Top-down driven architecture design

Richard L. Nolan
Professor of Business Administration, Harvard Business School, Boston, Massachusetts, USA

Argues that senior management must be involved in the IT architecture process in a directly participatory manner. Describes the process of executive architecture design, complete with the essential components of both top-down and bottom-up driven architecture. Describes the characteristics of five levels of maturity in the development of IT architectures, from a business competitor's perspective.

This article is reprinted, with permission, from *Stage by Stage*, Vol. 8 No. 1.

Information Management & Computer Security
5/4 [1997] 123–125
MCB University Press
[ISSN 0968-5227]

I advise senior managers that they must approach their corporate information technology (IT) as a participatory sport, not as a spectator sport. By this I mean that the senior manager's role must shift from one where he chooses an IT strategy from among those presented by subordinates to one where he creates business strategies with IT as an integral component – a component as critical as capital, people and organizational structure. Within this context, the senior manager drives IT strategy as an inseparable component of the overall business strategy.

Putting senior management in the IT driver's seat – learning to play the IT game as a participatory sport – is not easy. I am reminded of the Wimbledon semi-finals match I attended, pitting Jimmy Connors against Pat Cash. Connors won, with difficulty. Throughout the long match many spectators could not resist offering advice to Connors. At one point, a tired and frustrated Connors responded to an especially vociferous spectator by turning and saying, "Lady, here's the racket, why don't you come out here and play him?"

Well, the accomplished spectator can always comment effectively on the attributes of good play and bad play, but playing the game itself demands an entirely new set of skills. The player must learn the feel of the court, the rhythm of the game. Once these skills are mastered, the professional makes the amateur look foolish indeed. You, as senior managers, must acquire new expertise as players involved in making information technology an integral part of your business strategy. To compete in a global economy, you will have to learn to think and act differently, and to play the business strategy game at a higher level than ever before. It is a big challenge, but you are not alone: I believe every senior manager who influences the strategic direction of his company in the twenty-first century will become a top-down driver of IT strategy as well.

This article addresses the challenge by explaining how to translate business vision into architecture business design. "Architecture" refers to the structure of IT for doing business. It comprises the collective information technologies of a company that support company activities and which are key to carrying out the business activities.

The process of executive architecture design

Architecture begins with a business vision driven by senior management, a vision that grows out of executive deliberation on how the company should be run to survive and compete in the twenty-first century (Figure 1). Creating the vision generates a number of strategic courses of action through the application of such techniques as value chain analysis and customer and vendor workshops to analyze possible alliances. It is an inductive process. The "deliverable" of a business vision is a vision statement that is meaningful, understandable, inspiring, and which captures the essence of what the company must do well to prosper in coming decades.

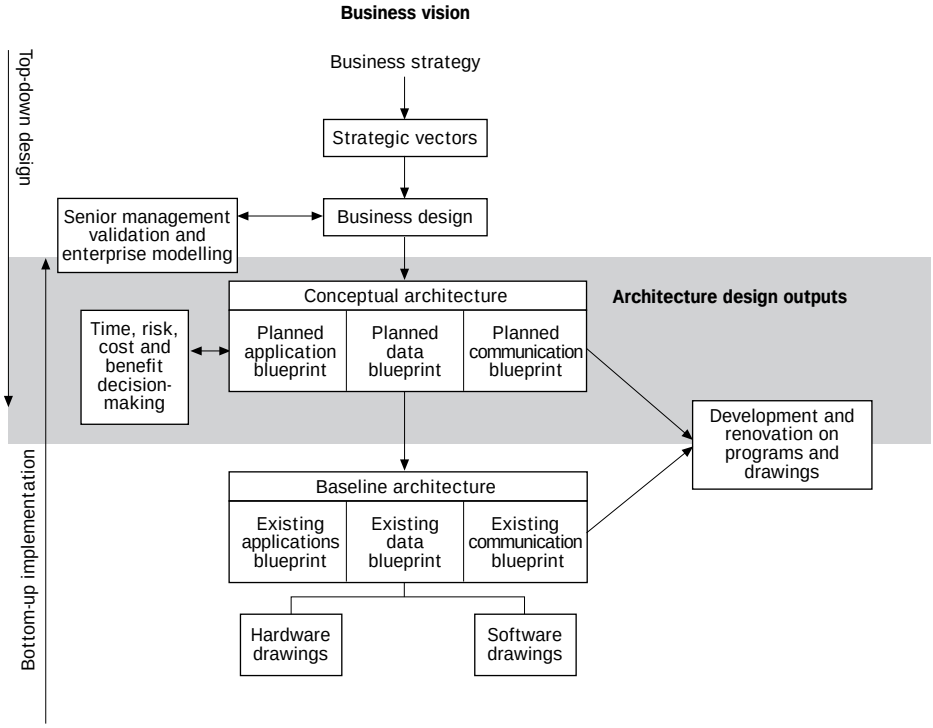
Business strategy, which is derived from a business vision, is a more analytical process for determining the key variables of success – the activities that must be done well and the resources that must be allocated to achieve the desired results. Business strategy in turn leads to formulation of strategic vectors – a cohesive portrait of integrated strategic objectives, performance and success measures, or, put another way, a finite set of programmes packaged to achieve measurable progress towards the business vision.

After these steps have been undertaken, analysis can begin to determine the features of what we call business design. Business design involves identifying and analysing three structural components: business functions, logical locations and information. Senior management's validation of business design is required to ensure that the attributes that can be created with IT are indeed the attributes most important to realizing the objectives of the strategic vectors.

Finally, from the business design the conceptual architecture can be derived, linking executives with implementors further down in the organization. The conceptual architecture is made up of high-level blueprints for key categories of IT (applications, data and communications). At this level of detail,

Information Management & Computer Security
5/4 [1997] 123–125

Figure 1
Architecture design framework



enterprise modelling can be conducted to assess the costs, benefits, time and risk of building a target architecture from a baseline architecture. Enterprise modelling requires a great deal of participation on the part of a senior management team; they must work closely with a technical design team to create a realistically manageable architecture.

The "big picture" perspective

Although we have developed many ways of describing an IT architecture in bottom-up detail, we have not until now had a comparable way of describing an architecture program from a senior manager's perspective. We have broken out five general levels that characterize a company's architecture based on the relative aggressiveness of the investment being made in architecture, and the relative importance of architecture in relation to the overall business strategy.

Architecture and the strategic role of IT are directly linked to a company's chosen components of transformation, such as building the network organization, leveraging knowledge workers, downsizing and creating strategic alliances. Through such linkage, the people in an organization can gain a clear understanding of the contribution architecture makes to business objectives. Establishing this link is a critical facet of organizational leadership since it propels the correct usage of architecture programs throughout the company. The levels of architecture we describe them here provide a common vocabulary for senior managers charged with this top-down dissemination process.

Level one

All-out. This characterizes an architecture strategy in which IT is applied aggressively to gain a lasting competitive advantage by changing the rules of the business' competitive playing field. IT expenditure levels will be two to three times that of competitors. We refer to companies employing an all-out architecture strategy as "break-away" companies. Examples of all-out strategies include American Airlines' $400 million reservation system; CitiBank's early concentration on IT spending for distributed banking services; and many insurance companies' technology-based, custom-designed financial services products and automated product life-cycle servicing.

Level two

Strategic. The company strives to achieve a strategic advantage through the use of IT but lacks the aggressiveness of the all-out strategy. This level is being pursued by a large number of companies in diverse industries;

Information Management & Computer Security
5/4 [1997] 123–125

the senior executive team both leads and supports the effort. Examples include Ford, The Equitable, Salomon Brothers and BP Oil.

Level three

Competitive. The company keys off its competitors, gauging their IT expenditures and objectives to remain on a competitive par. Example: engineering-intensive companies investing heavily in CAD/CAM because it's a competitive necessity. A competitive architecture strategy can result in rapidly increasing IT expenditures, but rarely yields lasting competitive advantage because all competitors are spending at about the same rate. Nevertheless, timing is critical when there is the chance of gaining even a temporary competitive advantage.

Level four

Positioning. Companies pursuing a position architecture are often described as "fast followers". The leading competition is watched closely, while the company's architecture expenditures and projects are decided on the basis of being able to match quickly any competitive advantage a competitor might gain through IT. Example: companies with highly competitive products, thin margins and conservative management, such as grocery chains, chemical companies and retailers.

Level five

Catch-up. Companies which have neglected IT for a number of years, now at a cost and service disadvantage in their industries, deploy a catch-up architecture strategy. So do companies that had mis-gauged the effectiveness of IT in their business strategies *vis-à-vis* their competition. Catch-up strategies often do not work where the competition gap is severe, so other approaches should be considered. For instance, the gap between American and United airlines one the one hand, compared with the other airlines on the other, forced many of the latter group to contract with either American or United for competitive online reservation systems.