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BUSINESS SERVICES INNOVATION: TRANSITION TO SUPERSYSTEM

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Abstract

It is well known that one of the major pillars of TRIZ foundations is that technical systems and engineering technologies develop in accord with certain generic trends and patterns of innovative development (often called as "evolution of technical systems"). Can similar patterns be found in the development of business systems and business services? The paper presents how the trend of transition to supersystem, specifically a line of mono-bi-poly evolution can be observed in the area of innovating business services.

Keywords: TRIZ, business innovation, service innovation.

Аннотация

Одной из фундаментальных основ ТРИЗ является то, что технические системы и инженерные технологии разрабатываются в соответствии с определенными законами и тенденциями инновационного развития (часто называемого «эволюция технических систем»). Возможно ли найти похожие принципы в разработке бизнес-систем и бизнес-услуг? Предлагаемая статья описывает известный в ТРИЗ метод перехода в надсистему, а более конкретно – линию эволюции «моно-би-поли», которая может применяться в области дальнейших инноваций бизнес-услуг.

Ключевые слова: ТРИЗ, бизнес инновации, инновации услуг.

1. Introduction

Despite the long history of studies of development of technical and engineering innovations, studies of business innovations have been a relatively new area. During the age of dominance of industrial progress, the role of business was primarily to aid creation and distribution of material wealth. Very different industrial companies used the same business models, while the same business models were used by various business organizations: targeted at either supporting industrial ones or providing business and public services: for example, banking or insurance services.

Transition to knowledge and digital economies, further globalization of production and distribution of goods and services strongly increased competition on a broad scale and forced both industrial and service delivering organizations to seek new ways to differentiate and add value. Developing innovative ways to provide service operations, marketing and sales of ser-

vices, dealing with suppliers, establishing new value networks became common for both small and large organizations. One can say that today, business innovation becomes as critical as engineering innovation.
Business innovation is a lot more diverse than technology and engineering innovation. There are many categories of business innovation: innovation of business models, business processes, business organizations, value networks, and so forth. Services are a large part of modern economy which experiences continuous growth. According to [1] services' value added accounted for 74 percent of GDP in high-income countries in 2015 versus 69% in 1997.

As any other category of business, the area of business services becomes highly competitive. Creation of new services and innovative improvement of existing ones which are delivered by business organizations becomes critical for survival. No doubt, innovation of business services becomes an area of study to understand how to perform this process more efficiently and effectively [2], [3], [4].

The goal of this paper is to explore how service innovation can be supported with TRIZ. Since TRIZ has broad body of knowledge, we limited ourselves to studying how one of the TRIZ Trends of Technical Systems Evolution known in classical TRIZ as "*The Law of Transition to Supersystem*" can be applied to systematically innovate new services.

2. TRIZ and Services Innovation

2.1. Service Innovation: Types

In general, a service is defined as "*the action of helping or doing work for someone*" [5]. With respect to business, a service can be defined as "*Any activity or benefit that one party can offer to another that is essentially intangible and does not result in the ownership of anything*" [6]. Each specific service provides a certain solution to customer needs. It has a clearly stated goal and provides means which deliver specific functionality needed to repeatedly meet the goal. Services can range from very simple actions performed personally without any tools towards complex systems supporting multiple processes and including complex machinery. Services can involve human labor and be partially or fully automated. Modern services are usually combination of processes and technical products where technical means are used to either support some process (e.g. using a truck to accelerate food delivery, or using Internet for online bank transactions) or are essential parts of a service without which the service would not be possible (e.g. city bus service or bike rental service).

One can distinguish between two large categories of business service innovation:

1. *Existing business service innovation*. These innovations neither suggest new solutions to customer needs, nor change goals of existing services. Such innovations deal with improvement of service performance or customer interface, further market expansion of specific services, costs reduction, change of business models defining how services are organized and delivered, and so forth.
2. *New business service innovation*. This category of innovation deals with adding value through proposing and designing new types of services, novel ways of integrating existing services, and transformation of existing services to add new value.

It is obvious, that the first category might include all known types of innovation: technology innovation, product innovation, process innovation, market innovation, etc., and results can be either beneficial for an organization or for a customer, or both. For example, radical costs cutting of processing insurance claims can be considered as internal innovation which brings

benefits to the service organization only. The second category focuses on discovering new solutions that can be implemented as new value propositions through introducing new service or by disruption of an existing service with respect to customer needs.

2.2. The Use of TRIZ

The use of TRIZ to hep service innovation can be manifold. First, classical (technical) TRIZ can be used to innovatively improve technical means which support services. Second, specific business problems and challenges can be attacked by a specific version of TRIZ developed and adapted for dealing with business and management systems and products [8], [9], [10].

Regarding TRIZ applications within services industry, up to date the progress has been rather slow and therefore, there is a limited number of cases available. One of the first publications on the topic provided examples of innovations in service operations management for the most popular TRIZ technique: 40 Inventive Principles [11]. Other publications present case studies of applying TRIZ within different types of services: eco-innovation [12], canteen operation [13], online application software services [14], hospitality industry [15], tele-healthcare [16], "ageing-in-place" service for senior citizens [17]. Each case (except [15]) presents the use of original Contradiction (Altshuller) Matrix with 40 Inventive Principles to generate new solution ideas through discovery and elimination of contradictions. In some cases, Ideal Final Result [16] and TRIZ-based Function Analysis were used [16], [17]. A new approach to designing a contradiction matrix specifically for service industry was proposed in [15]. However, the effectiveness of the new matrix still must be verified.

Another big area of interest rather than solving existing problems which present in the service industry is invention of new services. The assumption has been made that there are generic trends and patterns of services evolution, which are similar to the patters describing evolution of other types of men-made systems.

3. Services: Transition to Supersystem

3.1. The TRIZ Law of Transition to Supersystem

The Law of Transition to Supersystem was formulated by G. Altshuller in [7] as one of the universal trends of technical systems evolution: "*Upon exhausting resources of development, a system becomes a part of a supersystem as one of its parts; and further development of the system continues within its supersystem.*" A typical example is a smartphone which combines several systems which were independent before integration: mobile phone, camera, handheld computer. One must note that modern understanding of the law of transition to supersystem is broader than originally formulated: waiting till resources will be fully exhausted is a particular case of becoming a part a part of a supersystem since integration may happen earlier to meet some specific goals: sharing energy source, providing mobility, and so forth. In such cases, both a standalone system and a system which became a part of a bigger system can continue their development independently.

Apart from sharing resources, combination of systems to bi- and poly-systems might provide other type of benefits, for example, emergence of a new property which does not belong to any of systems which are brought together. A well-known example is a catamaran: a single boat does not provide the high degree of stability during the ride while two joined boats considerably increase it.

The system of the universal trends of technical systems evolution is not static, it is continuously updated. Currently, there are several versions of the system of the trends suggested by different TRIZ developers, e.g. [16] or [17] which have slightly different modifications. According to [17], the Law of Transition to Supersystem defines a general line of evolution (Fig. 1).

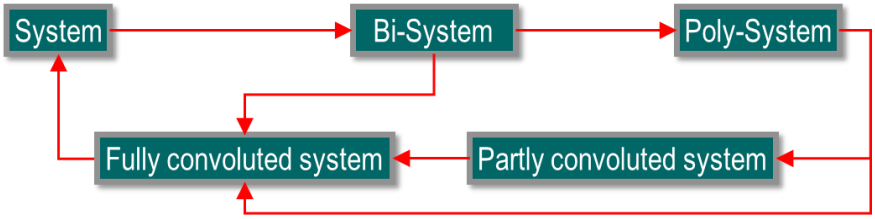

Fig. 1. General simplified line of transition to Supersystem: “Mono-bi-poly”.

In this model:

- *Mono-system*: a single system delivers some main function.
- *Bi-system*: a system delivers either improved or extended functionality and consists of two identical, similar or competing systems (competing systems deliver the same function but the ways of delivery differ).
- *Poly-system*: a system delivers either improved or extended functionality and consists of more than two identical, similar or competing systems.
- *Partly convoluted system*: a system which delivers functionality of previous bi- or poly-system but without some system which was a part of the system in the past.
- *Fully convoluted system*: a system which delivers functionality of previous bi- or poly-system but presented by a single (mono) system.

In turn, bi- and poly-systems can be:

- *Mono-functional*: integrating systems that have the same function.
- *Poly-functional*: integrating systems that have different or opposite functions.

The complete evolution model “mono-bi-poly” is presented in Fig. 2.

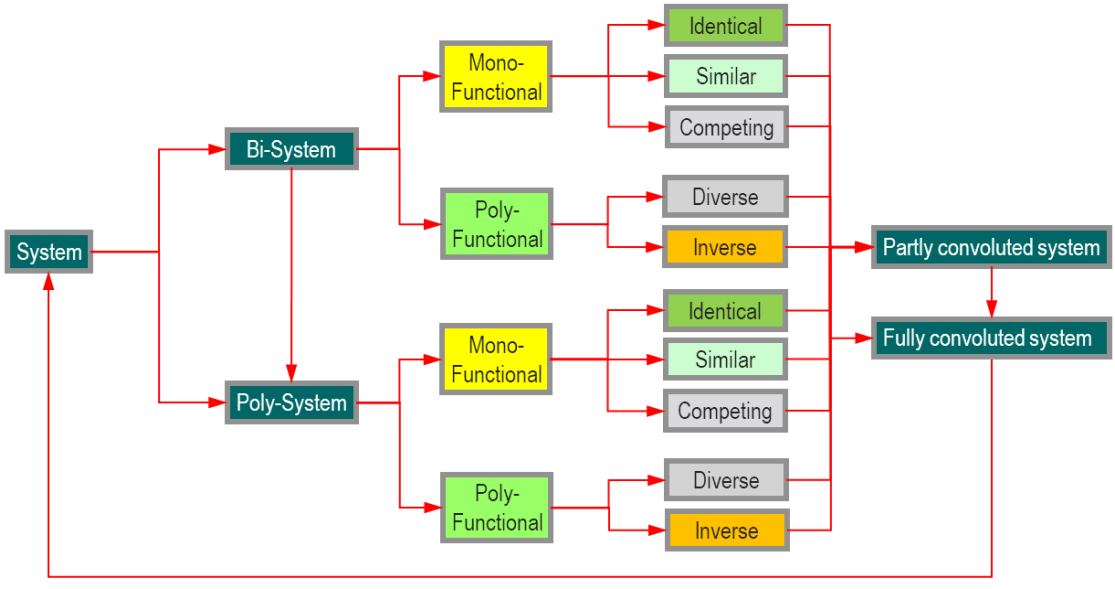

Fig. 2. Complete line of transition to Supersystem: “Mono-bi-poly”

Convolution is a next step of evolution when a bi- or a poly-system transforms back to a mono-system or a bi-system which includes a lower number of integrated systems (subsystems) but without losing functionality and qualities provided by a previous bi-system or a poly-system.

3.2. The Law of Transition to Supersystem for Services

A service can be presented by several key descriptors (Fig. 3):

- ***Goal*** defines why a service exists. Goal always specifies demands of a supersystem. For example, a goal of a restaurant is to provide high-quality meals to customers in a specific place.
- ***Main Function*** defines how the goal of a service is delivered at functional level. Main function of the restaurant is to serve ready to eat meals to customers. Note that the same function can be delivered by other types of services: fast food outlets, cafeteria, take away service, and so forth.
- ***Context*** defines specific conditions of a service. Meals can be served in different ways. The traditional restaurant service provides clean environment, high level of interaction with customers, quality dishware and specially designed interior and atmosphere while fast food outlet uses minimum interactions and plastic or paper dishware.
- ***Target Audience*** presents details of customers of service. The customers or traditional restaurants prefer dining out in a slow and cozy environment.

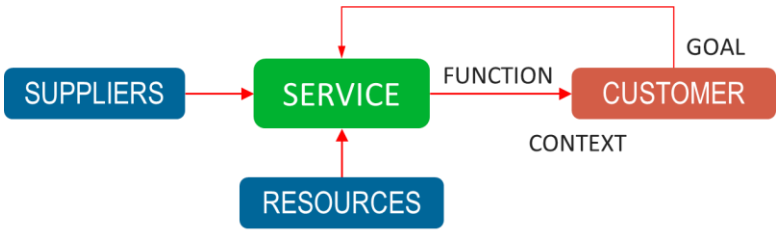

Fig. 3. A generic model of a service

3.3. Model of Transition to Supersystem for Services

Next, let us consider example of evolution of a restaurant according to the model presented in Fig. 2 but applied to services (Fig. 4). Assume, a restaurant starts a typical business: preparing and serving meals to customers. Like a “mono-system”, it can be considered as “mono-service”. As mentioned above, the main function of the restaurant is to serve high-quality prepared meals to customers. Transition to bi-service would be opening another restaurant. However, the bi-service can be created by adding a new service within the same restaurant which is either identical, or similar or different to the existing one: say, the restaurant adds meeting facilities in addition to serving meals. Poly-services, in turn, would require more services delivered by a restaurant, for example, serving meals, providing meeting facilities, and providing take away service. In the next subsection, examples of such combinations according to the evolution line of transition to supersystem will be shown.

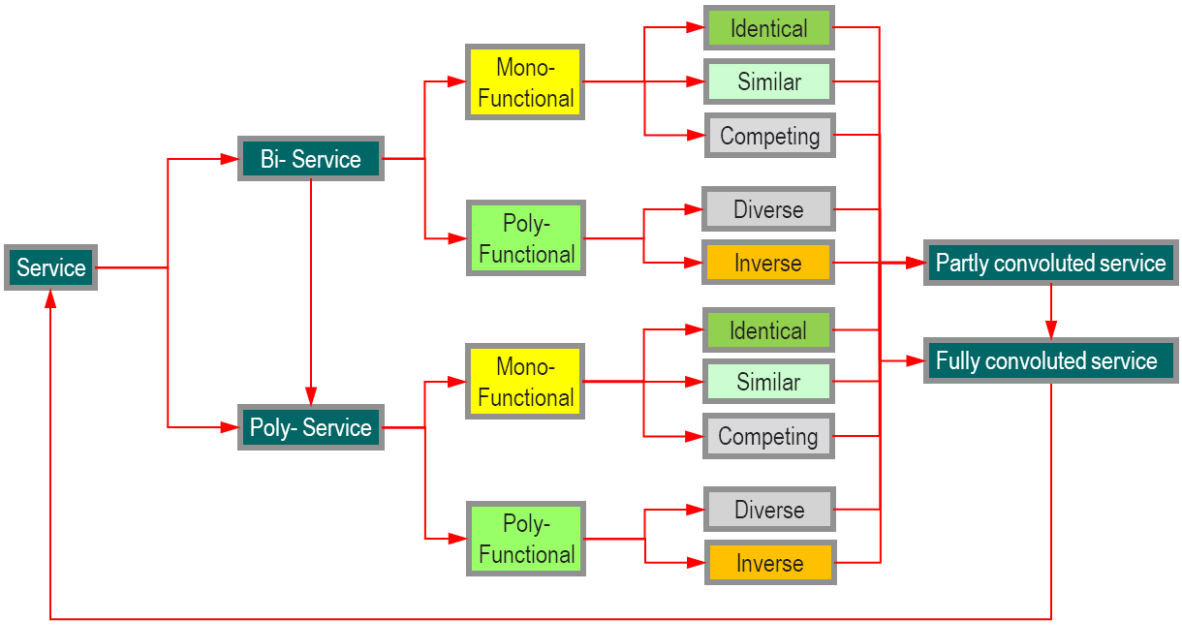

Fig. 4. Complete model of transition to Supersystem for services: “Mono-bi-poly”

3.4. Examples of Transition to Supersystem for Services

The following “mono-bi-poly” evolution of services in a restaurant can be observed:

Transition to bi-service:

- *Identical mono-functional*: a company running the restaurant opens another restaurant in a different part of a city.
- *Similar mono-functional*: the company opens the second restaurant which prepares different meals. Now, for example, the first restaurant serves local cuisine while the second restaurant serves Italian cuisine.
- *Competing mono-functional*: the company opens a fast-food outlet in addition to the restaurant. The function of the outlet remains the same as the function of the restaurant but is based on a different principle: preparing food from precooked ingredients to accelerate the process of delivery of meals.
- *Diverse poly-functional*: A company opens a food store in addition to the restaurant.
- *Inverse poly-functional*: A company opens a gym in addition to the restaurant. In this case the functions are opposite: if restaurant provides meals which help to gain calories, the gym helps to get rid of them.

Transition to poly-service:

- *Identical poly-functional*: a company opens a chain of identical restaurants in a city.
- *Similar poly-functional*: the company which has a chain of restaurants introduces differentiation depending on a type of cuisine offered at each restaurant: Italian, Japanese, Hungarian, etc.
- *Competing mono-functional*: in addition to a restaurant, the company opens a fast-food outlet and cafeteria.
- *Diverse poly-functional*: A company opens a food store and a bookstore with food-related literature in addition to the restaurant.

- *Inverse poly-functional*: A company opens a chain of gyms in addition to the chain of restaurant.

Examples of convolution:

- Restaurant combines usual meals service with a possibility to purchase some prepared meals and some ingredients acting as a food store.
- Rather than having a separate fast food outlet, a selection of meals that can be prepared fast is placed in a different "fast service" menu and delivered in a section of the same restaurant.
- Rather than opening a second restaurant, the restaurant can offer two types of menus: of a local cuisine and some other, for example, Italian cuisine.

Another examples of convolution of bi- and poly-services for short-time accommodation are shown in Fig. 5.

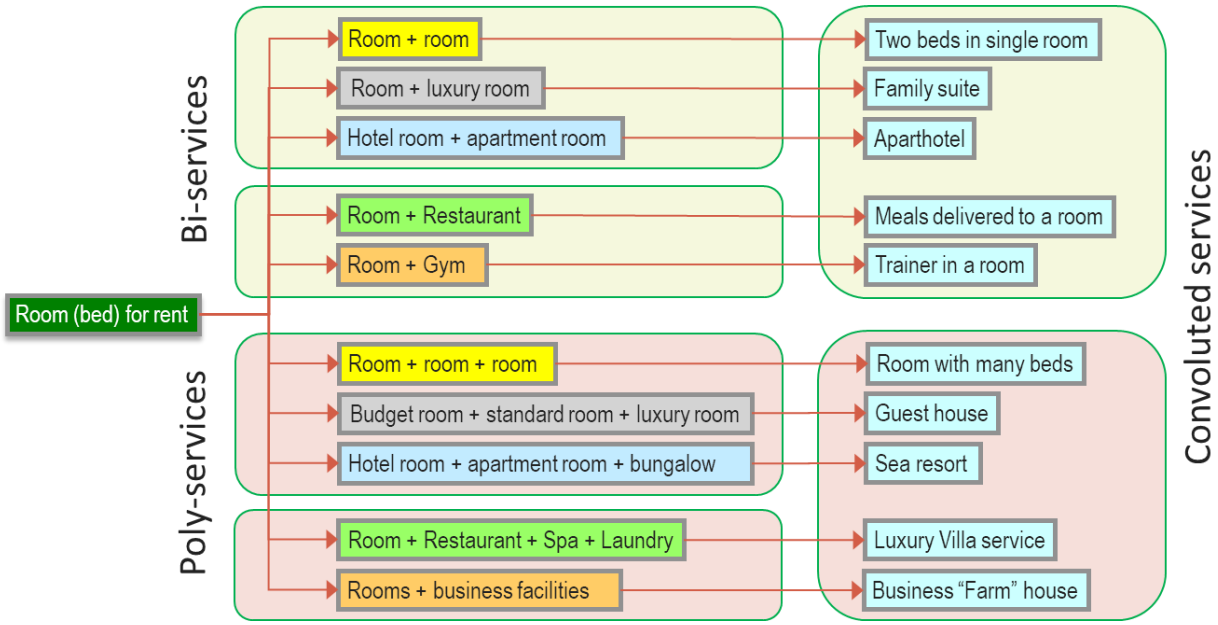

Fig. 5. Examples of convolution of bi- and poly-services

3.4. Causes of transition to supersystem

The goal of any business is to develop a win-win situation: to create a revenue stream for business by adding value through satisfying customer demands. It is obvious that profitable business can be built upon maximizing the use of resources available. Sharing the resources creates ground for developing new services in addition to the existing ones. In such cases, the resources which are already used for delivering a certain service can create additional benefits by delivering another service based on the use of these resources. Among the most common types of resources are the following:

- Location (space).
- Facilities (material and immaterial).
- Time interval.
- Human resources.

- Competencies.
- Target user group (interests, demography, etc.).
- Data, knowledge, information.

3. Conclusions

As seen from the model and examples introduced in the paper, the line of transition to supersystem of services strongly resembles the line of transition to supersystem of technical systems. Currently, they seem to be identical but further research is needed to identify if there are any differences. Nevertheless, the line of transition to supersystem of services proposed can be used to explore resources available and create new bi- or poly- combinations of services**.**

Another area of future research is understanding how the links between services develop in bi- and poly-services similar to how it was done in TRIZ for technical systems.

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