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Information Behavior and Managing the Next Generation Software Development

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Abstract

I was involved with two different software development projects in two organizations during the last 18 months. Each organization belongs to different industry, have nothing in common in terms of market sector, customer profiles, and product properties. Within a period of twelve months, software development projects were initiated from these two organizations with a vision to utilize existing information portfolio captured in past operation to help the organization to innovate for market leadership.

These 2 recent development projects indicate that it is the search of “Opportunity” perspective we are experiencing, and that may well transcends the IT industry from the current Information Age to an “Innovation Age”. We may well be experiencing another paradigm shift of information behavior, from the current user perspective to a potential of client perspective.

This paradigm shift is brought about by recent changes in scholarly publishing, which enabled end-users to search for and retrieve information by themselves. Software is expected to look for potential opportunities from existing information (both internal and external) for new products, new markets, new services, new technologies, and new management processes. This new paradigm shift may arrive sooner than expected because of the current economic crisis is acting as a catalyst of the transition. How will this Innovation Age affect future IT projects and how can we manage these projects may be something we should look at in real earnest.

Keywords

Information behavior
Program Management

Innovation System
Next Generation Software

Innovation Age

Early IT landscape and Information Behavior

Computing technologies and software development played a major role in re-shaping how information behaves in our commercial establishments. The “user requirements phase” dictated the design of computer-based systems, and managing user requirements is one of the key success factors in software engineering project management.

Before the 1980s, organizations develop software for the purpose of managing business processes and commercial data in order to gain competitive edge of operational effectiveness and efficiency, minimizing human intervention and potential human errors to reduce operation cost. The development focus of software was changing manual processes into computerized processes and is known as the “Automation Age”. It is a period of technology utilization, by understanding how the manual process delivers business objectives. “Terms of Reference” set the boundary of project engagement and users requirement, were the analytical outcome of the business processes that needs to computerize, formulated by software engineers (Refer to PM World Today’s Featured Paper, June 2008 – Where to look when Requirements do not exist in today’s Software Projects-Hubert Vaughan).

Most frequent used development methodology by software engineers was the Information System Development Methodology (ISD), Waterfall Development Methodology and Structured System Analysis and Design Methodology (SSADM) that focused around understanding the business processes and modular structure of the solution, i.e. the system. Managing software development during this era of automation age simply ensures effort estimation and development progress falls within the allocated resources and timelines. Such responsibility usually falls onto the Senior System Analyst of the development team. There was no proper project management methodology for the industry except using Program Evaluation and Review Technique (PERT) and GANTT charts that help team leader to identify project progress. PMBOK draft document was not published until 1986 and the First Edition was only released in 1994.

System testing was conducted by the developers ensuring all user requirements identified during the initial learning of the business processes (fact finding phase), and the subsequent application system (design phase) that formulate the application architecture does deliver the expected logic and data for departmental operation purposes.

Users Acceptance Test was conduct by users who used to perform the manual tasks ensuring the overall application system as a whole does perform and deliver proper result as per the manual processes. Departmental staff members was the de-facto Information owners ensuring data accuracy and consistency, as well as being able to provide upper management operational details of their routine operation.

In this era of Automation Age, successful software delivery started with knowing the system can deliver the end result same as those of the manual system. The only proof for IT practitioners to ensure it deliver the system meeting “user requirement” is to plan for and eventually set up parallel run testing environment demonstrating both results are equivalent.

From System focus to User focus

Information accumulated for decades before the 80s provides business managers with statistical details of their management effectiveness. Then the world’s energy crisis in the 70s and early 80 encouraged organizations to improve coordination of information and look for ways to further streamline their operations by eliminating redundancies, avoid duplication, timeliness of business processes and data gathering. Decision of technology application depends largely on its Return of Investment (ROI) and the common expectation of technology application needs to improve management ability within departmental operation. Apart from the traditional computerization of manual business processes, new projects were created to consolidate and integrate existing information. Management was paying more attention on their information needs and how information was delivered for their own benefit. Management gradually took over information ownership from their operational staff.

User requirement was more difficult to define. Introduction of Statements of Works (SOW) replacing Terms of References to define project boundary does help in new software development, but failed miserably for system integration and data consolidation projects because there were no pre-defined processes to follow. The focus of fact finding continues to be on operational staff that had no answers to all the questions during fact finding exercises. It is this period of time that Rapid Application Development (RAD), Computer Aided Software Engineering (CASE) tools, and Fourth Generation Language (4GL) appears that encourage Do and Fix approach in Software Development. IT practitioners failed to understand that it was not the development methodology that caused IT projects failed; it was our misunderstanding of information ownership and our failure to define project scope that caused project over-run.

Information technology and business entities took the whole decade in the 80s to transform from the Automation Age to the Information Age. The paradigm shift of Information Behavior from focusing on the system to the users and their characteristics impacted software development methods and how software development was managed during the last 20 years. Business managers expected software enable them identify areas of improvement and cost saving, and investment on Information system projects aimed at delivering value through technology application. The failure of understanding information

behavior by the IT professional leads to the many failures of system development in business organizations.

When Information Age came into full force from early 1990s, software were focused on strengthening management ability in all disciplines within an organization, from manufacturing to marketing, supplies and services oriented operations. It takes many shape and forms like Enterprise Resource Planning (ERP), Customer Relation Management (CRM), Supply Chained Management (SCM), etc. Successful implementation of these types of Information Systems requires a thorough understanding of how information owners (management) wish to utilize information to manage their operation. It was unfortunate that most IT practitioners tried to secure management's mind-set from their operational staff during fact finding exercises, causing deliverables not meeting management expectation and continuous project over-run.

The convergence of information and communication technologies was an enormous leap for people of the modern information society, and creates additional opportunity for failure in software development. We continue to ignore the fact that only the information owners are the only one that can help us to define project scope, reasons of investing on the software solution, and the expected outcome of the software. Project managers should work with information owners to obtain proper expectation and investment objectives, create the roadmap that derives user requirements, of which their operational staffs are unable to provide. Such "code and fix" phenomenon is also reflected in the tools available for recent date software development.

We may argue that Project Charters does defined management expectation and value of technology application via ROI statements. The gaps between the project charter and the development processes (methodology) deployed by organization, and the activities focus of compiling project charter and delivering project deliverable is getting wider and wider. Information owners (management), information providers (operation staff) and information architects (software engineers) are not in coherence nor integrated in the development processes, causing our current state of failures for information system development.

Successful project management of any information system started with a well defined acceptance criteria at the start of any Information System project. Instead of diving into defining user requirement at the start of a project, the project manager should work with the de-facto information owner (management) to draw up a well defined acceptance criteria of final delivery. It is the only way how project managers can understand the user's (management) expectation and the mind-set behind the software investment. Managing Acceptance Criteria instead of user requirement have a better chance of winning customer's sign off sooner.

The Next Generation Software

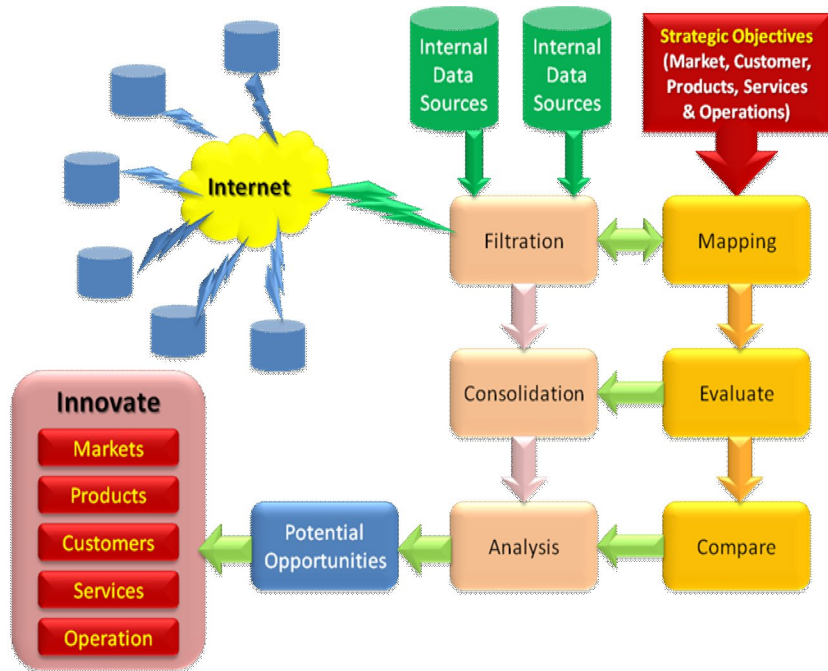
I was involved with two different software development projects in two organizations during the last 18 months. Each organization belongs to different industry, have nothing in common in terms of market sector, customer profiles, and product properties. Within a period of twelve months, software development projects were initiated from these two organizations with a vision to utilize existing information portfolio captured in past operation to help the organization to innovate for market leadership.

The first example involved a telecommunication carrier who is trying to develop an application that can make use of information captured during the past, as well as search through the public internet domains to select relate dataset available, to create a repetitive model supporting future development of new product, identify new market, and discover new services to customers so to remain competitive.

It was part of the business strategic objectives of senior management that past operational details, and information cumulated, along with the huge amount of information available from the public domains over the internet, should provide insight of their past success and failure. The company should have the appropriate tools to make use of such information for future product and service development as well as market penetration.

The second example is an engineering organization wishes to develop an application that can highlight potential technology improvement and new product development, by analyzing performance data of existing products in services and similar technical details across the public domain.

The use of information from internal and external sources to deliver project objectives that enables operational management to identify opportunities to innovate, and gain competitive edge over competitors. The mapping of internal information, external information, and strategic objectives are the key



success factors of this type of project. Information retrieved needs to be filtered, consolidate, analyze, and compare their normal and abnormal pattern of behaviors (with baseline drawn from internal information) related to the strategic objectives will constitutes to the exposure of potential opportunities. Innovation opportunity and strategic objectives are further divided into potential market segments, technology enhancement, product, services and operational processes (Methods) improvement.

Innovation objectives must have a tight relationship of business strategy. Potential opportunities must map innovation objectives, which requires further breakdown of focus of innovation development such as new products, new services, and/or new market catered for the potential customers, new technology or review and enhance the management processes to streamline the operation.

These two recent development projects indicate that it is the search of “Opportunity” perspectives that we are experiencing, and that may well migrate the IT industry from the current Information Age to an “Innovation Age”. We may well be experiencing another paradigm shift of information behavior, from the current user perspective to a potential of client perspective. This paradigm shift is brought about by recent changes in scholarly publishing, which enabled end-users to search for and retrieve information by themselves for their own purpose. Next generation software is expected to look for opportunities from existing information (both internal and external) for new products, new markets, new customer group, new services, new technologies, and new management processes. This new paradigm shift may arrive sooner than expected because of the current economic crisis is acting as a catalyst of the transition. Organizations that accumulate huge amount of information during their past operation is going to put into good use driving value out of these assets. How will this Innovation Age affect future IT projects and how can we manage these projects may be something we should look into in real earnest.

It is very likely that other industries may follow suit, such as telecommunication service carriers, financial institutions, public transportation services, utility services and others that used to cumulate huge amount of operational details during normal business operation.

Manage like a Program

There are many papers, publications, and researches in recent years on Innovation Systems from various governmental and commercial perspectives. However, actually trying to build an IT application to achieve innovation objectives through available information sources (both inside and outside of the company domains) has not been fully explored.

These types of development projects can be considered as part of the operational support system as well as part of the R&D efforts. The first sample project was developed to create a

new operational process to identify opportunities while the second sample project was developed for new product development purpose.

IT Era	Information Focus	<i>De-facto</i> Information Owner	Method of Acceptance
Automation Age	System	Operational Staff	Through Parallel Run demonstrating equal results of manual and automated processes
Information Age	User	Management	Expectation Management demonstrating meeting management objectives
Innovation Age	Client	Senior & Operational Management	Opportunity definition of normal pattern or behavior.

The nature of these two projects inclines to invalidate all traditional development methodology available. They all start as strategic visions that are conceptual in nature and there is no precedence in the IT industry how to manage such development processes in term of Scope, Budget, Resources, Risks, Changes, Quality (Acceptance Criteria), timeline, and progresses. While project management knowledge still applies to the project life cycle, the life cycle itself have to be closely examined so that a development model can be derived for meeting delivery objectives. It may be possible certain innovation model developed by researchers on innovation management can apply.

The convergence of information and technology is going to enable organizations to leap forward in today's global competition. The Clients we are facing are not researchers, scientists, nor individual who are trained to spot opportunities. The project deliverable will be used by individual ranging from senior executives to operational staff, which needs to deliver various forms, shapes and details based on the clients' personal perspective and characteristic on their vision of achievement from a pool of ever expanding information sources outside available to the organization.

The sample projects indicated that the best way to manage this type of Innovation System development project is to manage it like a program and continuously measure the opportunity matrix after transfer of system ownership to user for operational purpose.

Instead of measuring benefits and capabilities of program outcomes, we measured value and opportunities of pre-defined strategic objective of the project deliverable.

Indeed we are experiencing another paradigm shift of information behavior. The internet technology and amount of information available from internal sources and public domains enabled end-users (clients) to search for and retrieve information by themselves in any forms and ways they choose. The new paradigm shift of information behavior will focus on client perspective and future IT solution will focus on how Clients wish to create the innovation tools for their specific purpose. It will certainly impact the IT industry in the near future, and the way we manage these solutions.

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