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Seven Good Reasons for the Rapid Growth of Project Management in IT and why that Trend will Continue

By: David L. Pells

Over the last decade, modern professional project management (PM) has been embraced by organizations involved in information technology (IT) more rapidly and more seriously than in any other sectors. The increased use of PM in technology organizations has been astounding, as reflected by the rapid growth in membership in the Project Management Institute (PMI). PMI has seen its membership increase from 50,000 to over 270,000 worldwide over the last 12 years, with 80% of the new members working in IS, IT, Telecoms and other technology-oriented organizations. In particular, PMI's Project Management Professional (PMP) certification has been widely embraced and adapted by IT organizations, to the point where the PMP is now one of the most sought after certifications within the IT sector.

Many of us who have been involved with the PM profession for many years have been amazed at these trends, wondering what it all means. Is the PM profession now to be completely dominated by IS and IT organizations? Why haven't we seen similar growth in adapting PM among older, more traditional, project-oriented industries and organizations, for example, in aerospace, construction and defense? What is really driving these trends? Why all the interest in PM by IT professionals and companies? Will this trend continue?

In this paper, seven major reasons why I think that PM has been so rapidly and fully embraced by IT organizations and professionals are outlined. In the context of this article, I include software, hardware, systems and subsystems development in the IT sector. The factors discussed below apply to all of these industries, and the projects and organizations within those industries. The reasons described below have all put pressure on technology organizations to embrace professional PM. When considered together, these factors have created enormous pressure to improve performance on IT programs and projects.

Seven good reasons for the rapid growth of PM in the IT sector are:

- 1) Massive investments in IT worldwide
- 2) The natural project-orientation of IT
- 3) The increasing complexity of IT programs and projects
- 4) Rapidly changing Technologies
- 5) IT Project Failures
- 6) The Information Age – The Third Wave has arrived
- 7) IT crosses all industries, organizations and projects

I believe these seven factors have fueled the growth and interest in PM in the IT sector. In addition, these factors when taken together have also led to other important trends and developments in the PM field, including Project Portfolio Management and Complex PM.

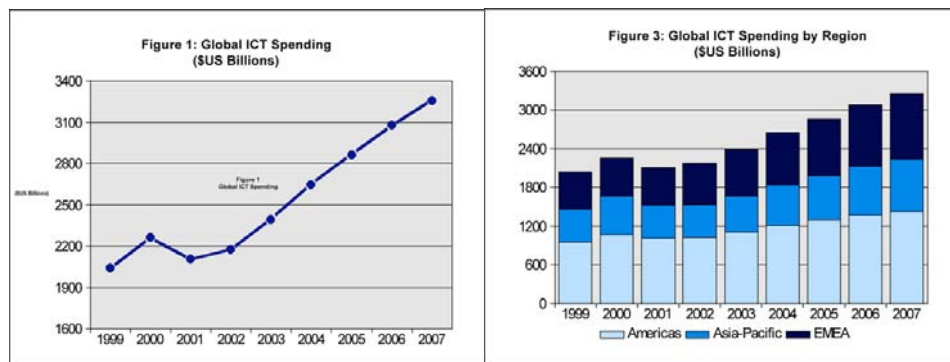
Broad Definition of IT

According to Wikipedia¹, Information Technology (IT), as defined by the Information Technology Association of America (ITAA), is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware." IT deals with the use of electronic computers and computer software to convert, store, protect, process, transmit, and securely retrieve information. The term information technology has ballooned to encompass many aspects of computing and technology.

The information technology umbrella can be quite large, covering many fields. IT professionals perform a variety of duties that range from installing applications to designing complex computer networks and information databases. A few of the duties that IT professionals perform include data management, networking, engineering computer hardware, database and software design, as well as the management and administration of entire systems. When computer and communications technologies are combined, the result is information technology, or "infotech". Information Technology (IT) is a general term that describes any technology that helps to produce, manipulate, store, communicate, and/or disseminate information.¹

1. Massive Investment in IT Worldwide

According to a presentation by **Harris Miller**, President of the World Information Technology and Services Alliance in October 2004, global ICT spending had reached US\$2.5 trillion by 2004 and was projected to surpass US\$3 trillion by 2007 (as shown in the charts below).



Of these amounts, approximately 70% was business and governmental investment, with the balance in consumer goods. According to Miller's presentation, in 2003, governmental spending on IT amounted to \$398.1 Billion worldwide, while business and industry accounted for approximately US\$1.5 Trillion, with a majority of that investment in communications, finance, manufacturing, services, transportation and general business. From 1999 through 2004, total ICT spending ranged from 6.75% to 7.35% of total global gross domestic product (GDP).²



According to IT market research firm IDC in late February 2008, worldwide IT spending will rise by 5 percent in 2008, reaching \$1.38 trillion, and in the United States IT spending growth will moderate at 4 percent, compared to 6 percent growth in 2007.³ In January, ITD predicted that that between 2006 and 2010, IT spending worldwide will grow at a compound annual growth rate of 6.3 percent, rising from \$1.16 trillion in 2006 to \$1.48 trillion by 2010.⁴

According to **Andrew Bartels** at Forrester Research in February³, global purchases of IT goods and services will equal \$1.7 trillion in 2008, growing by 6% after a 12% increase in 2007. A declining US dollar boosted 2007 growth rates and will do so in 2008 as well; measured in euros, global IT purchases growth will be 4%. A US economy in or near recession will be the main cause of slower 2008 growth, pulling down growth in IT purchases both in the US and with major trading partners in Europe and the Americas. IT purchases in the US will grow by less than 3%, while growth in Western and Central European purchases will slow to 3%; IT purchases in the rest of the Americas will expand in local currencies at 6% rates. Asia Pacific and the oil-exporting area of Eastern Europe, Middle East, and Africa will be the main engines of growth. Total global spending on technology goods, services, and staff, the global IT operating budget from a CIO perspective, will reach \$2.4 trillion in 2008, an 8% increase from 2007.⁵

According to **Dale W. Jorgenson and Khuong Vu**⁶ the growth of IT investment jumped to double-digit levels after 1995 in all the G7 economies – Canada, France, Germany, Italy, Japan, the United Kingdom and the United States. These economies accounted for nearly half of world output and a much larger share of world IT investment. The surge of IT investment resulted from a sharp decline of prices of IT equipment and software. Jorgenson (2001) traced this to a drastic shortening of the product cycle for semiconductors from three years to two years, beginning in 1995. All seven regions of the world economy experienced a surge in investment in IT equipment and software after 1995. The impact of IT investment on economic growth was most striking in the G7 economies. The rush in IT investment was especially conspicuous in the U.S., but jumps in the contribution of IT capital input in Canada, Japan, and the U.K. were only slightly lower. France, Germany, and Italy also experienced a surge in IT investment, but lagged considerably behind the leaders. IT investment subsided among the G7 economies

after the dot-com crash of 2000, while the contribution of Non-IT investment varied considerably and explains important differences among growth rates of the G7 economies.⁶

Even though the above analysts and experts do not agree on the exact numbers, or the definition of IT investment, it is clear that global spending and investment on IT have been enormous since 1995, and have continued to grow from 3-6% per year. If we assume that a good portion of those IT expenditures are in the form of contracts, projects and portfolios of projects, then the need for project management has been growing rapidly along with the investment. This is exactly what we have seen in the PM profession and in the marketplace.

2. The Natural Project Orientation of IT

The IT industry and field is naturally project oriented. Whether developing semiconductors, components, hardware, software, subsystems, networks, ERP applications, other enterprise systems or global communication systems, 90% will be in the form of programs and projects. These projects can be system or technology upgrades, new product developments, simple system implementations, or massive network and system implementations.



Nearly everything in the IT world is conducted as a project or program, with the exception of operational support. And even operations is frequently upgraded or modified, due to rapidly changing technologies, business requirements, market conditions, organizational or personnel changes, or other factors. Even outsourcing of IT services is conducted in the form of projects now.

3. IT Project Failures

A number of studies and surveys have been conducted in recent years that have highlighted problems and failures related to IT projects. A summary of the following surveys can be found at the IT Cortex website⁷.

The Chaos Report (1995), the first survey by the Standish Group, is perhaps the most famous study on this topic. The Standish Group surveyed IT executives in large, medium and small organizations across major industry segments. The 365 respondents represented 8,380 applications; focus groups meetings and personal interviews were also conducted. The results: 31.1 % of projects will be cancelled before completion and 52.7% will cost over 189% of original estimates. Based on the research, the Standish Group estimated that in 1995 alone, American businesses and government agencies would spend \$81 Billion for cancelled software

projects and that more than 80,000 software projects would be cancelled. In large companies, only 9% of projects were expected to come in on-time and on-budget.

The OASIG Study (1995), a study in the UK by a special interest group associated with organizational aspects of IT. Information was collected from 45 IT experts across the UK with an average of 20 years experience, drawing conclusions from around 14,000 user organizations. The results: IT project success rate was around 20-30% at best, with 70% of IT projects failing in some respect.

The KPMG Canada Survey (1997), a survey on IT project management issues sent to 1,450 of Canada's leading public and private sector organizations. 176 completed questionnaires were analyzed. The results: Over 61% of projects were deemed to have failed; 75% were 30% over schedule or more; over 50% had exceeded their budgets by significant amounts.

The Conference Board Survey (2001), a survey of executives at 177 companies related to ERP (Enterprise Resource Planning) implementations. The results: 40% of the projects failed to achieve their business results within one year of going live; the companies that did achieve benefits said achievement took six months longer than expected. Implementation and operational support costs were significantly underestimated.

The Robbins-Gioia Survey (2001), a study conducted by the Alexandria, Virginia based consultancy related to the implementation of ERP packages – 232 respondents from communications, financial services, government, healthcare, IT and utilities. The results: 51% viewed their ERP implementations as unsuccessful; 46 % did not feel the organization understood how to use the system to improve their business.

There have been many surveys since these, and many articles on IT project failures can be found on the internet. In particular, the failure of IT projects in the governmental sector has been readily apparent, in the USA and in Europe. A good discussion can be found by **Michael Krigsman** in the UK, who wrote on May 30, 2008, "Failed government IT projects occur with alarming frequency. In some respects, these failures share much in common with botched private sector initiatives. For example, failures in both environments are primarily a function of poor management rather than bad technology. Still, there are important differences between government and business projects, particularly in areas related to procurement, needs definition, project oversight, and accountability."⁸



Krigsman goes on to quote **Philip Virgo**, Secretary General of the UK political advisory body EURIM, who has described the dynamics that cause government projects to tank. Here are Philip's six reasons that government IT projects fail:

- Analysis of business needs, missing or wrong
- Needs change before implementation
- Over-ambition, about what is achievable in practice, given the people, time and budgets available....
- Delays, particularly in agreeing priorities between conflicting objectives, leading to delay in planning and procurement....
- Lack of top customer management involvement, and lack of high-level skills, training or experience in planning, procurement or implementation.
- Supplier project or team management, usually because the 'B' team is trying to salvage an already doomed system, after the 'A' team has moved on to the next bid.

Government projects have so many problems, according to Virgo, because "accountability structures" separate project requirements and goals from the real needs of end-users. "Shifting political priorities, with neither consultation with the users nor consideration of the practicality of the consequent 'ministerial' demands for change" cause projects to flame out. If the root of government IT failure lies



deep in the structure and relationship between political masters and humble IT servants, then spectacular public sector meltdowns are here to stay.⁸

Results of another more recent survey by CIO.com on IT project failures can be found by Matt Asay on cnet.com.⁹ Clearly there are many reasons for project failures, both within the IT sectors and in other industries. But IT project failures have been numerous and highly visible in recent years. Such failures have also been leading to more interest and investment in professional project management, and increased demand for more qualified and certified project managers.

This is not to say that there have not been many successful projects, some of which have been famous and spectacular. But in my experience, successful projects often lead to reduced budgets for PM, whereas project failures generally lead to increased focus on PM, with increased budgets and staffing for more and better PM.

4. The Increasing Complexity of IT Programs & Projects

According to CIO.com, "Managing an IT project is like juggling chunks of Jell-O: It's neither easy nor pretty. Information technology is especially slippery because it's

always moving, changing, adapting and challenging business as we know it. IT project management is complicated by shifting business needs and demanding stakeholders. IT projects fail because they're just plain harder. They include the usual project-management challenges, such as deadlines, budget constraints and too few people to devote to the project. But they also face unique technology challenges, from hardware, operating system, network or database woes, to security risks, interoperability issues, and the changes manufacturers make to their hardware and software configurations." ¹⁰

IT projects are much more complex than most people realize, and getting more complex all the time – for several important reasons. For large IT projects, involving multiple organizations, platforms, technologies and locations, and with many people involved, the complexities become mind boggling. Some of the complexity is due to rapidly changing and advancing technologies, in underlying hardware and software, and the interplay of individual complex technologies in system configurations.



An additional level of complexity has been added in recent years with the growing importance of governance, risk and compliance (GRC). This is a challenging trend in the IT field, combining issues associated with various standards, schemes and complex controls all together. There is still a lot of confusion on what exactly GRC is and what sub-components to consider.

Speaking in London on May 21, 2008 to senior IT security professionals, **Lord Erroll**, spokesman for the House of Lords Science and Technology Select Committee's report on personal internet security, said, 'The issue of IT security is complex. There are rules and regulations to adhere to, but the IT professional is still unsure of their role or their requirements to ensure their company's compliancy. Cybercrime and its implications on businesses are still not fully understood, or taken seriously at a governmental level, even in the wake of such serious data loss incidents as reported by the media. The government needs to take responsibility and put into place a serious provision of support and incentive guidelines, including technical information, for all UK businesses. The future lies in governance (not control) and incentives; in new and evolving encryption and authentication technology and in groups committed to cyberwarfare, such as the CPNI (Centre for the Protection of National Infrastructure).'

Compliance can be defined as the risk of legal or regulatory sanctions; material financial loss or loss to reputation a company may suffer as a result of its failure to be compliant. Simply put, compliance enables companies to assure the integrity and confidentiality of their data. Companies must identify the rules, regulations, laws and policies applicable to their company, breakdown the IT requirements and control objectives, ensure there is no duplication of IT requirement to fix one

problem, and map out the business processes, use existing or new frameworks, and implement, monitor, analyze and report on compliances needed.

GRC includes increased competitive pressures, ethical and financial standards, accountability demands, increasing regulations and demands from stakeholders. Different approaches to gaining compliance include asset based risk assessments; threat modeling; technical auditing; dependency modeling and gap analysis. When added to an already complex project environment, GRC can compound the difficulties.



There are many reasons for complexity on IT projects, but it may lie in the very definition of IT now. If an IT project manager must understand the underlying technical complexities of semiconductors, hardware, networks, subsystems, systems and the interplay of those various components, then the complexity becomes more apparent.

In my opinion, this is exactly what has happened. While hardware has become smaller, more mobile and more powerful, the compatibility, software, and systems integration issues have become more complex. And all the time, technologies continue to change.

5. Rapidly Changing Technologies

We are all familiar with how rapidly personal computers, cell phones, mobile devices and other consumer electronics have transformed both business and society in recent years. There have been many more advances in industrial applications, driven by developments in semiconductors, networking and systems theory. And as semiconductors have continued to follow "Moore's Law", the rate of change has increased while the impacts have multiplied.

Here are just a few newly emerging technologies that will affect the IT world ¹¹:

- ❖ Artificial intelligence – devices to replace humans
- ❖ Solid state drive - smaller, faster, quieter, lower power consuming storage that can replace hard drive
- ❖ Memristers - smaller, faster, lower power consuming storage, analog electronics that could replace some current integrated circuits and many electronics devices
- ❖ Optical computer - smaller, faster, lower power consuming computing that might replace many integrated circuits and other electronics devices
- ❖ Nanomaterials and carbon nanotubes - stronger, lighter, and more intelligent materials to replace steel, aluminum and other traditional materials
- ❖ Molecular nanotechnology - desktop devices that can make anything
- ❖ Wireless communications – continuous and expanded development of wireless technologies and devices

- ❖ Semantic web/answer machines - web machines that link data on the web based on meanings, which could revolutionize web searches
- ❖ Organic light emitting diodes (OLED) – computer displays and screens of various kinds that can replace LCD and plasma displays (shown in photo at right)
- ❖ Machine translation – electronic translation of natural languages in areas where misunderstanding is non-critical and language is formalized, facilitating cross-cultural communications
- ❖ Optical and holographic data storage – allowing storage and archiving of data that was previously erased for economic reasons, possibly rendering other optical data storage solutions, magnetic tape data storage, and other mass storage devices obsolete
- ❖ Quantum computing - Much faster computing
- ❖ Nanowire batteries - technologies for storing energy (hydrogen, conventional batteries and in some cases fossil fuels) that might be used for laptops, cell phones, electric cars, storing power for electric grids, and other uses
- ❖ WiTricity – wireless energy transfer



And we have not even mentioned continuous development of semiconductor technologies based on nanotechnology that have led to miniaturization, systems-on-chip, and other developments that are increasing the power of computers. The life cycles of technologies, products, systems continue to decrease. The potential impact of changing technologies on IT projects and PM in the IT sector are and will continue to be dramatic.

6. The Information Age – The Third Wave has Arrived

According to Wikipedia, “Information Age” is a term that has been used to refer to the present era. The name alludes to the global economy's shift in focus away from the production of physical goods (exemplified by the industrial age) and toward the manipulation of information.¹²

The Information Age represents the third wave of civilization described by futurist **Alvin Toffler** in his classic 1980 book, *The Third Wave*. Toffler defined three “waves” of development as coinciding with hunter/gatherer/agriculture-based civilization, the industrial age, and the post-industrial (modern) era. Key characteristics of Toffler’s Third Wave included the following¹³:



- The rolling back of the Industrial-Era creed of "standardization", as exemplified in the one-size-fits-all approach typical of institutions of this era, such as the education system, factories, governments, mass media, high volume mass production and distribution, etc. – replaced by customization and personalization.

- The gradual loss of consensus, such as characterized the politics of the USA, as well as political turmoil in China (largely split amongst urban-rural lines), Israel (orthodox vs. secular), Germany (the deadlock following the 2005 elections), the Islamic world (fundamentalist or traditional vs. secular) and elsewhere. It would include the rise of regional interests and the progressive devolution of the nation-state; e.g. more autonomy in Wales and Scotland in Britain; frequent separatist movements; the dissolution of Yugoslavia, Czechoslovakia, the USSR, and Ethiopia; and the emergence of microstates, such as East Timor.
- The rise of powerful non-national entities: NGO's, multinational corporations, religions with global reach, and even terrorist organizations or cartels. It would include the progressive hemming-in of national economies and of nation-state under a growing network of super-national organizations and affiliations; e.g. the European Union, the African Union, and organizations such as the World Trade Organization (WTO) or International Criminal Court.
- The eclipsing of monetary wealth by knowledge and information as the primary determinant of power and its distribution.
- The eclipsing of manufacturing and manufacturing goods by knowledge-production and information-processing as the primary economic activity.
- The emergence of various high technologies, such as cloning, global communications networks, nanotechnology, etc.
- A transformation of the very character of democracy, itself, from rule-by-periodic polling at the election booth, toward a more direct interaction between the government and its populace, for example as exemplified by the rise of the Internet.¹³

We can clearly see these characteristics in today's world. Toffler mentioned some of these concepts in his first major book *Future Shock* published in 1970, then further refined them in his third book on the subject, *Powershift*, published in 1990.



The fundamental transition of societies and economies to the information age, through the widespread dissemination and usage of IT, has been underway for the last three decades and continues to gain momentum. While there may be much debate about the name, range and impact of these changes, few can argue that the world is now information oriented. IT affects everyone in the developed world, and more and more people and organizations in developing economies. The US economy, and the economies

complex, the complexity of IT systems, programs and projects also increase. As IT is applied to ever more human activities, and across more industries and organizations, opportunities for increased complexity multiply.

- Changing Technologies – most predictions include not just changes but increased rates of change, and the impact of some technologies may be dramatic and disruptive – for example, in the nanotechnology field, energy, materials and artificial intelligence. Many new technologies will have an impact on IT.
- IT Project Failures – while logic suggests that as IT professionals gain more experience and knowledge, failures should subside. Due to the complexity of IT projects along with rapidly changing technologies, I do not see major improvements for many years. IT will be a fertile ground for more and better PM for decades.
- The Information Age – as the information economy spreads around the world, and especially in Africa, Asia and Latin America, the number of IT projects will continue to increase, along with the need for modern PM. This process may well dominate the 21st century.
- IT Across Industries – like project management itself, IT can be found in all industries and on all projects and programs, in all organizations. Every project has one or more IT sub-projects. IT will become one of the largest users of PM, with the largest segment of the PM profession and the one with the most impact. As IT becomes more critical for more organizations and more projects, IT PM becomes more important.



What it means to the Project Management Profession

Now we can begin to understand why PM has been growing so rapidly in IT and why that trend will continue. The implications for the PM professional world and PM industry are obvious. More organizations will need IT project managers, or project

management professionals with IT experience and knowledge. IT organizations will need PM professionals, and IT project managers who are educated, experienced, qualified and certified (or licensed) in modern, professional PM. And they will need the services, technologies and tools to serve those projects and project managers.

We can now understand the growth in PMI's membership, and how PMI has positioned itself to ride this (third) wave so effectively, in recent years. Other professional bodies around the world should follow suit, providing information, tools and services to support this growing body of PM professionals. This is not a short term phenomenon, but rather a trend that will continue. I predict continued growth in the application of PM in IT for many years to come.

Good luck on your projects!

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