



ELSEVIER

J. Eng. Technol. Manage. 18 (2001) 271–294

Journal of
ENGINEERING AND
TECHNOLOGY
MANAGEMENT
JET-M

www.elsevier.com/locate/jengtecman

Sociotechnical systems: towards an organizational learning approach

Eric Molleman*, Manda Broekhuis

*Faculty of Management and Organization, University of Groningen, P.O. Box 800,
9700 AV Groningen, The Netherlands*

Abstract

By means of three design principles (the sociotechnical criterion, the principle of minimal critical specification and the principle of joint optimization of the technical and social system), STS as a design theory is related to four organizational performance indicators (price, quality, flexibility and innovation). As a diagnostic theory, STS helps to find contingencies between environmental demands and work design. The diagnoses result in sets of STS practices. It is argued that as long as price and quality are the only important performance criteria, STS practices have little to offer and their contributions will be only at the job level. If flexibility is of importance, STS has much more to offer, on the job level as well as the organizational level. The same is true for when innovation is a relevant indicator, in which case STS practices may also help to ‘design’ processes, such as mutual trust among workers and diversity with respect to attitudes, abilities and cognitions. It is argued that the dominant performance indicators have changed in a cumulative way from efficiency, via quality and flexibility towards innovation and learning. In accordance with these changes, the STS principles are extended with the concept of organizational learning. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Sociotechnical systems; Performance indicators; Organizational learning

1. Introduction

In this paper, we will present the sociotechnical systems (STS) theory as a diagnostic theory and as a design theory. We define STS as an integral theory of work design and quality of working life (QWL). By means of three principles of STS, we will diagnose what kind of work design may help organizations achieve four different patterns of performance indicators. In other words, with a specific pattern of performance indicators in mind, we will depict a work design contingent on these three principles. Considering STS as a practical

* Corresponding author. Tel.: +31-50363-3846; fax: +31-50363-2032.

E-mail address: h.b.m.molleman@bdk.rug.nl (E. Molleman).

design theory, we will examine whether STS practices, such as job enrichment, job enlargement and self-managing teams, fit in the diagnosis or whether non-STs practices seem to be more appropriate. Our primary aim is to contribute to the development of STS theory and more specifically to extend it to the phenomenon of organizational learning. Moreover, the links we make between performance patterns and the success of STS practices may aid the understanding of previous conflicting research outcomes.

In this section, we will systematically introduce our framework. First, we will describe the three diagnostic principles and following this we will consider four patterns of performance indicators. Since the early years of STS theory, many different organizational principles have been launched, which we may find, amongst others, in the works of Emery (1969, 1978), Herbst (1974), Cherns (1987), Pasmore (1988), and Pava (1986). We will determine the value of STS in terms of dealing with different performance indicators by means of three of these principles in particular, the sociotechnical criterion, the principle of minimal critical specification and the principle of the joint optimization of the technical and the social system.

The sociotechnical criterion deals with the control of variance and states that variances should be controlled as near to their point of origin as possible (Cherns, 1987). The sociotechnical criterion was incorporated in STS from systems theory, where it was referred to as ‘the principle of requisite variety’ (Ashby, 1969). According to this principle, to manage environmental demands successfully, an organization should have enough means to transform the input of information, materials and parts into the output that it desires, that is, only variety can beat variety.

The principle of minimal critical specification refers to the following: define as little as possible how a worker should perform tasks, but provide just enough directives to ensure that he or she is able to perform the task properly while still allowing for the employee’s personal contribution (Cherns, 1987; Morgan, 1986). This refers particularly to local autonomy and decentralized control, which will result in enriched jobs and empowered workers.

The joint optimization principle deals with the fact that STS endeavors to consider both the social and the technical system simultaneously. The technical system refers to the production structure, the technical equipment and to systems from the field of information and communication technology. The social system refers to human resources, job design and to the control structure.

We will discuss the relevance of STS in the light of four performance indicators: price, quality, flexibility and innovation. Kumpe and Bolwijn (1994) have discussed these performance indicators and have placed them in a historical perspective. They argue that until the 1960s, price was the only leading objective and that in the 1970s, quality also became an important indicator. In the 1980s, the need for flexibility grew and in this day and age, they consider innovation to be the major value-added criterion. Nowadays, more and more organizations have to deal with highly dynamic environments and complex and dramatically changing transformation processes, making flexibility and innovation key issues for most firms (Volberda, 1996). Kumpe and Bolwijn consider these performance indicators to be cumulative, that is, first only price was the leading indicator, then price and quality, and so on. We will follow this cumulative approach and we will not detract from their historical perspective, although we think that not all of the four performance indicators are significant

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات