Workplace behavior and its impact on project goals

- A statistical model for experience feedback -

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The importance of goal-setting

To set goals for activities is important to help employees to focus and prioritize. Goals can be used to change long-term employee behaviors. In an organization it may be desirable to aim at several goals at the same time, for example profitability, quality and logistics development, but this is not functional. There are several risks in doing so, goals can be mutually incompatible, and the opportunity is given for employees and managers to choose between the goals and play them off against each other. With only a few high priority goals the organization gets more unison; everybody gets the same idea of what the company wants. Only a few hard rules (goals) give the employees the ability to work more focused to solve problems and to break new grounds. Other goals than the high priority ones should be constraints rather than goals that do not require extraordinary efforts to achieve. (Ahrens, 2008)

Critical success factors (CSFs) is a denomination of the overall goals that an organization should have in order to succeed. A CSF could be a goal such as deliver on time or good taste, and so on. (Pheng & Hui, 1999) (Chan & Chan, 2004) These success factors are measured by the organization with defined Key Performance Indicators (KPIs). KPIs can be measurements such as number of errors, number of unhappy customers due to wrong delivery. A KPI is thus a key that indicates to how well a company or project works. If all KPIs for a CSF show good values, it demonstrates that the company has the potential to be successful in the precise area that the success factor is defined, such as quality and cost. Critical success factors must be defined in line with established business strategy and vision. (Schneier, Shaw, Beatty, & Baird, 1995) Efforts to establish good KPIs help to clarify key areas that are working properly or give the opportunity to be improved. Then resources can be deployed and thus contributes to a good workflow and efficiency. (Chan & Chan, 2004) (Pheng & Hui, 1999)

The goal of creating indicators is to enable the measurement of how well a project or an organization is progressing. Often it's not only objective measures that should be assessed but also subjective measures are important. Subjective goals may be more difficult to define. Objective goals could be time, costs, sickness statistics, safety in the

project and accidents. These goals are easy to define as concrete metrics that easily can be easily obtained. Subjective goals such as quality, functionality and satisfactory degree of stakeholders and foremost the customer is essential for a successful project, but much harder to measure and evaluate. Surveys are a way to quantify or make subjective opinions measurable KPIs. (Chan & Chan, 2004) (Schneier, Shaw, Beatty, & Baird, 1995)

Things to consider when creating the KPIs: An organization and/or a project management should not have too many KPIs to measure. Otherwise there is a risk that one concentrates too much on measuring, instead of moving the business forward. Too many KPIs are time and resource intensive. KPIs are useful to compare different projects, however it requires that a large amount of projects are measured to obtain reliable results. For that reason it is useful to design KPIs so they can be used in various projects. To take full advantage of the set of KPIs it should be ensured that all who work within that organization is familiar with the objectives and KPIs. Familiar KPIs clarify for employees what defines a successful project. Finally, the KPIs must be updated continuously so that they do not become obsolete and are measuring old parameters that have been changed. For this reason KPIs should be easy to redefine. (Chan & Chan, 2004)

The importance of a description and mapping of the project managers and organizations that gains the most desirable project results have begun to attract attention. Previously project success was described arbitrary and operated intuitively. By using mapping further development can take place more efficient. (Chan & Chan, 2004)

Improvement through standardization

Mapping is a fundamental analytical tool to guide the various improvement measures in a value stream. An action to improvement is standardization which is one of the pillars of Lean improvement tool. One of the reasons to why it is one of the pillars is that a standard is a necessary base for future improvements. Standards should cover three aspects: working hours, work sequences and standard work in process. Standards should not be specific but not very comprehensive. There is one best way to carry out specific tasks under specific conditions and a specific standard is a first step towards the most optimal way to work. It is important that there is something to measure when using standards to see what the new standard affects. (Bicheno, 2004)

There should be standards at all levels in an organization. From an overall and more accepted standard, such as how a project will perform with various activities/processes, to more operational standards such as where different groups of workers establish and define how different tasks should be performed optimally. (Bicheno, 2004)

Create a standard by mapping

The mapping of the current state, the IS-mode, is the basis for the sketches of a future SHOULD-mode. When a map and an overview of a current state are present, a map should be plotted of the future and desirable condition where the focus is on retaining only those processes in which value is created. (Bicheno, 2004) The reason this is done is that the definition of success must be specified before it is possible to get there. No action can take place before a map of the current and future state is present. Action shouldn’t be based on pure intuition. If the processes are unknown it is not possible to confirm if

taken actions are providing more efficient work or not. (Chan & Chan, 2004)

Mapping is the foundation and an important part in developing an organization's value stream and processes to minimize waste. It demonstrates how decisions and improvements are affecting the chain while it facilitates the exchange of experience in the processes. (Rother & Shook, 2005) Once processes are identified, it is easier to find areas for improvement and the causes of waste in the processes. It is important that the same person handles all mapping to get a holistic view. In a product flow it is not only the flow of material for the product that should be mapped, also the information flow is an important part in the mapping survey. The survey can be divided into three phases, planning phase (1), construction phase (2) and maintenance and operational phase (3). Material and/or information flow is represented in the different phases (Arditi & Gunaydin, 1997). Phase one includes only information flow. Phase two includes both information and material flow. Phase three does not belong to the construction phase and is not affected directly by the material and information flow until the construction project is completed. A good flow during phase two can be achieved by identifying use of work stations, tools and machines. (Rother & Shook, 2005)

A look at NCC under the microscope

The construction industry is criticized of having poor productivity performance relative to other industries. The industry believe that this is due to each project is unique, with unique implementation and unique conditions. This would be an obstacle to the process of standardization in contrast to many other industries that have increased their productivity.

NCC is actively working to increase productivity through the introduction of different processes, activities and behaviors to be used in production, for example international purchases to reduce costs, the use of various kinds of additional services from suppliers, platforms consisting of different standard procedures for construction. *Verksamhetssystemet* is a collection of documents and descriptions that can be used as standards in different projects. Unfortunately NCC lacks the ability to see how most of these tools are used and if they get a foothold in the organization. Change and improvement must be measureable in a standardized production. The measurements should be comparable against clearly defined objectives that permeate the entire organization. NCC have plenty of goals but many of them are non-measurable and non-project specific, therefore it is not possible to derive the change in them to specific processes, behaviors or activities.

The company has taken a step towards collecting standardized and structured data through a customer survey where the customer's subjective perception of how well the project was completed is measured. In addition to this, NCC has several financial metrics that can be used for further evaluation. Data gathered is analyzed at meetings without any significant processing of the statistical data. Without processing the data NCC lacks the ability to, in a non-resource intensive way, analyze the data and compare it to KPIs. NCC also lacks the ability to collect data and mapping the construction process and link it to the KPIs.

A quantitative model for mapping and feedback of experience

By collecting data of behaviors in a wide variety of projects, while also documenting the projects KPIs it is possible through a statistical analysis to determine how behaviors affect the project outcome. A prerequisite to do this effectively is that the data retrieved is in a standardized and

structured form. This can be done by for example by an email survey with multiple choice options. Another condition is that the outcome for each project is documented through measurable objectives (KPIs).

When the methods for collecting data are available, a statistical model is needed to quickly analyze data that can provide clear and meaningful results. When using a *multiple logistic regression analysis*, where each individual behavior is compared against a project goal, one at the time, for all projects, the model gives a result that tells how much each specific behavior contributes to the increase/decrease of the desired project objective. It also gives an indication of how statistically significant the model is and the likelihood of impact of chance effects. To avoid misinterpretation of the statistics gathered data should be analyzed with complementary short interviews.

The method used for analysis is described above. The study was performed in the following steps:

1) E-questionnaire to projects with 40 different statements about how and what kind of project behaviors that is used or not used.
2) Collecting registered KPIs at each different project.
3) Collected data is analyzed in a *multiple logistic regression model*.
4) The output from the regression model tells what behaviors that have the greatest impact on project objectives and if the impact is positive or negative on the KPIs.
5) The results are interpreted with material from interviews and theory.

The above model identifies project objectives for each project as well as the behaviors used in the projects.

Behaviors that affect project success

The study identified 8 different project behaviors that had a positive or negative impact on the defined KPIs or project objectives. The data in this study were not sufficient to draw any precise conclusions, however, the results revealed trends that indicate that it is possible to detect and identify behaviors that generally affect the project positively or negatively. The results from the study indicated that the model was over determined. An over determined model cannot interpret varying input. It is exactly adapted to the input data available. The results also indicated that it is of great importance that behaviors which is reformulated to statements in the e-survey must be strict so that they clarify exactly what behavior they corresponds to, to prevent that the respondents may misinterpret the statements. Misinterpretation is also avoided by interpreting the statistical data using empirical and theoretical material.

Future opportunities for NCC

If NCC would reduce the number of goals and define them more clearly and make them measurable, it would not only make it easier for employees to understand NCC's core values and what direction the company wants to further develop the business. With fewer goals it would also make it easier to establish a basis for a resource efficient way to gather project specific goals for the use of a further improvement work.

The foundation for improvement lies in standardized ways of working. Standards are based on the mapping of activities, processes and behaviors. If NCC lacks an effective tool to map their projects, some essential building blocks are missing to establish specific or general standards for how the work should be done at the workplace. Without a standard, improvement occurs largely on experience

and gut feeling. I most cases, improvements based on these feelings cannot be linked to how the project goals are achieved.

If NCC should be able to standardize the construction process NCC should find a resource efficient method to see how the projects are implemented and how the various project implementations may affect project success.

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