

Toward “Satisficing” Creativity Effort within Project Management

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Abstract— Project management plays an important role in our society as most work activities are organized around projects. While many are successful, a large number of projects fail due to the inability to meet project management constraints. One of the key constraints is that of budget, and projects often go over the planned budget. This happens because of inefficient allocation of resources to such critical areas as fostering a culture of innovation and creativity. It is a current standard practice to maximize creativity regardless of the nature of the project. However, such an approach is not always effective, and this paper proposes an adaptive decision-making framework based on the degree of project complexity. The framework can be used to determine the “satisficing” level of creativity effort needed to be generated and supported depending on the project type. In turn, this can lead to a more productive allocation of resources and achievement of project goals.

Keywords—*optimizing; satisficing; creativity; project management; project complexity*

I. INTRODUCTION

Projects often go over budget with significant negative consequences for the project concerned [1]. This is partly due to the waste associated with ineffective use of resources: and part of this is the extensive expenditure allocated to fostering creativity. Fostering creativity requires significant investment [2]. Although creativity is crucial, fundamental and at the center of innovation, all of the effort and cost expended on creativity must be financially accountable. Is there a point where additional resources devoted to creativity effort produce less and less return on investment, and if so how is that point determined? Even though creativity is important and needed, there may be times when investments in creativity effort may be greater than the project warrants. This paper presents a method of assessing whether investments in creativity efforts are appropriate and justifiable. The complexity of a project is a factor which needs to be considered when making an investment in creativity. What this paper is proposing is that the investment in creativity needs to be matched with the complexity of the project; that is, how much creativity effort is warranted needs to be

assessed against the level of complexity of the project. This assessment will result in more effective investments in creativity.

It is generally believed that creativity is always positive, and that fostering creativity is always a good investment [3]. Typically, decision-makers tend to optimize or maximize creativity in an effort to obtain the best result for a given project. In general, project management is based upon the concept of optimization. However this is not always the best way to go, especially under conditions of severe constraints [4]. It has become standard practice to maximize expenditure on creativity, regardless of the nature of the project. However, such an important project management decision should be financially accountable. This paper focuses on decision-making: in particular, the decision whether or not to invest additional resources into creative solutions to a project. This type of decision-making occurs in social human analytics, and the benefit of this approach is that it recognizes that investing more resources will not necessarily lead to better outcomes.

The paper analyses investment in creativity against the effectiveness of that investment as it relates to the complexity of the project and proposes a framework which can be useful in helping project managers to determine the most effective allocation of resources invested in creativity effort under differing levels of complexity. Investing in the right amount of creativity will be cost-effective: fostering too much creativity for the project is costly; on the other hand, insufficient creativity effort will also be costly in terms of loss of opportunity. It is therefore important that the project manager assesses the complexity involved in the project of interest before investing in creativity effort. The paper addresses a way of assessing a project and its degree of uncertainty, and then applying the correct level of creativity to match that project. The framework will assist project management decision-making regarding how much to invest in creativity effort, and this will mean greater efficiencies. The framework minimizes the loss or waste associated with unused creativity effort.

Section II of this paper discusses the benefits and costs of creativity efforts; Section III looks at an approach to allocating creativity efforts; Section IV presents a typology of projects

based on degree of complexity; Section V discusses benchmarking creativity in line with project complexity; Section VI presents a model; and Section VII concludes the paper.

II. BENEFITS AND COSTS OF CREATIVITY EFFORTS

There are many ways to define creativity and there is no one universally accepted definition, but creativity is generally viewed as entailing the production of something novel and appropriate [5]. Other definitions focus upon usefulness and aesthetics [6]. Howard et al. [7] listed several keywords describing creativity, including unobvious, adaptive, unexpected, resourceful. Creativity is therefore considered to be about producing outcomes which are different from expectations or from the norm. The relationship between individual creativity and organizational innovation has been investigated [8], as has the optimal method for organizations to encourage creativity in the working environment [9]. Creativity has also been linked with resilience [10], through for instance the capacity of flexibility. Metzl and Morrell [10] suggest that creativity can be a predictor as well as a facilitator of resilience. Creativity clearly has many benefits.

Creativity can be considered solely as a mental process of the individual: however, some authors contend that creativity is also social and cultural. Social systems make judgements about the creative products of individuals and decide whether and how valuable they are. A systemic approach assesses creativity against various interacting systems. For example, the evolving systems approach of Gruber (1988) considers three interacting systems, which through their interaction make the creative work; knowledge, purpose and affect. A systemic approach to creativity, then, asserts that the cognitive process occurs within a context and that looking at the process itself and not considering the importance of the context is a limited view of creativity. The creative person is interacting with the environment and those interactions affect the internal process of creativity. Csikszentmihalyi [11] proposed the DFI model of creativity which contains three major component systems; the domain, the field and the individual. The system of the field consists of people who make the judgements about what is creative and valuable and what is not. The creative process is thus considered to be not just the emergence of an idea, but also considers the larger process in which that idea is impactful and accepted. Ideas need to be used to be useful. A systemic approach addresses not just whether a creative idea is generated but also the extent to which an idea has an impact in its field and is accepted as a creative contribution in that field. There is a larger process beyond the creative act itself.

Within the realm of project management, creativity is the engine of innovation: without creativity new ideas do not evolve: and innovation is necessary for businesses to maintain competitiveness. Improved processes, new markets, new products all arise as a result of creative thinking, and companies need to foster creativity in order to maintain their competitive advantage. However, there are costs involved in encouraging creativity in terms of investments in money, time, resources, staff and leadership; and the investment in creativity efforts needs to be justifiable.

III. AN APPROACH TO THE ALLOCATION OF CREATIVITY EFFORTS

There are multiple approaches to the allocation of creativity efforts. One of the standard approaches is optimization. Project managers often choose this as their decision-making method, but there are limitations to this approach. Optimizing or rational decision-making consists of exploring all the available alternatives and then choosing the best possible option to achieve the best outcome. In using this approach, the project manager decision-maker needs to have a full knowledge and understanding of all the creative possibilities and options and must be able to assess those possibilities in an effective way. However, there are problems with this method of allocating creativity effort. Because in the real complex world rationality is bounded due to various constraints, it is not always possible or feasible to make an optimizing decision about the deployment of creativity and to encourage maximum creativity effort by considering all the options.

An alternative approach to optimizing is that of “satisficing” [10]: this approach is more adaptive to the complexity of a project. Projects are becoming more and more complex and require a different form of decision-making than optimizing. High-quality decision-making under complex conditions has spawned a number of tools such as decision trees, probability analysis, Monte Carlo simulation and others [12]. “Satisficing” is one decision-making method for complex projects and involves searching through the available alternatives until an acceptability threshold is met. “Satisficing” is a decision process used when all the available alternatives cannot be feasibly listed out and the best alternative chosen in an orderly fashion. If the project is dynamic, there are unclear boundaries and emergence is occurring, it is necessary instead to choose a “satisficing” “good enough” option which will satisfy a previously set benchmark [13][14]. Within project management, a “satisficing” decision will mean not continuing to invest in creativity efforts beyond the point when that investment will not be effective.

This paper suggests that, traditionally, project managers tend to optimize creativity, irrelevant of the degree of complexity. When a project is simple, it is feasible to optimize. However, when a project is complex, it is not feasible, and “satisficing” is what will be required. This paper suggests that it is necessary to decide whether it is appropriate to optimize creativity or instead use “satisficing”, so that investments can be more effective. In this way, creativity efforts will only be engaged when they are really needed.

IV. A TYPOLOGY OF PROJECTS BASED ON THE DEGREE OF COMPLEXITY

The degree of complexity present within projects varies: not all projects are the same based upon the variable of complexity. Several different typologies of project complexity have been proposed: this paper is based upon the typology of Snowden and Boone [15], which presents a model of four levels of complexity, similar to the work of Volberda [16]. This framework has been applied across many domains

including medicine [17]. Quantification of complexity is still in the early stages [18]. In this typology, projects are recognized as falling into four main types, as listed below;

A. Simple

Known; in simple projects, operations are predictable and repeatable; cause and effect are clear. There is no need for analysis or experimentation as the outcomes are known. This is the area of knowable best practice.

B. Complicated

Known unknown; in the case of complicated projects, there is some degree of interconnectedness of constituents and problems are those of coordination or specialized expertise. Cause and effect can be surfaced through analysis. Investigation, analysis and specialized knowledge are helpful in this kind of scenario. Good practice, not best practice, is applicable to complicated problems.

C. Complex

Unknown unknown; in complex projects, it is not possible to know and understand all the features within any project and there are ambiguity, unpredictability and uncertainty: because of the dynamic nature of the project, things are constantly changing, and emergence occurs. The management process is about probing, identifying possible responses, trial and error and evaluation. This scenario is not about imposing best practice or good practice, but rather emergent practice. Previously established protocols are not likely to work in complex projects. Cause and effect are understood only in retrospect.

D. Chaotic

In chaotic projects there is high turbulence and constant change, and there are no clear cause and effect relationships. The project is very dynamic and flexible and produces a lot of outcomes. The boundary of the system is not clearly definable. A great amount of information is flowing around in the system and the project manager needs to make sense of this information and propose a clear way forward. Decisions need to be made quickly and there is no time for consultation; communication is top-down. Establishing a focus and a sense of control may be more important for managers than selecting the 'right' or best way to respond. Gaining control is the first imperative [15].

V. BENCHMARKING THE LEVEL OF CREATIVITY IN LINE WITH THE COMPLEXITY OF THE PROJECT

Traditionally, the complexity of a project is not considered when assessing how much creativity effort should be fostered; rather, decision-makers tend to maximize creativity efforts under all conditions. However, this paper suggests that complexity is important in making the decision about the level of creative effort to be deployed. There are benefits and costs for creativity in each type of context, as presented below.

A. Simple Project

1) Benefits of creativity

Even in simple projects, some people need the stimulation of varying their approach to keep their mind on their work and to avoid being bored, which can lead to carelessness and a loss of focus [19].

2) Costs of creativity

In simple projects, creativity may impede work progress [20]. The scenario is known and understood and there is not much need for creativity effort. When the instructions are clear, and the task is straightforward, it is more efficient and accurate for people to follow the rules as they are laid out. Deviations from instructions are unnecessary and may be damaging and wasteful. Organizations do not need a great amount of creativity in the simple project.

B. Complicated project

1) Benefits of creativity

In complicated projects, there is room for minor adjustment in ways of approaching a problem to get an optimal outcome. Complicated projects often require the input of experts [15]. A moderate amount of creativity will be useful under these circumstances.

2) Costs of creativity

Whenever experts need to be brought in, this cost will need to be built into the assessment of the investment.

C. Complex Project

1) Benefits of creativity

In complex projects when things are changing rapidly, there is much more uncertainty and it is necessary to encourage as many ideas as possible, to use a trial and error approach to address unique, fast changing project challenges. This is the field for a high level of creativity effort and innovation. Enabling leadership which encourages creative effort is important [21][22]. There may be a paucity of resources, including time. There is no blueprint for how to respond and there is a need for ideas generated specifically for the project [23].

2) Costs of creativity

As well as considering the costs of wide consultation with a variety of participants, if a great number of creative ideas are produced, many of them can be wasted, especially if management has no control [17].

D. Chaotic project

1) Benefits of creativity

In a chaotic project there are opportunities for innovations, provided the project can be managed. Decision-making in the chaotic project is not straightforward. The project manager needs to decide how to channel decisions to the correct level of decision-making: some decisions are simple and not requiring creativity; some decisions will be complicated and there may be room for some creativity; some decisions will be complex and require a great deal of

creativity. The decision to act may be simple, but the process of execution will require some creativity in how resources are organized and applied [23]. In the chaotic project, maximum creativity effort is useful.

2) *Costs of creativity*

There is often a lack of control and it is possible that creativity effort will be wasted. In a chaotic project, all ideas generated may not be able to be capitalized upon because there is no boundary of the system. Too much creativity effort is destructive and distracting because people can lose sight of their objectives. If there is limited time to reach a solution the fostering of an excessive amount of creativity effort will cause a loss of focus.

VI. CREATIVITY AND PROJECT COMPLEXITY: A MODEL

Not all projects require high levels of creativity. Figure 1 shows that optimizing in simple projects is unnecessary. There are not many outcomes and there is not much built-in

uncertainty: there is no need for a range of different approaches and investment in creativity is unnecessary. As projects become more complex, more uncertainty is present, and a wider variety of approaches and solutions is needed. To deal with this variety of outcomes, a commensurate variety of approaches is needed. Ashby [24, 25] indicated in his Law of Requisite Variety that the variety of solutions available within a project must be at least equal to the variety of problems which need to be addressed. Thus, a complex project needs sufficient creativity and innovation in devising a variety of approaches to match the complexity contained within the project. In a chaotic project, maximum creativity effort is needed to cope with the turbulent environment. Thus, optimization of creativity effort is beneficial. However, it is difficult to capitalize on all the ideas generated and there will be a lot of waste.

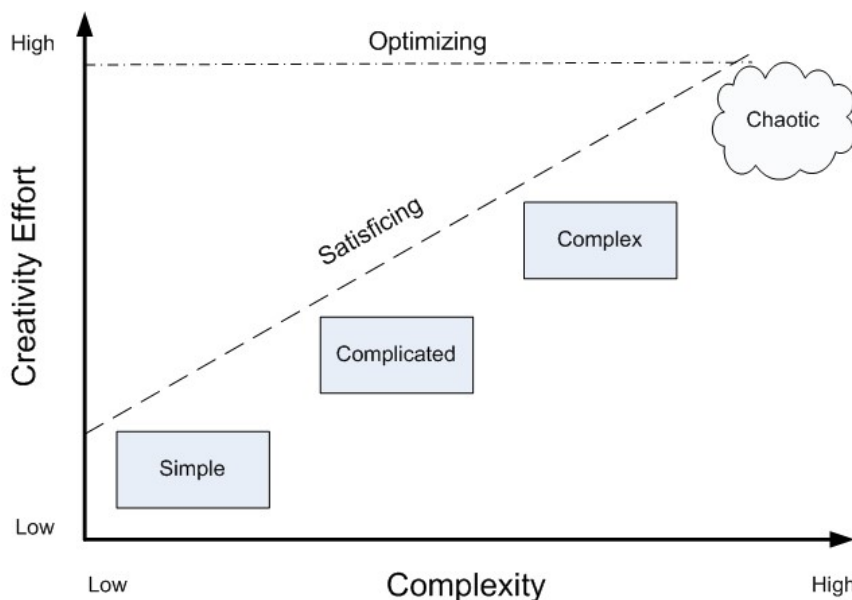


Figure 1. The relationship between complexity of the project and creativity effort

When “satisficing” is undertaken, the right amount of ideas is generated, and waste is minimized. Choosing to optimize under all circumstances without considering the complexity of the task is clearly an inefficient approach and an incorrect investment into fostering creativity [26]. The framework shown in Figure 1 is useful because project managers need to assess the type of project they are dealing with before deciding the amount of creativity effort which is needed: and this consideration will lead to greater investment effectiveness overall.

As an example, consider the following scenarios as an illustration of decision-making at various levels of complexity. The project is to transform an uninhabitable piece of land into a livable solution. At the simplest level, a person may go to a dealer of mobile homes to make their selection. There may be limited options available, the person chooses

one, and arranges for delivery. There is no customization, no preparations are needed, and the mobile home is already complete. Creativity effort is not necessary. Alternatively, the person may decide to use a partly customizable dwelling in the form of a modular home. They go to a dealer who has five different modules which can be assembled in various combinations. Now, there are more outcomes and the decision scenario entails a greater amount of choice. The home is complete but does need foundations and sewerage and other considerations concerning the environment. Some creativity effort will be needed. At the more complex level, a person may decide to commission an architect to produce detailed plans for a highly customized unique home. Next, a contractor will be hired to build the house. There it is much more uncertainty in this scenario and many more potential outcomes for this project. The individual can have whatever they want.

Creativity effort is certainly required in this complex project. As an example of chaos, an owner may decide to build their own home with no plan, no approvals, no architect, no zoning checks and not much idea of what they are doing. In this scenario, there are many choices and the options may constantly change. Optimization of creativity is necessary in

this project. Figure 2 below locates these projects on the “satisficing”/optimizing model.

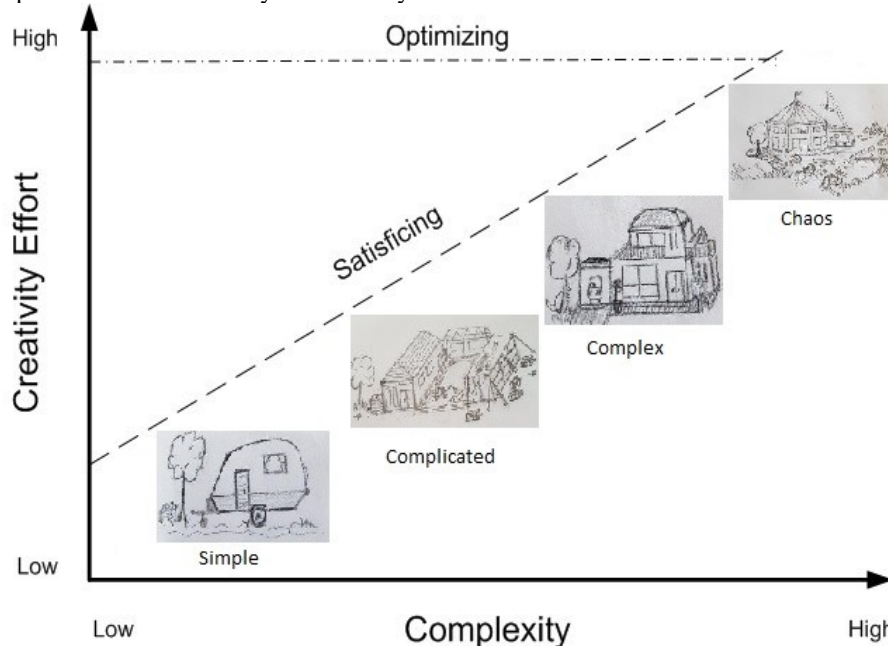


Figure 2. Examples of housing projects of differing complexity and their relationship with creativity effort

VII. CONCLUSION

This paper addresses the important issue of how much creativity is necessary under different contexts. It is commonly believed that the more creativity is generated, the better the outcome. In recent times, a high value has been placed on creative endeavors: stimulating, encouraging and financing these is seen as desirable and a measure of contribution to society. This paper presents a novel approach in suggesting that it could be more effective to map the amount of creativity effort against the nature of the project, and that not all projects require maximal stimulation of creative ideas. Based upon the complexity of the project, it will be necessary to decide how much creativity to generate, to minimize the wasted creativity effort. It is wise for practitioners and managers to assess the level of complexity in any given project, and to adjust investment in the generation of creative ideas accordingly. This can lead to a viable return on investment related to creativity effort within project management.

The practical strength of this paper is that it generates a rule which will help project managers to know how to allocate creativity efforts in line with the complexity of the project. In terms of theoretical contribution, the paper has deconstructed the idea that fostering creativity is necessarily good. The paper has demystified creativity by putting a financial value on it. The concept of parsimony is relevant here. This theory separates out the action from its value. The paper is moving

away from an evaluation of creativity on its own merits towards an evaluation of creativity as an ability to solve a problem and move forward. Putting a practical and financial value on creativity challenges the current view which places creativity on a pedestal in terms of its value to society.

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