

Analysis of Job Burnout and Its Impact on Quality and Economic Benefits of Enterprises

Abstract:

Job burnout is a crucial cause for the decline in product (work) quality and operating efficiency, which may lead to increased costs, reduced revenues, and a decline in quality and economic performance of business enterprises. Based on a systematic review of the extant literature, this paper examines several conceptual issues of job burnout (i.e., connotation, classification and consequences), explores its influencing factors and possible intervention measures, and analyzes the impact of job burnout on operating quality and economic benefits from the perspective of quality cost management. We contend that the negative impact of job burnout on "improvement of quality and operating efficiency" cannot be overlooked. It is of great practical significance to prevent the occurrence of job burnout and minimize its adverse effect on quality and economic benefits of an enterprise. Some counter measures to avoid or alleviate job burnout are proposed, from the perspectives of legislative and institutional setting and new technology applications.

Keywords: Job burnout; Quality costs; Economic benefits of quality, Business performance.

I. Introduction

Burnout, also known as job burnout, is a concept that was initially proposed by Herbert Freudenberger, an American psychologist, in 1974. He described the physical symptoms and behavioral manifestations of burnout and pointed out that people working in some care taking or helping professions, such as free clinics and therapeutic units, are more likely to experience fatigue or burnout. He also suggested some preventive approaches to cure job-related burnout. Since then, research on "burnout" has been increasingly conducted in various occupations, e.g., psychology, medicine, education, and management. Many scholars have proposed the concepts and measuring scales for job-related burnout from different dimensions. In the early studies, job burnout was described as a phenomenon unique to the occupations of human services, which mainly include healthcare, social work, psychotherapy, legal services, and policing (Schaufeli et al., 2009; Ahola and Hakanen, 2014) As researchers have delved deeper into the issue of job burnout, they found that the phenomenon is not just restricted to the industries or occupations that serve people as clients (Pines and Aronson, 1988; West et al., 2018; Schaufeli et al., 2020). In fact, job burnout is a common problem in all industries, and more recent research has gone beyond descriptive and qualitative studies that focus on cognitive concepts, measuring scales, and intervention measures, towards empirical studies that investigate the antecedents and

consequences of job burnout, with the change of main research methods from in-person interview, on-site observations to surveys and case studies (Leiter et al., 2015; Maslach and Leiter, 2017).

We conduct a theoretical analysis of “job burnout” in light of the development of Chinese economy. This is because that job burnout is a widespread phenomenon or it is a common problem that arises from repetitive and monotonous work or activities. Therefore, job burnout is a critical issue not just in human resources management but also a problem that needs attention and resolution in the course of “improving quality and operational efficiency” in business enterprises (Chen and Wang, 2019).

Currently, the Chinese government has proposed a strategy of transforming the national economy from “high speed” growth to “high-quality” development and all business enterprises are engaging in business restructuring in light of the changes in national development strategy and market demands, with greater efforts on “improving quality and operational efficiency” to ensure high product quality and better profitability (Chen and Wang, 2019). Thus, job burnout has received more attention during this transition period, since it is associated with the attainment of core business goals. In particular, against the backdrop of current social phenomena such as “excessive competition” and “lying flat (giving up)” among the young generations, research on job burnout should have significant practical implications. In the business reality, job burnout of employees will cause a decline in product (operation) quality and economic benefits of enterprises at the micro-level, which will further impede the achievement of the strategic goal of transforming and upgrading China's manufacturing industry at the macro-level.

In addition, we analyze the relationship between job burnout and quality management in business enterprises from the perspective of quality costs management. We contend that job burnout will directly impact the operation of quality management with a negative effect on economic benefits of quality, and it will eventually reduce operating efficiency and business performance results. Thus, sufficient attention should be paid to job burnout phenomenon. We further examine the influencing factors to job burnout and the functioning pathway of job burnout to economic benefits of quality. Finally, we discuss the necessity and possibility of intervention measures to preclude or alleviate job burnout in the respects of legislative and institutional setting and adoption of new technology applications in business production. The results of this study should make a positive contribution to related research and enrich the conceptual constructs and theories on job burnout. This study should also generate positive practical implications for business enterprises to have a better understanding of job burnt suffered by their employees, and to formulate appropriate policies and measures to effectively

prevent and intervene the incurrence of job burnout in their operations to promote the efficiency of quality management and enhance economic benefits for their business performance.

II. Overview of Research on Job Burnout

2.1 Concept of Job Burnout

The phenomenon of job burnout has already existed for quite a long time, dated back to the adoption of the "Taylorism" in the early 20th Century (Taylor,1911), when the replacement of labor operations by machines had expanded at a large scale in industrialized production (Luo, 2011). The earlier literature mainly describes the phenomena similar with that in Graham Greene's 1960 novel "A Burnt-Out Case," which depicts an architect who suffers from occupational burnout by exhibiting symptoms of depression, fatigue, apathy, and cynicism and has to quit his job and retreats to Africa (Maslach et al., 2001; Burkee et al., 2001; Maslach and Leiter, 2017; Schaufeli 2017; Lubbadah, 2020). Since the concept of burnout was proposed by R.F. Freudenberger in 1974, its early connotation had been associate with professionals in helping or servicing occupations or industries, including police officers, teachers, healthcare workers, lawyers, social workers, and others, emphasizing their interpersonal relationships with clients or patients (Bakker et al., 2000; Aiken et al., 2002; Woo et al., 2020). Maslach et al. (1981) argued that job burnout often happened among individuals engaging in "human work," which is a syndrome characterized by emotional exhaustion, depersonalization, high stress, and decreased personal accomplishment. This definition has resulted in a three-dimensional theoretical model consisting of emotional exhaustion, depersonalization, and lack of personal accomplishment, forming the basis for the development of the first job burnout measuring scale, the Maslach Burnout Inventory (MBI or MBI-HSS). This scale has been considered of the "gold standard" for measuring the levels of job burnout and has become dominant in research on job burnout (Maslach and Leiter 2008; Maslach et al., 2012; Gan and Gan, 2014; Maslach and Leiter, 2016b; Weng et al., 2018; Woo, et al., 2020). In fact, the three-dimensional conceptual model is an important theoretical foundation for research on job burnout and it has been widely accepted by many scholars. Various definitions and interpretations of job burnout from different perspectives appeared in the subsequent research based on this model. Pines and Aronson (1988) reported occupational burnout in respect of emotional exhaustion, as they believed that burnout is a state of physical, emotional, and mental exhaustion. Halbesleben and Demerouti (2005) treated emotional exhaustion and work alienation as two dimensions of job burnout, while Gil-Monte and Figueiredo-Ferraz (2013) contended that job burnout consists of four dimensions: enthusiasm for work, psychological exhaustion, laziness, and feeling of guilt. With further research being undertaken, some scholars have proposed a few new theories on job-related burnout, including the Job Demands-Resources (JD-R) theory and the Conservation

of Resources (COR) theory (Maslach and Leiter, 2016a). The JD-R theory suggests that when individuals experience continuous job demands and do not have sufficient resources to meet or alleviate these demands, they may experience job burnout (Bakker and Demerouti, 2007; Kumar, 2016; Lubbadah, 2020).

The COR theory suggests that job burnout arises from the continuing pressure or threat to available resources. When individuals realize that their valued resources are threatened, they will make efforts to maintain these resources. The loss of these resources, or even a potential loss, may exacerbate an experience burnout (Hobfoll and Freedy, 2018). Schaufeli et al. (2020) argued that there are certain constraints in the three-dimensional theoretical model of job burnout, and defined it as a work-related state of exhaustion that appears among employees, with the characteristics in four core dimensions: extreme fatigue, decreased ability to adjust cognition, emotional presence, and mental distance. This type of burnout is usually accompanied by three secondary attributes: low emotional mood, non-specific psychological distress, and physical pain symptoms. In addition, as research has expanded beyond the helping and servicing professions or industries, the job burnout measuring scale has continuously been amended to expand its applicability in different occupations and industries. Maslach et al. (1996; 2001) revised the MBI scale to make it more "occupationally neutral" and redefined the three dimensions as exhaustion, cynicism, and professional efficacy. The revised scale (MBI-GS) could be generally applicable to all occupations (Halbesleben and Demerouti, 2005). They emphasize that job burnout is a crisis relationship between individuals and their work, not just between workers in the helping and servicing professions and their clients or patients (Schaufeli and Greenglass, 2001; Halbesleben and Buckley, 2004; Bakker and de Vries, 2021). In addition, Schaufeli et al. (2020) developed the Burnout Assessment Tool (BAT) based on the four core dimensions and the three secondary attributes. They have verified its applicability and reliability.,

Later, researchers in various countries have developed localized versions of job burnout measuring scales contextual to the cultural characteristics of their own countries. The Chinese version of the MBI-GS scale has been confirmed by the initial scale designer, C. Maslach, in the early 2000s and it has been broadly used in research on job burnout in China since then (Li and Xiao, 2003; Gu, 2010; Gan and Gan, 2014; Wang et al., 2015; Zhou et al., 2016; Li et al. 2022).

Table 1 Representative Viewpoints on Job Burnout

Author	Main Viewpoints
R.F. Feudenberger (1974)	Physiologically, an individual experiences a feeling of exhaustion and fatigue, frequent colds, headaches, gastrointestinal discomfort, insomnia, and difficulty in breathing. Behaviorally, an individual exhibits quick anger and sudden feelings of discouragement.

Maslach et al. (1981)	It is a syndrome characterized by emotional exhaustion, depersonalization, reduced sense of accomplishment, and negative self-evaluation. It often appears for individuals working in professions that require frequent interactions with people, such as doctors, teachers, and social workers. The main symptoms of this burnout include physical fatigue, low mood, loss of interest in work, negative self-evaluation, lack of a sense of achievement, and a feeling of personal worthlessness. Without timely treatment and management, this syndrome can have long-lasting negative effects on an individual's personal and professional life.
Pines & Aronson, (1988)	It is a state of exhaustion experienced by an individual due to prolonged exposure to situations that excessively demand his/her emotional resources, including physical, emotional, and mental exhaustion.
Maslach et al., (2008)	Job burnout is the mismatch or discrepancy between a person and the tasks he/she is required to do.
Shirom et al., (2005)	Job burnout is an individual's mental state that manifests as physical exhaustion, emotional exhaustion, and cognitive exhaustion.
Schaufeli et al., (2020)	Work-related fatigue that incurs among employees and it is characterized by four core situations: extreme fatigue, decreased ability to adjust for cognitive and emotional processes, a sense of detachment or reduced personal accomplishment, and low mood. In addition, there are three secondary attributes: non-specific psychological distress, physical discomfort, and emotional exhaustion.

Note: Sorted based on relevant literature

Through our review of the existing literature, it is evident that there is currently no consensus on the definition and connotation of job burnout (Rotenstein et al., 2018; Lubbadah, 2020; Whiteoak et al., 2023). Scholars have provided different descriptions based on various theoretical foundations. This paper considers job burnout to be a common phenomenon in human labor work across various industries, characterized by lack of concentration, fatigue, boredom, decreased attention span, negative mood in working, lack of enthusiasm and initiative, and loss of work motivation.

2.2 Association between burnout and related phenomena

Job burnout is a professional terminology, with varied interpretations, i.e., fatigue, work overload, laziness, and depression. Conceptually speaking, they are related but distinct concepts. Although burnout is related to these terms, its occurrence is not a necessary condition or result of these phenomena. For instance, Laziness and burnout share similar manifestations such as lack of concentration, but laziness is a behavior or habit, whereas job burnout is not. Even hardworking individuals may experience job burnout (Wu et al., 2021) Fatigue or

exhaustion focuses on the physiological and physical aspects of stress and stress reactions, while job burnout is associated with psychological and behavioral aspects of negative work attitudes (Dewa et al., 2014). Work overload indicates an employee's positive attitude and a high level of involvement in his/he job, characterized by vigor, dedication, and absorption (Schaufeli et al., 2002; Maslach et al., 2012). But there is a negative correlation between work overload and job burnout, since work engagement and job burnout are not the simple opposites. Work engagement has its own measurement standards and is an independent concept measured by the Utrecht Work Engagement Scale (UWES) (Maslach and Leiter, 2016a). Depression is a common mental disorder being characterized by low mood, slow thinking, and decreased willpower. The emotional exhaustion dimension of burnout is considered to be more closely related to depression, while the cynicism and low personal accomplishment dimensions have a lower correlation with depression (Bakker et al., 2000; Bianchi et al., 2015). However, depression is not directly related to work situations and it can take place in various contexts, even in personal life and learning, while job burnout is a work-related phenomenon specific to certain situations (Halbesleben and Buckley, 2004; Bakker and Demerouti, 2007; Jun et al., 2021).

2.3. Classification of Job Burnout

Job burnout is not only a problem in certain industries that involve interpersonal contact and it is also prevalent in different occupations or industries. Job burnout develops progressively with varied stages, and different individuals may experience varied degrees of burnout, with different symptoms. Thus, an explicit classification is useful for a better understanding of Job burnout. Based on a systematic review of prior studies, we summarize and identify several types of job burnout from different perspectives. For the duration of job burnout, it can be classified as temporary, short-term, and long-term. Temporary job burnout lasts for hours or days; short-term job burnout lasts for weeks or months, and long-term job burnout continues for years. If temporary or short-term burnout is not addressed and treated promptly, it may turn into long-term job burnout with significant consequences. In the respect of industry, job burnout involves employees in different occupations with varied industrial characteristics, e.g., manufacturing, financing, teaching, consoling, health care or nursing, hotel or recreational, and so on. In terms of the labor performance, job burnout could be differentiated by physical laborer burnout and mental laborer burnout. Job burnout can also be classified as monotony job burnout and diversity job burnout in light of the diversity of work content and employee engagement involved. Judging by individual competency in work, it will have competent job burnout, potential competent job burnout, and incompetent job burnout. Competent job burnout refers to employees who can perform their work well but experience burnout. Potential competent job burnout is for employees who can improve their work performance through effort but

experience job burnout. Incompetent job burnout refers to employees who are unable to perform their main work duties, resulting in job burnout. Table 2 presents the classification of job burnout from varied perspectives.

Table 2 Classification of Job Burnout

Criterion	Classification
Duration of burnout	Temporary job burnout; short-term job burnout, long-term job burnout.
Industrial sectors	Manufacturing, finance, education, healthcare, food and beverage, hotel, and various other industries
Types of labor	Physical labor job burnout and Mental labor job burnout
Nature of work	Monotony job burnout and Diversity job burnout.
Individual competency:	Competent job burnout, Potential competent job burnout, Incompetent job burnout

2.4. Consequences of Job Burnout

Job burnout has adverse effects on individuals, families, clients, and organizations, resulting in significant costs for both organizations and individuals (Cordes and Dougherty, 1993; Shirom and Melamed, 2005; Shanafelt, et al, 2010; Kumar 2016; Maslach and Leiter, 2017; Taylor and Frechette, 2022; Whiteoak et al., 2023). In general, the main consequences of job burnout include the followings:

(1) Effects on individuals: Job burnout mainly impact physical and mental health of individuals. There is a reciprocal relationship between job burnout and individual health status, i.e., poor health can lead to job burnout, and job burnout can also result in poor health (Ahola and Hakanen, 2014; Jun et al., 2021). Physically, burnout is usually associated with stress symptoms (e.g., headaches, chronic fatigue, gastrointestinal problems, muscle tension, high blood pressure, colds, and insomnia, as well as unhealthy lifestyles such as smoking and excessive drinking). Psychologically, job burnout will develop into depression, anxiety, irritability, anger, and decreased self-esteem;

(2) Effects on families: A person who experiences job burnout may receive negative evaluations from his/her spouse and express dissatisfaction with his/her marriage and family life (Burke and Greenglass, 2001; Schaufeli et al., 2009);

(3) Effects on clients: For individuals who provide helping work to other people, suffering from job burnout would lead to a decreased client satisfaction and a decline in customer experience. Job burnout by medical professionals may yield a decline in the quality of diagnosis and nursing care, that may induce medical accidents and a negative doctor-patient relationship (Aiken et al., 2002; Shanafelt, 2010; Wang et al., 2019); and

(4) Effects on organizations: Employees who experience burnout may produce a negative impact on their colleagues, and job burnout can have a "contagious" effect, leading to group or departmental burnout (González-Morales et al., 2012). This will ultimately affect the morale of the entire organization, cause a reduction in internal operating efficiency and organizational performance. At the same time, job burnout may result in employee dissatisfaction with their work, a rise of departure intention and higher turnover rate (Halbesleben and Buckley, 2004; Maslach et al., 2012), a decline in work efficiency (Dewa et al., 2014), and a negative impact on work output and product (service) quality, all will increase operating costs (e.g., the costs associated with employee turnover and various internal and external losses such as accident claims, absenteeism, and other indirect costs due to lower work efficiency) (Enshassi et al., 2015; West et al., 2018). As a result, job burnout will ultimately bring about a decline in operating performance and economic benefits of the enterprise (Jun et al., 2021; Taylor and Frechette 2022).

Several studies have examined the factors influencing burnout and the effects on individual health and families, but relatively little research effort has been made to explore the economic consequences of job burnout for organizations (enterprises or non-profits). West et al. (2018) pointed out that there is a gap in the study of job burnout and its economic consequences. Nonetheless, research on the assessment of job burnout from the development of organizational quality improvement and economic benefits should be of particularly significant for quality management. In the real business world, for quality control methods and quality management operations, an emphasis is placed on the important role of employees in the assurance of product and service quality. Improvement of overall morale and employee literacy plays a critical role in assuring product quality and reducing production costs. We entrust that the direct consequence of employee job burnout at an enterprise or organization is the adverse effect on the quality and efficiency of its operation, which may lead to an increase in quality costs and a decrease in economic benefits of quality (Halbesleben and Buckley, 2004; Dewa et al. 2014; Lubbadah, 2020; Jun et al., 2021). Indirect consequences include the potential for group or departmental burnout, which may depress the morale of the entire enterprise or organization (González-Morales et al., 2012). The implementation of a series of internal management policies and systems may also be adversely affected, thus, causing a decline in overall operational efficiency and economic benefits. Direct effects are temporary, visible, and

significant, while indirect effects are long-term, gradual, and less noticeable in respect of the reductions in organizational performance. Various adverse consequences of job burnout in organizations may further deteriorate job burnout, creating a vicious cycle regardless a job burnout by managerial staff or frontline workers. This will significantly impede product quality and cost-effectiveness (Maslach et al., 2012; Hobfoll and Freedy, 2018; Li et al., 2022; Whiteoak, et al., 2023). Therefore, a close attention should be paid to the issue of employee job burnout in all kinds of management and operating activities.

2.5. Influencing Factors of Job Burnout

Many researchers have examined the factors influencing job burnout from varied perspectives (Cordes and Dougherty, 1993; Aiken et al., 2002; Kumar, 2016). Maslach et al., (2001) argued that several personal and situational factors can lead to job burnout. Personal factors are mainly of demographic characteristics such as age, gender, marital status, education level, personality traits, and attitudes towards work. Environmental (or situational) factors include job characteristics, occupational characteristics, and organizational characteristics. Job characteristics are mainly of work overload, high job demands, time pressure, role conflict or ambiguity, and lack of resources such as social support and control (Leiter et al., 2015; Maslach et al., 2001). Maslach et al. (2008) summarized job-related factors of a mismatch between individuals and their jobs, e.g., workload, control or autonomy, rewards, community (including social support and interpersonal relationships), fairness, and values. Organizational characteristics are of the organizational and management environment, which is shaped by social, cultural, and economic factors (Leiter et al., 2015). In addition, factors such as emotional labor and occupational compromise can also induce or deteriorate job burnout (Liao and Yan, 2016; Weng et al., 2018). Research shows that environmental or situational factors are the main driver to job burnout (Maslach et al., 2001; Lubbadah, 2020; Wu et al., 2021).

Therefore, we contend that the factors influencing job burnout, as shown in Table 3, should be examined and analyzed carefully from the perspectives of cognitive level, job characteristics, work environment, personal attributes, and social environment.

Table 3 Influencing Factors on Job Burnout

Influencing factors	Definitions and Connotations
Cognitive level	Level of understanding or perception of the meaning and specific demands for work or job
Job characteristics	Features of job, including job object, job nature, and other related aspects.
Work	Both physical and internal social aspects. The physical environment includes

situation (environment)	workplace (e.g., geographic location, transportation, and climate), working conditions (comfort, safety, and convenience), organizational structure (type, social status, size, industry, and operational process), and regulations (e.g., welfare packages, compensation systems, performance evaluation systems, promotion systems, etc.). The internal business environment includes organizational culture, interpersonal relationships, and work pressure.
Personal characters	Individual characteristics or attributes that may influence job burnout, e.g., gender, age, education, disciplines, professional qualifications, position or ranks, values, religious beliefs, organizational belonging, experience, skills, physical or healthy condition, personality traits, temperament, interests, social networks, marriage status, income level, etc.
Social environment	External factors that may affect job burnout, e.g., economic development level, Political situation, social trends, public opinion, scientific and technological advancements, legislation and judicial status, and unexpected public events, etc.

2.6. Intervention of Job Burnout

Intervention is necessary or desirable to mitigate job burnout. Prevention is uttermost crucial. Preventive measures should be contemplated to avoid job burnout and appropriate relieving measures must be considered right after its incurrence, emphasizing upon organizational and individual interventions. Some studies mainly focus on interventions that aim to change individual characteristics. Various kinds of training or coaching programs for employees have been proposed to prevent job burnout, such as training on stress handling and mitigation, time management, and self-confidence, to improve personal abilities to cope with stress and make a quick recovery (Plaunmann and Walter, 2009; Maslach and Leiter, 2016). Spot activities and physical exercises are also beneficial to preventing job burnout (Freudenberger, 1974; Kumar, 2016; Bakker and de Vries, 2021). Working situations will significantly impact job burnout, and maintaining a positive work environment is a necessary condition for the prevention of job burnout (Pines and Aronson, 1988; Kumar, 2016). Measures taken at the organizational level play a critical role in preventing and alleviating job burnout. However, research on intervention measures that focus on changing organizations has evolved relatively slow. Existing studies have mainly highlighted the interventional effects of social support, human resource management strategies, organizational structure, and workflow changes towards job burnout, indicating that appropriate social support (from work supervisors, colleagues, organizations, and unions) and human resource management strategies can help reduce job burnout (Halbesleben and Buckley, 2004; Taylor and Frechette, 2022). Changes of organizational structure and workflow can also reduce the risk of job burnout (Kumar, 2016; Zheng et al., 2019).

III. Job Burnout and Economic Benefits of Quality

3.1 Economic Benefits of Quality

Economic benefits of quality for a business enterprise refer to the difference between quality income (revenues) and quality costs, which is reflected in the relationship between product quality, quality costs, and selling prices. Quality income derived from product sales revenues, and selling price and quantity of products are affected not only by external factors such as market supply and demand and consumer preferences, but also by quality level of the products. Quality costs are affected by the relationship between quality management activities and various types of quality costs. In an economic sense, because profit (economic benefit) reaches its maximum when marginal revenue equals marginal cost of a product. The primary purpose of analyzing quality and economic benefits is to determine the level of quality at which quality and economic benefits reach their maximum. We can use the quality-cost-profit relationship model as an analytical tool. The marginal quality and economic benefit derived from product quality improvement equal to the sales volume times the difference between the product's unit selling price and unit product quality cost, that is:

$$\Delta E = (\Delta p - \Delta c) X$$

When the marginal product quality cost and sales revenues are zero, the quality and economic benefit reach the maximum (Yang et al., 2019). Product quality not only determines quality costs through quality losses, but also directly impacts quality income (revenue). However, unlike quality costs, quality income (revenues) cannot be completely controlled by an enterprise due to uncontrollable external market factors. Therefore, to improve economic benefits of quality, it is crucial to target at controlling quality costs and taking measures to reduce quality costs in terms of quality cost accounting and quality management activities (Yang et al., 2020).

3.2. Quality Costs and Their Control

Currently, research on economic benefits of quality is mostly conducted from the perspective of quality management and quality costs management, and few scholars have studied the issue in light of economic theories (Cheng, 1985; Guo, 1992). In the early 1950s, American quality expert A.V. Feigenbaum (1956) initially proposed the concept of quality costs, arguing that a quality cost report should include the costs of quality prevention and appraisal and the losses caused by failures to comply with quality standards. Another American quality expert, J.M. Juran (1958) suggested the ideas of "Gold in the mine" and "Iceberg on the water surface," contending that quality costs are the expenses and losses incurred to meet the preset quality

requirements and the losses caused by not meeting the quality requirements. The explicit waste or loss in production line is only the tip of the iceberg of total quality costs or losses. Reducing the products of non-conformance can prevent an enterprise from incurring huge quality costs and increase its operating profits (. These quality management experts contend that product quality will continue to improve as investment in quality prevention and appraisal increases. As a result, total quality costs will show a trend of initially decreasing and then increasing, with an optimal quality level that minimizes total quality costs. Their views lay the foundation for the theories of quality costs and total quality management. Accordingly, quality management activities are not only for production process management, but also for value creation in an enterprise. The control of quality costs has attracted widespread attention in practice since then. Many quality management specialists and scholars in different countries (including China) have continuously explored and developed the concept and connotation of quality costs and proposed different conceptual constructs and models of quality cost management in pace with the progress in quality management at different stages. For instance, P.B. Crosby (1979) proposed the concept of "zero defects" and advocated "doing things right the first time" to control quality costs. He argued that an emphasis should be placed upon preventive measures to minimize total quality costs. Harrington (1987) suggested that quality costs should be renamed as "costs of poor quality" and it is necessary to focus on the costs associated with products not meeting user expectations. In China, the central government issued "Guidelines for Quality Cost Management" (GB/T13339-91) in 1992, which defines quality costs as "the cost required to maintain product quality in conformance with the specified standards." Quality costs consist of prevention costs, appraisal costs, internal quality failure costs, and external quality failure costs. In certain circumstances, the external quality assurance costs should also be included (Lin and Johnson, 2004). Lin Wanxiang, a Chinese professor, summarized the main contents of quality costs accounting in Chinese business enterprises based on practical experience by then (2002), as shown in Table 4.

Table 4 Definition and Contents of Quality Costs Accounting in Chinese Enterprises

Categories	Definition	Content
Preventive costs	All expenses for preventive activities to ensure product quality and avoid quality failures	Training for quality, setup of quality system, quality accreditation, appraisal of suppliers, spending on quality system design and improvement, quality awards, salary and benefits of quality management personnel, etc.
Appraisal costs	All expenses required to test products, raw materials, and semi-finished products used in the production in order to evaluate	Quality inspection and testing expenses, wages and benefits for personnel involved in quality inspection and testing, expenses related to product quality appraisal and

whether they meet the specified quality requirements. testing, and depreciation for inspection and testing equipment and facilities, etc.

Internal failure costs	All costs or losses incurred due to failure to meet the specified quality standards before products are shipped to customers, or they are "internal costs of poor quality".	Costs and expenses associated with rework, scrap, repairs of defected products, downtime losses, expenses related to analyzing quality accidents, and losses on product downgrades or price discounts, etc.
External failure costs	All spending or losses incurred due to not meeting the specified quality standards after products have been shipped to customers, as well as lost sales due to damage on quality reputation. They are typically referred to "post-sales quality costs" or "external costs of non-conformance."	Product warranty spending, handling expenses of customer claims, losses from product recalls, legal fees and compensation on claims for quality defects, product price reductions, and other expenses related to post-sales quality issues," etc.

The widely accepted traditional quality cost model, as shown in Figure 1, shows that product quality improves and quality losses decrease as the costs of quality prevention and appraisal increase, resulting in a decrease in total quality costs. When the costs of quality prevention and appraisal equal the costs of quality failure losses, the overall level of quality costs is minimized or optimized. However, when the costs of prevention and appraisal exceed this optimal level, an increase in these costs will outweigh the decrease in quality failure losses, causing the total quality costs to rise (i.e., when the costs of prevention and appraisal exceed the optimal level, the total quality costs will increase). Therefore, the overall quality costs exhibit a trend of initially decreasing and then increasing in accordance to an increase in quality prevention and appraisal spending, emphasizing the role of quality prevention and appraisal investment in quality costs management (Yang et al., 2020).

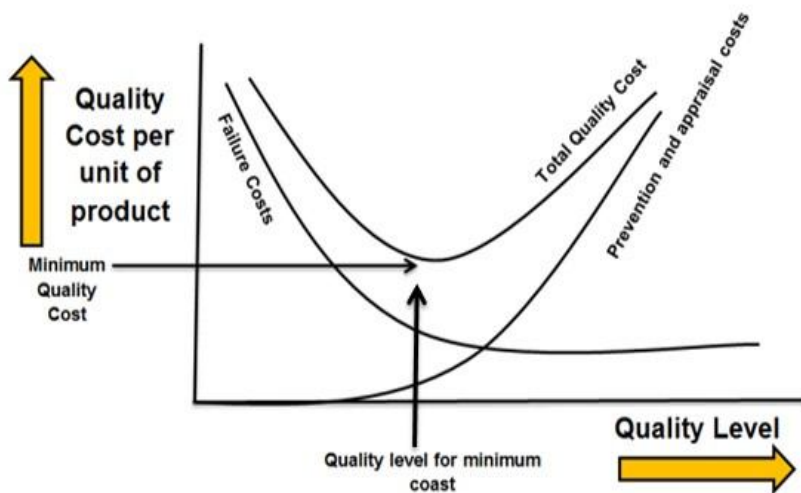


Figure 1 Traditional Model of Quality Cost Curves

3.3 Impact of job burnout on economic benefits of quality

As shown in Figure 1, the traditional quality cost model suggests that an increase in quality prevention and appraisal will lead to an improvement in product quality, resulting a decrease in quality failure losses. However, Certain limitations exist for this model. Quality prevention and appraisal costs involve positive or negative components. An appropriate investment in quality prevention and appraisal can reduce quality losses, but an excessive investment in quality prevention and appraisal, when the utilization of various prevention and inspection measures exceeds the capacity of employees to perform, it may lead to job burnout, improper operation, and an increase in quality failure losses, even causing the "black swan" quality incidence that could generate a huge quality losses to an enterprise.¹

For the specific accounting content of quality costs, factors that influence operating efficiency of quality management can be divided into elements associated with equipment, raw materials and part, systems, and human. Quality costs caused by equipment are mainly the depreciation of various testing equipment and facilities, and the losses due to defective products, production downtime, and product downgrade or price discounts due to equipment malfunctions. Quality costs stemmed from raw material and parts usually include various internal and external losses stemmed from the use of unqualified raw materials or composing parts, resulting in defective products.

System factors affect quality prevention and appraisal costs. For a business enterprise, a mature and effective quality control system spends more on quality prevention and appraisal, such as investing in quality training programs, quality incentive schemes, salaries and benefits of quality management personnel, quality inspection and testing expanses, and other related costs (Gheorghina, 2008; Lin and Johnson, 2004). As the key element of production and operation, human factors play a decisive role in the production process and directly impact quality loss costs (Schaufeli et al., 2010; Wang et al., 2019). Human factors that directly affect product quality and quality costs are of the skills and operational activities relating to the production of products with non-conformance due to processing errors or mistakes made by quality personnel or improper operation by production workers, resulting in losses of production downtime, rework of defective products, downgrade or price discount, etc. Human

¹ For example, the Note 7 smart phone produced by Samsung in South Korea had encountered a huge quality failure loss due to a defective battery cell. On October 11, 2016, Samsung China announced it would to stop selling Galaxy Note 7, with a recall of 190,000 units of the smart phone sold in mainland China. It is estimated by market analysts that the suspension of sales in the mainland China has costed Samsung up to US\$1.7 billion (RMB¥ 114.7 billion) and this quality accident had also generated disastrous effects on the brand value and reputation of the Samsung Company.

factors will also determine quality prevention and appraisal costs through quality system dysfunctions, i.e., that of quality management personnel neglecting or overemphasizing the setup and operation of quality control systems, inadequate or overly complex quality prevention and appraisal system establishment, insufficient or excessive spending on prevention and inspection, thus, leading to extra total quality costs.

Job burnout is a common phenomenon in various industries, and it is highly relevant to quality management and quality cost management. For manufacturing enterprises, job burnout suffered by quality control personnel will impact quality inspection work, which may result in products with quality defects not being detected, being sold as normal products, generating external quality failure losses, and increasing total quality costs. Job burnout by frontline workers and supervisory staff could lead to errors, mistakes and dysfunctions in production processes and operations, directly causing product quality problems and producing defective or even scrap products, leading to internal and external quality losses or costs, as well as an overall increase in total quality costs (Yang et al, 2020). Job burnout by senior managerial staff may lead to the neglect in performing their duties, overlooking proper or effective functioning of quality-related systems and procedures, cutting spending on quality prevention and appraisal, etc. As a result, more quality losses incur and the total quality costs exceed the optimal level.

Based on the analysis aforementioned, we can conclude that job burnout by different types of employees impedes their work quality and operating effectiveness, and may yield an increase in quality costs, a decrease in quality income (revenues), and ultimately reduce operating efficiency and economic benefits of quality. The association of job burnout to economic benefits of quality and the specific influence pathways can be described in Figure 2.

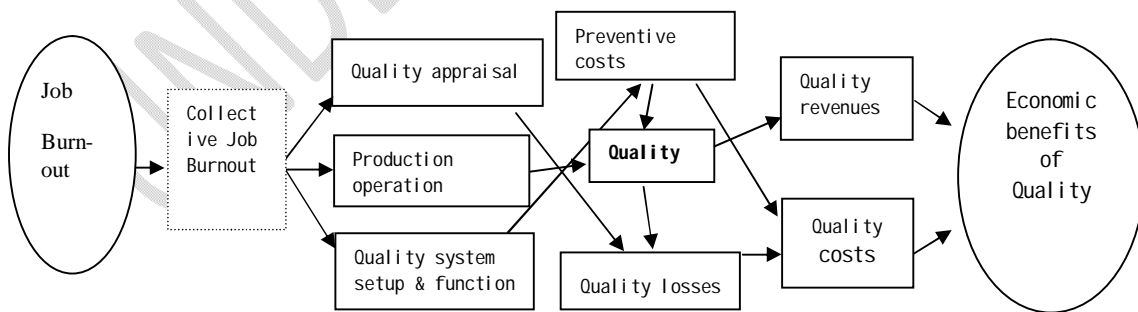


Figure 2 Logical Relations between Job Burnout and Economic Benefits of Quality

In summary, all kinds of employees are the main force of production and operation and they may experience job-related burnout, and even lead to the emergence of collective job burnout.

Business enterprises should pay a close attention to the issue of job burnout, and proactively take appropriate measures to reduce the negative effects of job burnout on product quality and operating efficiency in the respect of maximizing economic benefits of quality and business performance.

IV. Concluding Remarks

Job burnout is a phenomenon that prevails in all occupations and industries. Factors from personal, working situation, and social aspects can induce job-related burnout among all types of employees in any organization. Job burnout not only has an adverse effect on individuals' physical and mental health and family relationships, but also trigger dissatisfaction among employees or workers, which will inevitably cause an increase in the intention of resignation, decline in operating efficiency and an undesirable operating output and product (work) quality, resulting in significant losses for individuals and enterprises (organizations). Job burnout directly and negatively affect work quality and efficiency and will also lead to collective burnout, affecting the overall operational efficiency and business performance of the enterprise.

Prevention of job burnout is beneficial to the physical and mental health of individual employees, that should improve their work enthusiasm, and maintain a stable workforce for an enterprise. Therefore, the key of "improving quality and operating efficiency" for a business enterprise is to emphasize on the element of "people," those employees involving in core functions and positions in particular. This does not mean to ignore the management of material elements such as equipment, raw materials, and energy, but the management of "people" will greatly assist to improve the management of "physical things" and assist to truly achieve the business goal of "improving quality and operating efficiency."

At present, intervention measures for job burnout mainly target at changes in personal characters or attributes of employees. However, work situations or environments are also the main determinants of job occupational burnout. Alternation or improvement of relevant aspects at the organizational level is more effective in mitigating or preventing employees from job burnout. Therefore, greater effort should be made to improve working environment through the legislative and institutional settings, with continuous adoption of new technology applications.

4.1. Legislative and Institutional Aspects

Each employee or worker has several decades of working span time from joining workforce

till retirement. Government legislative authorities should proactively consider the issues of physical and mental health, personal tolerance level, and long-term career development of individuals, and timely formulate and continuously revise relevant legislations and regulations on employment, such as labor laws or employment statutes. In particular, regulations on maximum daily or weekly working hours and minimum rest time per week, as well as protection of the rights and benefits of employees should be established. From a legal perspective, the statutory requirements on workers' rest time, health and working environment are necessary to avoid regular long working hours and harsh working situations for employees, especially for those in the industries and positions that require high personal attention and psychological concentration and have significant impacts on production and operation safety. Business enterprises should strictly comply with labor laws and relevant legislative regulations, establish and improve human resource management systems with specific policies and guidelines covering personnel issues. It is recommended that attention must be paid to prevent long-term overload of employees and avoid accidents caused by overwork. If such accidents incur, the enterprise should bear joint liabilities. Statutory requirements on competitive systems for welfare and salary, performance evaluation and rank promotions should be mandated to ensure employers fully respect employees and their work achievements by offering them of all-around care and support. It is critical to fully affirm the role in work for each staff or worker and enable all employees to recognize the value and significance of their job and ensure their rights in work. Job rotation systems are effective to avoid employees working on the same positions for a prolonged time span that may induce fatigues and burnout, especially for those employees working on monotonous, tedious, and labor-intensified working positions. Enterprises should be mandated to take effective measures to prevent employees from boredom or even resentment that may lead to job burnout and adversely impact operating efficiency and economic benefits of the enterprises (organizations).

4.2 Technological Application Aspect

The rapid advancement of new technologies and their applications, such as artificial intelligence, digitalized processes and automated production, has become the important driving forces for economic growth and high-quality development. In pace with such a development trend, business enterprises should pay more attention to the favorable impact of artificial intelligence and production digitization technologies, and increase investment in relevant technologies to cope with the progress of "digitalization" in operation and production in light of specific goals and needs of business strategic development. Utilization of artificial intelligence and digital technologies will replace some labor work, monotonous, repetitive, and tedious work in particular. It can help to optimize professional division of labor, raise

labor productivity, reduce human errors in operations, improve product quality, Adoption of new technologies will also reduce the workload of employees, alleviate job burnout, prevent product quality problems caused by human factors, reduce product quality costs, and improve product quality and operating efficiency. As a result, the applications of new technologies should eventually contribute positively to economic benefits of quality and business performance of enterprises.

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