Stakeholders Influence for Successful Project Performance

Herry Pintardi Chandra[1] , Indarto[1] ,I Putu Artama Wiguna[1] , Peter.F Kaming[2]

[1] Dept.of Cilvil Engineering, Sepuluh Nopember Surabaya Institute of Technology. Indonesia , , [2] Dept.of Cilvil Engineering Atma Jaya University Yogyakarta, Indonesia.

Abstract: Criteria of successful project performance vary from project to project. Despite much work on the subject, there is no commonly agreed framework of performance measurement on construction project stakeholder.While some authors consider time, cost, and quality as the predominant targets, other performance indicators such as profit, customer satisfaction, safety, innovation, environment, and project team are increasingly becoming important. To bridge this gap, this research targets to investigate the perception of key performance indicators (KPIs) in the context of construction project surrroundings Surabaya.The aim of this study is to explore the significance key performance indicators (KPIs) in perspective of construction project stakeholders that can be divided along two orientations; process and result orientations . Based on a sample of 197 respondents , a range of key performance indicators, measured both process and result orientations in construction is developed by using factor analysis. The identification of KPIs is expected to provide significant insights into developing a comprehensive base for further research.

Keywords: Key performance indicators, project success

Introduction

A project is a temporary endeavor undertaken to create a unique product, service or result.Construction projects inherently contain a high degree of risk in their projections of cost and time as such is inuque. Because of different sites, each project presents its own challenges to ccurate cost, time, projections, and control.It must address the geography and conditions of the project site and the relation of the project to the environment. In today's world, construction projects involve many stakeholders with varying needs and expectations. Lee et al; and Kagioglou et al cited in [1]discussed that the construction projects have been criticized for its underperformance due to lack of performance measurements, project monitoring productivity, cost effectiveness, safety, and sustainability. Some efforts have been made over the past few decades to improve worker safety and health [2]; budget performance, schedule performance, quality performance, owner satisfaction, profitability, and public satisfaction [3]. Toor and Ogunlana [4] found that performance measurement should also be tailored for each project, and it can be be measured by key performance indicators: on time, under budget, efficiently, safety, meets the specifications, free from defects, conforms to stakeholders' expectations, doing the right thing, and minimized construction aggravation, disputes, and conflicts.

Takim and Akintoye [5] argued that the level of success will depent heavily on the quality of managerial, financial, technical, organizational performance of the respective parties, and consideration of risk management that can be influenced by business environment, econimic and political stability.

The perception of project success may even vary according to management's perspective.There is a substantial difference between the different stakeholder and the different site condition.

References

1. Skibniewski , M.J., and Ghosh, S.Determination of Key Performance Indicators with Enterprise Resource Planning Systems in Engineering Construction Firms.*Journal of Construction Engineering and*

Management©ASCE, 135,10,2009, pp.965-978.
2. Rajendra, S., and Gambatese, J.A. Development and Initial Validation of Sustainable Construction Safety and Health Rating System. *Journal of Construction Engineering and Management©ASCE*, 135,10,2009, pp.1067-1075
3. Ling, FYY., Low SP., Wang, SQ, and Lim, HH. Key Project Management Practices Affecting Singaporean Firms'Project Performance in China. *International Journal of Project Management*.27,2009, pp.59-71.

Detecting Springs in the Coastal Area of the Gunungsewu Karst Terrain, Yogyakarta Special Province, Indonesia, Using Fractal Geometry Analysis

Sari Bahagiarti Kusumayudha[1]

Abstract **— The Gunungsewu area is a karst terrain with water scarcity, located in Yogyakarta Special Province, adjacent to the open sea of Indian Ocean in the south. Shorelines of the Gunungsewu southern parts show fractal geometry phenomenon, and there can be found some groundwater outlets discharging to the Indian Ocean. One of the coastal outlets exists at the Baron Beach.The amount of water discharge from this spring reaches 20,000 l/sec in wet season, and approximately 9000 in dry season. In order to find other potential coastal springs, shoreline of the south coast is divided into some segments. By applying fractal analysis utilizing air photo of 1 : 30,000 scale, the fractal dimension of every shore line segment is determined, and then the fractal dimension value is correlated to the existence of spring in the segment being analyzed. The results inform us that shoreline segments having fractal dimension (D) > 1.300 are potential for the occurrence of coastal springs.**

Keywords Karst terrain , water scarcity, fractal geometry, coastal spring

Keywords— **Karst terrain , water scarcity, fractal geometry, coastal spring**

I. Introduction

Special Province, Indonesia (Figure 1.). Morphologically it shows a cone-karst-hills, comprises of limestone. Although the average annual precipitation in the area is about 2500 mm, it is always subjected to dryness, because the rainwater rather infiltrate underground than flows on the land surface, due to high permeability and porosity of the rock formation. There are more than 250,000 people living in the Gunungsewu area, suffering from fresh water deficiency especially in dry season. In relation to that, some effort need to be done in order to help the local government find any new water sources. It is the reason of why this study was held.

The objectives of this study were to identify the existence of springs on the coastal line of the Gunungsewu karst area, and to find the quantitative correlation of the shoreline geometry and the existence of the springs. Approaches used in this study were fractal geometry analysis. In fractal analysis, the main thing to be done is determining the dimension of the object being analysis. In this study box counting method was utilized to derive the fractal dimension.

Such a shoreline displays fractal phenomenon (Figure 2). In the south coast of Yogyakarta Special Province territory, there can be found some groundwater *outlets.* Plenty of fresh water discharges to the open sea without any barrier. Some of the outlets are that performs at the Baron Beach, and Ngrenean Beach. By utilizing air photograph of 1 : 30,000 scale, the curve of the shorelines were traced and their fractal dimension were determined (Figure 3.).

II. Method of Study and Fractal Geometry

In order to identify the existence of spring in the study area, this study utilizing air photo of 1 : 30,000 scale. The shoreline of the study area was traced and reprinted, and then divided into segments of about 2 km of length side. The fractal dimension of the curve of each shoreline segment was then determined by fractal analysis.

Mandelbrot (1983) used the word “fractal” to describe objects that are scale invariant, and are formed from a simple shape which grows more complex as the shape is repeated in miniature around the edges of the first shape (Xie 1993). Smaller versions of the shape grow out these smaller shapes, and so on to infinitive scale. The end result is infinite, swirling, and complex.

The natures of fractal are self-similarity, self-affinity, self-inverse, and self-squaring (Peitgen, et. al. 1992). Fractal scaling system is specified by a non-integer number called fractal dimension (Mandelbrot 1983), which can be used to quantify the degree of fractal irregularity (Sukmono 1996).

There are several methods to determine a fractal dimension, e.g. similarity method, cantor dust method, balls covering method, sandbox method, and box counting method (Mandelbrot 1983). The method used in this study is box-counting, because it is simple and more objective than other methods (Bunde & Havlin, 1994).

III. Box Dimension

The Fractal dimension derived from box counting method is called box dimension. Box counting method can be applied to objects which by Sahimi & Yortsos (1990) are classified into *statistical self-similar* or *statistical self-affine fractal*, such as fractional Brownian motion (fBm) and fractional Gaussian noise (fGn). The determination of the fractal dimension is very easy, e.g. by drawing grids with certain lengthside (r) over the fractal object. Then the fractal dimension (D) is determined using equation (Tricot, 1996):

$$D = \lim_{r \to 0} \frac{\log Nr(F)}{-\log r} \quad (1)$$

where $Nr(F)$ is the number of boxes that cover the fractal set (F), and r is the length of the box side (Figure 4).

---

[1]Sari Bahagiarti Kusumayudha is with Department of Geology, Faculty of Mineral Technology, Universitas Pembangunan Nasional “Veteran”, Yogyakarta, 55283, Indonesia. E-mail: saribk@plasa.com, saribk@gmail.com

The computation of *Nr(F)* is repeated by changing the length of the box side (*r*), so that *r* approaches zero. *Nr(F)* values and *r* are plotted on a log-log graph to derive the fractal dimension, e.g., the slope of the plot (Tricot 1996).

When F is a curve shaped fractal object, and Pn is the length of the "n" polygonal sequence of F, the length of the fractal object L(F) will be (Tricot, 1996):

$$L(F) = \lim_{n \to \infty} L(P_n) \tag{2}$$

When it is computed by *box counting method*, with the length of box side = r, and Nr(F) is the sum of boxes covering F, the length of the fractal curve will be (Tricot, 1996):

$$L(F) = \lim_{r \to 0} Nr(F) \tag{3}$$

…………………………………..

REFERENCES

[1] Bunde, A., Havlin, S. 1994. Fractals in Science, Springer Verlag, p 298.

[2] Kusumayudha, S.B., Zen, M.T, Notosiswoyo S, Gautama R.S. 1997. Fractal Analysis of River Oyo Flow in the Southern Mountains Central Java, a Lithologic and Geologic Structure Control. Jurnal Teknologi Mineral Vol. IV. 2, pp 71-86

[3] Kusumayudha S.B., Zen M.T., Notosiswoyo S, Gautama R.S. 1997. Identification of Fractal Pattern on Underground River and Surface Topography of Karstic Limestones in the Southern Mountains, Central Java, Proceedings of the 22nd Scientific Annual Meeting of HAGI, pp 176-179

[4] Kusumayudha S.B., Zen M.T., Notosiswoyo S., Gautama R.S. 1998. Study on Carbonate Rocks Distribution Based on their Fractal Characteristics, Valley Pattern, and Secondary Porosity, Jurnal Teknologi Mineral Vol. V.1, pp 21-28.

[5] Kusumayudha S.B., Zen M.T., Notosiswoyo S., Gautama R.S. 2000. Fractal Analysis of the Oyo River, Cave System, and Topography of the Gunungsewu Karst Area, Central Java, Indonesia. Hydrogeology Journal, Vol. 8, pp 271 – 278

[6] Kusumayudha, S.B., 2002, Sistem Hidrogeologi Gunungsewu, Prosiding Sumberdaya Geologi Daerah Istimewa Yogyakarta dan Jawa Tengah, Ikatan Ahli Geologi Indonesia (IAGI) Pengda DIY-Jateng, pp 130 – 141

[7] Kusumayudha S.B. 2004. The Application of Fractal Geometry Analysis to Groundwater Exploration, Research Basin and Hydrological Planning, A. A. Balkema,

[8] Kusumayudha S.B. 2005. The Beauty of Fracral in Farst System Case Study Gunungsewu Area, Central Java, Indonesia. Proceedings of International Conference of Women Engineers and Scientists, Seoul.

[9] Kusumayudha S.B., 2008. The Use of Fractal Geometry as an Alternative Method to Groundwater Resource Exploration, Inaugural Speech, UPN "Veteran" Yogyakarta Press

[10] Mandelbrot B.E. 1983. The Fractal of Nature, Springer Verlag, p 468.

[11] Peitgen H.O., Jurgens H., Saupe D. 1992. Fractal for the Classroom: Part One Introduction to Frcatals and Chaos, Springer Verlag, p 450.

[12] Sahimi, M., & Y.C. Yortsos (1990), Applications of fractal geometry to porous media : A review, *SPE 20476 Paper*

[13] Sukmono S. 1996. Fractal Analysis on Seismicity of the Active Fault of Sumatra. Proceedings of HAGI Annual Meeting XX

[14] Suyoto 1994. Stratigraphic Sequence of the Gunungsewu Carbonates, Proceedings of IAGI Annual Meeting XXIII. Vol. 1, pp 19-32

[15] Tricot C. 1996. Curves and Fractal Dimension. Springer Verlag, p 323.

[16] Turcotte D.L. 1993. Fractals and Chaos in Geology and Geophysics, Cambridge University Press, p 221.

[17] Van Bemmelen R.W. 1949. The Geology of Indonesia, IA, Martinus Nijhoff The Hague, p 792.

[18] Xie H. 1993. Fractals and Rock Mechanics, A.A. Balkema, p 453.