Using TRIZ Systematic Innovation Methods for Redesign Services in Small and Medium Enterprises

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ABSTRACT

Small and Medium Enterprises (SMEs) in service sector take the lion share of the market compared to other sectors such as agriculture and manufacturing. The increasing number of SMEs in the service sector brought the competition in the market to its peak, which forced SMEs to invest in improving their services. However, solving service problems requires more resources such as skilled labor or research and development funds that might be limited for many SMEs. In this paper, we review the systematic innovation methods, TRIZ, for redesign services in Small and Medium Enterprises.

KEYWORDS
Service Redesign, Small and Medium-Sized enterprise, SMEs, Systematic Innovation

INTRODUCTION

According to Bayarcelik, Tasel, and Apak (2014), the management skills is the most important factors to support innovation inside SMEs. The innovation champion characteristics such as age, education, experience, and psychological traits strongly influence innovation adoption (Hazbo, Branka, Marinko, & Arnela, 2006), and plays a minor role in fostering innovation within the organization and generating variant solutions in order to solve the service problem (Bayarcelik et al., 2014; Dess et al., 2003; Man, Lau, & Chan, 2002). Therefore, any efforts to prompt SMEs owner’s skills in term of innovation, indeed it will improve the SMEs innovation capability.

Systematic innovation method such as TRIZ provides problem solvers with different tools/methods that can generate effective and innovative solutions with low cost. Even though the TRIZ was designed to be used in technical areas, current studies are focusing on using TRIZ in non-technical sectors such as the service sector (Chai, Zhang, & Tan, 2005; Chen, Shie, Wang, & Yu, 2015; El Hassan, 2014; Lin & Su, 2007; Regazzoni, Pezzotta, Persico, Cavalieri, & Rizzi, 2013; Retseptor, 2003; Ruchti & Livotov, 2001). Mann and Domb (1999) indicated that the power of TRIZ is in its ability to eliminate contradictions rather than using the conventional methods, such as compromises or trade-offs. In fact, solving contradiction problems usually produces innovative solutions (Hsia & Pu, 2013).

This paper presents the most common TRIZ tools/methods that can be used to improve the SMEs managers’ innovation capability for improving the method of solving their existing service problems in order to generate innovative solutions.

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TRIZ

TRIZ is Russian acronym for “Teorija Rezhenija Izobretatelskih Zadach” which means “The Theory of Inventive Problem Solving” (Rantanen & Domb, 2007). The founder of TRIZ is Genrich Altshuller, a Russian mechanical engineer, in 1946. Altshuller studied over than 400,000 patents in engineering systems and technologies and found that those patents had common patterns of evaluation (I. Ilevbare, Phaal, Probert, & Padilla, 2011). TRIZ has been used in Russia, but was not introduced worldwide until the late 1980s (Stratton & Mann, 2003).

TRIZ is a systematic innovation methodology for solving inventive problems, which means that the problem structure has at least one contradiction, and the solutions that can eliminate the whole or part of that contradiction are called the inventive solutions (Chai, Chuan, Liao, & Jun, 2012; Stratton & Mann, 2003). TRIZ offers resolving contradictions toolkit for identify problems in a system and generating better and effective ideas for overcoming the problem and further improvements (Ilevbare et al., 2011).

Main Tools/Techniques within TRIZ

Through the years of Altshuller and others’ empirical analysis, different tools/techniques have been developed in order to facilitate the creativity or inventive thinking (Koswatte, Paik, & Kumara, 2015; Teplov, Chechurin, & Podmetina, 2014). The terms of tools, techniques, and methods are used alternatively among TRIZ authors. However, the majorities use the term “tools” while they explain the TRIZ. Tools of TRIZ can be effectively used by others regarding to their ages (Bajwa & Mahto2, 2013). According to I. M. Ilevbare, Probert, and Phaal (2013), the main tools and techniques in TRIZ are:

- **40 Inventive Principles (IPS):** For solving technical and physical contradictions
- **76 Standard Solutions:** For solving problems based on eliminating undesirable interaction among two parts in the system, not contradictions
- **Effects Database:** For solving problems based on 2500 concepts obtained from the body of engineering and scientific knowledge
- **Separation Principles:** For solving problems that have physical contradictions though four techniques using the inventive principles
- **Contradiction Matrix:** For solving problems that have technical contradiction though 39 technical parameters using also the inventive principles to solve technical contradiction
- **Patterns of Evolution of Technical Systems:** For forecasting the future features of technology development
- **Ideal Final Result (IFR) and Ideality:** For searching about solutions without cost or harm
- **Fitting:** for searching about solutions through taking a step back from the IFR
- **Function Analysis:** For modeling system elements and uncovering the problems from their interaction with each other
- **Substance Field (Su-Field) Analysis:** Similar to function analysis but with a comprehensive map of the entire system to describe the exact problems. This tool needs a problem solver to have great technical knowledge compared with some other TRIZ tools
- **Analysis of System Resources:** For analysis of resources around the system to be utilized for providing the problem situations that are close as possible to the IFR
- **Nine Windows (Multi-Screen Diagram of Thinking):** for helping a problem solver to think in terms of time and space and understand how the problem can change over time
- **Creativity Tools:** For overcoming psychological inertia
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