Capabilities Integration:
The Three Steps for Chief Data Officers

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Chief data officers (CDOs) must know what skills and knowledge (capabilities) are essential for enhancing and maintaining information quality (IQ) in their organization. CDOs need this information to make effective decisions regarding staffing, training, and organizing talented IQ professionals to ensure that their division has the capabilities required to succeed.

In this article, first, I describe the IQ capabilities framework developed at the MIT CDOIQ program. Next, I highlight the cultural barriers in integrating these capabilities. I conclude with my recommendation for the three specific steps that CDOs should take to integrate these capabilities.

The IQ Capabilities Framework

All skills and knowledge relevant to IQ work broadly fall into three categories: technical, adaptive, and interpretive capabilities. Technical capabilities refer to skills and

knowledge regarding the design and functions of technological systems such as machine learning, artificial intelligence, and computational theories. Adaptive capabilities center on enhancing the usability of technological systems, meeting the users' needs, and amplifying their capabilities. Interpretive capabilities denote the abilities of sense-making the role of technologies in the context of the organizational strategic direction and its environment. Our analysis of the empirical data supported that perceived import of specific skills and knowledge among IQ executives, managers, and professionals coalesces into these three categories.

Indeed, specific skills may come and go over time. However, these classifications will most likely remain fundamental ways of conceptualizing the capabilities because these classifications are congruent with how academics categorize academic disciplines. The disciplines such as mathematics and engineering focus on mechanical systems (complex inner workings of the systems). The disciplines such as biology and psychology focus on open systems (reaction and interaction between the complex systems and their environment). The disciplines such as sociology and organization sciences focus on interpretative systems (developing meaningful frameworks and perspectives for sense-making complex systems). Each classification of disciplines have their way of thinking and creating new knowledge. As an interdisciplinary field, IQ work draws upon knowledge from diverse disciplines. Professionals with an educational background in diverse disciplines contribute to IQ work. Hence, one can reasonably surmise that the influences of these disciplines reflect on professionals' perceived import of the capabilities.

Barriers of Integration

One can easily see the need to integrate these three areas of capabilities. For example, data intelligence--the main theme of this year's MIT CDOIQ Symposium--requires transforming the data into an impetus for immediate value-creating action. Technical capabilities are necessary for processing the enormous amount of data that many organizations can acquire. Adaptive capabilities apply in facilitating intense interaction among technological systems and their users. Interpretive capabilities are necessary to ensure that the resulting action plans fit with the organization's business model, strategic direction, and environmental contexts. These capabilities must work in unison as an integrated solution, not as three loosely connected independent components. However, two types of barriers often impede the successful integration of these capabilities.

The "We Do That Too" Barrier

A dominant capabilities area often attempt to subsume the work of another capabilities area claiming "we do that too." In fact, for example, all three areas of capabilities use some mathematical or statistical modeling. Also, all three areas do some forms of sense-making. Seeing the work for one area from the perspective of another area such as applying the engineering perspectives to competitive strategy development may even facilitate a fresh approach.

However, the differentiation between these three areas of capabilities does not rest just on the required skills and aptitudes. In each of these three areas, researchers and

practitioners have developed and accumulated a considerable body of specialized

knowledge, not to mention the wealth of knowledge that they draw upon from their basic

disciplines. This barrier forestalls taking full advantage of specialized knowledge. For

example, a biologist working as an MD would not be effective any more than an MD

working as a biologist. Researchers have accumulated an impressive amount of

specialized knowledge regarding many capabilities such as software engineering, human-

computer interaction, and IT strategy. Haphazardly subsuming the roles requiring

specialized capabilities is a poor substitution of actually acquiring and integrating the

necessary capabilities.

The "We Have People for That" Barrier

Compartmentalizing these three capabilities areas is another barrier to integrating

these capabilities. One area does their work and hands it off to another for them to their

work. Such division of labor facilitates each area to focus and leverage on their core

competencies.

However, this compartmentalization--the stovepipe, swimlane, or whatever else

one may refer to it as--is an ineffective approach in rapidly changing environment that

most organizations face these days. Solutions must be engineered to deliver the intended

organizational outcome at the first go. They must not stay bouncing around between

units, nor should they remain a constant state of being retrofitted just to catch up.

The Three Steps for CDOs Toward Capabilities Integration

1. Overcome the Competency Trap.

History demonstrates that the core competency of a firm can often impede acquiring new core competencies. For example, one might have thought that large retail chains with ample successful experience and knowledge in brick-and-mortar store retailing would have a strategic advantage in dominating the online retail markets. On the contrary, they were slow to get into the online markets and ended up busy catching up rather than innovating. Competency creates a comfort zone, and success breeds complacency.

Similarly, the capabilities--let it be finance, marketing, engineering, or some other functional area--that help executives rise in the ranks of an organization can also become an impediment to exploring other capabilities area. This competency trap is an enabler of the two types of barriers described above. CDOs must set themselves from this trap. They must embrace the view that the diversity in capabilities is an opportunity for success, not any acknowledgment or reminder of anyone's deficiencies.

2. Be a Leader (not just a manager)

Integrating the three areas of capabilities requires intense collaboration among professionals with diverse sets of capabilities. To facilitate such intense collaboration among their reports, CDOs will need to foster a sense of community among their reports (which academics refer to as a community of practice). This feeling of being in the same boat can lower the barriers of integration and facilitate the spirited exchange of ideas and knowledge. In this context, CDOs should also assume the role of the community leader who leads everyone in the boat to row in the same direction.

3. Embrace Career-Long Learning

In each of the three areas of capabilities, researchers and practitioners not only have accumulated a substantial body of knowledge but also continue to add new skills and knowledge. For example, the attendees of the last year's MIT CDOIQ Symposium had a chance to learn an abundance of new best practices, methods, and cutting-edge technologies at the Symposium. Undoubtedly, this year's Symposium will also showcase another impressive lineup of speakers who will impart intriguing new skills and knowledge. Every issue of the leading IT journals is also full of new knowledge relevant to the IQ field. In short, even just keeping up with advancements in knowledge in the field is a challenging task (which my doctoral learners have often likened to "drinking from a fire hose").

These rapid advances in the body of knowledge in our field require CDOs to commit themselves to career-long learning. CDOs are not just the head of their division, but also the intellectual leader who must provide meaningful and informed guidance to highly trained professionals. In particular, to integrate (and lead) the three areas of capabilities, CDOs need to stay broadly aware of the latest advances in all three areas. CDOs making such a commitment will instill the import of career-long learning in their reports. It will also signify and symbolize that CDOs value all capabilities and embrace the need to integrate these capabilities.