

Predictive Markets on IT Portfolio Management Process

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Abstract

Although IT Portfolio Management has been source of a complete study and not only an academic but also an enterprise concern, there hasn't been a single method able to manage in an efficient way organization's IT Portfolio, neither a framework capable of taking advantage of the most organization's valuable asset, people.

The actual Market's conjecture, the recent economic slowdown and the lack of credit given to investments in Information Systems are factors that increasingly concern CIOs. Therefore, justifying the real value carried by an investment to organization is a hard task.

A good Portfolio Management approach, is an excellent way to accurately justify the adoption of a given investment and to avoid misalignments between investments and the overall organization's strategy and resources. This thesis purpose an approach to solve the problems early mentioned, through the redefinition of the Portfolio Management process. With the inclusion of Predictive Markets in this process, we seek to maximize the attainment of information, in order to better perform decisions.

We intend to specify the feasibility of the purpose developed, through the implementation in a bank and inside Instituto Superior Técnico.

Keywords: IT Portfolio, Predictive Markets, Investments.

1. Introduction

Nowadays IT investments are well-known as agents who can change how organizations perform. Their benefits are uncountable and when applied in a planned and rational way they can bring enormous advantages to organizations against other players in the market [(Brynjolfsson, McAfee, 2008)].

In the last 25 years, the number of IT investments and the reliance of organizations against these investments have grown exponentially [(Selig, G, 2006)], and, although the number of benefits is vast, investments have to be aligned with organization's strategy, in order to sustain competitive advantage [(Jurgen Laartz, Eric Monnoyer, Alexander Scherdin., 2003)].

Linked with the facts above, at the moment Chief Information Officers (CIOs) are frequently facing small investment margins and a frequently mutations on business priorities. The broken connection between Business and IT inhibits organization to align projects, people, partners and resources with business objectives. As a result, changes in business expectations cause huge impact in project requirements, consuming time and money in an unduly way [(Selig, G, 2006)].

So, decisions regarding IT investments become essential in order to justify properly organization's IT Portfolio.

A recent report by AMR Research contends that as many as 75% of IT organizations have little oversight of their IT portfolios and employ non-repeatable, chaotic, planning processes [(Datz, Todd, May, 2003)]

Still, the IT investments selection process is frequently managed individually or in small groups by senior managers, as an overhead to their normal functions, making this process inefficient and carrying problems. The fact that decisions are performed by a small group, who has not knowledge about all the business variables, can turn decisions in bad ones.

IT Portfolio Management can be viewed as a whole process which inside contains a chain of smaller processes [(Jeffrey, Mark and Leliveld, Ingmar, Spring, 2004)] . This article will focus on the Selection and Prioritization process which we believe it is managed in an unrighteous way.

Table 1 outlines some facts that will prove the argumentation above:

	Yes	No
Is IT investment appraisal seen as important by business managers?	55%	45%
Do you have an effective investment appraisal process?	22%	78%
Are business managers adequately involved in IT investment appraisal?	30%	70%
Does the appraisal process consider the implications of business changes?	10%	90%
Do people making decisions understand the business cases?	25%	75%
What % of projects deliver the benefits that justified the Investment?	27%	73%

Table 1 - Survey about IT investments [(Lampert, R., C., E. - Cranfield School of Management, 2003)]

To address the problems early mentioned, we propose to add Predictive Markets to the process of Portfolio Management with the purpose of gathering more information from all the stakeholders that can provide useful information to make decisions concerning IT investments.

The remainder of the paper is organized into seven sections. Section 2 discusses related work; Section 3 explains the research model used and Section 4 provide the proposal to address the problem mentioned earlier. In Section 5 and 6, we report the first and second Action Research cycles taken. Finally, in Section 8 we summarize our findings and elaborate on future work.

2. Related Work

In this section, we will outline some important topics addressed in this paper.

2.1 IT Portfolio Management

Simply put, IT Portfolio Management is a discipline that ensures alignment between IT and business objectives. It is about human and capital resource allocation and prioritization between various projects [(IT Governance Institute, 2006)].

Although a portfolio of IT investments consists mostly of projects, the nature of a project itself is variable, in the way that not only software projects are considered. People, infrastructures and service projects are also eligible to be part of the investment portfolio of an organization.

The main objectives of this discipline are:

- Efficiently manage risk and resources to maximize returns [(Handler, Robert and Maizlish, Bryan, 2005)].
- Create synergies between IT investments and organization's objectives [(Selig, G, 2006)].

2.2 Predictive Markets

Also known as Information Markets or Ideas Markets, Predictive Markets are markets created to aggregate information.

Instead of trading on future prices for commodities or financial instruments, a Predictive Market trades on the likelihood of realization of a specific, identifiable operational proposition at some future point in time –an idea, event or investment. Shares in a Predictive Market are bought and sold using standard market methods. The price of the future reflects the aggregated information over all traders about probability associated with the proposition. Prices rise or fall based upon changes in information perceived by market participants. [(Justin Wolfers and Eric Zitzewitz, Spring, 2004)]

Predictive Markets are well known to perform accurate guesses; Philip O'Connor in his article writes "In fact studies have found that the market price does a better job of predicting future events than all but a tiny percentage of individual guesses".

According to [(Justin Wolfers and Eric Zitzewitz, Spring, 2004), (Michael S. Rozeff, 2006)] Predictive Markets that predict elections have been shown to outperform the prediction of opinion polls. Google uses internally Predictive Markets to predict products release dates and to perform some strategic decisions [(Google, 2005)]. Many other successful facts about Predictive Markets can be found.

2.3 Dynamic Pari-Mutuel

Dynamic Pari-Mutuel (DPM) [(David M. Pennock)] acts like a hybrid between a Pari-Mutuel (PM, e.g. Racing Horse bets) and Continuous Double Action (CDA, e.g. Financial Markets) inheriting some of the advantages of both. Similarly to PM, DPM incorporates mechanisms which provide infinity liquidity to the market and zero-risk for the market institution. Akin to a CDA, DPM can continuously react to new information, aggregating dynamically this information in prices, allowing investors to block his gains or losses.

DPM will support the Predictive Market introduced in the organization.

3 Research Method

The research method taken for this study was Action Research [(Baskerville, Richard L., 1999)]. We believe that this method was best suited for this study because it produces highly relevant research results, and it is grounded in practical action, aimed at solving an immediate problem situation while carefully informing theory.

The Action Research methodology is composed by five stages: Diagnosing, Action Taking and Planning, Evaluating and Specifying Learning

4 Proposal

The goal is not to implement a disruptive change in the way the organization manages its Portfolio, although the intention is to bring more value to the IT Portfolio Decision Process trough the addition of Predictive Markets.

Figure 1 outlines the proposal:

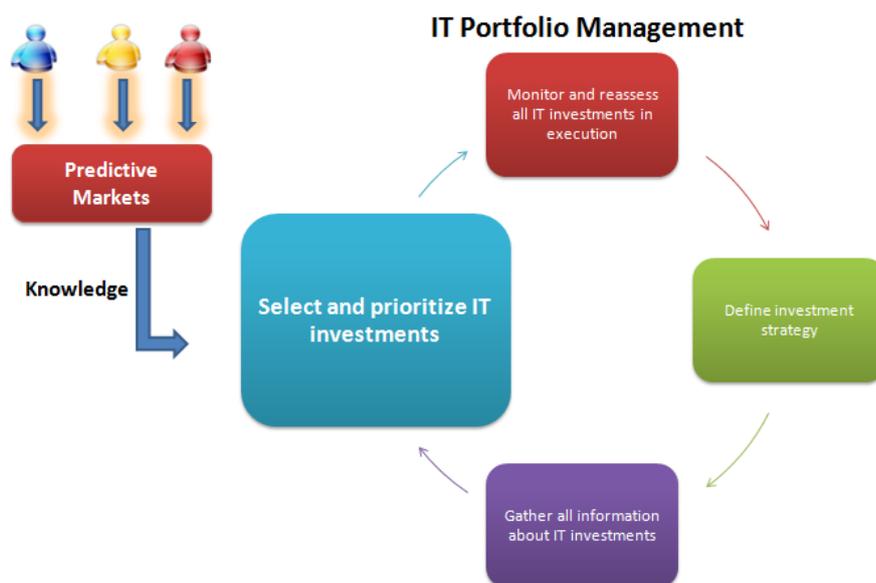


Figure 1 - Proposal of work [(Aral, Sinan and Weill, Peter, Winter, 2006), (Jeffrey, Mark and Leliveld, Ingmar, Spring, 2004)

5 First Action Research Cycle

In this section we will describe the first Action Research Cycle.

5.1 Diagnosing

Here, we will introduce the organizational context, the IT department and the problem to be address.

5.1.1 Organizational Context

The organization chosen is a specialized financial institution with headquarters in Lisbon. The organization pioneered online investing in Portugal and today is the leading independent provider of online investment services in Portugal based on internet trading volumes.

Being this organization an online bank, IT has great influence. The CIO is also positioned in the Administration Board; which reveals the great importance of IT to Business.

The IT Department operates under an open-space with a good environment of cooperation and professionalism. The team is formed by 15 persons distributed beneath four main areas: Security, Database, Helpdesk, and Software development.

5.1.2 Problem

With the purpose of developing competencies in its collaborators related with software development, database, and security, the organization decided to acquire some workshops. There were a limited number of inscriptions, so the objective turned to correctly allocate all IT departments' collaborator and to maximize all's satisfaction.

In previous years, these workshops were allocated accordingly to CIO's knowledge about collaborators' interests. This approach created some dissatisfaction inside the group, consuming time to CIO, who needed to solve some conflicts between the workshops chosen. Although the time lost solving conflicts, the result was never perfect and some choices were not in sense with collaborators expectations.

5.2 Action Planning and Action Taking

In this section, we will present the data that has been collected as part of the study and the methodology of how it was collected.

5.2.1 Data Collection and Methodology

For the study, data has been collected from three sources: workplace observations/personal conversations, questionnaires, platform results and from a Control Objectives for Information and related Technology (COBIT) audit.

5.2.2 Action

Since January 2010 the researcher was at the Company two days per week. At first, his role was to implement a Predictive Market platform where the CIO could introduce the ideas/futures investment that he was will to realize. Subsequently, users would invest in the ideas in order to determine which was the best ones and should be approved.

After this phase, his role was to assist users and resolve any problems related to the use of the platform.

Between these two phases, the researcher introduced the concept of Predictive Markets to all IT department members. The objective was to give users a better understating of how the platform should be used and how the process would be managed.

The study was performed with the intention of finding out which workshops would most suit user's expectations and how they would be distributed. Consequently the researcher started to create a

market with all the workshops regarding software development. This market had duration of a week (the period of time needed to observe stagnation on daily investments). Every workshop presented in this market, had a belief, which varied accordingly to the investments made by users (all workshops started with a belief of 50%). Within each workshop users could buy shares of Yes (which meant the belief in the realization of the workshop) or shares of No (which meant the not belief in the realization of the workshop). Every user had a limited number of credits.

After the market was closed the three most believed and least believed workshops were identified, and the results presented to organization’s CIO.

There were other markets for Database and Security workshops, this experience extended through approximately one month.

5.3 Evaluation

In this section, we will provide a description of both quantitative and qualitative results from the case study.

5.3.1 Quantitative Results

COBIT Audit

The audit was made personally with the CIO who answered all the control activities requested and supplying evidences when needed. The overall score of IT Portfolio Management was 2.4 in 5. Since all IT Portfolio Management best practices were implemented the researcher found the result acceptable and considered that the organization was capable to implement Predictive Markets.

Questionnaires

Inside the IT department, 9 of the 15 collaborators were selected by the CIO to be enrolled in the Action Research cycle. After the Action phase was concluded, questionnaires were made. The main objective of these questionnaires was to get some insight about collaborators opinions, about the importance of this approach and if they were in sense with the results obtained.

Figure 2 graphs the user’s belief in the importance of Predictive Markets to the organization:

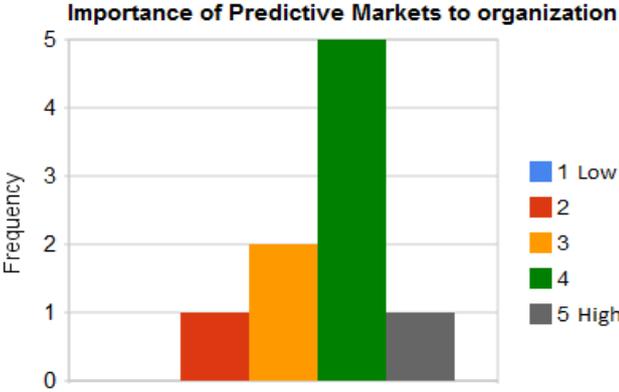


Figure 2 - Importance of Predictive Markets to Organization

Through observation from the graph above, we can conclude that 6 of 9 collaborators found this approach important (with a score of 4 to 5). The global average of responses was approximately 4 which corroborate the thesis before.

Another question was made with the purpose of finding out if the most and the least believed workshops were all perfectly in sense with user's expectation. There was an agreement of 100% with the most and least believed workshops.

Platform Results

The results presented in this section will only focus in the Software Development Predictive Market.

With the purpose of saving organizations identity and protecting confidential information the author will name respectively Workshop X and Workshop Y to the most and least believed workshop.

The market where Workshop X and Y were inserted had nine collaborators, each of one invested more than one time in workshops.

Although all investments were made in the first three days, this market had duration of approximately one week, with the aim of observing stagnation in investments.

Figure 3 depicts the variation of user's belief in the most and least believed workshops:

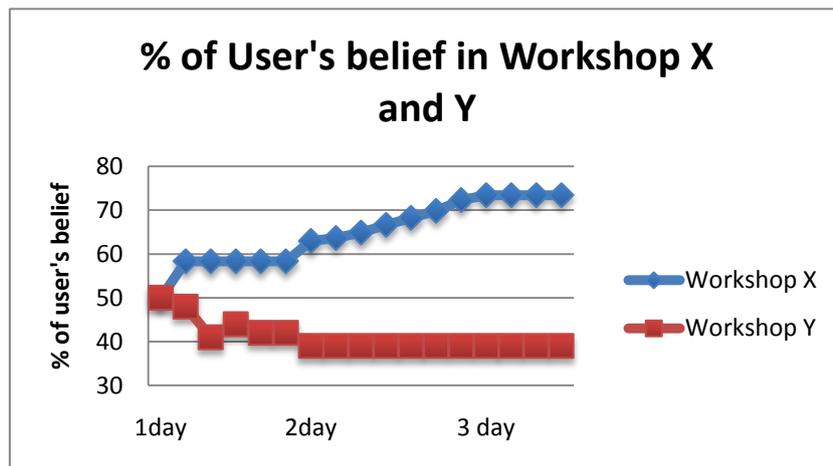


Figure 3 - Workshop X and Y Variation in users' belief

As we can see by the graph above, the belief in workshop X started with 50% and steadily increased until the third day, were the investments stopped. On the other hand, investments in the Workshop Y steadily decreased until day two, with a slightly increase in the mid of the day one. This increase has to do with a collaborator's belief in the realization of workshop Y.

5.3.2 Qualitative Results and Discussion

Here we will present some qualitative results from conversations/observations and from questionnaires.

The questions were made after the markets were finished and were run essentially to get some feedback from collaborators about the approach introduced by this experience and to get some idea of the differences before and after the introduction of Predictive Markets.

The overall feedback we got from collaborators was positive. When asked what you most liked in this approach one collaborator said: “It promotes the participation and measures the tendency of the team to correctly adequate collaborator’s interests with business objectives. Others said that “the concept was extremely innovative and would carry enormous advantages to the organization”. All assumed that platform’s interface was really intuitive and simple. The CIO said, “Before Predictive Markets, workshops were allocated according with my belief in each person interests. This approach created some dissatisfaction within collaborators who would like to attend other workshops instead the ones I chose. The introduction of Predictive Markets simplified and automated this process.”

When asked what you least liked in this approach, one said “The mechanism that supports the appreciation and depreciation of capital gains, turned to be confusing and difficult the interaction with market”. Others said that “Predictive Markets would perform better in more technical subjects rather than workshops”.

5.4 Specifying Learning

From the results above and the experienced acquired from the researcher in the organization, we believe that Predictive Markets are one of the best-suited tools to make group decisions.

Although all the advantages, Predictive Markets and the mechanisms that supports them, are complex subjects that need to be exposed in a correct and simplified way, so all can understand how everything works, their position and responsibility in the decision process.

In futures iterations we pretend to increase the platform usability in order to turn the mechanism that supports the market more intuitive. We would like also to introduce some bonus to the investor who earns more credits in the market, with the aim of increase motivation and participation within the team.

6 Second Action Research Cycle

In this section we will describe the first Action Research Cycle.

6.1 Diagnosing

Here, we will introduce the organizational context of this second Action Research Cycle.

6.1.1 Organizational Context and Problem

The second Action Research Cycle conducted was performed inside Instituto Superior Técnico. This school, founded in 1911, distinguishes by its national and international influence and its main goal is: contribute to society through the promotion of quality high school education in science, technology, engineering and architecture.

Although there has been a decisive influence of students’ opinions in some decisions inside this organization, through some questionnaires and observations we can extrapolate that it is not enough. Students would like to have a greater influence in some decisions.

The main objective of this cycle was to get some insight, of Predictive Market’s applicability in the generation and prioritization of ideas about investments in information systems.

6.2 Action Planning and Action Taking

With the goal of mitigate this problem, we introduced Predictive Markets inside the Department of Informatics Engineering. The main objective of this Market was to generate possible ideas about new information systems that would be useful inside IST and then present them to its board. The target participants were mainly students from Informatics and Communication networks.

According to the feedback we got from the former cycle, some changes were made to the platform. These main changes were principally related with the usability of the platform and how the market was managed.

The market had a duration of six days. From a Monday to a Saturday.

6.3 Evaluation

In this section, we will provide a description of both quantitative and qualitative results from this Action Research Cycle.

6.3.1 Quantitative Results

Platform Results

During the six days in which the market extended, the participants submitted seven ideas. From the seven ideas submitted, two were rejected. The approval criteria weren't much restricted in order to promote innovation.

Questionnaires

Similarly to the previous cycle, when the Action phase was concluded, questionnaires were made. From the 35 participants, 24 answered the questions. The results are shown below.

Figure 4 graphs the participant's belief in the importance of Predictive Markets to the organization:

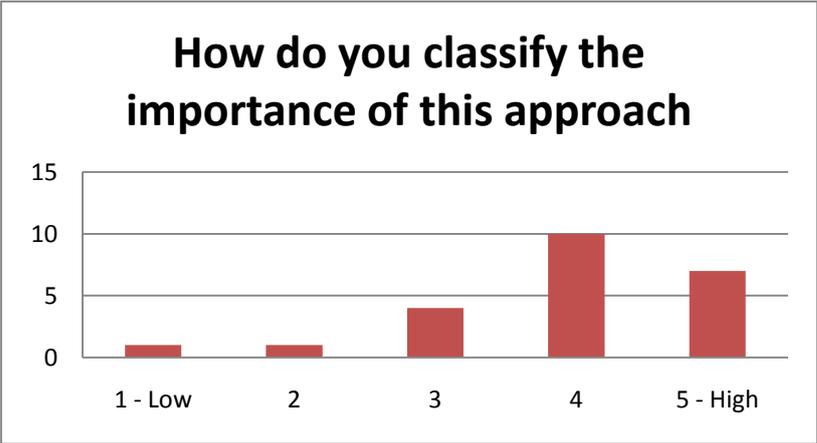


Figure 4 - Importance of Predictive Markets to participant

Through observation from the graph above, we can conclude that most of the participants found this approach important (with a score of 4 to 5). The global average of responses was approximately 4 which corroborate the thesis before.

Another question was made with the purpose of finding out if the most invested ideas were in sense with user's expectation. There was an agreement of 93% with the most invested ideas.

6.3.2 Qualitative Results and Discussion

Here we will present some qualitative results from conversations/observations and from questionnaires. When the market was concluded, questionnaires were made in order to determine user's opinions.

The overall feedback we got from the participants was positive. When asked what you most liked in this approach there was some consensus. The two following comments are meant to represent the majority of opinions: "The fact that all students can propose and invest in important ideas is certainly a valuable asset to IST". "The democratic way how ideas emerge and the fact that this experience favors the wisdom of the crowds is quite interesting."

On the other hand, when asked what you least like in this experience, the answers were quite divergent: "The market would be more dynamic if there were more redistribution of dividends. This experience would benefit more, if the market could be extended to professors and others entities." Other participant said: "The proposed ideas could be more interesting if they were more detailed"

6.4 Specifying Learning

From the results obtained and from the acquired experience, it is possible to take some valid learning.

Users' perception regarding the platform and the mechanism which supports the market increased. The changes made to the platform were undoubtedly a valuable asset, because it led to a more comprehensive and simplified view of the users from the mechanism that supports the market.

It is clear that the market could have been more success if it had been disseminated to all IST students. The participation of more students from other courses would be very helpful in obtaining more knowledge and in generation more and better ideas. However, due to time constraints we weren't able to meet this point

7 Conclusion and Future work

There are two main contributions in this paper. The first contribution is the presentation of empirical results from the Action Research Cycles showing that after Predictive Markets were introduced in IT Portfolio Management Process the collaborators satisfaction increased while at the same time the study shown that decisions were done in a more formal and supported manner The second contribution is the formulation and testing of a hypothesis based on a theoretical thesis.

In the future, we would like to test the presented hypothesis in additional case studies.

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