between HRM results (e.g. satisfaction, motivation, absenteeism, retention, trust and involvement) and core business performance indicators like profit and sales volume and market share.

HRM activities like recruitment and selection, personnel planning and reward management; all have an effect on HRM results. These HRM activities have a direct effect on business performance. For example, a high level of leave will lead to higher costs for the organisation and thus, lower profits. In some situations, there will be a reverse causality between HRM activities and business performances. For example, higher profits can lead to a higher level of willingness to invest in HRM activities, e.g. training of employees. Furthermore, situational or contingency factors (e.g. size and history of the organisation, location of branch, level of technology) have an impact on HRM activities, HRM results, and on business performance.

In the TQM literature there is a general description regarding the TQM activities that contribute to the development of 'business excellence'. Dale (1999) described leadership, training, involvement and participation of employees, co-operation and customer focus relevant to organisational excellence form a TQM perspective. Most of these practices can also be a part of current HRM literature.

Various authors indicate explicitly 'best practices' that required for competitive advantage for the organisation. Pfeffer (1994) described 16 'high performance' practices, which include 'information', 'high wages', and 'job security'. Arthur (1994) focused on 'decentralization', 'participative leadership' and 'excellent wages'.

Paul Boselie and Ton van der Wiele (2002) made a (pragmatic) distinction between the following outcome variables:

1. *Perception HRM outcomes*; e.g. employee satisfaction, employee motivation, employee trust, employee commitment, and employee loyalty (often collected by means of surveys amongst employees)

2. *Objective HRM outcomes*; e.g. employee turnover rate and absence due to illness rate

3. *Manufacturing performance*; e.g. product/service quality and productivity

4. *Firm performance*; e.g. sales, market share, profits and market value

Paauwe and Richardson (1997) said that HRM outcomes (perception and objective outcomes) are more closely related to HRM activities or practices than manufacturing- and firm performance. Guest (1997) described that HRM effectiveness should be studied by focusing on the effects of HRM activities on HRM Outcomes, and not on the effects of activities on financial performance.

**Research Problem and its Relevance:**

HRM and TQM matters a lot, but the nature of the relationship between HRM, TQM and performance is very complicated. The majority of prior research is focused on the effects of HRM and TQM at the organizational level (e.g. Arthur, 1994; Choi et al., 1998; Hendricks and Singhal, 2001; Huselid, 1995; MacDuffie, 1995; Wiele van der, 1998). Research on the perceptions of employees reveals a new area for the discussion on the effectiveness of HRM and TQM in an organization (Guest, 1999).

The literature review shows the studies explore the relationships between quality management practices, and human resource management and financial performance, have been done in manufacturing and software industry, not yet been include the relationship of these quality and HRM practices with perceptual HRM outcomes among employees which are very important from the human resource prospective and shows the HRM results in any organization. These

finding indicates a gap in literature on quality management and human resource management in the software industry. Considering the growth of the software industry (globally as well as in India) and a very high attrition rate in software industry, is a need to explore the relationship between quality management practices, HRM activities and perceptual outcomes in the software industry. **To fill this gap in literature, the link between quality management practices, human resource management and perceptual outcome in the software industry in India will be explored in this research.**

**Conceptual Model for Research:**

The conceptual schema of this study focuses on the development of a theoretical business excellence model as a systematic way to implement TQM and HRM practices within software industry in India. Examining the relationship between TQM and HRM practices and business excellence will explain the complexity of the relationship that exists between them.

The TQM and HRM practices are categorized into two types: High Involvement practices and Low involvement Practices. In the contemporary HRM-business performance literature, high involvement practices are typically measured by indexes that incorporate, or assign points to the extent of team-based work and other employee participation arrangements, employee training and development, formal performance management systems, variable pay, business information sharing with employees, targeted or selective recruitment and hiring, and certain other practices. The entities –companies, service work groups -with high index scores can be said to practice what might be called "high involvement" HRM; the entities with midlevel index scores can be said to practice what might be called "average high involvement" HRM; and the entities with low index scores can be said to practice what might be called "low high involvement" HRM (Lewin 2004).
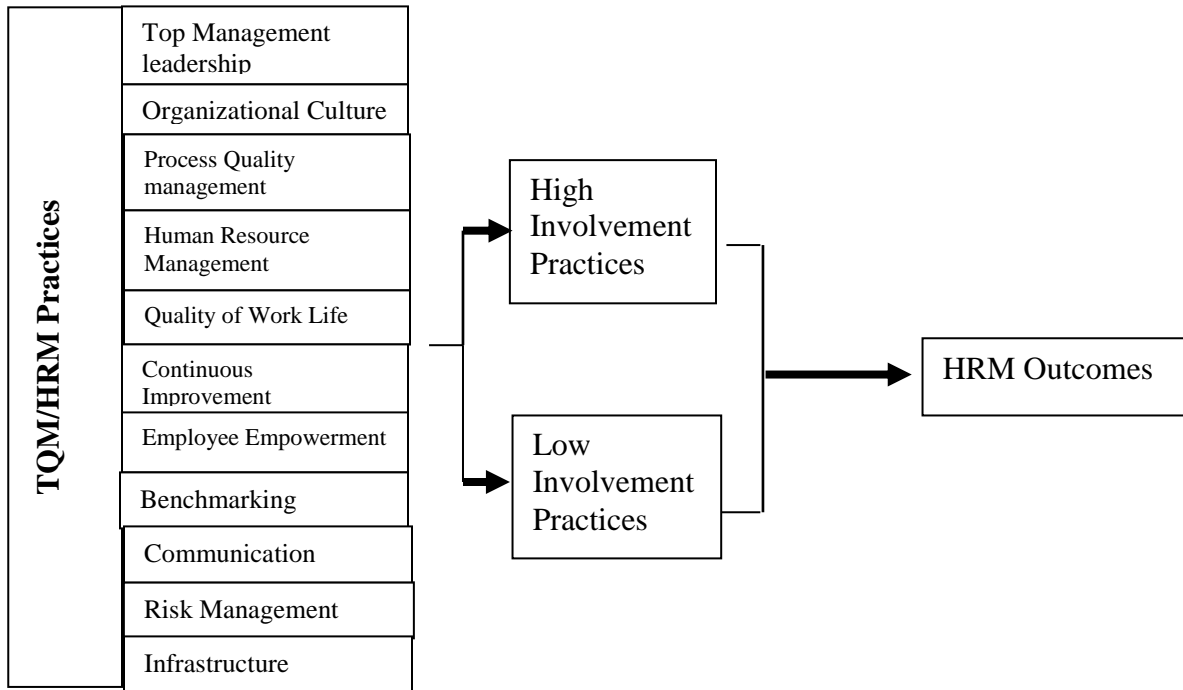
TQM/HRM Practices

| Top Management leadership |
| Organizational Culture |
| Process Quality management |
| Human Resource Management |
| Quality of Work Life |
| Continuous Improvement |
| Employee Empowerment |
| Benchmarking |
| Communication |
| Risk Management |
| Infrastructure |

High Involvement Practices

Low Involvement Practices

HRM Outcomes

**Figure: 1 Conceptual Model**

The link between Total Quality Management (TQM) and Human Resource Management (HRM) practices and HRM outcomes is illustrated in Figure 1, which is developed on the basis of literature review. In this theoretical framework, TQM and HRM practices are independent variables and HRM outcomes are dependent variables.

**Hypothesis development**

Based on the extensive study, the following hypothesis is proposed:

H0: Quality practices have a very little impact on HRM outcomes.

**Methods:**

**Sample and Procedures**

An initial list of constructs was prepared through literature survey and it was sent to the software engineers and academicians to verify it. They evaluated the list and also assessed the relevance,

understandability, clarity, and unambiguity of the questions. This ensured the validity of the questionnaire.

Data were collected from employees of various software organizations in India. The companies were selected from the member list of NASSCOM (National Association of Software Companies).

NASSCOM is the premier association of the trade bodies and the chamber of commerce of the IT-BPO industries in India. NASSCOM is a global trade body with over 1200 members, which include both Indian and multinational companies that have a presence in India.

NASSCOM's member and associate member companies are broadly in the business of software development, software services, software products, consulting services, BPO services, e-commerce & web services, engineering services and animation and gaming. NASSCOM's membership base accounts for over 95 percent of the industry revenues in

India and employs about 2.3 million professionals.

The questionnaire survey was done for data collection. The questionnaires were sent to software developers and their managers, naming more than 2 years of experience, of 100 development centers of different software firms. They were sent through email or distributed through HR manager. Out of the 400 questionnaires sent, 324 questionnaires were returned, yielding a response rate of 81 percent, which is considered acceptable.

**Variable Measurements**

Theoretical, empirical, and practitioner literature was explored to determine the factors (constructs) of quality management practices and perceptual HRM outcomes in the software industry. The factors were determined after a thorough review and synthesis of the literature, and

discussions with professionals in charge of software development and quality control in the software industry.

Questioner consists of the questions to measure the quality practices and perceptual HRM outcomes. All the questions are designed with 5 point Likert scale, ranging from (1) Strongly Disagree (2) Disagree (3) Neither Disagree nor Agree (4) Agree (5) Strongly Agree.

**Independent Variables (TQM/HRM practices):** 45 questions are designed to measure the 12 TQM/HRM practices. The 12 practices are described below:

**Top-Management Leadership (TML)**

The leadership of top management is very important and is central to the implementation of a TQM/HRM practices in any organization. Many researchers said that the quality improvement efforts in any organization should start from the top and flows down to the lower level (Ahire 1996; Li, Chen, and Cheung 2000; Sureshchandar et al. 2001; 2002).

**Organizational Culture (OC)**

Quality cannot be achieved without the cooperation and coordination of everyone in the organization. A proper atmosphere should be created in the organization to imbibe and cultivate an organizational culture, which builds up the commitment of everyone to quality (Tenner 1991).

**Customer Focus (CF)**

Many studies agree that quality means, satisfaction of customer requirements (Xenos and Christodoulakis 1997). Customer focus leads to improved quality irrespective of anything. So, understanding of the client's requirements and maximizing his satisfaction are critical in the software industry also. The requirements of the customers (internal and/or external) should be satisfied at each stage of software development.

8

**Process Quality Management (PQM)**

Quality performance depends on process management, measurement and analysis of data. So, the quality of processes needs to be improved continuously for improving the quality of the product. "Process" is a key factor in software development. Improvement of processes helps to reduce the effort, development time, and defects in software (Jalote 2000).

**Human Resource Management (HRM)**

Based on an empirical study, Paul and Anantharaman (2002) said that there is a positive relationship between human resources practices and organizational performance. The authors further stated that there was a significant difference in human resources practices across multinational and Indian software companies. Thus, it is evident that human resources practices such as reward and recognition, recruitment, selection and retention, training and development, and teamwork are critical in software firms.

**Employee Empowerment (EE)**

Empowerment means the assigning of responsibility with authority to the employees. High performance and high commitment that requires high levels of employee empowerment can be successfully used to transform organizations. Freedom for all team members to give suggestions during software development or project execution is a good practice for improving the software quality (Shrednick, Shutt, and Weiss 1992).

**Continuous Improvement (CI)**

According to the TQM philosophy, the key to quality is satisfying the needs and expectations of the customer through a continuous improvement strategy (Goyal and Islam 2001; Ahmed 2001). Therefore, superior quality demands the propagation of a culture of continuous improvement, driven by measurement and improvement (Lewis 1999).

**Benchmarking (BM)**

Benchmarking is a term used to describe activities that are aimed to make comparisons against the best practices. Benchmarking is a common element of TQM implementation, irrespective of the nature of the organization (Zinovy et al. 1996). In the IT industry, the common benchmark themes are expenditures, operations, helpdesk activities, programming effectiveness, and efficiency (Cortada 1995).

**Infrastructure and Facilities (IF)**

Infrastructure becomes very critical in the case of software companies, where technological advancement is rapid and its adaptation is compulsory for survival. The term "facilities" also includes sufficient conference rooms; training areas; physical resources such as furniture, computers, and application software; and communication technologies such as telephone, fax, and e-mail (Bahrami and Evans 1997).

**Communication (COM)**

Communication helps to provide better control of processes, which in turn helps to improve quality. Communication helps to provide clarity of roles and responsibilities of each employee. Communication helps to improve quality through customer satisfaction by providing better service and quicker response to queries (Cortada 1995).

**Dependent Variables:**

**Perception HRM outcomes:** e.g. employee satisfaction, employee motivation, employee trust, employee commitment, and employee loyalty.

**Results of the survey**

**Factor analysis and scale reliabilities**

*Note: n = 324*

| Measure | Items | Factor loading | KMO | Eigenvalue | Variance explained (%) | Reliability |
|---|---|---|---|---|---|---|
| Independent variables | | | 0.838 | 44.269 | 87.915 | 0.869 |
| Top management commitment and leadership (TMCL) | 3 | 0.681,0.739, 0.845 | | | | 0.776 |
| Organization culture (OC) | 6 | 0.591,0.737, 0.744,0.741, 0.810, 0.892 | | | | 0.781 |
| Customer focus (CF) | 4 | 0.594,0.589, 0.569,0.710 | | | | 0.778 |
| Process quality management (PQM) | 4 | 0.517,0.629, 0.679,0.914 | | | | 0.897 |
| Human resource management (HRM) | 7 | 0.600,0.790, 0.841,0.741, 0.853,0.857, 0.882 | | | | 0.800 |
| Continuous improvement (CI) | 3 | 0.578,0.656, 0.665 | | | | 0.854 |
| Employee empowerment (EE) | 6 | 0.604,0.864, 0.764,0.631, 0.800,0.829 | | | | 0.865 |
| Benchmarking (BM) | 2 | 0.743,0.770 | | | | 0.786 |
| Infrastructure and facilities (IF) | 2 | 0.551,0.891 | | | | 0.789 |
| Communication (COM) | 3 | 0.609,0.577 0.744 | | | | 0.867 |
| Risk management (RM) | 3 | 0.767,0.756 0.844 | | | | 0.876 |
| Process quality measures (matrix) (QMET) | 5 | 0.557,0.689, 0.789,0.876, 0.789 | | | | 0.843 |
| Dependent variable | | | | | | |
| Perceptual HRM outcome (PHO) | 7 | 0.641,0.679, 0.896,0.786, 0.777,0.788, 0.889 | 0.734 | 1.34 | 75.270 | 0.886 |

**Table 1: Factor analysis and scale reliabilities – Independent and Dependent variables**

**Analysis of data:**

Multiple regressions were used to determine the relationship between the dependent and independent variables. TQM and HRM practices were regressed against dependent variable i.e. perceptual HRM outcome. Multivariate analysis of variance is an extension of bivariate analysis of variance in which the ratio of among groups variance to within groups variance is calculated on a set of variables instead of a single variable. This technique is considered appropriate when several metric dependent variables are involved in the research study along with many non-metric explanatory variables. In other words multivariate analysis of variance is specially applied whenever we want to test hypothesis concerning multivariate differences in-group responses to experimental manipulations.

A principal component factor analysis with varimax rotation was conducted to validate the TQM practices (Table 1). In interpretation, only a loading of 0.5 or greater on the factor is considered. Varimax rotated analysis showed the existence of 12 significant factors and 48 items (details in annexure) with total Eigen value (i.e. 44.269) greater than one that explained 87.9 percent of the variance. The KMO sampling adequacy test had 0.84 value for each item with sufficient intercorrelations with the Bartlett's test of sphericity was also found significant ($\chi^2 = 472:06$, p < 0.001). Thus, the factors were considered adequate because they were less than 60 percent of the variance recommended in social sciences (Hair et al., 1998). The results of the factor analysis are represented in Table 1.

Similarly, another factor analysis was done to check the dimensionality of the dependent variables. The single factor with 7 items (details in annexure) analysis with eigenvalue of 1.34 showed 75.27 percent of variance in the data. The KMO measure of sampling adequacy was 0.73

indicating sufficient intercorrelations, while the Bartlett's test of sphericity was significant ($\chi^2 =$ 339:92, p< 0:01).

The reliability of the questionnaire was tested by Cronbach alpha. The reliability coefficient (alpha) of each element of TQM practices was as follows: top management leadership (77percent), employee empowerment (86 percent), organization culture (78 percent), communication (86 percent), process quality management (89 percent), human resource management (80 percent), , infrastructure and facilities (81 percent), benchmarking (73 percent), and for continuous improvement (78 percent). The reliability for dependent variables i.e. HRM outcomes is (88 percent).  The reliability coefficients of all the five elements of TQM were above 0.70, which concurred with the suggestion made by Nunnally (1978).

**Descriptive statistics analysis**

|  | Mean | SD |
|---|---|---|
| Top-Management Leadership | 2.667 | 0.783 |
| Employee Empowerment | 3.370 | 0.694 |
| Organizational culture | 2.948 | 0.566 |
| Communication | 2.880 | 0.517 |
| Customer Focus | 2.750 | 0.832 |
| Process Quality Management | 2.700 | 0.875 |
| Human Resource Management | 3.036 | 0.525 |
| Infrastructure and Facilities | 2.658 | 0.895 |
| Benchmarking | 2.679 | 0.787 |
| Continuous Improvement (CI) | 2.831 | 0.952 |
| Quality Measures | 2.430 | 0.932 |
| Risk Management | 2.607 | 0.790 |
| HRM outcome | 3.76 | 0.52 |

*Notes: n = 324;*

**Table 2. Mean and Standard Deviations of TQM practices and HRM Outcome**

Table 2 indicates that employees' within the Indian software industry perceived empowerment (with the highest mean scores, i.e. M = 3.370, SD = 0.694), HRM (M = 3.036, SD = 0.525),

Organization Culture (M = 2.948, SD = 0.566) to be the most dominant TQM implementation practices within their firm, followed by communication (M = 2.880, SD = 0.517), continuous improvement (M = 2.831, SD = 0.952), customer focus (M = 2.750, SD = 0.832) and process quality improvement (M = 2.700, SD = 0.875) which were all rated as moderate practices of their firm. Top management leadership (M = 2.667, SD = 0.783), benchmarking (M = 2.679, SD = 0.787), infrastructure and facilities (M = 2.658, SD = 0.895), risk management (M = 2.607, SD = 0.790) and quality matrix (M = 2.430, SD = 0.932), with the low mean score was perceived on the overall as weakest practices within organizations.

Human resource management, organization culture, employee empowerment and communication (with highest mean scores) can also be treated as High Involvement practices, continuous improvement, customer focus and top management leadership as moderate involvement practices and process quality management, benchmarking and infrastructure and facilities (with least mean scores) can be treated as Low Involvement TQM practices.

Meanwhile, the impact of TQM practices on HRM outcome and operative outcome in the software industry was largely positive. The standard deviations were quite high, indicating the dispersion in a widely spread distribution. This means that the effects of TQM practices on HRM outcome can be approximated to a normal distribution.

**Multiple Regression Analysis:**

| | Unstandardized Coefficients | | t | Sig. | Collinearity Statistics | | Result |
|---|---|---|---|---|---|---|---|
| | B | Std. Error | | | Tolerance | VIF | |
| (Constant) | .118 | .180 | .658 | .511 | | | |
| TMCL | .181 | .065 | 2.765 | .006 | .177 | 5.646 | Accept |
| OC | .194 | .055 | 3.514 | .000 | .233 | 4.285 | Accept |
| CF | .015 | .072 | .207 | .836 | .219 | 4.575 | Reject |
| PQM | .027 | .067 | .407 | .684 | .201 | 4.986 | Reject |
| HRM | .369 | .073 | 5.028 | .000 | .261 | 3.826 | Accept |
| CI | .137 | .049 | 2.813 | .005 | .201 | 4.974 | Accept |
| QMET | .064 | .041 | 1.561 | .119 | .277 | 3.608 | Reject |
| EE | .458 | .060 | 7.589 | .000 | .239 | 4.178 | Accept |
| BM | .015 | .045 | .321 | .748 | .228 | 4.384 | Reject |
| IF | .027 | .059 | .455 | .650 | .217 | 4.601 | Reject |
| COM | .163 | .042 | 3.826 | .000 | .271 | 3.693 | Accept |
| RM | -.067 | .054 | -1.244 | .214 | .213 | 4.692 | Reject |

*Dependent Variable: Perceptual HRM Outcomes*

*Overall model F = 98.581; p =0.01; $R^2$ = 0.728; adjusted $R^2$ = 0.720; : N = 324*

**Table 3: Multiple Regression Analysis**

The results of multiple regressions are shown in the Table 3. The table indicates that there is a strong relationship between HRM, OC, EE, TMCL, COM, CI and dependent variable. The overall F-value for the model is 98.581.The Adjusted R Square value explains that the model accounts for 72% of variance in the spelling scores indicating it to be a good model. The Beta Coefficients give a measure of the contribution of each variable to the model. A large value indicates that a unit change in this predictor variable has a large effect on the criterion variable. The t and Sig (p) values give a rough indication of the impact of each predictor variable – big t value and small p value suggests that predictor variable have a large impact on the criterion variable. In Collinearity diagnostics the tolerance values are a measure of the correlation between the predictor variables and can vary between 0 and 1. The closer to zero the tolerance value is for

a variable, the stronger the relationship between this and the other predictor variables. VIF is an alternative measure of collinearity (in fact it is the reciprocal of tolerance) in which a large value indicates a strong relationship between predictor variables. In our case we found HRM, EE, OC, TMCL, CI and COM are strong predictor variables. Therefore we can say that null hypothesis "there is no impact of quality practices on employee job perceptions or perceptual HRM outcomes" is accepted.

The results indicate that there were three elements of TQM; namely, empowerment, HRM, organizational culture and communications are very positively associated with employees' job perceptions. It can be argued that seven elements of TQM (employee empowerment, HRM, organization culture, communications, continuous improvement, top management commitment and leadership and quality measures) are directly involved in the improvements in employees' job perceptions. Moreover, the findings also indicate that the most important TQM practices that explains the variance in employees' job perceptions are empowerment HRM and organization culture and are significant at the 1 percent levels ($p < 0.01$). The other element of TQM, namely, communications, continuous improvement, top management commitment and leadership and quality measures are also associated with employees' job perceptions. While benchmarking, risk management, process quality improvement, customer focus and infrastructure and facilities are not significantly associated with employees' job perceptions. However, these practices have provided long term infrastructure and operational benefits necessary for the continued improvement over time, but with an indirect association towards employees' job perceptions.

**Discussions**

A very strong relationship was found between empowerment, HRM, organization culture and employees' job perceptions or perceptual HRM outcomes. In contrast, there was a weak

relationship between process quality improvement, risk management, continuous improvement and perceptual HRM outcomes. These practices are found to have insignificant contributions towards perceptual HRM outcomes. This indicates that these quality practices are less motivating effects on people at work. The findings indicate the importance of communications and continuous improvement at moderate level for predicting perceptual HRM outcomes.. This indicates that focusing on delivering communications and improvement in implementing TQM, encourage managers to make the best use of their people and resources. The moderate relationship between communications and continuous improvement and perceptual HRM outcomes indicate that management encouraged efforts and succeeded to translate its satisfaction and commitment into this improvement practice. The result also indicated that there was a positive relationship between organizational culture and perceptual HRM outcomes. The findings stress on the need to monitor organizational culture and to evolve better TQM practices so that employees' job perceptions and other work-related outcomes are maintained at a high level. Further, the result of simple and multiple regression analyses confirmed that the perceptual HRM outcomes variable is significantly related to perceptions of quality management practices and thus implementing quality practices does payoff. The result of this regression analysis also supports the proposed model based on the empirically validated quality management implementation instruments, which are reliable and valid.
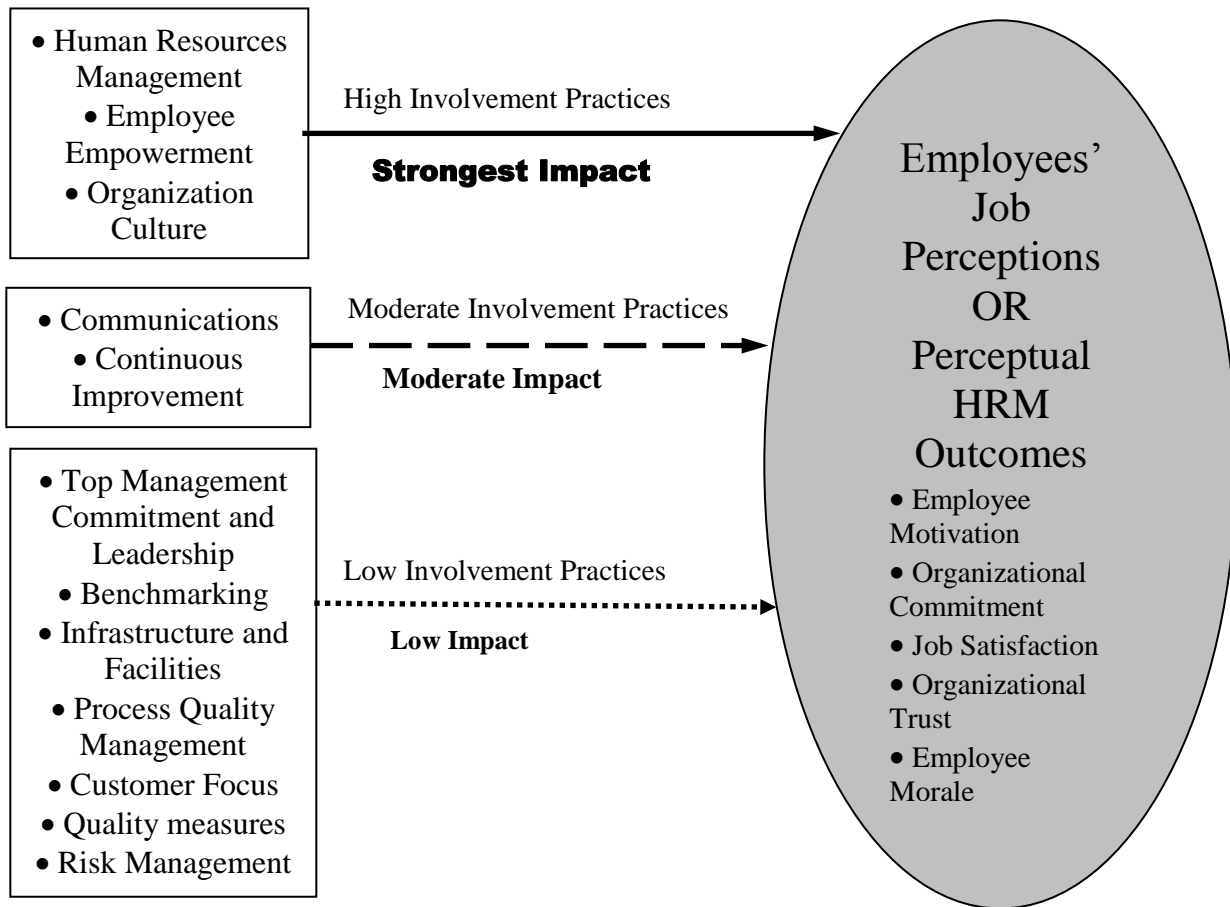
**Figure 2: Proposed Model for Impact of Quality Practices on Perceptual HRM Outcome**

**Conclusions:**

Present study and inputs from the software industry experts have led to the following conclusions. Software development is a creative process, and, therefore, individual competence and experience have great influence on the development process and also on outcomes (both HR and operative). Realizing this, most software organizations applaud that employee empowerment is essential in software development organizations irrespective of their quality practices. Similarly, the significance of infrastructure and facilities (such as hardware, software, Internet

access, library, and modern communication systems) are essential for the survival of software organizations, which is again a widely accepted fact.

**Managerial Implications and Contributions of the Research:**

The findings are considered to have made a significant contribution by using perceptual HRM outcomes that proves to be useful as an example of a methodology that might be used to track the extent of TQM effects on total outcomes. The findings identify three elements of TQM practices, namely, empowerment, HRM and organization culture more significantly associated with improvement in perceptual HRM outcomes. The implication is that organizations should focus firstly on empowerment, HRM and organizational culture. Another lesson to be learned is that the other elements of TQM, are provider of long-term, infra-structural benefits necessary for the continued improvement over time, but with a less significant relationship with perceptual HRM outcomes. The findings could prescribe potential implications for top management to review their TQM programs, consistent with the training needs of the employees within the organization. Hence, employee will be more likely to perform better and feel a higher level of job satisfaction and increasing levels of commitment towards the organization

To the best of our knowledge, this is the first study that examines the association between TQM and employees' job perception, within the software industry. Finally, the findings from this study creates awareness and understanding for the development of a theoretical base for application of soft TQM practices resulting in an improvement of employees' working conditions that inevitably contributes towards their perceptual HRM outcomes.

This study also provides a theoretical rationale for particular practices by accompanying quality framework. Focusing our independent variable on TQM and linking it with HRM outcomes

improve our theoretical modeling and practical measurements and will help to progress the evaluation in this area.

On the employee's side, the high involvement practices provides motivation to them and leads to high HR outcomes in the form of better job satisfaction and high moral and less turnover. But on the other side low involvement practices required for the cost efficiency and better operative outcomes. However, the interaction between involvement and intensification is very critical. On the company's side, the caution should be taken with over generalized claims of economic benefits. This study will help us to know that *when* and *how* a high involvement system might perform, thus helping us with the contextual and causal questions that is the central to this line of research.

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