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Developments in Practice XVI: A Framework for Enhancing IT Capabilities

James D. McKeen
Queen's School of Business, Queen's University, jmckeen@business.queensu.ca

Heather A. Smith
Queen's School of Business, Queen's University, hsmith@business.queensu.ca

Satyendra Singh
Queen's University, ssingh@business.queensu.ca

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James D. McKeen
Heather A. Smith
Satyendra Singh
Queen's University
jmckeen@business.queensu.ca

ABSTRACT

Given evidence that IT capabilities are linked to business performance, well-defined procedures would be expected to exist for engineering these capabilities to high standards. Surprisingly, this does not appear to be the case. In fact, IT executives freely admit that they may not use standard, verifiable, and repeatable capabilities. To address this situation, the authors formed a group of senior IT managers from leading edge companies to share experiences and insights into how best to identify and implement effective IT capabilities. The result is a 5-step framework for enhancing IT capabilities.

Keywords: IT capabilities, capability maturity model, IT competencies, conversion effectiveness

I. INTRODUCTION

IT professionals are usually the best in the organization when it comes to business process re-engineering. Why is it, then, that the IT group often uses some of the most "under-engineered" processes in the company? It is true. IT is great at looking at business processes in other parts of the organization but not as comfortable looking at how its own work is done [Golmolski, 2004].

This observation is not lost on senior IT executives. They are the first to admit that they may not use standard, verifiable, and high performing capabilities across the IT department. Furthermore, today's competitive environment is driving these same executives to provide guaranteed levels of service at reduced costs. This goal can only be achieved by enhancing the way in which IT work is done. As a result, IT executives are investigating internal IT capabilities as a vehicle to reduce IT costs, gain efficiencies, and improve the quality of their service in order to reap enhanced benefits from the IT investment.

To explore how organizations are developing IT capabilities, the authors convened a focus group of senior IT managers from a variety of different companies in several industries. These managers were asked to consider how their firms were addressing a number of issues, including what IT capabilities had been identified, how these capabilities were subdivided into processes, how people skills were mapped onto these capabilities and what

outcomes they experienced with their focus on capabilities. The specific questions the focus group members were asked to address in preparation for the meeting were:

- What specific IT capabilities did you identify within your organization?

- How do you measure these capabilities?

- Did you break these capabilities down into identifiable processes? If so, what are they?

- Did you map skills onto IT capabilities?

- What strategies did you adopt to increase your organization's performance with these capabilities? How effective are they?

- What outcomes did you realize? Did your focus on capabilities change the performance of IT in a significant way?

This paper presents the results of this focus group session. Section II offers definitions to clarify the discussion, followed in Section III by a discussion of the value proposition of IT capabilities within organizations. Section IV presents a five-step framework for developing and managing IT capabilities.

II. DEFINING IT CAPABILITY

Terms such as competencies, capabilities, processes, procedures and even methods are often used interchangeably in common IT parlance. As a result, working definitions are needed. We propose the following:

- **Capability** is the ability to marshal resources to affect a predetermined outcome. Resources could include both tangible and intangible assets. Portfolio management, for example, is the capability to manage a set of IT applications as a logical whole.

- **Competency** is the level of proficiency in marshalling resources to affect a predetermined outcome. Capability indicates your ability to do something whereas competency reflects how good you are at doing it.

- **Processes** are well-defined activities within capabilities. Portfolio management, for example, includes the following processes: business case development, project prioritization, resource allocation, performance benchmarking, and portfolio analysis.

- **Procedures and Methods** are "how to" guides or step-by-step instructions for implementing a process.

III. WHY FOCUS ON IT CAPABILITIES?

Researchers long argued that IT capabilities lead to better organizational performance. For instance, Rockart et al [1996] argue that a direct linkage exists between IT capabilities and organizational value and identify eight imperatives that IT organizations must fulfill to support the organization's strategic thrusts. Ross et al. [1996] suggest a direct relationship between IT capabilities and organizational value in the form of specific IT assets which collectively guarantee long-term competitiveness for organizations. Results by Bharadwaj [2000] indicate that organizations with high IT capabilities tend to outperform organizations with low IT capabilities on profit and cost based performance. Santhanam and Hartono [2003] showed similar results.

Previously thought to be a single dimension concept, researchers now increasingly argue that IT capability is a multidimensional concept [Santhanam and Hartono, 2003]. Combining

findings of some earlier studies with their own work on IT leadership and outsourcing, Feeny and Willcocks [1998] proposed nine core IT capabilities. They suggest all these capabilities are necessary for IT organizations to meet the three enduring challenges of (a) uniting business and IT vision, (b) delivering IT services, and (c) designing an IT architecture. The IT capabilities are:

1. Leadership – Integrating IS/IT effort with business purpose and activity
2. Business Systems Thinking – Envisioning the business process that technology makes possible
3. Relationship Building – Getting the business constructively engaged in IS/IT issues
4. Architecture Planning – Creating the coherent blueprint for a technical platform that responds to current and future business needs
5. Making Technology Work – Rapidly achieving technical progress by one means or another
6. Informed Buying – Managing the IS/IT sourcing strategy that meets the interests of the business
7. Contract Facilitation – Ensuring the success of existing contracts for IS/IT services
8. Contract Monitoring – Protecting the business's current and future contractual position,
9. Vendor Development – Identifying the potential value added of IS/IT service suppliers

Further, Wade and Hulland [2004] suggest that IT capabilities can be sorted into three types: inside-out, outside-in, and spanning.

- Inside-out capabilities are deployed from inside the firm in response to market requirements and opportunities, and tend to be internally focused (e.g., technology development).

- Outside-in capabilities are externally oriented, placing an emphasis on anticipating market requirements, creating durable customer relationships, and understanding competitors (e.g. market responsiveness, managing external relationships).

- Spanning capabilities involve both internal and external analysis that are needed to integrate the firm's inside out and outside in capabilities (e.g., managing IS/business partnerships).

Evidence of multidimensionality was also found in the focus group. It was argued by the members that IT capabilities must also include governance and business management, as well as skills management.

Consistent with the studies that show that IT capabilities lead to better organizational performance, there was also a strong sense among the focus group that enhanced IT capabilities would certainly improve the chances of successfully converting IT investments into measurable outcomes for the organization. Weill [1988] and Markus and Soh [1993] found that successful IT investments are the result of "conversion effectiveness" – the ability of an organization to transform its IT expenditures into assets that provide economic and social value. As with any other ability, some firms are likely to possess it to a greater degree than others, partly due to factors outside the organization's control and partly due to managerial acumen and skills. We may now be in a position to argue that these core IT capabilities collectively constitute conversion effectiveness.

IV. A FRAMEWORK FOR DEVELOPING KEY IT CAPABILITIES

If the existence of key capabilities enables IT investments to be converted successfully to organizational value, then it logically follows that we need strategies for building these IT capabilities. Based on their experience, the focus group suggested that organizations should create a framework to identify, develop, and manage key IT capabilities. The framework that emerged is shown in Figure 1. Each step in this framework is described in the following subsections.
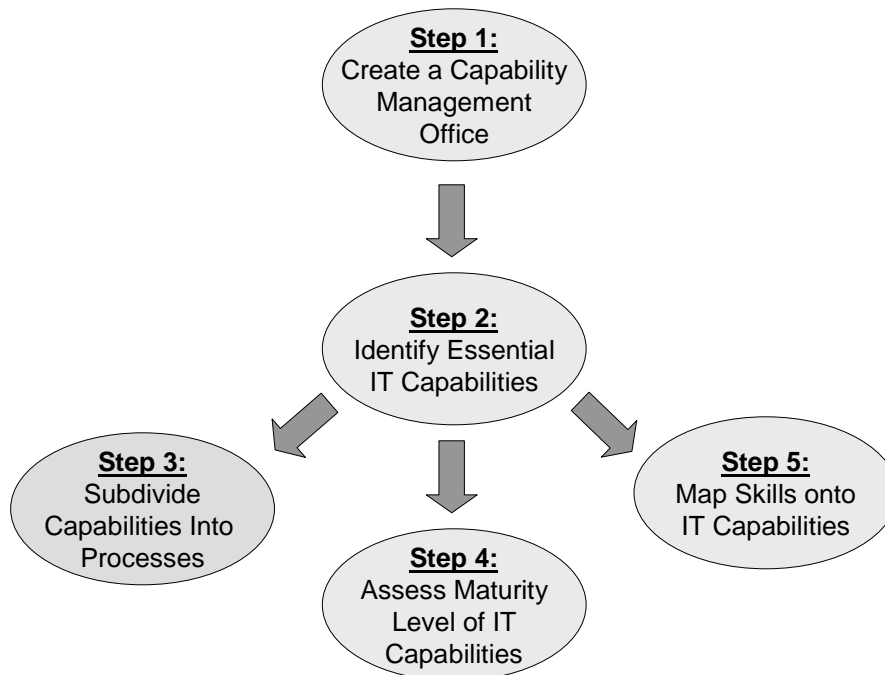

Figure 1. A Framework for Developing Key IT Capabilities

STEP 1: CREATE A CAPABILITY MANAGEMENT OFFICE

The first step for organizations is the creation of a set of activities, structures, policies and governance principles to advance the development and management of their IT capabilities. To accomplish this task, most organizations create a "capability management office". Not only is this office the focal point for capability development and management (that is, Steps 2 through 5), but its creation signals the importance which IT senior management attaches to this activity. While focus group members agreed that this activity is important if IT capabilities are to improve, organizations varied significantly as to how they actually carried out this step.

One company created an entity called the Capability Support Group with overall responsibility for the development and management of IT capabilities. Another company formed an internal group called the Capabilities Council to investigate current practice within IT as part of a company-wide ISO 9000 initiative. However the capabilities development and management office is configured, at a minimum, the group felt that it should administer the following activities:

- Define and assign responsibility for all capabilities
- Ensure that adequate resources and funding are provided

- Develop strategies for the development of these capabilities
- Secure software to manage these activities
- Adopt a continuous capability improvement approach
- Develop organizational training plans
- Report the status of organizational capability performance

It was also strongly recommended that this office, while assuming overall responsibility for the development of a capabilities management program, assign individual responsibilities to individual capabilities.

> *"making a capability someone's 'day job' has been more successful at generating improvement than addressing it as a sideline or trying to grow it by committee".* A participating manager

STEP 2: IDENTIFY ESSENTIAL CAPABILITIES ALIGNED WITH BUSINESS GOALS

Each IT organization should go through the exercise of identifying essential capabilities. The first point made by the focus group was that these capabilities shouldn't be aligned too closely with the current business.

> *"capabilities are less a functional view and more of a view of outcomes that the organization needs to be able to create".* A participating manager

This view argues against simply adopting an existing list of core capabilities such as those suggested by Feeny and Willcocks [1998]. Focus group members felt that there is significant value in deriving one's own list or at least in tailoring an existing list to suit one's goals. Identifying capabilities is an introspective analysis of the key activities that IT must execute effectively. It forces people to examine key business directives, not just IT challenges, and to establish priorities. This trip is well worth taking. In some cases, focus group members felt that it brought IT much closer to the business and actually enhanced alignment.

Despite the obvious linkage with business, identifying essential capabilities in practice is largely an internal IT exercise. As a result, the key capabilities identified are much more in IT-speak than in business-speak. For instance, capabilities might be couched in terms of SLAs, fail-soft mechanisms, solution delivery and help desk provisioning. Such a list would be easily recognized by IT professionals while somewhat obscure to their business counterparts. The focus group members argued that measures need to be taken to ensure that the resulting essential capabilities are tied as closely as possible to the business, starting with the language.

The two lists of capabilities in Table 1 were derived by two focus group members. Firm B adopted a set of capabilities that is remarkably devoid of IT terminology and, as a result, could apply to a line of business as easily as it applies to IT.

Table 1. Comparison of Capabilities for Two Organizations

Firm A	Firm B
1. Skills Regeneration	1. People Management
2. Enterprise Architecture	2. Strategy and Planning
3. Shared Services Governance & Development	3. Portfolio Management
4. Development Methodology	4. Resource Management
5. Project Initiation and Investment Management	5. Solution Delivery
6. Business Process Definition and Change Management	6. Service Management
7. Infrastructure Alignment and Crisis Control	7. Asset Management
8. Partner Management and Outsourcing	

Another company (Firm C), after identifying a set of capabilities, realized that they were not tied closely enough to the business. They feared the situation where IT could demonstrate high competence on specific capabilities while the business faltered. As a result, they revisited their capabilities earmarking those that explicitly tied them to the business. This exercise resulted in the identification of 12 capabilities of which five were classified as "business enablement"; the other seven were classified under the headings of "IT utility" and "business operations". The company decided to depict these capabilities as a wheel (Figure 2) to reinforce the dynamic nature of these capabilities and their mutual interdependence.
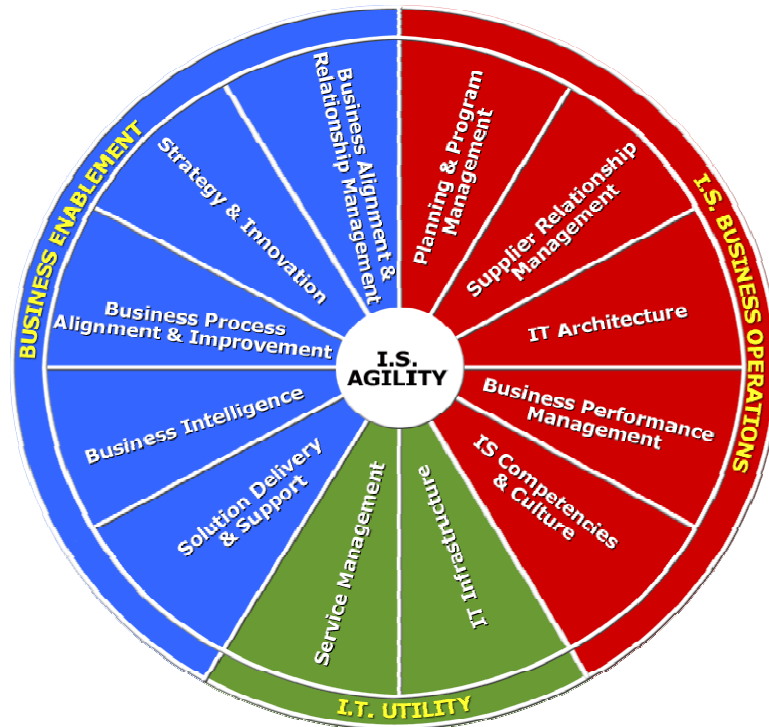
Figure 2. IT Capability Wheel

Firm C identified "IS Competencies and Culture" as a capability. This choice is an explicit recognition that the definition and management of IT capabilities is itself a capability! Another obvious difference between the capabilities of Firm C and Firms A and B is the level of detail. This difference begs the question of how many capabilities should there be. A poll of the focus group resulted in a range in the number of capabilities from seven to twelve which is probably a good working range. Many more than twelve would become too granular while fewer than seven would be overly generic and would risk losing focus and definition.

STEP 3: SUBDIVIDE IT CAPABILITIES INTO KEY PROCESSES

Once key capabilities are identified, the next step is to subdivide them into processes. The result of this step is a set of well-defined activities that can be measured and managed. Such a set of well-articulated processes enables organizations to evaluate their overall performance with respect to key capabilities. "Portfolio management", for example, is a capability that is difficult to measure. "Business case development", however, is a well-defined component process of

portfolio management and performance on this process can be measured. Using the seven capabilities identified by Firm B in Table 1, Table 2 shows how these capabilities were subdivided into 40 clear processes.

Table 2. Capabilities and Related Processes

	Capabilities	Processes
1	People Management	1. Recruiting and hiring 2. Coaching and motivating 3. Performance management and career planning 4. Identifying and developing talent
2	Strategy and Planning	5. Account management 6. External benchmarking 7. Strategy development 8. Architecture development 9. Business process influence/enabling 10. IT marketing
3	Portfolio Management	11. Business case development 12. Project/service prioritization 13. Portfolio investment determination 14. Resource investment/allocation 15. Performance benchmarking 16. Portfolio analysis
4	Resource Management	17. Staffing strategy development 18. Resource capacity management 19. Staffing sourcing 20. Resource assignment 21. Budget management
5	Solution Delivery	22. Project management 23. Solution configuration 24. Solution development and integration 25. Architecture implementation 26. Solution verification and validation
6	Service Management	27. Solution release 28. Service level management 29. Asset availability management 30. Asset capacity management 31. Incident management 32. Problem management 33. Change management
7	Asset Management	34. Asset inventory management 35. Asset affiliation management 36. Asset lifecycle management 37. Security/permeability enforcement 38. Supplier relationship management 39. Lease/contract management 40. Knowledge management

In the absence of accepted methodologies for subdividing capabilities into processes, focus group members offered some advice based on their experience. One member suggested starting with the basics such as configuration/capacity management, IT asset management, procurement,

or vendor management. Based on an argument of ease of measurement, another member suggested starting with service delivery which includes well-identified activities such as service level agreements, application life cycles, and quality assurance. Gomolski (2004) suggests a different approach – to focus on the "pain points" within the organization. For instance,

> *… if your staff is still responding to end-user requests in an ad hoc fashion, you'll want to look at your request management processes. Or if you find that basic information about IT capabilities isn't getting out to your internal customers, you'll want to focus on your communications processes. Maybe IT planning is weak, or budget estimates fail to hit the mark.* Gomolski [2004]

These approaches are "inside-out" approaches; that is, they focus on internal capabilities to distil component processes. By contrast, the "outside-in" approach takes advantage of the fact that external sources of well-defined IT processes already exist. Perhaps the best-known source is the Software Engineering Institute (SEI) at Carnegie Mellon University with its capability maturity model (CMM) for software development. Other popular IT process frameworks used by members of the focus group are the IT Infrastructure Library (ITIL) and CobiT (Control Objectives for Information and Related Technology). Available frameworks less directly tied to IT include:

- Six Sigma – a methodology from quality control in which processes are continuously refined until their outcomes fall within an acceptable level of defects.

- ISO 9000 – a set of standards focused on achieving uniform business processes.

While the majority of the focus group members created their own list of processes, they felt that perhaps the best approach is a combination of both the inside-out and the outside-in approaches. Start with an external source of processes to ensure that your list is comprehensive and then link this list to your organization's key capabilities. It was suggested that adopting externally-defined processes runs the risk of appearing foreign to IT staff making it more difficult for them to develop an understanding and to foster feelings of ownership.

STEP 4: ASSESS MATURITY LEVEL OF IT CAPABILITIES

To evaluate other processes, some organizations adopted the maturity levels as described by the capability maturity model (CMM) of the Software Engineering Institute (SEI) at Carnegie Mellon University[1]. Arguably, CMM is the most successful development to date beyond the systems development life cycle and structured design. Not only is it the most widely-accepted standard in North America for software development but many companies insist on dealing only with those IT shops that can demonstrate a level of quality management prescribed by the SEI. The CMM levels for software development are:

- **Level 1 (Initial):** Software development follows few rules. The project may go from one crisis to the next. The success of the project depends on the skills of individual developers. They may need to finish the project in a heroic effort.

- **Level 2 (Repeatable):** Software development successes are repeatable. The organization may use some basic project management to track cost and schedule. The precise implementation differs from project to project within the organization.

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[1] http://www.sei.cmu.edu/pub/documents/02.reports/pdf/02tr011.pdf

- **Level 3 (Defined):** Software development across the organization uses the same rules and events for project management. Crucially, the organization follows this process even under schedule pressures, ideally because management recognizes that it is the fastest way to finish.

- **Level 4 (Managed):** Using precise measurements, management can effectively control the software development effort. In particular, management can identify ways to adjust and adapt the process to particular projects without measurable losses of quality or deviations from specifications.

- **Level 5 (Optimizing):** Quantitative feedback from previous projects is used to improve the project management, usually using pilot projects, using the skills shown in level 4.

It was evident from the focus group that the capability maturity model is applicable to many tasks in addition to software development. To evaluate processes constituting IT capabilities, some organizations adopted the maturity levels described by SEI; others have created their own levels. Obviously the definition of each maturity level must be tailored to the specific IT capability because the above definitions pertain only to software development. One focus group member uses the following six levels:

1. **No capability:** No observable value added

2. **Aware:** Clear understanding of need

3. **Developing:** Defined action plan and actively engaged

4. **Practicing:** Demonstrating and achieving value

5. **Optimizing:** Measuring results and investing in continual improvement

6. **Leading:** Recognized proficiency and consistent value contribution

As long as the capability maturity levels are well defined, focus group members felt that the framework was immaterial. They felt it more important that the maturity model be effective in assessing capabilities and driving continuous improvement. It was widely recognized that not all processes within a capability would be at the same maturity level at any given point in time. What does it mean for a capability if some of its component processes are at a maturity level 2 while others are at a maturity level 3? Focus group members felt that it is more important to determine measurable improvement than uniformity across and within capabilities (i.e., all component processes at the same maturity level).

It is important that the capability management office knows the overall maturity of each capability in order to focus attention correctly. At one member's company, a team of senior managers reviews their capability maturity to identify high-priority process improvement areas. They then

- develop a plan for the advancement of these highlighted processes,

- establish a time-line, and

- hold individuals accountable against delivery of these improvements.

At another organization, each capability is assigned an executive owner who is tasked to meet measurable objectives regarding the maturity of his/her capability. A quarterly report outlines the capability's current state, desired future state, time-lines for deliverables, a description of overall progress and performance as well as a gap assessment (HR, budget, information/tools/technology, schedule, quality, sustainability, and measurement). An important aspect of this report (reproduced in Table 3) is its use of verbal descriptions in combination with quantitative indicators.

Furthermore, each capability owner must articulate what will be different about their organization's performance as a result of having this future state capability. This unique requirement forces each capability owner to link his/her capability directly to a distinct organizational outcome. This exercise was found invaluable for ensuring that any improvements in the maturity of IT capabilities results in associated business impact.

A key question for IT executives is the following: what level of maturity should we target for our capabilities? The general consensus among the group was that IT vendors are likely forced to "aim high" while other companies would be satisfied with mid-range maturity. One member suggested that the gain in moving from level 2 to level 3 on the maturity index was significant but the gain in moving higher was substantially reduced. All believed in this law of diminishing returns.

Table 3. IT Capability Progress and Performance Chart

IT Capability	*e.g. Portfolio Management*		
Operational Definition	*Written description of this particular capability*		
Owner	*Name of the individual*		
Future End State Vision	*Describes what will be different about IT performance as a result of having this future state capability*	**POD[1]** *5*	**POA[2]** *8*
		Impact	**P&P[3]**
End of Year Deliverables	*Process 1: Description*	*Medium*	*S*
	Process 2: Description	*High*	*N*
	Process n: Description	*Low*	*S*
Overall Progress and Performance	*What did you plan to get done this quarter and what did get done? If there is variance, what was the source of the error?*		

Gap Assessment[4]				
	Process 1	**Process 2**	**Process n**	**Explanation[5]**
Human Resources	*G*	*Y*	*G*	***
Budget	*Y*	*Y*	*G*	***
Information/Tools/Tech-nology	*G*	*G*	*G*	
Schedule	*G*	*G*	*G*	
Quality	*G*	*R*	*Y*	***
Sustainability	*G*	*G*	*Y*	***
Measurement	*G*	*G*	*G*	

[1]POD is "point of departure" (i.e., your current state) on a scale of 1-10.
[2]POA is "point of arrival" (i.e., your end state) on a scale of 1-10.
[3]P&P is "pace and performance" where "S" is satisfactory and "N" is not satisfactory.
[4]G = green, Y = yellow and R = red.
[5]Detailed explanation required for any row that isn't "green".

STEP 5: LINK SKILLS TO IT CAPABILITIES

The final part of the framework for IT capability development is the linkage between skills and capabilities. Failure to link results is a significant disconnect between individuals and capabilities

– a belief that individuals have little to do with capability maturity beyond that of following the dictates of established procedures. This insight is surprising because even a cursory glance at the processes in Table 2 shows that many of the processes are closely related to individual skills. Only one company within the focus group addressed this issue directly. Others, despite being well advanced in terms of identifying key processes and mapping these processes onto capabilities, chose indirect methods for tying individual skills to key capabilities.

Feeny and Willcocks [1998] classify the necessary IT skills in terms of business, technical, and interpersonal. For each of their nine key capabilities, they ranked the need for each of these skill classifications as being high, medium, or low. The IT leadership capability, for instance, required a high level of business skills, a medium level of technical skills, and a high level of interpersonal skills.

The focus group company that addressed this issue created matrices to map individual skills (such as "conceptual thinking") against roles (such as "application architect" or "business analyst"). These individual skills can be exercised at different levels for particular roles; for example, a level 3 business analyst would require greater mastery of each requisite skill than a level 2 business analyst. Because roles are mapped to processes and processes are mapped to capabilities, it is possible to connect individuals to the capabilities that are identified as important for the IT organization. Furthermore, these matrices make the progression between levels within roles explicit and therefore the focus of annual performance reviews and career advancement discussions. In this same company, a number of communities of practice were established to disseminate skills further throughout the organization (for example, a business analyst community).

In those companies without direct links between individual skills and key IT capabilities, indirect linkages exist. In one company, process improvement was made everyone's job. Anyone in the organization was encouraged to "raise a process improvement". These initiatives were maintained within a process improvement database and reviewed on a quarterly basis by a senior management team. This initiative successfully engaged individuals in making them more aware of the need for continuous process improvement. Another organization included organizational process skills within their internal training programs for job roles. The training ensured awareness and knowledge of key processes across the IT department. The key point is that individuals must be connected (either directly or indirectly) to the process of developing IT capabilities.

IV. CONCLUSION

The improvement of IT capabilities and processes within organizations will undoubtedly result in enhanced benefits from IT investments. Improving performance on such activities as solution delivery and asset management alone promises substantial results. When IT departments take the next step and identify those capabilities that are vital to the business and then develop those capabilities to advanced maturity levels, the rewards will be significant. Section III in this paper sets out a step-by-step framework which should assist IT organizations in reaching this goal.

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ABOUT THE AUTHORS

James D. McKeen is Professor of MIS at the School of Business, Queen's University at Kingston, Canada and is the Director of the Monieson Centre – a research centre focused on the study of knowledge in organizations. He received his Ph.D. in Business Administration from the University of Minnesota. His research interests include IT strategy, user participation, the management of IT, and knowledge management in organizations. His research is published in a variety of journals including the *MIS Quarterly*, *JITM*, *CAIS*, the *Journal of Systems and Software*, *the International Journal of Management Reviews, Information & Management*, *CACM*, *Computers and Education*, *OMEGA*, *Canadian Journal of Administrative Sciences, JMIS*, *KM Review*, and *Database*. He currently serves on the Editorial Board of the Journal of End User Computing and was the MIS area editor for the *Canadian Journal of Administrative Sciences* for seven years. Jim and Heather Smith's most recent book: *Making IT Happen: Critical Issues in IT Management* was published in January 2003 by Wiley.

Heather A. Smith is Senior Research Associate with Queen's University School of Business, specializing in IT management issues. A former senior IT manager, she is a founder and co-director (with James McKeen) of the IT Management Forum, the CIO Brief, and the KM Forum, which facilitate inter-organizational learning among senior executives, and co-author (with James McKeen) of *Management Challenges in IS: Successful Strategies and Appropriate Action* (1996). She is also a Research Associate with the Lac Carling Conference on E-Government, the Society for Information Management, and Chair of the IT Excellence Awards University Advisory Council. Her research is published in a variety of journals and books including *CAIS, JITM, Information and Management, Database, CIO Canada,* and the *CIO Governments Review.* Her book, *Making IT Happen: Critical Issues in IT Management* with James McKeen was published by Wiley in January 2003 and she is co-author of a new book, *Information Technology and Organizational Transformation: Solving the Management Puzzle* published by Butterworth-Heinemann.

Satyendra Singh worked as a manager in the software industry for 12 years before joining the School of Business at Queen's University in Kingston, Canada as a doctoral candidate in Management Information Systems. He holds an M.B.A .from Queen's University, a Master's in

Computer Applications from Andhra University in India, and a B.Sc degree from Osmania University in India. Mr. Singh is currently conducting research on information technology strategy and knowledge management.

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