Results of Applying Strategy System Model (SSM) for Building and using "Human Centered Enterprise Model (HCEM)"

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ABSTRACT

An organization is a social system which is composed of human elements. The main difference between social and industrial systems such as aircraft or car is that a social systems' elements are humans.

The root cause of problems in the social system is that the elements of a social system that are humans which are independent biology system and also has their own interests/needs and goals that might differ from each other or the system's goal, thus making the system extremely complex.

In this paper we examined the possibilities of tackling this complexity through applying TUSS's Strategy System Model /SSM/.

Keywords

System – A system is a logical and integrated mental representation of interactions that take place between involved elements and constitute synergistic stable properties.

Social system - A social system is a logical and integrated mental representation of interactions that take place between involved stakeholders/humans/ and constitute synergistic stable properties required for realizing a commonly shared goal.

Commonly shared goal - A commonly shared goal is a goal aimed at satisfying common needs of involved stakeholders.

Strategy system model - A system model aimed at creating strategic synergetic properties for achieving a commonly shared goal.

System logics mapping methodology - Is a methodology to create visualized logical representation of elements interaction of a system.

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INTRODUCTION

While building my family owned business I experienced many failures and successes. My major is a mining engineer and I started my business in 2005. My business was expanding rapidly until 2015 when we faced number of serious challenges. We have tried everything that could help us in addressing the problems and challenges. My personal experience in applying solutions offered by traditional management science suggests that such solutions offer only short-term relief but not a fundamental solution. The main reason of failure of applying traditional management tool is:

- it offers fragmented solutions
- increasing complexity of the nature of business makes traditional tools less effective.

Though system engineering discipline faces many challenges today, it is still a powerful tool to solve problems with high degree complexity. Complexity we are facing currently is growing exponentially and even decision making at such simple action like having lunch requires to deal with high degree complexity.

Since 2015, we conducted regular research on finding a solution that can help to bring fundamental changes and system approach was chosen as a potential solution to that problem. We developed a social system model and identified three small and medium business entities to test the effectiveness of the model. In this paper we'll examine the results of this application.

METHODS

To address such high degree complexity problems, we applied system thinking and trial-and-error method.

Set of methods includes readily available mental solutions and new mental solutions we invented.

In 2015 we developed the first version of our social system model and set of metrics for immediate application and since then the model has been improved constantly and

today we use third generation of the model. It has been a long journey and its improvement will never end.

In the process of application and advancement, we developed over 200 mental solutions in the form of various models, methodologies, templates, algorithms, IT platforms, metrics, matrixes, training modules, regulations, bylaws and others. These are essential tools for social system engineering and the following are some examples:

- Visualized model of thinking
- Strategy system model
- Matrix of mandatory properties of social system
- System health status classification
- Aligned measurements metrics

Taxonomy of fundamental human needs

It's necessary to find proper answers to such questions like why do we create solutions? why do we define a goal? why do we work? for understanding and dealing with root causes of complexity that we are facing.

To understand the nature and complexity of a social system that's composed of human elements, we must first understand the nature and types of human needs and ways of fulfilling those needs. Some of those fundamental needs are satisfiable only by collaboration There are many studies involving human needs, and its classifications, and we have identified and examined a taxonomy developed by an economist Max Neef on fundamental human needs which proved to be capable of serving as a universal mental model of human fundamental needs.

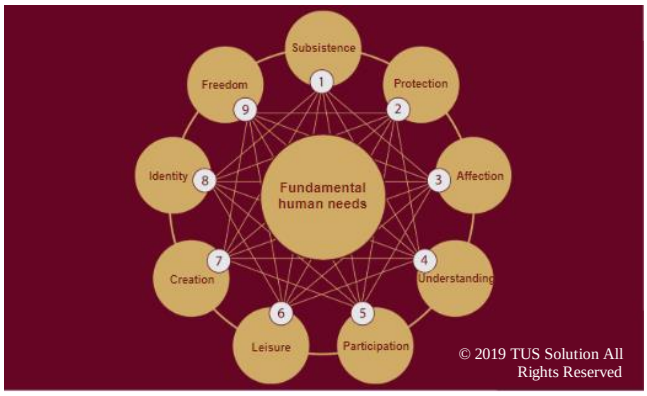

Figure 1 – Max Neef's taxonomy of fundamental human needs

The taxonomy suggests to divide fundamental human needs into 9 types. All 9 fundamental needs are closely interrelated and each of these fundamental needs are driven from the need to satisfy rest of the 8 needs. More detailed look into an interdependence between needs suggests that each of those fundamental needs of an individual is very much dependent from collaborating with other individuals.

Strategy system model /SSM/ for satisfying universal needs

The fundamental concept for developing a social system is "Goal enforcement mandatory integrated axioms" /GEMIA5/. The axioms are as follows:

- There must be commonly shared goal for the existence of a social system;
- There must be aligned duties to enforce goal implementation;
- There must be inclusive information flow that generates quality data;
- There must be clear, verifiable criteria for measurement of performance and its results;
- There must be continuous feedback mechanism.

Our team further developed a model of a social system based on the above axioms and aimed at implementing the commonly shared goal which is a representation of aligned universal fundamental needs of all involved stakeholders. Later the model was applied to a real-life case.

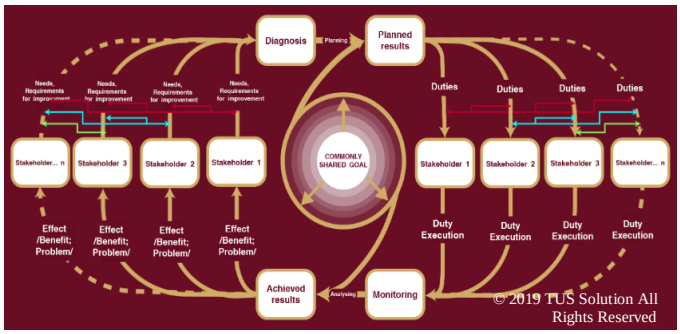

Figure 2 – Strategy system model

To embed GEMIA5 into the model, we have defined "Five mandatory interconnected subsystems" /5 MICS/ each of which is designed to enforce one of axioms.

These subsystems have specific properties aligned with each other which enables the enforcement of the system's commonly shared goal. The 5 MICS are following:

- Goal interpretation subsystem
- Duty performance subsystem
- Information flow subsystem
- Feedback subsystem
- Criteria subsystem

Goal interpretation subsystem

Goal interpretation subsystem is a subsystem that is aimed at enabling all stakeholders to interpret the goal of the system in the same meaning. It also serves as a basis for integrating every stakeholders' interests.

Duty performance subsystem

Duty performance subsystem is a subsystem that forms and allocates a set of clearly defined duties aligned in terms of time, location and logics.

By using SSM we were able to break-down any social systems' activity into quantifiable functions, jobs, duties and even simple actions.

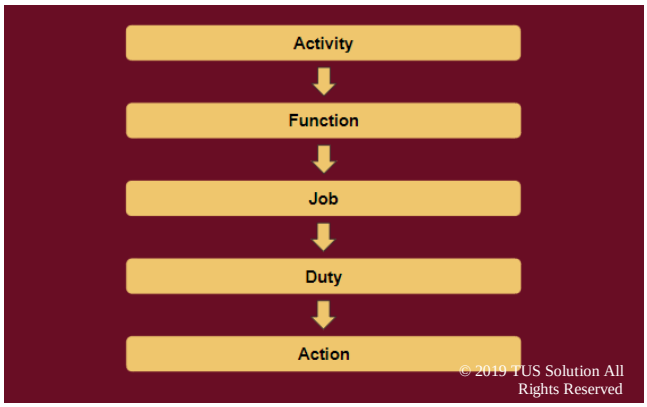

Figure 3 –Activity breakdown

Information flow subsystem

Information flow subsystem is a subsystem that enables circulation of structured quality data throughout the system and its stakeholders.

The subsystem prevents the system from being overloaded with data and enables the decision-making to be swift, and accurate, making the organization more adaptable to the fast-changing environment in a timely manner by using few but quality data.

Quality data is a data qualifying six mandatory properties at the same time that's necessary for making accurate conclusions and creating effective solutions.

Figure 4 – Properties of quality data

Feedback subsystem

Feedback subsystem is a subsystem that serves as an immunity mechanism for maintaining good health of the system and its continuous improvement in a changing environment. In social systems, the feedback subsystem consists of incentive and responsibility solutions aligned with shared goal and stakeholders' duties. Feedback subsystem also enables the organization to diagnose deficiencies in the system comprehensively.

Criteria subsystem

Criteria subsystem is a subsystem of documentable and inter-related criteria that is designed to measure every aspect of the system. These criteria are composed of quantifiable measurement metrics and non-quantifiable but documentable norms.

By applying SSM we developed a set of quantifiable, aligned measurement metrics.

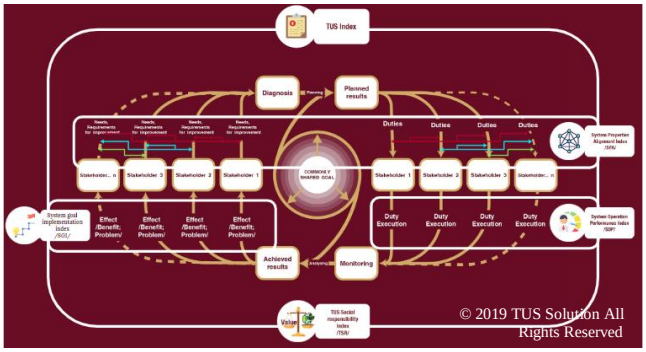

Figure 5 – Metrics used in the SSM

Following are the five main measurement metrics that's being used in the system:

- TUS index

  The index is used for measuring health status of the system.

- SPA /System properties alignment/ index

  Measures quality of alignment between properties of a system

- SOP /System operational performance/ index

  Measures the performance of a social system as a whole.

- SGI /System goal implementation/ index

  Measures outcome results of the social system's operation.

- TUS-SR /Social responsibility/ index

  Measures impact to environment, resource, and society.

Quality data and the criteria metrics help in making the system to be continuously learning and evolving system.

Planning requirements set

Set of framework has been developed and applied for planning the goal realization activity that's aimed at enforcing peremptory growth of continuous value creating based on the 5 MICS.

This framework offers to study external and internal factors affecting the goal realization process of the system and aimed at incentivizing initiatives and efforts to create more value by every stakeholder.

RESULTS

Data generated by applying the model to a real-life case suggests that the model can serve as a universal model for

various activities by a group of people with commonly shared goal.

Due to the nature of commonly shared by all involved stakeholders goal, which serves as the cause of system's existence, the proposed model can be regarded as organizational system model sustaining human wellbeing.

We've observed following changes in the system during the implementation:

- Changes come gradually but in a systematic and sustainable way
- First changes take place in the area of system health improvement
- Next change of improvement emerges in systems operational performance
- Finally, the system becomes capable of realizing its goal in sustainable way

Following the changes many quantitative and qualitative results emerge:

Qualitative results:

- High degree interest alignment between all stakeholders.
- Real time, continuous, accurate information based on systematized data.
- Shared common understanding on responsibilities and benefits by all stakeholders.
- Able to fix any deficiencies in timely manner through system integrated monitoring and diagnostics.
- Enables to carry out tailored policy changes without changing fundamental properties of the system
- Enables to develop prescriptive and objective planning
- Increase adaptability to fast changing environment.
- Serves as a solid foundation for carrying out digital transformation.

Quantitative results

Testing at the all three companies provided similar results, and below are the results of one of them:

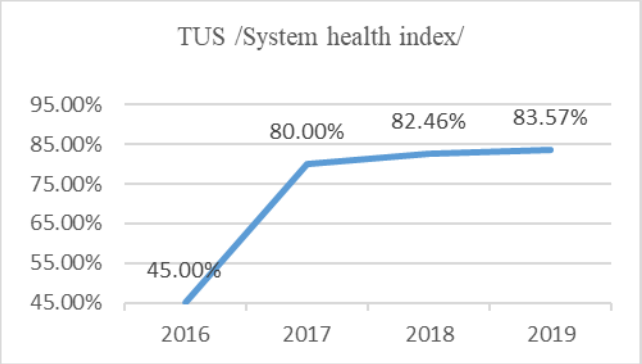

Figure 6 – TUS /System health index/

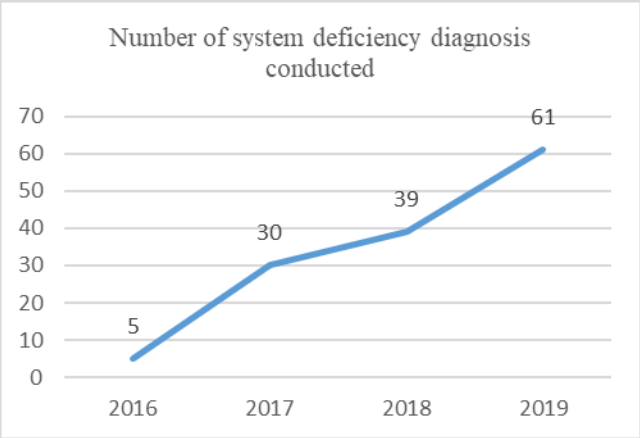

Figure 7 – Number of system deficiency diagnosis conducted

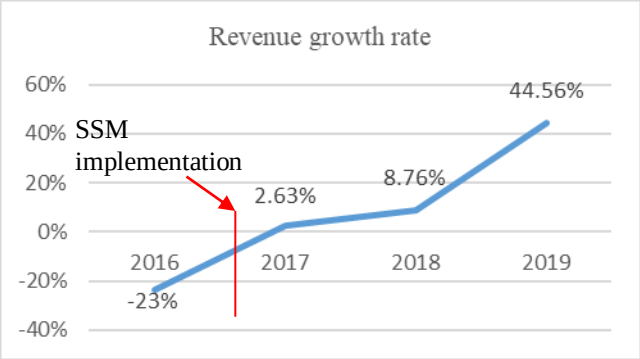

Figure 8 – Revenue growth rate

CONCLUSION

Here are some of my findings gained from application of our model:

- System is a notion derived from necessities to understand things and phenomenon and its relationships as a whole. This understanding is essential for survival strategy of the system.
- System is a way of logical modeling various things and phenomena together as a whole that is capable to generate certain property. Humans ultimately need those properties but not a system. Those properties are essential in creating an environment that supports our life.
- Systems thinking is the underlying foundation for building a system that is capable of delivering much needed properties and any system is a mental model produced by systems thinking.
- Therefore, no system can exist outside or a part of our thinking.
- Human beings have common fundamental universal needs which can serve as a basis for creating commonly shared goal.
- Human being is also a product of a society and society members interact to satisfy their growing needs and no human being is capable of satisfying own personal growing needs without interacting with others.

- Commonly shared needs form commonly shared goal and commonly shared goal is the primary force that is motivating people to invent and build systems which is capable to generate needed properties.
- Social system is a logical and integrated mental representation of interactions that take place between involved stakeholders/humans/ and constitute synergistic stable properties required for realizing a commonly shared goal.
- SSM can serve as an effective tool for human system integration.
- The model proved to be useful in many ways for small and medium-sized companies and organizations but it needs to be tested at a bigger scale.

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