A Socio-Technical System Perspective on Sustainable Organizational Effectiveness: A PRISMA Systematic Review

NOOR AZMAN BIN ALI[1], SAJJAD AHMAD[2] AMER HAMZAH[3] MUHAMMAD KASHIF[4] MD REAZ[51]

ABSTRACT

Background. In fast paced era of 21st century, attaining and maintaining organizational effectiveness is a challenging task for the leaders and strategists. This systematic review intended to assess the modes of achieving effectiveness, from the existing literature across various disciplines and backgrounds.

Methods. Relevant literature was identified from EBSCO, Web of Science, Scopus and ScienceDirect from their start to June 2019. Studies were selected on the basis of their relevance to organizational effectiveness and its determinants, especially in relation to sustainability in contemporary age. A sociotechnical system perspective was opted while reviewing and discussing the effectiveness studies.

Results. We identified 614 studies, of which 59 studies (12 countries) were used for the study. The study found various antecedents, predictors, barriers and outcomes of a sustainable organizational effectiveness. The study highlighted sociotechnical perspective introducing the social and technical subsystems in an organization, keeping in view the needs of industrial revolution 4.0. It was suggested that a synergy between social and technical subsystem may result in sustainable organizational effectiveness, effectiveness in context of higher education institutions.

Conclusions. A synergy between social and technical subsystems leads to sustainable organizational

Keywords: Sustainability, Organizational Effectiveness, Higher Education. Systematic Literature Review.

1. Introduction

The twenty first century' s fast paced technological advancement and an increasing awareness of sustainability has effected almost all the fields and aspects of individual and collective life. In such a networked and globalized economy, attaining and maintaining effectiveness has become highly challenging for the organizations, due to the increasing stakeholder demands. Today it is not sufficient for an organization to survive in the market, that it is effective and efficient. Rather the compliance criteria now also includes being socially and environmentally responsible (REF). The awareness of sustainability among the stakeholders has changed the meaning, scope and implications of effectiveness, which requires extensive research on the topic.

This detailed review of literature on organizational effectiveness (OE), sustainability and sociotechnical system (STS) perspective aims at providing updated view on the nature boundaries and current status of the subject matter. It is postulated that an awareness of organizational effectiveness in the sustainability and sociotechnical system perspective will help the scholars, managers, strategists and decision makers to enhance their efforts for organizational success without harming the planet and the environment, while being socially and technically updated and competitive. Although it first appeared in the medical sciences, the systematic literature review has become an established methodology in reviewing the accumulated knowledge in different fields. It is useful for scrutinizing and synthesizing a large volume of research on a specific topic or phenomenon, seeking to generate new insights from integrating

[1] 1,2,3 : Faculty of Economics, Universiti Putra Malaysia
4: Faculty of Economics and Management Sciences, Minhaj University, Lahore
5: School of Business, Western sydney University

empirical evidence, identifying knowledge gaps and inconsistencies, and setting directions for future research.

In this study, we aimed to illustrate the steps for developing a rigorous systematic review in business and management research. We show examples of the different steps, stages, and activities involved in this approach, and discuss the various decisions we made throughout our research journey. Moreover, we provide learned lessons, highlight caveats, and offer suggestions and guidance for enhancing the rigor of future systematic literature review research. Tthis process opens up scope for reflecting upon its shortcomings and for questioning novel research avenues contributing to furthering theoretical development. The remainder of this paper is structured as follows: Section 2 explains our methodological approach; Section 3 scrutinizes our findings; Section 4 discusses the results; and Section 5 concludes this article, by discussing opportunities for future research. In the process of achieving effectiveness, the organizations face numerous social (Schuler & Cording, 2006) and technological challenges (Nguyen et al., 2015). So the stakeholders have high concern for the organizational effectiveness of their organization(Nguyen et al., 2016).

2. Methods

2.1. Literature Search Strategy

This systematic review on sustainable organizational effectiveness was conducted with sociotechnical system perspective by using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). An extensive search was done on four management online resources i.e. EBSCO, Web of Science, Scopus and ScienceDirect from the 1st of January 1998 to the 20th of September 2019. Our main aims were to: (1) provide a comprehensive view of organizational effectiveness, (2) provide a sociotechnical perspective on organizational effectiveness, and , (3) to identify sustainability issues associated with organizational effectiveness (OE). To attain the highest possible level of sensitivity in the research strategy, the term “sustainability” was combined with “(organizational effectiveness OR performance)”, “sociotechnical system” with “(organizational effectiveness) OR (performance)” as key words. The reference lists of all included articles, previous literature reviews on the topic and top hits from Google Scholar were reviewed for further identification of potentially relevant studies and were assessed using the inclusion and exclusion criteria.

2.2. Selection Criteria

The eligibility criteria for this present systematic review consisted of the studies which investigated organizational effectiveness with its various dimensions, models and criteria, sustainability issues and factors in organizational effectiveness and sociotechnical system perspective ir relation to organizational effectiveness. Initially, skimming was done as the primary stage of review, by reviewing the titles and abstract of all available articles. Moreover, articles discussing a combination of OE and sustainability and OE with STS perspective were reviewed.

Exclusion criteria for systematic review included studies on sustainability, other than business management background, like in agriculture, and environmental studies. We also excluded studies on sociotechnical system which were conducted in pure technical background and did not provide some insights for business management research. The duplicate studies and having poor methodology were also excluded. The under-review studies were limited to English language.

2.3. Data Extraction and Appraisal

The review data were extracted from the texts, tables and figure of selected article. Data extraction was performed through SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research type) framework. It included study title, year, research design, country, outcomes, findings and conclusions. All selected articles were reviewed thoroughly. The available themes and research frameworks were explored to propose new research avenues and frameworks.

Table 1: Extraction of Data by using SPIDER Framework

SPIDER Tool[a]		Search Terms
S	Sample	"employees" OR "manager*" OR "top management team*" OR "leader*" OR "stakeholder*"
P of I	Phenomenon of Interest	"sustainability" AND "organizational effectiveness OR performance", "sociotechnical system" AND "organizational effectiveness OR performance"
D	Design	"questionnaire*" OR "survey*" OR "interview*" OR "focus group*" OR "case stud*" OR "observ*"
E	Evaluation	"view*" OR "opinion*" OR "observ*" OR "contend*" OR "belie*" OR "state*" OR "proclaim*" OR "argue*"
R	Research Type	"quantitative" OR "qualitative" OR "mixed method*"

[a][S AND P of I] AND [(D OR E) AND R]

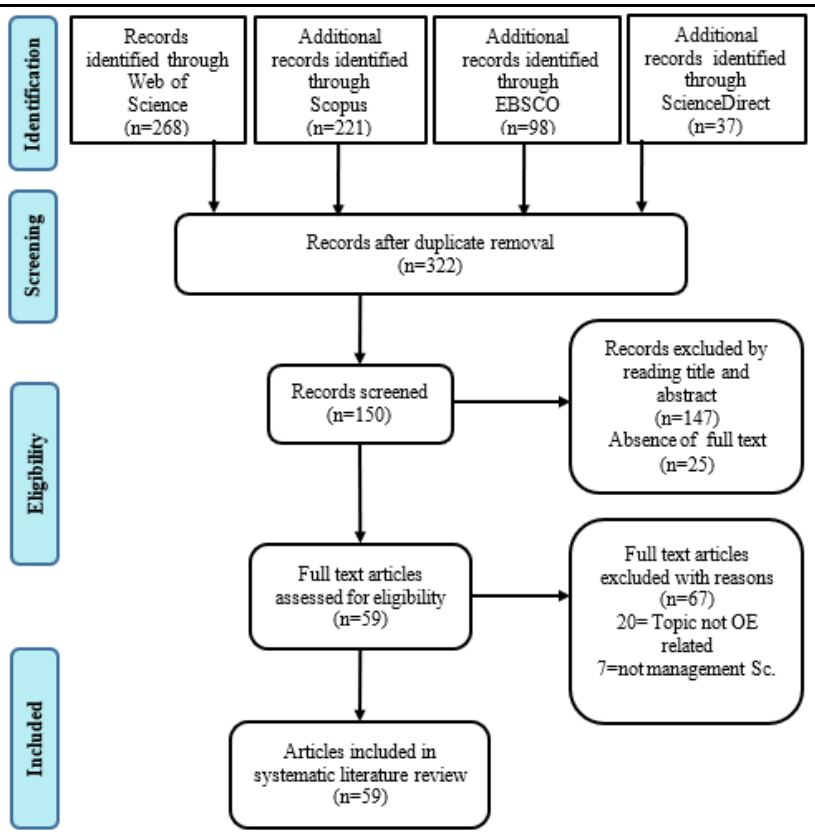

Figure 1: PRISMA Process of the study

3. Results and Discussion

At the sampling stage systematic reviews was used as a key mechanism to promote diversity of knowledge in a certain domain (Easterby-Smith et al., 2015). If conducted diligently, the process of inclusion or exclusion of theoretical contributions is not implicitly biased as in conventional approaches, that may underrepresent certain perspectives (Tranfield et al, 2003). We adopted a replicable and transparent process for inclusion or exclusion of references in the review, which consequently provided audit trails to question the employed criteria and the identified conclusions (Pittaway et al., 2004). The process started by collecting and analysing bibliometric data to inform the initial sampling of papers for the review. Bibliometric analysis scrutinizes published data, measuring text content and bibliographic information such as authorship, affiliation, citations, and keywords (Bellis, 2009). It can be used to describe, evaluate and monitor the state of a field over time. We employed it to identify the most cited journals, scholars, and keywords to choose a sample capable of informing about these prevailing theoretical foundations. As we aimed to obtain a comprehensive historical perspective of the literature, at this stage, we did not filter our data collection by date, geography or discipline. Data was collected from the Web of Science database in January 2018, following recommendations of Webster and Watson (2002). As literature recognizes that incremental and standalone changes in sociotechnical systems will not be sufficient to address sustainability challenges, our first focus was on theories covering wide-scale sociotechnical systems for organizational effectiveness. We then searched for the strings "sociotechnical" OR "organizational effectiveness" OR "sustainable performance". We also checked for an alternative, hyphenated spelling of the word sociotechnical (i.e. socio-technical).

At identification stage, The resulting dataset of 624 records first checked for duplicates and 322 articles were attained after duplicate removal. At eligibility stage 147 Records excluded by reading title and abstract, whereas 25 records were removed due to absence of full text and 150 records were found eligible for thorough reading. While reading as a second part of eligibility stage, 67 articles were found to have very less or no relevance. 20 articles were found with misleading or irrelevant titles and 7 articles were found not related to management science field. Thus 59 articles were included in this study using PRISMA. At Analytical Stage Most academic endeavours are focused on extending the coverage of literature, or filling gaps that have been neglected by previous research (Alvesson and Sandberg, 2011) rather than challenging embedded foundations of existing theories. Since this research aims at revealing theoretical foundations, it follows the approach introduced by Whetten (1989). Based on an extensive review of these these selected articles, the upcoming analytical discussion is presented.

4. Organizational Effectiveness

Organizational Effectiveness (OE) has been viewed as the most important but at the same time one of the most problematic concepts, when it comes in term of measurement, methodology and practical application in public sector organizations (Coulter, 1979) Several perspectives and approaches have been articulated by different authors including (Campbell et al., 2017) (Cameron, 1978), (Price, 1972), (Yuchtman & Seashore, 1967) (Quinn & Rohrbaugh, 1981) and (Chelladurai, 1987). These perspectives can be divided into five major approaches: the goal attainment model, the process model, the multiple constituency models.

Table 2: Approaches to Organizational Effectiveness, criteria and conditions for use

Model	Effectiveness defined	Effectiveness Criteria	Author	Condition for use
Goal attainment model	The extent to which goals are accomplished	Productivity, efficiency	Price et al. (2017), Harkin et al. (2016)	Goals are clear, consensual, time bounded, measure-able; eg. production companies
System Model				
Human relations Approach	Employee Satisfaction	Morale, Cohesion	Pfeffer and Villeneuve (1994), Huselid (1995)	A clear connection exists between human resources and performance
Internal process approach	Smooth Internal Functioning	Stability, Control	Kataria et al. (2013). Steers (1975).	The organizational functions are mainly based on internal process.
System resource approach	Acquisition of resources from environment	Resource Acquisition, Flexibility	Yuchtman and Seashore (1967). (Muczyk, 2004)	A clear connection exists between inputs, processes and performance
Sociotechnical system	Synergy among socio and technical aspects of organization	Resource Acquisition, system functionality	Trist (1981) Appelbaum (1997).	A connection exists between organizational performance and sociotechnical aspects.
Multiple constituencies model	Satisfaction of all Constituencies, strategic	constituencies Satisfaction	Connolly et al. (1980). Pathak and Singh (2013).	Constituencies have a powerful influence on the organization, and it must respond to demands.
Competing values model	Integration of above definitions' effectiveness	Change in above criteria over time and space	Quinn and Rohrbaugh (1981), Oz et al. (2015)	The organization is unclear about its own criteria or change in criteria over time is of interest.
High performing systems	Comparatively better than other similar organizations	excellence relative to other organizations	Pasmore (1988) Huselid (1995)	Comparison among similar organizations is desired
Ineffectiveness perspective	Removal/ absence of ineffectiveness	Absence of characteristics of ineffectiveness	Cameron (1984) Scheerens (2016)	Ineffectiveness is measurable and identified

5. Sustainability in Organizational Effectiveness

There is globally rising trend to hold the organizations accountable for environment and society. Less people and nations accept the financial performance as a sufficient criterion of organizational effectiveness. National and international agencies insist on reports covering the organizational impact on the ecosystem and environment at large. Furthermore, the stakeholders require the organizations to be competitive in the technologically advanced world by adopting new and innovative ways to revitalize the competitive advantage as per requirements. In recent years, the organization science field has increased its focus on how an organization effects the wellbeing of its employees, society and environment while being efficient and effective in its operations.

A sustainable perspective of organizational effectiveness evokes various issues related to organization design, leadership, talent management and organization development. It necessitates an entirely new mindset to manage evaluate and change the organization. An appraisal of globally preferred organization designs to select best suitable one, and a recurring process of change is required to meet with the continuous change requirements of the rival market and in the environment. Historically, the sustainability awareness can be attributed to the report titled "our common future" by WCED (1987), which provided the most accepted definition of sustainability by citing "Sustainable development is the aiming needs of the present without compromising the ability of future generations to meet their needs". Elkington (1994) explained the concept of sustainability with triple bottom line (TBL) highlighting the importance of planet, people and profit at once. TBL directed the focus towards three dimensions of a company performance financial, social and environmental, instead of only emphasizing on maximizing the profit at the cost of ozone layer, labor or rainforest.

This concept of sustainability was further developed and enhanced as the Quadruple Bottom Line (QBL) in **2014,** adding up the fourth element of purpose to the mix. QBL necessitates transparency of the three bottom lines (planet, people, profit) and emphasizes the significance of purpose to be employed in the organization as culture and spirituality. Thus, sustainable development of a firm is first based upon cultural continuity and cultural wellbeing of the employees, by considering culture in all strategic endeavors and policies. Second, it is based on the notion of spirituality, which is humanity based and has a wider context than religious boundaries. It adds meaning to one's life and motivates him to excel in the workplace. This awareness of purpose in life is ever increasing, and more and more employees now demand for it in their professional life. Hence, for an organization to achieve sustainable effectiveness, it is necessary to be responsible for all the four dimensions of QBL, including purpose, people, planet and profit.

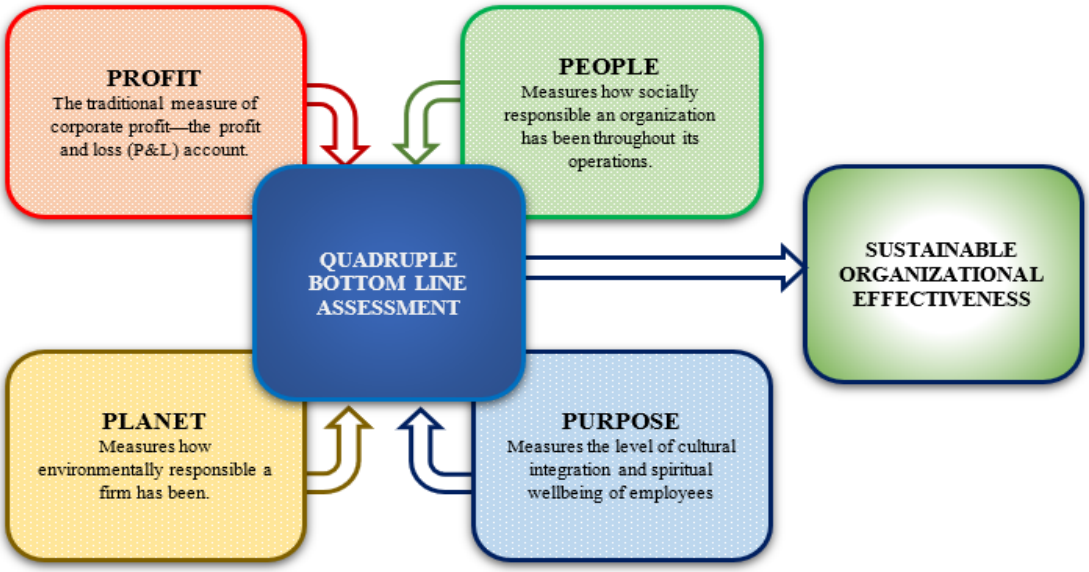

Figure 0.2: Quadruple Bottom Line (QBL) Perspective on Sustainable Organizational Effectiveness

In this way, the sustainability factor with Quadruple Bottom Line (QBL) concept has enhanced the effectiveness criteria and has necessitated for the firms and the strategists to not only think and plan for themselves but to consider also their employees and environment with the lens of their core objective and purpose. This purposeful way of thinking will make them more beneficial for the people and the environment and their profit will also be sustainable once their firm is considered as responsible for all the four dimensions of QBL. On the other hand, the critiques of sustainable effectiveness argue that this notion has become so complex and inclusive the strategists and policy makers can rarely be able to get guidance from it. Lafferty (2006) termed sustainability as democracy and proclaimed that it is that "universally desired, diversely understood, extremely difficult to achieve, and won't go away". Some of the scholars contended that sustainability is losing its relevance for commercial and profit oriented organizations for example how culture and spirituality can be measured for their contribution towards profitability or rate of return (Hopwood et al., 2005; Redclift, 2005).

6. Sociotechnical System Perspective

There are various perspectives and points of views about organizational effectiveness. System approach is one of the most pervasive concepts. System theory was initially proposed by (Bertalanffy, 1950, 1956) and was extended to management by Talcott Parsons (1951) and Trist (1981). Socio-technical system (STS) theory suggests that a fit is required between the two components of every organization, first the technical sub-system and the other social sub-system, for the system to be effective (Mumford, 2003). The theory presents two fundamental assumptions. First, the interaction of social and technical factors leads an organization to

success or a failure. Such interaction may be a predictable or contrived relationship between cause and effect, or it may be a complex unpredictable non-linear relationship. Second, isolated optimization of only socio or technical aspect, will not only increase the unpredictable relationship but will also negatively affect the organizational performance (Hazy, 2006). Hence sociotechnical theory emphasizes that organizational effectiveness can be attained if both technological excellence and human performance are synergized in a coherent way (Cooper & Foster, 1971; Pasmore et al., 1982).

It is very consensual within literature that innovations are not isolated events: they should be seen in the light of co-evolving systems (Freeman and Soete, 2000). The most important property of system thinking is that a system is more than the sum of its parts, and these parts are interconnected into complex structures (Meadows, 2008; Seiffert and Loch, 2005). The basis of system thinking is thus seeing "wholes": investigating entire systems within a boundary, understanding their components, functions, and interconnections (Senge, 1990). It is widely accepted that systems are characterised by feedback loops, self-organization, and hierarchies. Feedback loops are closed chains of causal connections that can be either sources of (in)stability, (dis)continuity or resistance to change. Self-organization describes the ability of systems for self-structuring to learn, diversify, and become more complex over time. However, self-organization also tends to create resilience towards radical changes, as systems tend to keep coherence in their functions. Systems often involve hierarchies too, with arrangements between systems, subsystems, and their components. The trade-off between autonomy and coordination in hierarchical systems is rather complicated, potentially constraining or fostering subsystems. It is also important to highlight that, as resilience, self-organization, and hierarchy are the main reasons dynamic systems work so coherently, intervening in these properties can drastically influence the system's ability to function (Blizzard and Klotz, 2012; Meadows, 2008). The literature presents some sources of tension, in what regards distinct analytical characteristics and the proposition of different pathways. This includes, for example, regime transformation (Van de Poel, 2000), technological revolutions (Perez, 2002), system innovation (Elzen et al., 2004) and sociotechnical transitions to sustainability (Geels and Schot, 2007). However, despite conceptual specificities, these perspectives share the understanding that systems are changed through interconnected changes within self-reinforcing domains of technology, the economy, institutions, behaviour, and cultural systems (Rotmans et al., 2001).

7. Limitations and future research

Our approach has the following limitations. Our data was initially collected from the Web of Science database and was subsequently expanded through snowballing. Therefore, relevant publications not covered by the database are not included in the initial sample. This also applies to publications at the margins of the research field that have not been sufficiently cited. Furthermore, our content analysis was conducted in a structured and systematic fashion but involves some levels of subjectivity in defining relevant extracts through codification. An empirical quantitative study to explore the theoretical underpinnings is recommended.

REFERENCES

Allport, G. W., Kluckhohn, C., Murray, H. A., Parsons, T., Sears, R. R., Sheldon, R. C., Shils, E. A., Stouffer, S. A., & Tolman, E. C. (1951). *Toward a general theory of action*: Harvard University Press.

Appelbaum, S. H. (1997). Socio-technical systems theory: an intervention strategy for organizational development. *Management decision, 35*(6), 452-463. doi:https://doi.org/10.1108/00251749710173823.

Bertalanffy, L. V. (1950). An outline of general system theory. *British Journal for the Philosophy of science*.

Bertalanffy, L. V. (1956). General system theory. *General systems, 1*(1), 11-17.

Cameron, K. (1978). Measuring organizational effectiveness in institutions of higher education. *Administrative Science Quarterly*, 604-632.

Cameron, K. S. (1984). The effectiveness of ineffectiveness: A new approach to assessing patterns of organizational effectiveness *Research in organizational behavior, 6*, 235-285.

Campbell, H., Strawser, M. G., Sellnow, D. D., & Religion. (2017). Addressing the Leadership Crisis through Servant-Infused Pedagogy in the College Classroom. *Journal of Communication, 40*(2), 43-60.

Chelladurai, P. (1987). Multidimensionality and multiple perspectives of organizational effectiveness. *Journal of Sport Management, 1*(1), 37-47.

Connolly, T., Conlon, E. J., & Deutsch, S. J. (1980). Organizational effectiveness: A multiple-constituency approach. *Academy of Management Review, 5*(2), 211-218. doi:https://doi.org/10.5465/amr.1980.4288727. .

Cooper, R., & Foster, M. (1971). Sociotechnical systems. *American Psychologist, 26*(5), 467. doi:http://dx.doi.org/10.1037/h0031539.

Coulter, P. B. (1979). Organizational Effectiveness in the Public Sector: The Example of Municipal Fire Protection. *Administrative science quarterly, 24*(1).

Elkington, J. (1994). Towards the sustainable corporation: Win-win-win business strategies for sustainable development. *California management review, 36*(2), 90-100. doi:https://doi.org/10.2307%2F41165746.

Harkin, B., Webb, T. L., Chang, B. P., Prestwich, A., Conner, M., Kellar, I., Benn, Y., & Sheeran, P. (2016). Does monitoring goal progress promote goal attainment? A meta-analysis of the experimental evidence. *Psychological bulletin, 142*(2), 198. doi:http://dx.doi.org/10.1037/bul0000025

Hazy, J. K. (2006). Measuring leadership effectiveness in complex socio-technical systems. *Emergence: Complexity and Organization., 8*(3), 58. doi:https://doi.org/10.emerg/10.17357.35c842ca4c07405f1dd3545d3321f38f

Hopwood, B., Mellor, M., & O'Brien, G. (2005). Sustainable development: mapping different approaches. *Sustainable development, 13*(1), 38-52.

Huselid, M. A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal, 38*(3), 635-672.

Kataria, A., Rastogi, R., & Garg, P. (2013). Organizational effectiveness as a function of employee engagement. *South Asian Journal of Management, 20*(4), 56.

Lafferty, W. M. (2006). *Governance for sustainable development: the challenge of adapting form to function*: Edward Elgar Publishing.

Muczyk, J. P. (2004). A systems approach to organizational effectiveness: The alignment of critical organizational dimensions with selected business/competitive strategies. *Journal of Comparative International Management, 7*(1).

Mumford, E. (2003). *Redesigning human systems*. Covent Garden London, United Kingdom Information Science Publishing, IGI Global.

Nguyen, Mia, L., Winata, L., & Chong, V. K. (2016). Effect of transformational-leadership style and management control system on managerial performance. *Journal of Business Research*. doi: https://doi.org/10.1016/j.jbusres.2016.08.018.

Nguyen, Newby, M., & Macaulay, M. J. (2015). Information technology adoption in small business: Confirmation of a proposed framework. *Journal of Small Business Management, 53*(1), 207-227. doi:https://doi.org/10.1111/jsbm.12058.

Oz, M., Kaya, F., & Ciftci, I. (2015). Evaluating the Organizational Culture Types of the 5-Star Hotel's in Istanbul in terms of the Cameron & Quinn Competing Values Model. *Journal of Yasar University, 10*(40).

Pasmore, W., Francis, C., Haldeman, J., & Shani, A. (1982). Sociotechnical systems: A North American reflection on empirical studies of the seventies. *Human relations, 35*(12), 1179-1204.

Pasmore, W. A. (1988). *Designing effective organizations: The sociotechnical systems perspective* (Vol. 6): John Wiley & Sons Inc.

Pathak, P., & Singh, A. (2013). A review study on the approaches and criteria for the assessment of organisational effectiveness. *Management Insight, 9*(1).

Pfeffer, J., & Villeneuve, F. (1994). *Competitive advantage through people: Unleashing the power of the work force* (Vol. 61): Harvard Business School Press Boston, MA.

Price, J. L. (1972). The study of organizational effectiveness. *The Sociological Quarterly, 13*(1), 3-15. doi:https://doi.org/10.1111/j.1533-8525.1972.tb02100.x.

Price, J. L., The, S., Quarterly, S., & Winter, N. (2017). The Study of Organizational Effectiveness The Study of Organizational Effectiveness *. *13*, 3-15. doi:https://doi.org/10.1111/j.1533-8525.1972.tb02100.x.

Quinn, R. E., & Rohrbaugh, J. (1981). A competing values approach to organizational effectiveness. *Public productivity review*, 122-140. doi:https://doi.org/10.2307/3380029.

Redclift, M. (2005). Sustainable development (1987–2005): an oxymoron comes of age. *Sustainable development, 13*(4), 212-227.

Scheerens, J. (2016). Theories on educational effectiveness and ineffectiveness. In *Educational effectiveness and ineffectiveness* (pp. 259-289): Springer.

Schuler, D. A., & Cording, M. (2006). A corporate social performance–corporate financial performance behavioral model for consumers. *Academy of Management Review, 31*(3), 540-558.

Steers, R. M. (1975). Problems in the measurement of organizational effectiveness. *Administrative Science Quarterly*, 546-558.

Trist, E. (1981). *The evolution of socio-technical systems*. Paper presented at the Conference on Organizational Design and Performance: Occasional paper.

WCED. (1987). *World commission on environment and development : "Our common future"*. Retrieved from https://idl-bnc-idrc.dspacedirect.org/bitstream/handle/10625/152/WCED_v17_doc149.pdf?sequence=1

Yuchtman, E., & Seashore, S. E. (1967). A system resource approach to organizational effectiveness. *American Sociological Review*, 891-903. doi:https://doi.org/10.2307/2092843.