



A Critical Review of Literature on Job Designs in Sociotechnical Systems

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ABSTRACT

Job redesigns systems have been a subject of interest for a long time. Indeed, from the days of Frederick Taylor who is regarded as the father of the scientific school of management, managers have striven to understand on how to design jobs that would optimize workplace productivity. Different theories have also been postulated and some of the most celebrated in the arena of job designs include Job Characteristics Model and the Socio-Technical Systems Theory. This paper explores conceptual and empirical literature touching on three typologies of job designs viz Job Enlargement, Job Enrichment and Job Rotation and seeks to establish commonalities and controversies with an overall agenda of establishing the nature of relationship between these job designs and workplace productivity. The paper recommends that a Metanalysis of studies on these job designs systems be done to build a case of the nature of these relationships.

Keywords:- Job Enlargement, Job Enrichment, Job Rotation, Metanalysis.

1. INTRODUCTION

The Tavistock Institute for Human Relations in London is extensively recognized with coining the concept of socio-technical systems in London, about the end of the nineteen fifties (Emery and Trist 1960). The concept fundamentally began from a need of a group of researchers, consultants and therapists, some of whom were trained in the medical sciences, to use the techniques they had developed, to assist soldiers affected by the Second World War regain their psychological wellbeing and return to civilian life. The Tavistock Institute of Human Relations was consequently founded by this group of researchers in London in 1946, through a grant from the Rockefeller Foundation (Trist and Murray, 1993).

Their initial studies revolved around the effects of introducing new machinery into coal mines (Eijnatten, 1997) and they demonstrated that new technology has a disruptive effect on jobs (Trist *et al.* 1963). Their research further showed that there is need to give consideration to behavioural issues in the design and implementation of new technologies (Eijnatten, 1997). According to Clegg (2000), this early work represented the gist of the sociotechnical systems.

At the time of the conception of the idea, newly nationalized industries were not productive and there were concerns that increases in mechanizations were not correspondingly leading to enhanced industrial productivity. The researchers hence sought to establish new paradigms of work which required the matching of social and technological systems.

This new model of work had some principles. The principles included (i) work system i.e. systems that comprised of sets of activities that made a functioning whole and these work systems were viewed as the basic units (ii) Work groups being central rather than individual job holders (iii) Emphasis on the importance of internal regulation rather than external regulation by supervisors (iv) Designs that were based on a redundancy of functions rather than a redundancy of parts and (v) Considering individuals as complementary to machinery and not as extensions of it (Jordan, 1963).

Ropohl (1999) argues that the concept of the socio-technical systems was established to emphasize the interrelationship between machines and humans and also to try to shape technical and social conditions of work to facilitate an enabling environment where 'efficiency and humanity would not controvert each other any longer'. Essentially, the socio-technical systems were influenced by the open systems theory and fundamentally with a desire to depart from hardcore tenets of the scientific management school of thought. Emery (1959) states that Von Bertalanffy's paper on 'open systems in Physics and Biology' indeed influenced the theory building, especially on the aspects of self-regulation and environmental relations. Over time, the socio-technical systems design became quite popular owing to a belief in the supremacy of the scientific thought as a means of attaining productivity (Whyte, 1956).

In the 1980s, most firms' principal and overriding objective was cutting costs to compete in increasingly turbulent global markets. This period hence was characterized largely by cost reduction strategies and socio-technical systems were seen as having little to offer in such an environment (Mumford, 1996).

Adler and Docherty (1998) argue that the dominant socio-technical research agenda progressively moved from a social dimension in the 1970s to a technical dimension in the 1980s and eventually to a business dimension in the 1990s. The implication of their argument then is that socio-technical systems have increasingly been seen as important determinants of business performance.

Socio-technical systems still continues to elicit interest from researchers. In the Netherlands for example, an approach which emphasizes on production structures as the main determinant of any socio-technical program has been developed. The principle behind the theory is that most production systems are overly complex and have a need to be simplified (Eijnatten and Zwaan, 1998).

2. LITERATURE REVIEW

Socio-technical systems have various aspects such as Quality Work Circles, Total Quality Management and Self-Directed Teams etc but are also discussed under work designs which include Job enlargement, Job Rotation and Job Enrichment. This paper discusses these three aspects of sociotechnical systems.

2.1 Job Enlargement

Dessler (2005) views job enlargement as an activity that entails assigning workers additional same level activities thus increasing the number of activities they perform. It hence means that job enlargement increases the scope of work laterally without necessarily increasing job tasks in a horizontal fashion.

Pierce (1980) argues that job enlargement is a variant of the motivational perspective of designing jobs. The implication of this is that it is largely difficult to view a job enlargement intervention as independent of an employee's motivation. That is, if such interventions are not employee centric, then they would defeat the very purpose of their execution, as low employee motivation would serve to defeat the benefits of such job enlargement interventions.

The import of job enlargement lies basically in the role it plays in fulfilling lower needs of Abraham Maslow's hierarchy of needs theory thus is an important determinant of job satisfaction (Chung and Ross, 1977). This argument implies that job enlargement plays a critical role in meeting an employee's basic and psychological needs in Maslow's continuum of the needs hierarchy giving such an employee the impetus to enjoy his or her work and thus enhance workplace productivity.

However, job enlargement has historically been criticized as decreasing social interactions and increasing workload thereby decreasing job satisfaction and commitment of employees (Donaldson, 1975). Essentially, this arises from the fact that job enlargement increases the volume of work of employees thereby reducing the socializing time ultimately leading to lowered job satisfaction and employee commitment.

Another disadvantage of job enlargement stems from the fact that including additional tasks can serve to increase role uncertainty and hence lead to role conflict (Lowe, 2003). This thus calls for a careful implementation of job enlargement interventions for if not carefully done, the resultant effects can be catastrophic.

2.2 Job Rotation

Job rotation refers to a systematic shifting of employees from one job to another and, in most cases, over prearranged intervals (Dessler and Varkkey, 2009). It essentially involves rotating employees from one position to another in a lateral fashion and is characterized by having tasks that require different skills, and at times, tasks with different responsibilities (Robbins, 1996).

Cosgel and Miceli (1999) argue that it should only be applied when the incremental benefits of its applications outweigh the benefits of work specialization. This means that it is necessary to carry out a cost benefit analysis before using this kind of job redesign and it should only be applied where it is rational to do so.

An important aspect of job rotation is in its inherent ability to promote organization learning. Ortega (2001) argues that job rotation indeed can promote organization learning better than specialization in circumstances where there is little information about the relative import of different job tasks. With the benefits that accrue from organizational learning, it means that job rotation is an indispensable aspect of job designs.

Job rotation is also important in the development of employees (Sonnenfeld and Peiperl, 1988). This means that when properly designed and executed, job rotation can result in improvement of capacity of employees hence resulting in enhanced task performance and productivity.

Ostroff and Kozlowski (1992) show that job rotation facilitates information sharing and socialization and this results in a more knowledgeable employee base and the resultant effect is that employees undertake their tasks much better hence enhancing work place productivity for the employees individually and collectively.

Zeira (1974) argues that job rotation is an important technique of augmenting employee's task commitment and job involvement and as such plays an important role in facilitating normal functioning of organizations thereby helping drive efficiency and effectiveness, which ultimately leads to enhanced workplace productivity.

2.3 Job Enrichment

Job enrichment is one of the most common interventions to improve performance at the individual level of analysis. Cummings and Worley (1997) argue that job enrichment efforts have been discreetly but dependably successful in achieving their intended objectives. Of importance to note here is that they have led to attainment of organization objectives.

Ongori (2007) states that job enrichment and employee empowerment coupled with compensation mechanisms have had a positive effect on employee commitment and loyalty. The implication of this argument is that job enrichment is not necessarily a stand-alone as a determinant of employee productivity but never-the-less is an important determinant of such workplace productivity.

Perhaps one of the strongest persuasions in favour of job enrichment as a structural intervention lies in the fact that it meets employee's psychological and social needs (Cappelli and Rogovsky 1994) besides increasing employee motivation to work, which consequently has the benefit of increasing an employee's work satisfaction levels. The overall effect of such a motivated employee is workplace productivity.

The aforementioned argument resonates well with that of Kopelman, (1985) who argues that job enrichment influences the quality of employee task performance principally through satisfying an employee's lower level hierarchy needs. Attainment of employees' higher level needs thus is seen to be predicated on work designs such as job enrichment interventions.

Further, it is also important to point out that job enrichment fundamentally meets its objectives through reversing the effects of repetitive tasks which would otherwise lead to employee dissatisfaction (Leach and Wall, 2004) hence lowered employee productivity. Drudgery as source of work place stress can hence be reduced significantly by practices such as job enrichment.

Basically, job enrichment entails giving employee's greater autonomy and control thereby influencing workers affective and motivational systems by chiefly providing multiple paths to job goals (Griffin, Patterson, and West, 2001). It is noteworthy to indicate that the fact that it introduces such autonomy is what qualifies it to be an important topic under socio technical systems.

Perhaps to just to cite an example of how job enrichment as a concept is fast gaining ground is by gleaning from the Fortune 500 companies of which many companies are increasingly adopting job redesign systems with a bid to giving greater autonomy to employees (Levering and Moskowitz, 2007).

However, some scholars argue that job enrichment can lead to de-motivated employees as a result of employees disliking job enrichment as a form of workplace intervention (Kelly 1982; Pollert 1991). It therefore implies that it is fundamental to understand what motivates employees before undertaking job enrichment since without such knowledge; job enrichment interventions can be counterproductive.

In the same vein, other scholars argue that enrichment techniques like total quality management, self-managed teams and quality circles encourage peer surveillance which can lead to lower job satisfaction (Delbridge, Turnbull and Wilkinson 1992; Sewell and Wilkinson 1992; Garrahan and Stewart 1992).

Other scholars such as Green (2004) argue that job redesign is usually characterized by work intensification and as such can be counterproductive. This argument contends that it is important to understand the end implications of job redesigns, such as job enrichment, prior to introducing such interventions if organizations are to have positive impacts on workplace productivity.

2.4 Theoretical framework

Studies on Job Designs have largely been based on Oldham's Job Characteristics Model and Herzberg's Two Factor Theory. However, given that the study seeks to take organizations as systems characterized by interdependencies of variables, the study will be anchored on the tenets of the Socio-Technical Systems theory and Oldham's Job Characteristics Model.

2.4.1 Job Characteristics Model

The model was created by Hackman and colleagues and it focused on five structural characteristics of jobs. These structural characteristics were task variety, autonomy, feedback, significance and identity. These scholars argued that these can enhance among others, work motivation, job satisfaction, and task performance (Hackman and Lawler, 1971; Hackman and Oldham, 1976, 1980).

In its initial days, scholars had a reservation on a number of its aspects. For example, there were concerns of weak relationships between job characteristics and performance (Aldag, Barr, and Brief, 1981) and with even more questions over the construct between nature of work perceptions and job attitudes. Simonds and Orife (1975) even cast aspersions as to its validity with questions of whether only corresponding increases in pay can determine preference for job enrichment.

The 1980's hence were consequently largely characterized by research on the model (Griffin, 1987; Oldham, 1996; Zalesny and Ford, 1990). To cite a specific interesting example of such research in this time, Fried and Ferris (1987) found that the five job characteristics were strongly related to job satisfaction and internal work motivation but established a weak relationship of the characteristics in relation to job performance.

Scholars over time improved and expanded the initial model to consider social and technological developments in the workplace. As such, researchers now appreciate that jobs contrast not just in terms of the core task characteristics described by the Job Characteristics Model, but also in terms of key characteristics such as task complexity, information processing, specialization, as well as in terms of physical characteristics such as physical demands, equipment use, ergonomics and work conditions (Morgeson and Campion, 2003; Morgeson and Humphrey, 2006).

Basically, according to the model, an employee will have high internal motivation if three important psychological states are experienced. These, which can be seen as precursors of work place motivation are: i) Meaningfulness of work. ii) Responsibility for the outcomes of the work. and iii) Knowledge of the results of the work.

To achieve the three fundamental psychological states, the Job Characteristics Model advocates that the work be designed with sufficient levels of five key job characteristics. These characteristics are skill variety, task identity, task significance, autonomy and feedback. Of these five job characteristics, task identity, task significance and skill variety are key contributors to experienced meaningfulness of work.

Hackman and Oldham (1980) contend that it would be difficult to find all three characteristics at high and critical levels in a particular job. However, they argue that higher levels of any one of them could singly contribute to greater experienced meaningfulness at work and thus by extension lead to job satisfaction. They argue that the fourth job characteristic in the model, i.e. autonomy, is an important contributor to experienced responsibility for work outcomes. Further, according to the model, knowledge of the results from the work can only be fulfilled if there is a feedback system between the job and the worker.

2.4.2 Socio-Technical Systems Theory

The Socio Technical systems theory suggests that work design should focus on both the social and technical systems of an organization (Trist and Bamforth, 1951). The argument here is that work designs based purely on technical systems with no consideration to social aspects are sub-optimal.

The gist of the theory lies in the proposition that in work designs, there should be a fit between design features of the organization and as of equal importance, a fit between the organization and its environment (Lawler, 1996). The sociotechnical systems theory basically presented a shift in how work and organizations are to be designed (Trist (1981). In the outline of the theory, self-managed teams are actually the core building blocks of organization designs (Appelbaum and Batt, 1994; Lawler, 1996; Macy and Izumi, 1993; Pasmore, 1988; Trist, 1981).

Socio technical systems approach is concerned with group and organizations as units of analysis. But given that it takes a systems perspective, it presumes that analysis will be at multiple levels. This theory has been applied in a number of ways in many nations of the world (Cummings and Worley, 1997) with relatively good levels of success.

2.5 Empirical findings on previous research conducted on the concept.

Kelley (1990): Established that job enrichment works better in less complex organizations i.e. in small firms. It is noteworthy to indicate that in their study, complexity of organizations implies size, and not necessarily structure. Their findings hence are of interest as they arouse curiosity and desire of knowing whether job redesigns, which essentially may imply disrupting extant structures, have an effect on employee’s performance levels.

Drago, Estrin and Wooden (1992): Established that there exists a positive association between controlling work place characteristics and employee job satisfaction. The illumination of their study helps researchers understand that if interventions intended to vary the characteristics of jobs would be done, then it expected that the resultant relationship would be improved employee satisfaction and hence improved performance.

Burchell, Mankelov, Day, Hudson, Ladipo, Reed, Noan, Wichert and Wilkinson (1999): Established that job redesigns increased work place performance of employee and decreased overall cost of doing business of companies. Their results are particularly of interest because in an increasingly competitive environment, it is important to have assurances that any interventions will make economic sense. Their study hence helps understand that job redesigns are not just interventions that help enhance employee’s performance but can indeed also lead to overall cost reductions thereby improving an organizations bottom-line.

Niehoff et al. (2001): Established a positive association between empowerment, job enrichment and employee loyalty in a downsizing environment. This study is particularly interesting because downsizing in itself is a change of organizational structure. Finding such a positive relationship infers that job redesigns are not just effective in static environments but can have such positive results on employee’s satisfaction even in times when organizations to instituting austerity measures such as downsizing.

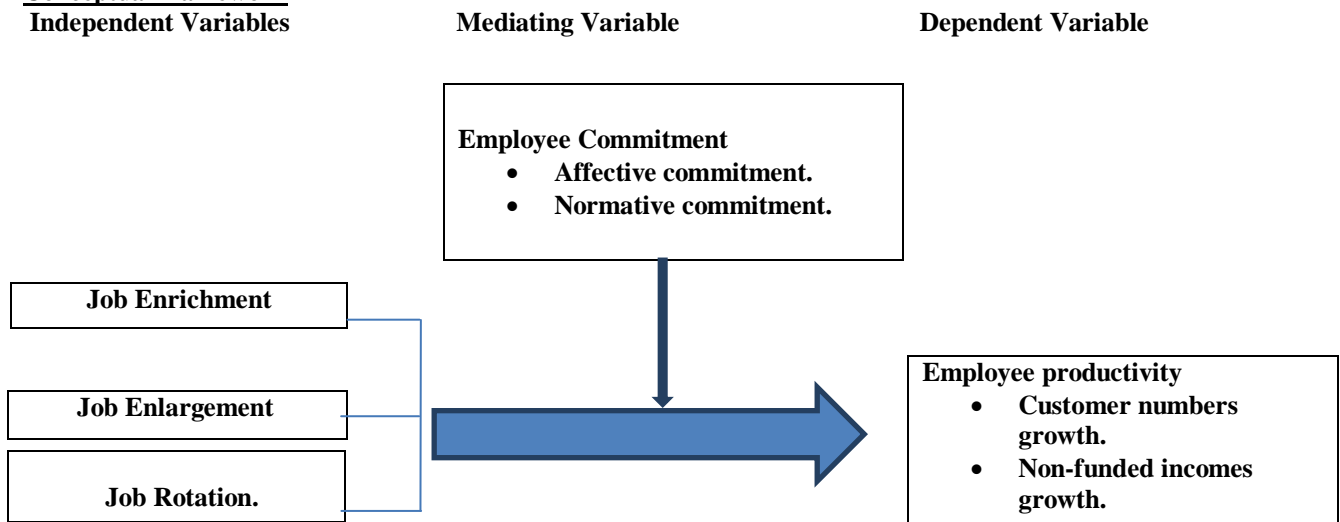
Askenazy (2001): Established that there exists a causal relationship between some job enrichment variables and workplace hazards. From their study, it can be concluded that it is important to ensure that job redesigns interventions such as job enrichment are implemented with caution as they may lead to increased workplace hazards which may otherwise lead to workplace injuries thus leading to reduced employee performances.

Brown and McIntosh (2003): Showed that controlling for workplace characteristics can actually qualitatively change conclusions about job-satisfaction. This study is also of great importance to researchers as it can help build a model that can assist isolating aspects of job characteristics that can affect employee’s qualitative conclusions about job satisfaction thus enhancing employee performance.

Brenner, Fairris and Ruser (2004): Showed that there is exists a relationship between job enrichment and work place related injuries. Just like in Askenazy (2001), this study emphasizes the importance of appreciating that there is need to cautiously implement job enrichment as a job redesign as it may have counterproductive effects of adversely affecting employees through inducing injuries hence leading to reduced productivity.

Fuller, Marler, and Hester (2006): Showed that autonomy as depicted in job enrichment interventions has positive relationship with job performance and functional work behaviors. This study is important as it highlights the causative role of job enrichment in reference to improved employee task performance.

Conceptual framework



Source (Author, 2014).

Job Enrichment

This relates to a horizontal expansion of an employee’s job/ tasks. From literature reviewed, it is an important component of employees’ motivation and influences employee task performance.

Job Enlargement

This related to lateral expansion of an employee’s tasks/job. It has also been argued to positively influence employee’s productivity.

Job Rotation

This entails periodic movement of employees from one role to another and in most cases over pre-arranged intervals. It has an important role in development of employees besides enhancing employees’ job satisfaction.

Employee commitment

Is the emotional attachment employees have towards the organizations they work for. It can influence effective application of job designs hence is a suitable mediating variable in the model.

Employee productivity

This entails how best employee meet set targets as indicated in the annual balanced score cards. Attaining high measures in the score card will entail higher productivity and vice versa.

3. METHODOLOGY

Given that quite a number of research undertakings have been done to establish the relationship between Job Designs in Socio-Technical systems, the research will employ use of Metanalysis and more specifically, the Schmidt–Hunter psychometric meta-analysis method (Hunter and Schmidt, 2004) will be used to conduct the meta-analysis.

To prevent a double count in the meta-analysis, studies with multiple measure of the same construct will have composite correlation values (Hunter and Schmidt, 2004). Studies that include multiple independent samples will be separately coded and reliability co-efficients will be tested using an average value of the Cronbach alpha coefficient of the major studies. A 95% confidence interval (CI) for each corrected population correlation will also be worked out.

Given that sample sizes are expected to differ across the different studies, the harmonic mean (Viswesvaran and Ones, 1995) will be used to calculate sample sizes for the meta-analytic regression. Ordinary least squares techniques for meta-analytic regression will also be used as they are more optimal when data are in the form of correlations.

4. FINDINGS

There are commonalities of thought as to the effects of job enlargement, job enrichment and job rotation on employee job satisfaction and workplace productivity. Indeed, such a thread of thought runs through leaving little doubt as to the seemingly positive relationship between the three sociotechnical designs on employee job satisfaction and productivity.

However, it is also evident that there are dissenting voices as to whether these interventions actually lead to workplace job satisfaction and employee productivity. Actually, these classes of researchers indicate that it is not just that the interventions have no effect on employees' job satisfaction and commitment but indeed have negative effects on such a relationship.

A Metanalysis of major studies on the subject of the job design systems can be used to work out correlations that can help shed more light on the subject of how the job design aspects of sociotechnical systems affect employee productivity.

5. CONCLUSIONS AND RECOMMENDATIONS

Job redesigns systems are not alien phenomena in organizations. Indeed, from the days of Frederick Taylor who is regarded as the father of the scientific school of management, scholars and practioners have continually sought ways of redesigning work with the overall intention being enhancing work place productivity.

Sociotechnical systems are supposed to help in establishing ways through which technology can be integrated with social systems. Areas of thrust under sociotechnical systems include job redesign techniques such as job enrichment, job enlargement and job rotations. These have been studied conceptually and empirically and have been found to have mixed results as to their efficacy in driving organization performance.

From the literature reviewed, it is self-evident that the subject of job redesigns and their effects on organization performance is an area that warrants more research to validate the nature of the relationship(s). A Metanalysis of the major studies on this subject hence is suggested as the best way forward of establishing if there exists any relationship.

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