RESEARCH ARTICLE
Vol.4.Issue.2.2017
April-June

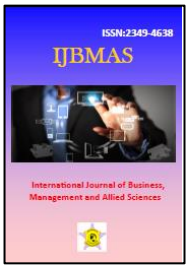
IJBMAS
www.ijbmas.in

INTERNATIONAL STANDARD SERIAL NUMBER INDIA
ISSN:2349-4638

INTERNATIONAL JOURNAL OF BUSINESS, MANAGEMENT AND ALLIED SCIENCES (IJBMAS)
A Peer Reviewed International Research Journal

GOAL DECOMPOSITION METHOD

ABHAY JUVEKAR[1], Dr. UMA SHANKAR PANDEY[2]
[1]Research Scholar, Mewar University
[2]Research Supervisor, Director & Professor



ABSTRACT
Organizations today are always goal driven. An Organization can be defined by the nature of business transacted, the size and spread of the organization and the values set upon by the management team. The organization profile determines the organization governing structure. The organization structure will determine the organization's goals at various hierarchical levels of the structure. The breakdown of the organization goals, starting at the highest level and going downwards and upwards must follow a structure for goal decomposition. This is called the goal decomposition method for the organization. This paper is attempts to state that there is a generic pattern for goal decomposition in the industry sector of Information Technology.
Key words: GDM Goal Decomposition Method, GSR Goodness Rating Score

1 Introduction

GDM is a mechanism that enables us to determine the hierarchy of goals (both top-down and bottom up) as they collectively enable the organization to pursue the stated mission. The mechanism also allows one the ability to logically reason through the hierarchy. GDM provides traceability between hierarchical goal levels using logical inferences through a set of decomposition factors allowing claims on a goal's achievement based on its sub-goals' achievement.

The idea of decomposition method is to break down a complex goal into several simpler and more manageable sub-goals that are achievable and then combining the effects together in order to achieve the original over achieving goal. High-level goals of stakeholders are recursively decomposed into lower level ones. The reverse bottom-up process of discovery of high-level goals as consolidated conclusions of existing sub-goals complements the top-down breakdown of goal definitions. The result, the goal decomposition method, is a hierarchical goal method.

1.1 Pre-Requisites

Effort reduction can be helped by goals of timeliness and defect free delivery. The practice of meeting deadlines and getting it right the first time will enable the reduction of efforts as time taken to redo, repair and rework at activities is reduced. Indirectly customer satisfaction is increased as schedules are met and the schedule revisions are minimized.

The sub-goals of timeliness can be met by including project activities to enhance the competency levels of resources utilized, increasing the utility of infrastructure support provided to the project. High levels of quality of product or service delivery can be gauged by reducing the number of defects detected and corrected

pre-delivery and reducing the number of failures post-delivery. These goals can be met by having sub-goals that include exhaustive planning of activities that include inspection and product or service testing by competent resources. An additional goal of early detection of defects during the project life cycle will also result in reduced efforts at repair and rework.

1.2 The Method

The decomposition structure serves the purpose of connecting stakeholder desires with system functions. By learning more about the nature of decompositions we would be able to allow for more natural and systematic ways of identifying and using these decomposition rules, increasing the quality and usefulness of the goal decomposition method.

Central to the emergence of the goal-oriented paradigm is the fact that it covers a clean approach to connect the problem domain with the solution domain through recursive decompositions of expressions of the former (goals) into expressions of the later (actions).

However, although in abstract terms we can think of a decomposition task as a complete and sufficient activity to manage goals in order to make them more easy to tackle, in practical terms, we have people doing the decomposing and people that need to judge whether the decomposed goals together match the higher level goal - i.e. when a decomposition is “good". The goal decomposition design team is a set of system professionals chosen for their depth of experience, breadth of knowledge and proven analytical skills.

1.3 Goodness Rating Score (GRS)

Let us say we have a higher level goal Pi and a lower level goal Qi which is a part of the decomposition of the goal Pi. How can we determine if Qi should be a part of the decomposition of Pi?

C = Rating for criticality of Qi to Pi

C = value set 3, 2, and 1 for levels of criticality ranging from high, to normal to minimal respectively.

A = rating for the achievement level of Qi.

A have the value set 4,3,2,1 for levels of achievement ranging from very high, high, normal to minimal respectively.

Then the relational rating between the two goals, Qi and Pi, can be seen as a function of (C,A) with a value set ranging from 0.5 to 1.7 with an average value of 1.0 based on the formula (Ai*Ci)/(Ai+Ci).

This means that if Qi has a relational rating of 1 or more it must be part of the decomposition of Pi.

S = the rating for stability of the processes deployed for Qi

S = the value set 3,2,1 for levels of stability ranging from high, to normal to minimal respectively.

N = the rating for the institutionalization level of Qi.

N have the value set 4,3,2,1 for levels of institutionalization ranging from very high, high, normal to minimal respectively.

Then the reliability rating between the two goals, Qi and Pi, can be seen as a function of (S,N) with a value set ranging from 0.5 to 1.7 with an average value of 1.0 based on the formula (Si*Ni)/(Si+Ni).

This means that if Qi has a reliability rating of 1 or more it must be part of the decomposition of Pi.

Considering a tolerance level of 10%, if the combined sum of the ratings (GRS) is 1.8 or more then Qi must be part of the decomposition of Pi.

Following the above method of determination, we can decide if the decomposition is “good” or not.

This process of arriving at the GRS of each Qi for each Pi must be done iteratively all the way down to the lowest level.

If for any reason the decomposition design requires Qi to be a contributing part of Pi, then care must be taken to bring about an increase in individual Qi rating to 0.9 and the combined GRS up to a par of 1.8 on an urgent basis.

2 Business organization goal decomposition

Each business has business goals. These pertain to one of the following affecting facets of the business:

- Customer / stakeholder satisfaction (complaints, commendations, rating)
- Cost of quality (effort variance, defect density, schedule variance)

KY Publications

These business goals have to be cascaded down through the organizational structure. To do so the organizational structure must be well defined. A common enough structure is depicted below:

Business organizational hierarchy

- Level 1: organization
- Level 2: business unit
- Level 3: program/account/project

The top management forms the upper level of the organization.

The business unit that is responsible for a group of related products or services is the next level.

The business unit breaks down further into program/account that manages individual projects or assignments.

Individual projects or assignments are completed by executing pre-defined processes.

Starting at the lowest level, the process, the process goal achievement is enabled by the set of ordered activities performed. The activities can be performed sequentially or in parallel. Coupling [interfacing] of activities can vary from being simple to conditional and thus complex. Complex coupling of activities would require a more detailed and finer breakdown structure of the goal hierarchy. Closely coupled groups of activities or a cohesive set of goals will form a sub-process. Goals are to be assigned to sub-processes and the process. Achievement of sub-process goals will lead to achievement of process goals.

2.1 A typical IT business organization goal breakdown structure suggests a normative common organization hierarchical structure that allows for a standard goal decomposition method to be applied.

The above depicts a hierarchical breakdown of goals that shows how high level goals can be decomposed downwards to achievable goals at the project and process levels.

KY Publications

Thus a roll-up of goals met from the bottom tier of processes to goals at the highest tier, at organizational level, generates the desired value set for the organization in the form of tangible benefits across the organization.

3 Key Factors

The achievement of a goal is to be considered from different perspectives giving us different indicators. E.g. Each indicator will have conditions to be satisfied for the indicator to be declared as completed. The cumulative effect of all indicators will enable us to judge if the goal has been achieved.

As explained above, the goal achievement is to be assessed from a bottom-up perspective leading us from individual process through a project up to a product of a business unit and thus upwards to the top level of the organization.

3.1 Customer satisfaction

Ensuring a high level of customer satisfaction rating is a ubiquitous goal across the industry. This goal ensures that the organization retains its market share and even manages to increase its share. Retaining market share has a secondary goal in that it ensures that profits before tax remain steady or even grow. This goal is supported by the other facets that ensure that the customer is retained.

As long as the production and service costs remain steady or even decrease, effectively indicating that productivity is increasing, then the market price can be maintained thus ensuring steady returns on investment.

The supply of the products or services remaining steady and being able to match the marketplace demands ensures that market share is retained. Thus streamlined production and service supply systems are a must to ensure timeliness of supply.

Customer satisfaction goals can be determined by considering the following set of parameters:

- Goal to decrease the number of customer rejections that occur
- Goal to decrease the number and severity of customer complaints that are registered
- Goal to increase the number of fully functional products delivered to customer satisfaction
- Goal to increase the number of additional features delivered to the delight of the customer
- Goal to lengthen the mean time recorded between reports of failures from the customer.
- Goal to decrease the mean time period of rework and repair required to service customer requests post-delivery.

This set of collective goals being satisfied ensures that the top level goal of customer satisfaction is met. Progressive goal decomposition enables this to happen.

3.2 Cost of Quality goals

A critical factor that influences the customer 'buy' decision is the quality of the product or service. Quality is projected through factors such as reliability, maintainability and fully functional product or service. Thus failures, especially repeated failures have to be avoided at all costs, especially post-delivery to the customer.

Costs are normally looked at from two component levels, the baseline standard operational costs and the variable assignment costs. Assignment costs can vary depending on the project environment, the complexity of the assignment and the competency level of personnel required executing the project and completing the assignment. Thus cost reduction (Failure Cost, Prevention Cost, and Appraisal Cost) being the main business goal can be decomposed into sub-goals.

3.3. Improve efficiency of standard processes to cut down operational costs

Efficiency is normally viewed as a ratio of value of output by cost of input. This implies increasing the percentage of value adding activities.

Decrease the costs of usage of resources and materials. Resources and materials are normally allocated to a project and reducing the usage will bring down project costs making the project more profitable. Project managers must be trained in employing the just-in-time principle whilst requisitioning resources and materials just as they must learn to release resources in time to reduce usage time allocated to the project.

Decrease the total efforts expended by resources on the project.

KY Publications

This will include the following efforts:

1. productive and billable
2. productive but non-billable
3. non-productive and non-billable.

This will cover the gamut of activities of the entire project life cycle adopted that extends to post-delivery support and service maintenance activities. Reducing the non-billable efforts will boost productivity and cascade over to boosting project profitability.

A major factor in effort reduction is enabled by minimizing the volatility of customer requirements and managing the complexity of requirements by detailed breakdown of requirements to simpler and less demanding requirements. The less the number of changes to requirements especially in the latter half of the project the lesser will be the efforts required to be expended. The simpler the task of requirement fulfillment, the less is the probability of defects creeping into production.

4 Success enablers

To enable the achievement of organization goals and sub-goals, project experience tells us that we must positively and constructively control and manage the following:

- Timely and adequate project funding
- Role definitions for key personnel
- Responsibilities defined and accepted by all roles
- Detailed planning of activities for each assignment

Project fund flows are normally a constraint during a typical project. The negative impact of this can be lessened by planning the funds flow to a great level of detail, ensuring timely deliveries, timely billing, just-in-time resource and material requisitions, maintaining high levels of productivity and enabling smart management of customer requirements. These factors, as discussed above, are significant contributors to the overall or overarching goal of profitable business management.

We need to identify the organizational hierarchical structure for each project team as adopted from the standard and the key roles and personnel that will be playing these roles. The personnel must then be primed including undergoing training wherever required to shoulder the responsibilities for each key role.

Similarly the project planning exercise must be done meticulously so that detailed activity and personnel assignments can be determined to a great degree of exactitude. This will enable the accurate planning of delivery and consequent billing to customer, leading to unhindered and timely fund flow.

Ensuring the success of all above factored goals keeps the personnel motivated and enthusiastic about continual improvement.

5 Conclusions

A specific design team must be made responsible for GDM. The design team that undertakes the responsibility of decomposition of the organization goals from a high of the top management to the low of processes deployed must be knowledgeable about the vision, mission and values of the organization. These three factors must be the overarching consideration during the design of decomposition. The team must also be knowledgeable about the organization business environment, culture and other key factors that create value for the organization.

While undertaking the task of decomposition of the higher organization goals one needs to be careful so as to minimize the subjectivity that can occur during decomposition. They must iteratively go through the process of GSR for the decomposition to ensure that they have a practical and consistent decomposition structure.

The design team must consider all the impact factors that could act as obstacles to the success of the decomposition. Once the design is finalized, it must be communicated and explained to all the personnel responsible for implementing the same.

GDM enabled through GSR will facilitate the achievement of the business mission.

References

[1]. Software Engineering Institute – Carnegie Mellon University - http://www.sei.cmu.edu

[2]. 2. Haruhiko Kaiya H., Osada A., Kaijiri K., Identifying Stakeholders and Their Preferences about NFR by Comparing Use Case Diagrams of Several Existing Systems, Prod. Of the International conference on Requirements Engineering, 2004 (RE04), pp.112-121.

[3]. http://quadread.ewi.utwente.nl/

[4]. https://en.wikipedia.org/wiki/Decomposition_(computer_science)

[5]. http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=6071825

[6]. J. S. Armstrong, W. B. Denniston, and M. M. Gordon. The use of the decomposition principle in making judgments. Organizational Behavior and Human Performance, 14(12):257–263, 1975.