Breaking Out of the IT Silo:
The Integration Maturity Model

Mark R. Nelson, Rensselaer Polytechnic Institute
Overview

Early in 2004, the EDUCAUSE Center for Applied Research (ECAR) published the results of a study called Information Technology Alignment in Higher Education. A team of ECAR fellows conducted that study using methodology that included an online survey, telephone interviews, and case studies. The study produced several interesting findings. The intent of this research bulletin is to expand the discussion of aligning information technology (IT) with higher education institutional priorities and to address some specific findings from the alignment study.

One important finding of the IT alignment study relates to the need for organizations to be more agile and “adaptive.” The study notes that this may require organizations to reconsider or change their organizational structures into ones that are less “silo” or functionally oriented. However, for years many organizations, including academic institutions, have maintained functional boundaries between departments or units of the larger organization. Supporting the change required to develop a more agile organization is not easy when each organizational unit is a distinct functional silo. We even see these boundaries among academic disciplines, with distinct departments dedicated to teaching topics solely within a domain.

Silo organizations are often bound by a hierarchical proclivity to inhibit communication across silos. In turn, this negatively impacts organizational effectiveness, the alignment process, and organizational agility. We refer to bridging these silos as the process of achieving cross-functional integration. There is substantial evidence from other studies that improving cross-functional integration also improves the achievement of goals, organizational performance, and success with information-system implementation and innovation. More importantly, integration can also improve the speed of response to environmental change—a critical issue for today’s academic institutions.

Highlights of Integration’s Role in Strategic Alignment

A key if not critical factor that affects the alignment of IT resources to a university’s or organization’s business needs is the careful integration of the IT unit with the priorities of the organization. Integration is “the quality of the state of collaboration that exists among departments that is required to achieve unity of effort by the demands of the environment.” This research bulletin provides a model to help higher education managers understand and assess the state of cross-functional integration between IT and other units in their institutions. By improving the state of cross-functional integration, institutions should expect to achieve a higher degree of IT alignment and reach a position of greater organizational agility and adaptability.

The Alignment-Integration Link

Woolfe identified four stages in the alignment process where IT can provide value to an organization: (1) functional automation, (2) cross-functional integration, (3) process
automation, and (4) process transformation. He argues that strategic IT alignment really occurs only after the fourth stage. The first two stages focus primarily on improving efficiency, while the latter two concentrate on changing the way work is done. Woolfe summarizes the role of cross-functional integration in the alignment process as follows:

Integration involves coordinating the development of creative business uses for IT to support business processes that transcend the boundaries of business units. Information services integration can save money by encouraging a common approach, but more important, it contributes to [organizational] added value by exploiting synergies that exists between business units.

Of the four stages, Woolfe notes that the second stage in particular, cross-functional integration, is both highly complex and not easily accomplished. Reasons cited for the difficulty include a lack of communication and complications in managing interdependence between information services and other business functions. Along similar lines and consistent with prior research, the ECAR IT alignment study found that information services performance ratings were higher when the information services function aligned itself closely with important business objectives.

The study also confirms findings from prior research that emphasize the importance of integrating institutional planning with IT planning activities. Chan and Huff suggest that for information intensive industries, integration occurs best when the business plans and IT plans are developed simultaneously. In addition to ensuring that IT focuses on the most critical IT needs and issues of the organization, such linking of planning activities is likely to improve IT project success and deliver on projects that are of value to the institution.

Finally, functional integration of the IT unit with business strategies can enhance IT alignment in two ways: first, by creating opportunities for the IT unit to contribute to both shaping and supporting the strategic initiatives and plans of other functional units, and second, by improving the link between organization-wide infrastructure and processes and IT infrastructure and processes. Thus, models and methods for improving cross-functional integration in an institution should contribute to improved IT alignment.

**The Integration Maturity Model**

The concepts reported here stem from data collected by the author through a number of sources. The primary study began with interviews of executives at several organizations who were asked to identify key IT issues facing their organizations. An extensive review of industry and academic journals and the business press supported development of a holistic model of IT integration with other functional units. Refinement of the model involved surveys and in-depth interviews with both IT professionals and respondents from other functional units in four large organizations. Each organization was selected based on the degree of integration present between the two functional areas. An expert panel of chief information officers (CIOs), heads of other functional units, and information systems consultants reviewed the model and suggested refinements and directions for future research and application. Later a fifth organization,
at the non-integrated level, was added as part of a follow-up study. Table 1 presents brief profiles of the five organizations, each with a different degree of cross-functional integration between the IT and other functional unit.

<table>
<thead>
<tr>
<th>Integration Status</th>
<th>Interface Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization A</td>
<td>Well integrated</td>
</tr>
<tr>
<td>Organization B</td>
<td>Moderately integrated</td>
</tr>
<tr>
<td>Organization C</td>
<td>Marginally integrated</td>
</tr>
<tr>
<td>Organization D</td>
<td>Poorly integrated</td>
</tr>
<tr>
<td>Organization E</td>
<td>Not integrated</td>
</tr>
</tbody>
</table>

Some interesting patterns emerged upon examination of the data from the selected organizations, and those patterns led to the creation of the model presented in Figure 1. The model explains how integration takes place within the context of organizational maturity. This means that the organization must “mature” through the stages of the integration model and that needs at one stage must be fulfilled before an organization can move to a more advanced stage of integration.
The first stages of the integration maturity model require the IT unit and other functional units to address basic needs for an effective working relationship, such as improving communication, trust, appreciation, and understanding. The later stages focus on the work-related dimensions of integration unique to the collaboration of the two functional areas. Thus, without basic understanding, communication, and trust between IT and other functional units, an organization will be less able to make effective use of technology to support the other functional units.

**Stages of Integration Maturity**

The lowest level or earliest level of integration maturity is what might be best termed “dis-integration” or the complete absence of an effective working relationship between IT and another functional area. Organization E (Table 1) fits this profile. Dis-integration may exist because the two functional areas never had a reason or incentive to interact, or it could be rooted in deeper problems related to internal politics or battles. At this stage there is usually little understanding regarding how each department operates, makes its decisions, sets its priorities, or even performs its work. This lack of understanding and communication may lead to mistrust and other unproductive conditions.

At the second stage of the integration maturity model, issues of trust and appreciation are most prevalent. Individuals in the units typically focus on communicating basic information between units. Organization D is an example of an organization typical of this stage—where integration is poor, but the organization has begun to address the problem. Organizations at the earlier stages of the integration maturity model are likely to have very unsophisticated systems and perhaps little more than standardized “green bar” reports where the format and data are mostly pre-determined, inflexible, and available on a regular schedule (as compared to “as needed”).
At the third stage, the quality of communication becomes a greater concern. Organization C is characteristic of an organization at this stage. The emphasis here is on communicating effectively. At this stage, developing quality communication between IT and the functional unit is more important than data infrastructure or system sophistication. Cross-functional work groups are more likely to act and perform like committees than teams as participation and collaboration mechanisms are initiated and residual early-stage issues are further addressed. Some early-stage organizations may have a sophisticated functional information system, such as a decision-support system of some type, but the functional users report that the system does not meet their needs and therefore may not be used.

At the fourth stage, the two departments focus on resolving data issues and building a shared understanding of data and support needs. Organization B is characteristic of this stage of integration. Data accuracy is an important issue, as is further improving joint participation in decision making and system development. Unlike the earlier stages, where communication was a significant problem or focus, at this stage there is a greater sense that “we do a pretty good job of communicating.” Cross-functional work groups begin to function more like teams than committees. Similarly, individuals in one functional unit appear to have a better understanding and respect for the work of individuals in the other functional area. Integrated data sets, data warehousing, and initial data mining tools emerge that are driven by the other function’s needs for information. These refinements in the systems and data infrastructure will lead to functional information systems that are often more sophisticated and more effective.

At the final stage of the integration maturity model, the focus is clearly on making effective use of available data. Organization A is representative of this stage, where the functional information systems are used more often and are more sophisticated than at earlier stages. The systems are likely based on a data-warehousing infrastructure with advanced decision support tools and flexible, real-time inquiry and reporting capability. System changes and enhancements required to meet changing business needs often occur very quickly, and functional users report a high degree of satisfaction with the systems and data. While individuals in organizations at other stages might be quick to point out problems in their interaction between departments, at this stage the interface is more seamless. Less energy is spent on managing the interface and more is spent on cooperation for effectively achievement of goals.

Using the Integration Maturity Model

Placement in the integration maturity model can be determined through several mechanisms. Members of the expert panel who helped refine the model suggested that many of them could identify where their own organizations fell within the integration maturity model. This suggests that managers could use the model and their own observational experiences to identify position within the framework. In doing so, managers in one functional area (for example, student services or academic administration) should compare their evaluation to those of managers in the other functional area (for example, IT) and engage in discussion around the points where conclusions differ. Managers might also consider gaining a wider range of input to the
evaluation, including a sample of staff at different reporting levels from both departments. This could be done through a short survey instrument or perhaps as part of a staff meeting or focus group.

In order to evaluate observational experiences or other data collected in the assessment process, managers should look for patterns that are similar to those described earlier in this bulletin. For example, poorly integrated functional areas are likely to find that integrative mechanisms, such as effective group participation patterns and high quality communication, are lacking, and employees will place a high importance on improving these. In contrast, well-integrated functional areas would place less importance on the communication and integrative mechanisms based on the experience (not just the assumption) that they are working well.

Once an organization identifies its stage of maturity within the integration maturity model, the core issues for that stage can be addressed. For example, an organization at one of the early stages should focus on building trust and understanding. To do this, share the reasoning behind decisions that are made, institute cross-functional training, and communicate plans and priorities. Take special care to reduce the risk of miscommunication, which can be common at these stages. At lower stages of integration maturity, face-to-face communication, while time consuming, is frequently more effective than telephone conversations or e-mail. As trust and communication quality improve, additional focus can be placed on participatory decision making and planning. When these basic integrative mechanisms are in place, the focus can shift to improving the data infrastructure and end-to-end processes through joint effort. This path to improving integration will yield integrated data, application, and process infrastructures that are more effective and useful in achieving the business objectives at the departmental level.

What It Means to Higher Education

For academic institutions pursuing IT alignment, the integration maturity model provides an additional tool for improving internal strategy and infrastructure relationships. Luftman identified a number of inhibitors to strategic IT alignment, and he notes that, “The primary problem [is] one of affiliation. [The organization] and IT are going in different directions with poor communication and interaction between them.” Luftman further refines this description through a listing of specific inhibitors to IT alignment that include no close relationship between IT and other functional units, lack of IT understanding of other functional units, no communication, plans not linked, and several others. As the material in this bulletin shows, however, these inhibitors are also characteristic of a poorly integrated organization. Thus, identifying and improving functional integration between IT and other functional units is a critical component for IT alignment. The integration maturity model provides an easy-to-communicate framework for accomplishing this task.

The integration maturity model does not address the technical aspects of integration as thoroughly as the organizational dimensions, and for that reason the framework can be adjusted to evaluate the relationship between any two functional areas, any two
organizations, or even an organization and its “customers” or suppliers. Thinking more broadly about business strategy and infrastructure relationships will lead to a broader array of useful applications for the integration maturity model within an organization.

Key lessons for leadership also emerged from the research to develop the integration maturity model. For one, top management in both departments must support better integration between the two units, and support from management is a key enabler of the maturity process. Conflict among executives in different functional areas is likely to be a greater barrier to improved integration than conflict at lower managerial levels. Second, it is possible for organizations to address multiple stages of the integration maturity model at once. For example, two departments can work on improving data quality while developing better communication and participatory mechanisms. However, this approach requires leaders to monitor and place emphasis on developing the basic integrative mechanisms first and then gradually shift their attention to higher-level issues. Until the basic integrative mechanisms are in place, the goal of effectively aligning strategy and infrastructure relationships is at best difficult to achieve. Improving those mechanisms is a top responsibility of the executive leadership. By improving the interface between IT and other functional units, academic institutions will be better at aligning their technology resources to their strategic goals and objectives, and ultimately at adapting to rapid environmental change. The key implication of the integration hierarchy for management is that it provides the groundwork for assessing and improving cross-functional integration in an organization. Using the integration maturity model, organizations can identify their degree of integration as it relates to developing effective information systems. Given that information, a plan to improve the integration of the information technology area with other functional areas becomes a more manageable objective.

**Key Questions to Ask**

- What is the state of IT’s working relationships with other functional units? Do the leaders of those units and individuals at lower levels within those units agree with the assessment?

- How satisfied are users in other units with the IT solutions provided to them? How well do these solutions meet their needs?

- How does IT make its strategic and operational plans clear to other functional units? How does IT articulate and share its priorities and its rationale for decisions that affect other units?

- To what degree does IT understand the strategic and operational plans, priorities, and decision processes of the functional units it serves?

- How effectively does the IT unit communicate with other functional units? In what initiatives and in what ways do IT staff members participate in goal setting, planning, or other activities within other functional units? In what initiatives and
in what ways to staff members from other functional units participate in the goal setting, planning, or other activities within the IT unit?

Where to Learn More


Endnotes


7. Ibid., p. 21.


11. Study was part of the author’s doctoral dissertation, which won a distinguished dissertation award upon completion.


About the Author

Mark R. Nelson (nelsom@rpi.edu) is an ECAR Research Fellow and an Assistant Professor of Management Information Systems and Information Technology at the Lally School of Management and Technology, Rensselaer Polytechnic Institute.