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IT Metrics for the Information Age

Are IT Metrics Stuck in the Industrial Age?

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The Historical View

Since the 1800s the U.S. economy has undergone two major shifts to the gross national product (GNP). The first of these was the change from an agricultural based economy to one that was manufacturing based. The second has taken place during the business lifetime of many of us and it is the shift from manufacturing to a service based economy. With this shift we moved from the Industrial Age to the Information Age and brought most of the free world with us. The advent of a service based economy and the birth of the Information Age has been a boon to many companies and the impetus for the creation of many others.

Manufacturers who once maintained "hands on" control over all processes from development through distribution have moved many of their functions beyond our borders. Service sector companies have seen unparallel and even unimagined growth. New industries have sprung up almost overnight to take advantage of new markets and the opportunity of global expansion. Each of these examples of change, and many others, only exist today because of the advancement and adoption of information technologies. There are many business sectors that exist today only because of information technology. When these businesses are combined with the companies that supply information technologies, including telecommunications, they will represent over 3 trillion dollars of GNP in the year 2006.

The roles of the CIO and the IT organization changed significantly as we moved into the Information Age. In response to this change, CEOs began to seek out a new type of CIO. To qualify as a CIO, it is no longer necessary to have "grown up" in the industry. Rather, CIO candidates are now valued for their business skills as IT budgets and investments continue to grow. This has resulted in many of today's CIOs coming from other parts of the business. Because of these changes, today's CIO and IT staff need new and better ways to manage IT function, IT investments and the increasing complexity of the services they provide. Software and hardware vendors have created the tools necessary to manage the installed technology and these have been readily adopted. Recently there has been a recognition of business intelligence tools as a means to better manage information, provide higher levels of analysis and therefore increase decision making capabilities. These tools should be of great value to the new breed of CIO and IT professionals faced with the need to make major investment decisions. Underlying these tools, however, is the need to develop, collect and provide the right information for analysis and decision-making. It is in the development of this new kind of information that we have seen less progress than is needed. The majority of IT organizations continue to rely on traditional operational and cost metrics; these metrics tend to be focused on the performance of installed systems, personnel and the consumption of services. Can these metrics help the CIO make decisions regarding IT investments? Can these metrics inform business partners of the value that the IT investment is bringing to the enterprise or their business unit? Can these metrics predict the ability of the infrastructure or applications to efficiently and effectively accommodate projected growth? The installation of the best tools will be for naught if the information being used to populate these tools is of another Age.

Business Models and Processes Change

Focusing on the past fifteen years we see that many events have reshaped the world economy. Some of these events have emerged slowly while others have come upon us at Internet speed. Throughout the world free markets have brought global opportunities along with global competition. This has created the need for geographically interdependent financial, marketing, production and distribution systems. Within our own borders the Internet created the need for new business models and major adjustments to business processes or the creation of entirely new processes. In order to compete effectively, decades old supply chain and value chain constructs have been dismantled and rebuilt according to rules driven by customers, supplanting the demands of financial markets.

The changes to core business models, processes and relationships can be viewed by dramatic shifts from:

- Focus on products to a focus on customers and service
- Economies of mass production to the ability to efficiently and effectively provide customization
- Slow, evolutionary product development to rapid development and deployment techniques
- Years of employer and employee loyalty to a dependence on vendors, business partners, external channels and employees that choose to operate as free agents
- Things of material value to the heightened value of information, knowledge and intelligence

The elements of success associated with the new business models and processes are different than those of the past. The factors that determine success or failure in a global economy are different from those of a geographically bound economy. Similarly the success factors of brick and mortar companies operating in the dynamic universe of the Internet can be significantly different than those that let to prior success.

Along with the shifts described above and the changes to business Critical Success Factors, has been the business' growing dependence on the use of information technology. In concert with the increased dependence on IT has been the need for IT to recognize the changes in it's own Critical Success Factors. In fact, today, more than ever, there is a direct connection between the business' ability to succeed and the delivery of IT services. Because of this, in most businesses, IT's Critical Success Factors are directly linked to the ultimate success of the business partners they serve.

The winners and losers in today's economy will be determined by the ability to develop new business models and business processes that meet the demands and challenges of global competition and a global marketplace operating at Internet speed. Companies that do not currently compete in the global arena must also adopt the means to do so because in the world of free markets, competition is likely to come from unforeseen sources. Business leaders must recognize the Critical Success Factors associated with these models and processes and so must IT's leadership since they are intrinsically linked to one another. Some of these Critical Success Factors are:

- Corporate responsiveness; enabled by IT's ability to respond through "plug and play" technology and a flexible applications architecture
- Highly capable business processes, supported by a highly competent and "business knowledgeable" IT staff and appropriately mature IT processes
- New value chain, created through the ability of IT to access and be accessed by customers, vendors and suppliers while providing the necessary levels of security
- Business or business unit agility, enabled by the ability of the IT infrastructure and applications to rapidly and efficiently scale for growth or contract for leaner times

In order to determine if IT is succeeding in meeting their Critical Success Factors, new measures of performance and outcomes must be put in place. This is understood by many CIOs yet, when viewing the measures and metrics in place today, they remain focused on the needs of an IT organization delivering services for the Industrial Age. To illustrate this point we use a common industry description of the eras of IT evolution.

ERA 1: Computers do it Faster (1950s – 1970s)

The Focus of IT

Computers arrive because the CFO has been convinced that they can automate a host of repetitive tasks and reduce the labor associated with high volume, manual functions. The end result would be higher quality at greater speed with reduced labor. In this era the computer system typically displaced its equivalent manual function. Programmers simply got the application's requirements from those currently employed doing the task being automated and then wrote the appropriate code. Data processing operations, as they were then called, hummed along in the "fishbowl" and everyone was content.

Operational Metrics

Metrics are generally directed at the DP/EDP operation of the mainframe and its attendant systems. Few, if any persons outside of DP were interested in the metrics due to their single focus on the computer operations.

Cost Metrics

Gross costs for operations are looked at and considered as "expense" rather than investment. Capital outlays for hardware are depreciated over the estimated useful life of systems ranging from as many as 5 to 30 years. Cost justification was often based on headcount reduction.

Applications Development Metrics

Applications development was typically not measured at all.

Other Metrics

At this point in time few, if any other metrics were being tracked.

ERA 2: Personnel Productivity and Empowerment (1980 – 1990)

The Focus of IT

The arrival of the PC began the evolution and eventual revolution from delivering DP or EDP services to the birth of the IT organization delivering information technology services. The proliferation of the PC quickly led to the advancement of distributed processing and the need for expansive local and wide area networks. The level of complexity of the IT environment grew extensively due to rapid advancement of technology and the specific demands of multiple, new, user communities. Few business leaders recognized the benefits of the PC and many IT professionals were equally as surprised at their rapid deployment. During this period many CIOs were surprised to find PCs and LANs operating in business units without their knowledge. While most IT organizations maintained the purse strings for PCs, some of them lost control to business units as IT feel behind in satisfying the demand for hardware, software and networks. Packaged applications became readily available and applications development tools were purchased to try and speed up development to meet increased demand. Mainframe computing remained the province of the IT department and the machines were moved to more secure environments. Many other changes took place during this era, however, for most enterprises, business models remained the same and business processes were modified to take advantage of high-speed, distributed systems. Applications development remained a mystery to most, but now the user was demanding more features with better and faster output from AD. As the cost of IT increased, CFOs began looking for more accountability from the CIO regarding IT capital expense and the IT budget. An economic recession brought a major focus to cost reduction and cost containment.

Operational Metrics

IT continued to focus their metrics on operations. Users, however, became more interested in the metrics due to the impact of IT on their day-to-day activities. Availability, mean time to failure, mean time to repair, et al. became the staple for IT monthly reports both internal to IT and external to users. Users had a greater stake in the delivery of IT services and metrics became the stick with which they could flog IT. IT's use of metrics was focused on monitoring and reporting rather than as a means to drive performance improvement. Almost all metrics were retrospective.

Cost Metrics

Because of user demand, IT was requiring large allocations of capital and IT budgets increased dramatically. Benchmarks became the tool of choice for trying to establish financial performance levels and gross costs gave way to unit costs as a means for the CIO to demonstrate how well IT performed compared to peers. Major hardware purchases were being capitalized, however, PCs and applications were continued to be expensed.

Applications Development Metrics

Applications development was overwhelmed by demand and under staffed. The development of business systems migrated to the business unit in order to move developers closer to the user. This also allowed the business to bypass delays associated with the central IT department. In the business unit, developers were

not measured at all. Corporate IT developers might be subjected to measurement by function points as a means of determining productivity levels and the unit cost of applications.

Other Metrics

Customer satisfaction surveys were being taken sporadically and the help desk became a major source of metrics having more to do with help desk performance than the impact of the help desk on the users it supported.

During the latter part of this era it became evident to some that IT was becoming misaligned with the business partners they served. This occurred due to IT's lack of inclusion in the business' strategic planning process and the unrelenting demand for better, faster and cheaper services. In other words, IT's Critical Success Factors became associated with what the CIO thought IT was being measured by and as we all know, "what gets measured gets done".

ERA 3: IT Enables the Business – Internal Focus (1990 – Present)

The Focus of IT

In hindsight we see that the greatest change from Eras 1 and 2 to Era 3 was the evolution of IT services providing transaction processing and user empowerment to services that enabled better, faster and simpler business processes. Companies that recognized the power of information technology began to reengineer their processes to take advantage of the technology rather than simply apply technology to outdated processes. Companies began installing enterprise resource planning software (ERP) to replace multiple legacy systems. Some of these companies redesigned their processes to take advantage of the ERP while others forced the ERP to work with existing processes. The former were far more successful in their implementation than the latter. These factors and others went into the decision to change or adopt new business models. Information became available in real time and the advance of the Internet fostered competition from sources that here to fore have remained in their own silos. The best example of these is the growth of financial services companies that had previously been: a bank, an insurance company, a brokerage, an investment firm, or even non-existent. To say that the business' Critical Success Factors had changed would be an understatement and once again the companies that recognized these changes were able to take market share from those that did not. With the end of the recession and the lowering of interest rates, cash flowed freely and IT capital budgets exploded.

Operational Metrics

There is some movement toward change in IT measures during this period, but not extensively. IT continues to focus on operations and continues to explain "how the clock works" when users are asking, "what time is it?" The availability of tools for monitoring hardware and network performance give IT the ability to overwhelm users with statistics regarding IT performance. Users became baffled by the metrics that show that mainframe availability was 99.99% yet they couldn't enter data or access systems.

Cost Metrics

The misalignment gap between IT and their business partners is widening as the investment in IT continues to grow. IT has responded to the CFO by subjecting investments to various ROI, IRR and EVA techniques. While this may mollify the CFO, it remains rare that IT, or for that matter any other department, returns to the original business case and confirms the results of the project. CEOs and CFOs are asking IT to show the value that IT is bringing to the business and the CIO is having difficulty in doing so.

Applications Development Metrics

Applications development has managed to elude the grasp of measurement. Function points have never made great inroads as the principle measure of AD productivity. The typical AD department focuses on the two primary metrics of "on time" and "on budget". When looking at today's IT Critical Success Factors, which once again should have changed along with those of the business, the need for good AD measures is greater than ever. As companies moved from expensing AD to capitalizing it, there is an ever-increasing burden to the balance sheet. Few organization will escape the inevitable impact of this to IT's overall budget. Applications have become a greater part of IT's non discretionary spending therefore reducing discretionary spending and the ability for IT to respond to new demands unless funded directly by the business unit. Further, due to the need for the increased speed of applications development and the potential for short-lived applications the need to measure AD is greater than ever.

Other Metrics

Because today's business processes are so intrinsically bound to the information technologies that enable them, it has become more critical to have Key Performance Indicators that inform IT about performance both retrospectively and prospectively. As IT capital demands continue to grow, (Gartner predicts that these will be 50% of all capital by 2010), CFOs and CEOs are asking what the value of IT is to the business. At the beginning of this era, some IT gurus tried to shift the emphasis away from the direct ROI associated with the technology itself, to the true benefits that would accrue to the organization and the organization's personnel. This concept was and remains difficult for most IT organizations to demonstrate because they are not measuring those aspects of their services that allow for this type of Key Performances Indicator. Many IT leaders whose careers have been solely in IT became successful based on their technology skills. This has made them more comfortable in dealing with metrics that focus on the technology. The new breed of CIO that may have come from elsewhere in the business, better understands the need for new metrics that can identify business value and relate to the outcomes of IT services. It is these outcomes that are of interest and importance to the business. To date these IT leaders are in the minority.

Outsourcing has also found its largest growth during this era. In most instances, this is a choice made for financial reasons and therefore should have metrics that compare in-sourced costs to outsourced costs. Ironically, only a few organizations have established a cost accounting system that can be compared to the billing received from the outsourcer, rendering an apples to apples comparison almost impossible. The next best thing has been to establish a benchmarking clause in the outsourcing contract. This clause allows for a comparison of then current costs to costs in the rest of the market place. The most popular

metrics associated with outsourcing are those associated with the Service Level Agreement (SLA). Unfortunately the metrics contained within an SLA are almost exclusively between the supplier and IT rather than with the end user. This forces IT to establish its own set of metrics that can communicate performance to the end user.

ERA 4: IT Enables The Business – External Focus (1995 – Present)

The Focus of IT

The primary challenge in moving from Era 3 to Era 4 is the need for IT to remain focused on internal business processes and at the same time accommodate the business' need to connect to and integrate huge numbers of external users. The business that IT serves today has had to develop new business models to meet the challenges and share in the opportunities of free markets, less regulation and a global economy. Just a few years ago CEOs understood their competition, which developed slowly and came from predictable sources. Today competition arrives at the speed of the Internet and from directions not even thought of in the past. Where once the business was in full control of development, manufacturing, distribution and customer care, today they are dealing with virtual shop floors, multiple external channels and outsourced help desks talking to new and varied customer communities. Globalization, increased competition, economic cycles, and the Internet are all contributing factors to the changes in business models and processes. These changes are a business imperative in order to be successful in Era 4. Following closely on the heels of Era 3, IT has had to adapt itself to serving these new models and processes. Not long ago IT was concerned about providing access to mobile users and connectivity to all locations. This task is almost trivial compared to the challenge of providing access to the business' customers, channel partners and suppliers. In many businesses applications need to be developed in ever shortening time frames in order to meet a specific opportunity in the marketplace that may only last for 30, 60 or 90 days. And once the opportunity is gone, so to is the application. In this Era and in Era 3, which is still with us, the need for integration of systems, information sharing and the right investment decisions has become paramount to the success of the enterprise. The importance of IT has never been greater and the complexity of decision-making has never been higher. These circumstances have made it a business imperative for IT to confirm its alignment with business needs and for IT to establish a means and a language that communicates the value of the business's investment in information technology.

Operational Metrics

While there have been significant changes to the technologies employed by IT in order to meet the challenges described above, there have not been many changes in the operational metrics that IT uses today. This is not a negative in that these metrics contain the underlying information required to measure operational performance and understand what needs to be improved. Where IT is in error is when it takes these metrics and elevates them to the level of Key Performance Indicators thus becoming the primary communication of IT performance. By and large, operational measures continue to be retrospective and focused on individual and technological aspects of performance. They are indicators of problems, but rarely communicate the cause of the problem or do they point to the solution. Further, they are seen in isolation rather than as a part of a total process that is crucial to the overall delivery of IT services.

Cost Metrics

These metrics have gained in importance as the cost of IT services has continued to rise and the capital investments have continued to grow. New ROI and EVA techniques are being applied to try and capture a more true understanding of the value of the IT investment. However, by and large, the focus remains on total IT budget expense, unit costs and IT's impact to the bottom line.

Application Development Metrics

A single measure of applications development productivity continues to elude most IT organizations that do not want to entertain function points. In point of fact, we might argue that "a" productivity measure could be subject to the law of unintended consequences. As an example, if productivity is defined as the number of lines of code produced per day, many applications could have many more lines of code than was necessary. If on the other hand productivity is defined as the speed with which an application is written and put into test or production, features could be left out and error rates could rise. When considering the importance of applications development to the enabling of business processes, IT managers must begin to focus on the software development life cycle and all its processes and not on the individual programmer. This means a shift from measuring the performance of the individual programmer to viewing the performance of the entire process from specification through the roll out to production. Establishing a best practices/continuous improvement focus will pay greater dividends than any single measure of productivity.

Other Metrics

The same issues of "value of IT" metrics apply to this Era as in Era 3. Pressure on the CIO to justify cross charges and the IT budget will continue to grow, as IT costs become a larger part of corporate and business unit budgets. The ability for IT to align itself with business strategies and Critical Success Factors will be the key to developing the right set of Key Performance Indicators that can demonstrate the value that IT is delivering to its business partners. Absent this alignment, IT will struggle to find the right set of measures that are acceptable to the business.

As in Era 3, outsourcing is also an important choice for many organizations trying to compete and prosper in today's economy. Outsourcing in this era may include business process outsourcing as organizations attempt to focus on core competencies leaving the utilitarian processes to those that might be able to do them better and less expensively. Applications development has also become a target of outsourcing with the proliferation of offshore programming. Many organizations are approaching AD outsourcing with great care and few, if any metrics are in place to measure the results of this choice. In both the near and long term this will make it more difficult to proactively manage the outsourcer from a cost and quality standpoint. The dilemma for IT is that they do not have good AD metrics under current circumstances thus making it more difficult to establish good measures once outsourcing has taken place.

Impact and Conclusions

IT has made a long journey in a relatively short time. In history, 50 years is merely the blink of an eye. In the world of information technology 50 years has seen the birth and death of many technologies and technology companies. The one constant that remains to this day has been the unrelenting appetites of the business world to devour almost every technology offered and then ask for more. IT organizations have gone from being in full control of technology and users to being controlled fully by their users.

Some organizations retain characteristics of Era 1. Many organizations must satisfy the demands of Era 3 and at the same time provide the services and capabilities of Era 4. Regardless of what era or eras you are in, this evolution will continue to have an impact on your IT organization.

Continued Growth in IT Expenditures

Another constant throughout the four eras has been the continued and dramatic growth in IT spending. This will not stop any time soon even in the face of economic downturns. The reason for this is simple. IT has become the enabler of almost all business processes and is the means by which companies are able to operate in global markets. Even those companies that remain domestically focused must be positioned to respond to competitive threats from beyond our borders and IT is the primary means for doing so. Traditional IT financial metrics, for the most part, will remain viable for the future. One change, however, should be understood. Metrics must be put in place that provide management with an accurate accounting of the impact of applications to the balance sheet. With applications and applications development now being capitalized, their costs can have near and long-term effects on the IT budget. As the capital expense moves onto the corporate books, it will add to total non-discretionary spending. When budgets are tight and CIOs are trying to minimize increases, the depletion of discretionary spending will make it more difficult to meet user demands unless the users are willing to fund projects.

The Need for Systems Integration Grows Larger and the Complexity of Solutions Grows Higher

As companies continue to distribute their functions to locations providing the lowest cost of operation and as they compete to seize global opportunities, the need for systems integration becomes greater. In fact, it is this need that is a primary driver of the increase in IT expenditures. Companies now must manage the virtual shop floor, multiple distribution channels, widely dispersed vendors and suppliers and new and remote customer communities. Even customer care may be outsourced. All of these internal and external requirements demand the availability and integration of information and systems.

The requirement for companies to reach well beyond their corporate walls has had an impact on IT infrastructures. The “reach” of the infrastructure has had to expand to accommodate the Internet, worldwide messaging, supply chain integration and the ability to “touch” the customer. Further, the “range” of services being accessed through the infrastructure has evolved from simple intra-company e-mail to full access to transaction processing systems for customers and suppliers. Infrastructure requirements taken together with the systems integration needs described above have let to a major increase in the size and complexity of the IT solutions necessary to meet the demands of Era 4 computing.

Today, business threats and opportunities present themselves with less warning and increased speed. The IT infrastructure and applications ability to respond to these threats and opportunities is a Critical Success Factor for both the business and IT. CIOs who can predict their infrastructure's and application's ability to respond to these threats and opportunities will best serve their business partners. Putting predictive metrics in place provides the opportunity to prepare for rather than react to changing business requirements. In order to be able to predict and prepare, the right set of metrics must be in place. These metrics will focus on the "reach and range" of the infrastructure, the scalability of applications and the competencies of the IT staff. Few IT organizations are using metrics of this type.

Business Models and Business Processes Transform

Enabled by IT and often as a result of IT, businesses have been transforming themselves to take advantage of new markets or to protect themselves from new competitors. These transformations require major change to business processes and in many cases, the creation of new processes enabled by IT. Most CIOs do not have crystal balls nor are they experts with taro cards making it almost impossible to predict these changes without some involvement in the business' planning process. When CIOs are asked if they are part of this process, most say "yes". If this were the case IT's strategies would directly align with those of their business partners. Experience tells us this is not the case and in fact, as more financial pressure is applied to IT, there will be a widening of the gap between IT's strategies and those of the business. If the CFO or the CEO is measuring CIO performance based on financial results, where will the CIO put the organization's focus? The means to overcome this dilemma is for the CIO to begin reporting the outcomes of IT services in terms that reflect their value and contribution to the business. At the same time, the CIO must develop the means to reduce the alignment gap.

IT Projects are Business Initiatives with Less Clear Accountabilities

In Era 1 an IT project to automate the general ledger was justified by reduced headcount or closing the corporate books faster. Developers were given a budget and the system was designed and implemented based on the manual system it replaced. If it did not perform those responsible were easily identified. In Eras 3 and 4 things are not nearly as clear-cut. When it is decided to implement an ERP it is not simply an IT project. In point of fact it is a business initiative that will drive many IT projects. Throughout the ERP design and implementation almost every part of the organization can be involved. As the ERP is rolled out in stages, many factors, both IT and non-IT, will influence the success of the implementation making accountability less clear. The impact of this change has many implications regarding the use of measurement and the appropriate metrics. The two most important of these are; the need for metrics that reflect the outcome of the work of the entire team rather than focusing on an individual, and the need for "predictive" measures that inform the team when the project is going awry. Using measurement as a management tool in this case will result in the creation of a unified team and increase the opportunity for a successful implementation.

Conclusions

Over the past five decades our economy has shifted from a manufacturing or industrial base to one based on service and information. When this type of economic shift happened in the past, from agriculture to manufacturing, major societal and industrial changes evolved. So to is the case today as technology speeds the pace of change and makes all parts of the world accessible to one another. The most important change, impacting IT organizations, is the dependence of business on information technologies.

Over the evolution of the four eras, IT has become one of the most important, if not the most important, strategic enabler to business. In many businesses IT has become the driver of strategic initiatives. Most would agree that IT's rise in importance has brought with it an obligation to optimize and report on IT's performance. In order to do this IT organizations must rethink the way they do this today. Most of IT's measures in use today do not:

- Demonstrate how to improve
- Provide the necessary inputs to a continuous improvement program
- Identify or clarify issues driving performance
- Provide a predictive view of success or failure
- Link to business objectives or shareholder value
- Relate to business management or the IT customer
- Communicate the value of IT

The time is at hand for CIOs to establish the Key Performance Indicators that address the deficiencies of our Industrial Age metrics. It is time for IT organizations, particularly applications development, to stop fearing measurement and embrace it as the only means to communicate IT value, establish best practices and sustain a continuous improvement culture.

In a 2002 survey of 200 CIOs, published by CIO Magazine, forty-eight percent of CIOs said that their CEO had unrealistic expectations of what IT could accomplish and thirty-five percent said that their CEO is not supportive or only somewhat supportive of their work and the IT function. It would be easy to blame the CEO's ignorance of IT as the reason for these perceptions, but that would not accomplish anything. It would accomplish a lot more if the CIO were providing the CEO with information that showed the value that IT was providing and what IT was able to do and was doing, to support the enterprise strategy. This information will only be available when the appropriate measures are put in place.

Some of you have been reading this with the expectation that at some point you would find the magic set of metrics or Key Performance Indicators for your IT organization. This is a common thought for many CIOs and the IT measurement staff. Unfortunately there is no magic set of metrics as each IT organization is different and therefore the right set of KPIs is going to be different.

The right set of metrics and KPIs for your organization is dependent on the intended use of the measures as well as your current strategies and objectives. If you are going to use measurement as a monitoring and reporting tool, the metrics employed will be far different than if measurement is to be used as a

management tool in support of a continuous improvement program. Further, if you require metrics that communicate the value of IT, those measures must be based on what is important to the business rather than what IT "thinks" is important..

There are many benefits that accrue to organizations that use measurement as a management tool. These benefits will only materialize, however, if your organization's culture is prepared to embrace measurement as a means of establishing best practices and in support of organizational improvement. To determine organization's readiness for measurement contact ITPMG and we will supply you with the means to quickly make that assessment.

Contact ITPMG today to get a better understanding of how your organization can benefit from implementing or upgrading an IT performance management program:

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