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Analyzing the Incremental Funding Method and its Software Project Scheduling Algorithms

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The Incremental Funding Method (IFM) is a financially driven approach to software development planning and execution. The method takes into account that software development is a productive activity that yields valuable goods and services. As a result, it requires capital investment to be carried out and is expected to provide return on investment. The IFM is based upon the idea that software development projects are usually divided into smaller parts. This tends to facilitate understanding, planning, programming, testing and monitoring. Moreover, the order in which these project parts are completed may have a considerable impact on the financial value of the software being developed. Since it was first presented about a decade ago, the IFM has become a influential way of analysing and directing investment in software development. In this respect, it has inspired the work of many academics and industry professionals. This paper revises the main concepts upon which the IFM is based and discusses the method's merits and pitfalls. Moreover it indicates possible research directions. It is intended to be a source of information for those who want to use and refine the IFM.

Keywords: Incremental Funding, Minimum Marketable Feature Software Units Software Development Projects, Scheduling Algorithms, Software Project Management, Value-Based Software.

1. INTRODUCTION

These days software development has become an important activity in a large number of private and public organizations around the world [1]. While some organizations use software development to yield products and services that have market value, others use it for process automation and decision making [2]. The former is comprised of organizations whose purpose is to produce software that is used by others. Among these organizations one can find the makers of enterprise resource planning systems (ERPs), office productivity applications, computer games, operating systems, database management tools, *etc.*, [3]. The latter encompasses organizations that need reliable up-to-date information to run their business such as supermarkets, airline carriers, banks, universities, car makers, *etc.*, [4].

With the widespread use of the Internet and mobile communication, software development has become a crucial element of competitive strategy formulation [5,6]. In the public sector, it has allowed governments to build information systems that facilitate the use of a variety of public services, as well as the interaction among government agencies [7]. Moreover, these systems favor a better control of public affairs and increased accountability from managers and decision makers. As a result, in many circumstances, the government in place has gained the necessary public support to carry out their political vision [8].

In the private sector, software development has

project tend to be considerably different.

As a result, each organization is likely to identify a different running sequence that returns the highest *NPV*. This leads to a conflict of interest that has to be dealt with before the project can be run. The IFM should be extended to deal with this kind of conflict, if it wishes to keep up to date with the changing world in which we live. By advocating the maximization of the *NPV* of a series of interconnected subprojects, the IFM seems to send the message that making money as rapidly as one can is always the best strategy. As this seems not to be the case in all circumstances, by blindly using the IFM one may not be taking the best course of action.

It is the case that the value of software projects should not be established individually, but in the context of the whole corporate strategy [62]. The IFM should be extended to allow a stronger alignment between corporate strategy and software development. According to Denne and Cleland-Huand software projects bring value to an organization in one or more of the following areas:(a) competitive differentiation, (b) revenue generation, (c) cost savings, (d) brand projection and (e) enhanced customer loyalty [21]. It should be noted that the calculation of the *NPV* generated by a project should take into account all these different dimensions.

However, this is more easily done in some areas than in others. Brand projection and customer loyalty seem to present some difficulties in this respect. As a result, it might be the case that when using the IFM one should be able to take into account more than one performance indicator to select the best running sequence. This may include the use of indicators of non-financial nature.

6. CONCLUSIONS

By analysing software development from a strictly financial point of view, the IFM has made it easier to bring the vision of those who fund software projects into focus. This has allowed developers, managers and investors to share a common view of how software should be developed. Moreover, the ideas and concepts upon which the IFM is based are not difficult to comprehend and use. Therefore, not surprisingly, the IFM has gathered support from both academics and industry professionals around the world. As a result, a considerable number of articles and reports have been published that refer to the IFM one way or another[1].

However, there are many circumstances in which the original IFM [21,16] fails to yield consistent results. Hence, many interesting proposals have been presented to extend and refine the method. This article reviews the ideas upon which the IFM is built. Moreover, it discusses its merits and pitfalls with the goal of making its supporters conscious of their existence. Furthermore, it points to future research directions. This aims to motivate research and development to further refine the IFM, increasing the number of situations in which it can be used successfully.

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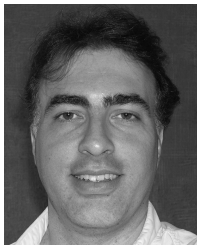

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