



# An empirical study of shop floor tacit knowledge acquisition in Chinese manufacturing enterprises

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## Abstract

China's WTO entry has led to further market reforms and openness. China's manufacturing enterprises are realizing that they have to strive to survive in the increasingly competitive market. One of the ways to attain a better competitive edge is to use new technologies. However, research has found that there are many hurdles to successful implementation of new technologies. As the shop floor of a manufacturing enterprise is where most computerized and automated systems are located and used, this research focuses on the shop floor of China's manufacturing enterprises in the context of computerization and automation. This empirical study started out with four research hypotheses. The test of these hypotheses was conducted through a questionnaire survey. The research found that tacit knowledge acquisition (TKA) on the shop floor could be measured quantitatively. The study identified nine factors that are associated with TKA. Among them, "technical professionals" play a significant role on TKA. The study leads to the development of a set of quantitative models that can be used to predict, analyze, assess, and improve the quality of TKA and performance of shop floor.

## Relevance to industry

This empirical study is relevant to Chinese manufacturing industries including aircraft manufacturing, automobile, motorcycle, machine tool, diesel engine, crane, boiler, and electronics appliance.

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## 1. Introduction

Research into tacit knowledge acquisition (TKA) can be traced back to the study of intelligence. Intelligence is defined differently by different researchers such as Neisser (1979),

Gardner (1993), Eysenck (1994) and Valsiner and Leung (1994). To most of us, intelligence generally means the ability to learn, understand, think, create, and innovate. It is a conscious activity rather than an instinct.

For over one hundred years, there have been numerous studies on intelligence (e.g. Spearman, 1927; Thurstone, 1938; Wechsler, 1944; Guilford, 1967; Vygotsky, 1978; Sternberg, 1985; Boykin,

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1986; Sternberg and Kagan, 1986; Lave, 1988; Ceci, 1990; Horn, 1991; Armour-Thomas and Gopaul-McNicol, 1998). These studies have deepened our understanding of the nature and application of intelligence. In particular, the study of practical intelligence has great significance in real world settings (e.g. Sternberg, 1982, 1997; Sternberg and Caruso, 1985; Sternberg and Wagner, 1989; Sternberg, et al., 1993). Practical intelligence concerns problem solving, problem finding, and knowledge acquisition. For most situations, knowledge acquisition is the basis of problem finding and problem solving.

Knowledge, generally, may be classified into two kinds: academic knowledge and practical knowledge. According to Sternberg and Caruso (1985), “Academic knowledge, can be either procedural or declarative, but if it is procedural, it is procedural knowledge not relevant to one’s everyday life” while practical knowledge has “both real world relevance and procedural (action) consequence. Information that does not satisfy these two constraints is viewed as academic.” In contrast to academic knowledge, acquired through declarative instruction (e.g. in school), practical knowledge derives from practical know-how, experienced in situations where information is generally not openly or explicitly expressed (e.g. on a job). Another major difference between practical and academic knowledge is that: academic knowledge plays a primary role in solving academic problems (Chi et al., 1988), but in general, contributes much less to practical problem solving. In everyday situations, the key to solving problems appears to be informal or tacit knowledge. Tacit knowledge, an instantiation of practical knowledge acquired in situations where the information is not openly expressed (i.e. tacit), is, in turn, hard to articulate and as a result, usually not explicitly verbalized or taught. Tacit knowledge is a tangible factor in achieving success in the workplace (Colonia-Willner, 1999). Tacit knowledge is practical know-how that one picks up on a job or in everyday kinds of situations, rather than through formal instruction (Sternberg et al., 1993).

Sternberg et al. (1993) distinguished three kinds of workplace tacit knowledge: tacit knowledge about managing oneself, about managing others,

and about managing tasks. Tacit knowledge about managing oneself refers to the knowledge about the self-motivational and self-organizational aspects of work-related performance. Tacit knowledge about managing others refers to the knowledge useful in work-related interactions with one’s subordinates, superiors, and peers. Finally, tacit knowledge about managing tasks refers to the knowledge about how to do specific work-related tasks well. There are two contexts of tacit knowledge, depending upon the time frame within which the tacit knowledge would be used. A local context refers to a concern with short-term accomplishment. The focus is on the situation at hand, for example, how to carry out the tasks one faces on a given day. A global context refers to a concern with long-term accomplishment. The focus is on how the situation at hand fits into the bigger picture, for example, how to get a promotion. Two orientations of tacit knowledge can also be distinguished. One way to judge ideas, solutions and products is in terms of their idealistic or absolute quality, without regard to their practicality. A second way is to judge them in pragmatic terms, that is, in terms of how workable they are. Because the three kinds of tacit knowledge are orthogonal to the two contexts and two orientations, combining them would yield twelve ( $3 \times 2 \times 2$ )—element tacit knowledge “cube” (see Fig. 1).

The other question is how to measure tacit knowledge. Wagner and Sternberg (1985) devised a method of presenting scenarios to individuals that depicted the kinds of problems faced by people in a given life pursuit. Examinees make

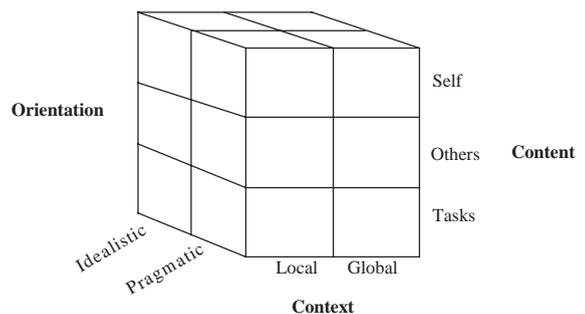


Fig. 1. The tacit knowledge framework (From Wagner and Sternberg, 1991).

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