

ROADMAPPING IN THE CORPORATION

Product-technology roadmaps define and communicate product and technology strategy along with a longer, smarter view of the future.

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In a corporation, an important need for roadmapping is at the product-line level. Product-Technology Roadmaps in the corporate setting are used to define the plan for the evolution of a product, linking business strategy to the evolution of the product features and costs to the technologies needed to achieve the strategic objective. This article describes the experience of Lucent Technologies in deployment and use of the roadmapping methodology during the past several years. A small group shepherded the deployment and use of roadmaps during that time, and the format and application described here have evolved with the experience gained.

Deploying roadmaps across a corporation helps achieve several key objectives. For each product line, roadmaps link market strategy to product plans to technology plans. Roadmaps created at the product line level are the base for corporate technology planning, identifying needs, gaps, strengths and weaknesses in a common language across the corporation. Roadmaps help focus attention on longer-term planning and improve communication and ownership of plans. Finally, the process helps focus a team's thinking on the few most important priorities at each step of the planning process:

■ *Linking strategy to product plans to technology plans.*—Creating the roadmap story means explicitly describing the why's for each key decision in the plan. Typically, strategies, product plans and technology plans are created independently by the people responsible for them. Roadmaps explicitly create the linkages, first linking strategic choices based on market needs and the competitive environment to product evolution and feature implementations, and then linking product plans to technology implementation plans.

■ *Enabling corporate-level technology plans.*—With roadmaps for several product lines, it is possible to look across the roadmaps for common needs that may be met

by a single development program or technology acquisition. This can be done by analyzing a database of roadmaps or with cross-roadmap reviews where product teams come together to identify common needs. Time-to-market improvements and other platform opportunities can result. Besides overlaps, cross-roadmapping activity can address hidden gaps and identify key strengths that can be deployed in other areas of the business.

■ *Focus on longer-term planning.*—Today's business climate can lead to a focus on short-term thinking, often tied to the reporting needs of the budget cycle or the next deliverable. Roadmapping helps to focus the attention of the team on future product generations, initiating longer-term projects or technology acquisitions so that their outputs will be ready when needed. For technologies with long lead times, the choice to develop or acquire is a near-term decision with long-term consequences.

■ *Improving communication and ownership of plans.*—The use of a cross-functional team to create a product line plan allows the members of the team to develop a shared plan. All share in the creation of the plan, developing ownership across functions. Roadmapping provides a common vocabulary that is shared across the team with diverse backgrounds such as product management, marketing, sales, research and development, manufacturing, project management, logistics, etc. The team develops its roadmap in a step-by-step fashion, building on each team member's special knowledge. The process is usually iterative, as the team realizes that the plan it has set out is not feasible or that there is a better alternative.

■ *Focus planning on the highest-priority topics.*—A key goal of roadmapping is to identify and focus strategy and product development on the few most important elements for success. At every stage of roadmap development, the group strives to define the two or three most important drivers, elements or issues. In this way, the focus is kept on identifying the highest priorities. As the roadmap is developed and implemented, the team identifies gaps and the actions to close the gaps. Gaps may include a key technology that must be developed or acquired, or a feature that must be included in the product to meet a high-priority customer or market need.

Deployment of Roadmapping

Firms can deploy roadmapping using several means, many of which can be supported organizationally. While it is tempting to initiate roadmapping by establishing a policy, such as requiring roadmaps for annual budget review, the experience of several organizations suggests that the resulting outcome may disappoint (1). An alternative approach is to assign responsibility to an organization for initiating roadmapping in key areas when they are needed. In a multi-business corporation it makes particular sense to deploy roadmapping at the corporate

level, provided this can be done without handing over responsibility for content to that staff. The deployment task for the initiating group continues long after the first roadmaps are written, as the roadmapping life cycle moves through initiation, maintenance and, sometimes, restarts.

During the start-up mode for roadmapping, a firm must decide where to begin. Which product lines have the greatest need for multi-generation product and technology plans? When should the activity be initiated and concluded to feed the product and budget cycle? Where are the greatest cross-business planning opportunities? History has provided several examples of roadmapping efforts that failed due to starting in the wrong place or trying to initiate it everywhere at once (2). Even as an organization's planning skills mature, we find that successful roadmapping leaders quickly move into new jobs, while acquisitions and re-organizations force a steady stream of fresh starts. The larger and more volatile the company, the more frequently it is in start-up mode.

Locating a deployment function at the corporate level brings other distinct advantages. Participants in the business units often lack the slack time to investigate and absorb new roadmapping tools and techniques, available from a small community of practitioners. For example, Lucent's corporate team built a unique economic trend analysis capability to prepare forecasts that were used in roadmaps across the company. "Experience curve" cost trends are particularly important to the communications equipment industry. Original analytical work like this, not readily available for purchase, is difficult to perform in a product-focused organization. Finally, a corporate perspective is sometimes the only vantage point from which to clearly spot the broader threatening trends that approach from the technological margins. Continuous and judicious startup, external visibility, analytical expertise, and trend spotting all make the case for giving corporate organizations custody of roadmapping deployment.

The deployment task can involve several activities aimed at putting roadmaps in the right places at the right times. Chief among them is training. The product-technology roadmap as described later involves a style of analysis and presentation that is often new to participants. Lucent's Technology Office created a workshop that covered these skills using a case-based exercise set in the magnetic disk drive industry. Participants were given a minimal education in industry fundamentals and used a roadmap to synthesize and articulate a strategy. In this two-day format, the act of wrestling with product, market and technical tradeoffs reinforced the essential links between these decisions. The workshop was sometimes customized to include real data from present business concerns, or excluded the case altogether for an abbreviated executive overview. Open sessions, offered through the corporate training catalog, generated broad

Roadmapping can identify and focus strategy and product development on the few most important elements for success.

interest and generated new roadmapping activity across the company. Closed workshops provided an effective just-in-time training for teams about to embark on a new roadmap.

Roadmap training utilizes a set of common tools and templates that encourage a universal language for technology planning throughout the corporation. Much in the way that standardized financial reporting permits a rapid dissemination of financial information, the roadmap template creates a common language for executive review of technology, enables cross-roadmap planning, and builds common roadmapping skills. At Lucent, having a standard template amounted to a starting point—a minimal set of information to describe an integrated product and technology strategy. Individual teams were free to embellish as the situation dictated.

Training also frequently preceded more active facilitation. Having corporate expertise available to facilitate made it possible to get roadmaps generated rapidly, without fumbling through process trial-and-error. Facilitators played active roles in appropriately scoping the roadmap, forming the team, setting up a work plan, and assisting individuals with their tasks in the larger effort. Perhaps most important, the facilitator challenged assumptions and forced rigor into the roadmap, made possible because all the facilitators had technical R&D experience in various parts of the business. Because creating a roadmap often occupies some of the company's most valuable people, a corporate organization can offer considerable value in deploying roadmapping wisely and efficiently.

Anatomy of a Product-Technology Roadmap

The product-technology roadmap is organized into three main sections: market, product and technology. Each presents a high-level view of strategy from that perspec-

tive, but they are not merely condensed versions. A fourth, summary section lays out the action plan and risks identified by team.

The overall roadmap template is shown in Figure 1. First, the roadmap organizes the product and technology program by showing the critical few items in priority order. It focuses attention by stating the most vital technology areas, supporting the critical few product attributes that are most important to target markets. (Organization attention is the scarce resource that should be focused on technology decisions.) The priorities in each section are glued together with a common set of drivers, chosen by the analysis and insight of the roadmap team. Finally, the roadmap brings a view of the external landscape (competitors, competitive products and alternative technologies) over the same time horizon as internal plans. In short, the product-technology roadmap reveals how the team plans to use technology to be different, over time, and in ways that matter to target markets.

The Market Section

The market section of the roadmap defines the market segments the team wishes to target in terms of size and

growth and prioritized customer needs. The section also lays out the competitive landscape, presenting an analysis of key competitors' strengths and weaknesses.

Competitive assessment

One feature that distinguishes roadmaps from other corporate planning documents is the explicit revelation of time. A roadmap version of competitive intelligence, therefore, is one where today's and tomorrow's competitors are examined. Typically, this section will consider a selected few leading competitors addressing the same market space. The assessment includes the following basic information:

- Current and announced products.
- Market share.
- Core strengths and weaknesses of each firm.
- Competitive strategy for this market.
- Competitive response.

Perhaps the most difficult, but most vital, of these items is understanding each competitor's strategy. What is

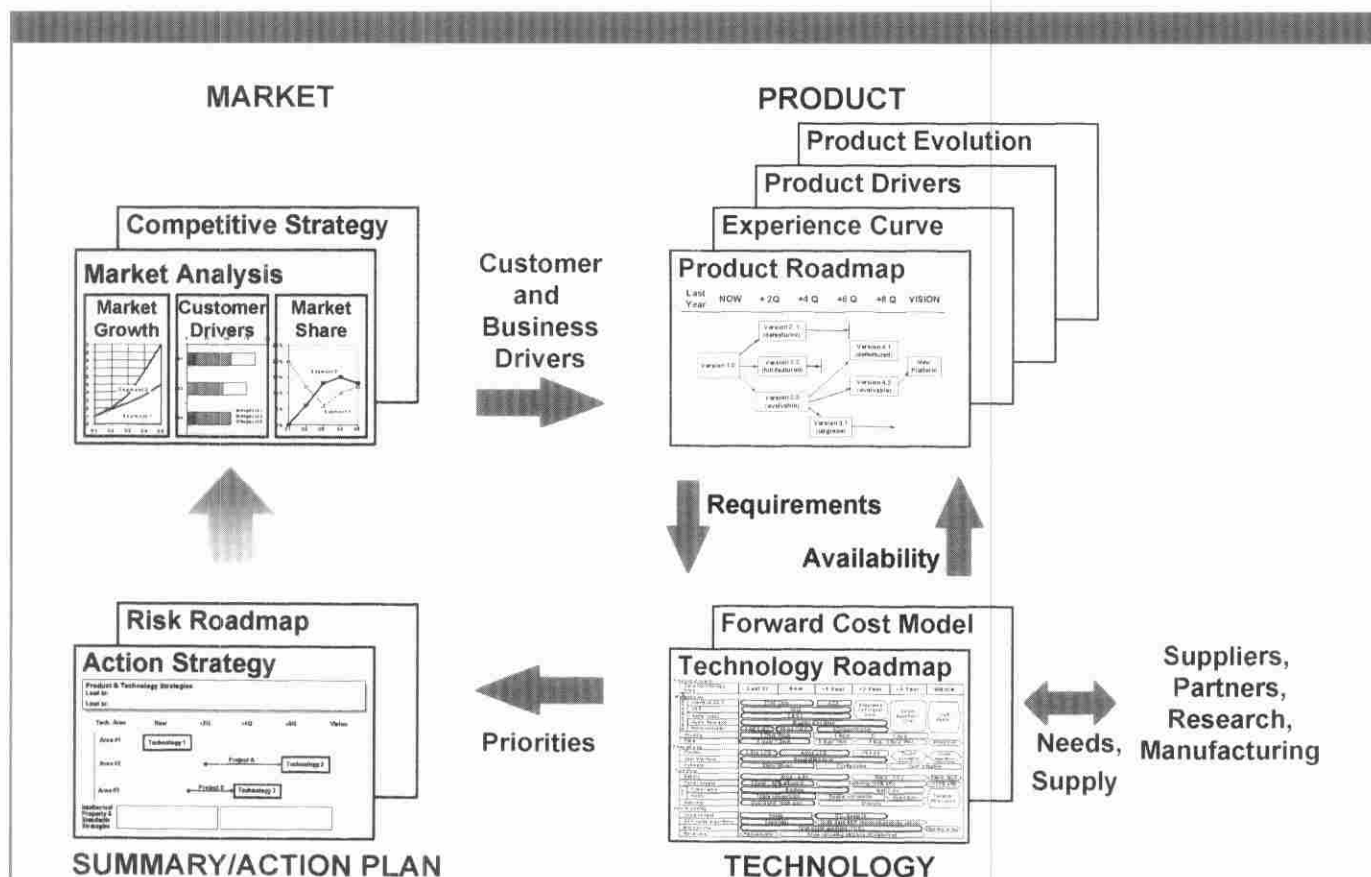


Figure 1.—A Product-Technology Roadmap presents an integrated market, product and technology plan, linking the essential elements with drivers, needs and capabilities. The roadmapping process results in an action plan to develop or acquire technologies, close gaps and monitor risks during development. A cross-functional team owns its roadmap and revisits it periodically to adapt to market, competitive or technological changes.

each player's pattern of behavior in a market? Their competitive strategy suggests future competitive targets. One can reasonably expect that firms will exploit their core strengths and focus on markets where they have strong customers and an installed base of products. Taken together, market share, manufacturing and distribution channels, in-house technology assets, and partners suggest how competitors are likely to position products into the future. Is a challenger competing on price, access to dealers, some performance dimension, or a solutions focus?

Our experience with roadmapping teams suggests that much of the existing competitive intelligence in an organization is not predictive. It focuses on today's competitors and current products. This view is not adequate for setting technology priorities that extend beyond the next product cycle, and is blind to attack from below by new challengers in (currently) niche markets. The intelligence may also not be specific to the market segments under consideration. The roadmap competitive assessment represents a refinement of traditional assessment and an extension of competitive assumptions into the future.

Market segmentation and trends

The market trends section of the roadmap answers the questions: Where are the growth opportunities and what are our growth targets? It combines a forecast and a plan into one view. The story of market trends is told by careful use of segmentation. Usually, this involves using several market segmentation schemes, not knowing in advance which scheme will produce the insights that drive a product strategy.

At a minimum, the rest of the roadmap requires that a values-based segmentation be applied. Unlike typical segmentations available in most market research reports, needs-based segmentation starts with groups of customers who have similar needs and benefits and works backward. Geography or firm type may not contain homogeneous customers in terms of their buying priorities (drivers). Also, segments must be meaningfully different in terms of their drivers and product requirements. It is this kind of segmentation that results in a cleaner set of product priorities, linking in with the product and technology sections of the roadmap.

Other views of market trends that should be examined are competitors' share of the market over time and product share of the market over time. Instead of annual sales, cumulative sales may also be a revealing view. Cumulative sales represent an installed base of product that carries a significant switching cost for customers, locking in future business. The product strategy must consider the current installed base, especially where

customer choices are constrained by in-service product (3).

Frequently, the market analysis described here involves new data collection and estimation where good data is not available. Accuracy is not as significant as relative size and growth.

Product Section

Product drivers

The buying priorities of market segments suggest a set of key product metrics that customers value in their purchase decisions and which are the basis of product competition. These product drivers are the tangible measures used in the marketplace to evaluate products relative to competitors. They may be the same as market drivers or components of those drivers. By identifying and plotting them, the roadmap team can use the observable trends to set internal development targets. In particular, the team can set the long-term targets that R&D requires and that customers are often unable to see. Figure 2 shows the mapping of customer drivers to product drivers and some typical trend/target plots for key drivers.

On the roadmap, the product drivers are generally shown in priority order as a series of time trend plots. Capacity may be one such driver, and the current product might lag competitors while the intention is to take the lead. The target plots can span several pages if necessary, but most products will have only a handful of critical measures.

Enough historical data must be collected to establish any trends. Use a linear or log scale—whichever straightens the plotted data for predictive purposes. Individual competitors or an industry average can be shown.

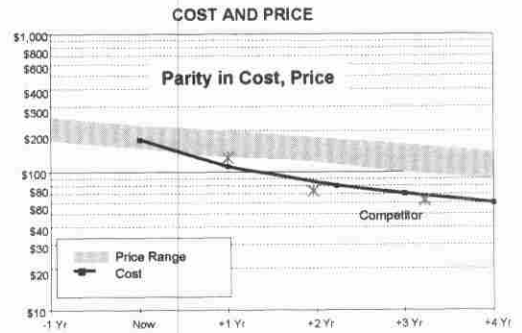
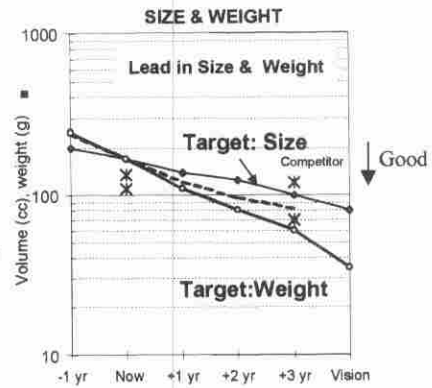
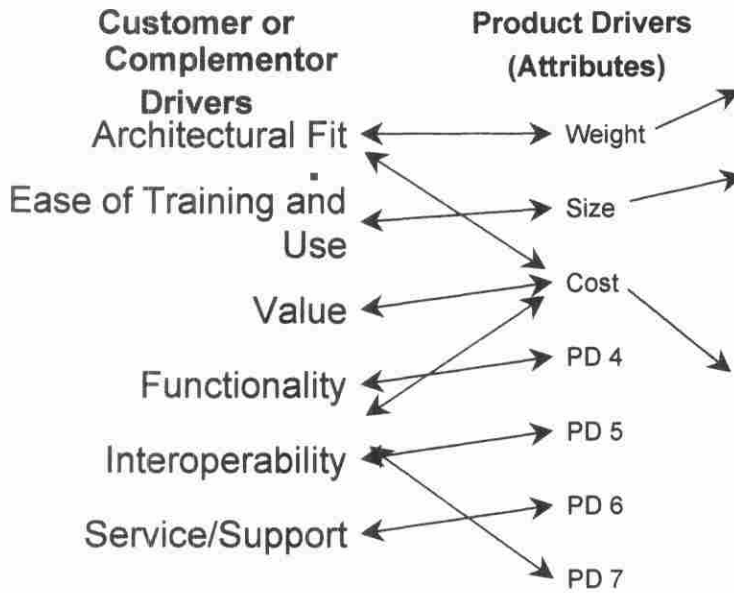
The hazard of this section is to ignore the possibility of attack from below (i.e., the Innovator's Dilemma (4)). New platforms that serve smaller markets can improve at a rate that overtakes current technology and disrupts the established competitive market. Consider showing the progress of alternative technologies, potential competitors and emerging markets.

Experience curve price forecast

Cost trends in hardware industries usually follow an "experience curve" instead of a simple time trend. The experience curve plots the decrease in price vs. the total quantity produced up to that time. Done right, the tool offers a long-term forecast of industry pricing and leads to well-founded cost targets. Using this tool requires plenty of judgment, however.

Figure 3 shows the experience curve for wireless terminals, derived from industry data. The average industry price is shown versus the cumulative volume of industry production. On the experience curve, the vertical

Product Drivers



Prioritize top to bottom

Figure 2.—Product drivers and their targets are shown in priority order.

WIRELESS HANDSET PRICE

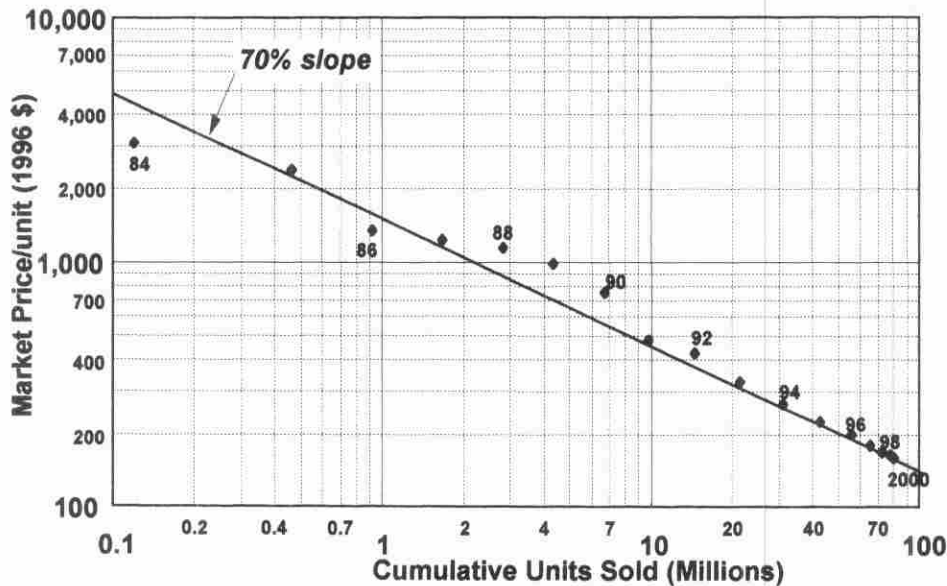


Figure 3.—Experience curves help set targets for price and cost based on industry advances.

axis must be normalized to some industry average market price per unit. The unit should have relatively constant functionality over time. For example, the best unit for data networking routers could be bandwidth, not

the number of routers. A typical router sold in 1995 has only a fraction of the capacity of one sold in 2000. Bandwidth is usually a good equalizing unit in the telecommunications business, even for things like cabling

where meters would be the obvious unit. One should use constant dollars if inflation is a factor.

For the horizontal axis, the experience curve requires an initial estimate of the cumulative *industry* shipments up to the first data point available. Knowing when to start the counting at zero requires some judgment. For example, is the DSL modem a continuation of the analog modem market? Inspection of the technology and architecture can lead one to conclude either way, and sensitivity to either choice should be calculated. Cumulative units may have to be calculated from industry reports (e.g., multiplying units by typical configurations by bandwidth to get each annual figure). In rare cases, individual producer volumes can be used instead of industry volume, either when there is little technology sharing across competitors or when competitive market shares remain nearly constant.

Slope has a unique meaning for experience curves. A slope of 70 percent, a typical value in the electronics hardware business, means that for every doubling of cumulative volume, the industry average price drops to 70 percent of its original value. If calculations yield a slope shallower than 80 percent, the data may not be normalized correctly, or may be including significant components with unchanging cost (e.g., bulk copper). In new markets, where there is little history, related historical market slopes can be used to extrapolate from only a few data points.

To use this tool for prediction, a trend line has to be identified and extended. Often, the early points are excluded because of early market pricing strategy. To estimate future year prices, place the future year points on the horizontal axis according to best available volume forecasts. Find the corresponding price value on the vertical axis for that volume. Use sensitivity analysis on

the slope assumption, the future volume forecasts, and the estimate of volume in the early market.

Product roadmap

The product roadmap, shown in Figure 4, is a “boxes and arrows” view of the product family evolution over time. It shows the entire platform or relationships between products in a platform. For example, one product may have to be split into two product lines to best serve the diverging interests of target markets or regions. Products may collapse into fewer platforms, particularly after company acquisitions. End-of-life support for product is important to recognize as well. Rationalizing the product line has significant consequences for component and other technology plans. The extreme right of the product roadmap can be used to present a vision of the platform, perhaps discontinuous with today’s product plans.

This product roadmap is also linked with the product evolution plan as a graphical view of the various instances of the product over time. Its value lies in the free-form nature of the chart. Where the other roadmap sections promote a linear view of the future, the platform roadmap is really blank paper. For the roadmap team, it is most powerful when embellished with annotations, call-outs, and open questions to map the organizational issues that drive product decisions. Why do we need both products? Why don’t they share common interfaces? This page is a place to expose such organizational gaps and design hurdles that fall into the executive’s sphere of influence, and thus makes the roadmap truly worth reading.

Product evolution plan

The product evolution plan interprets the platform roadmap. It starts with a traditional list of key features for

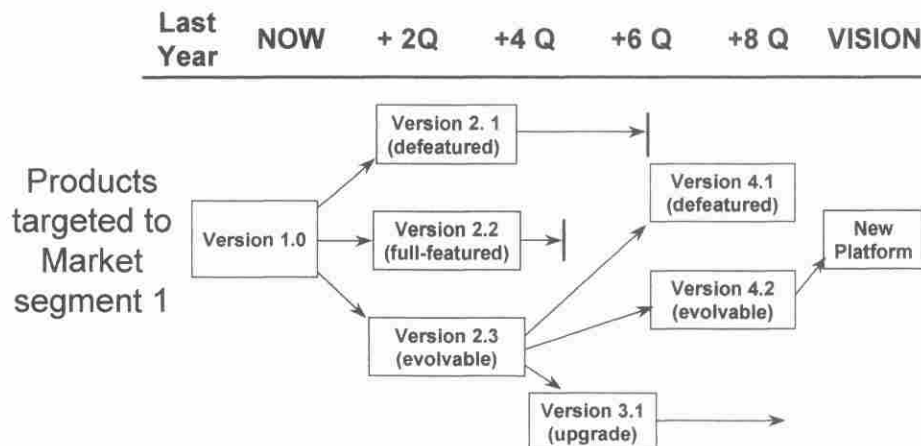


Figure 4.—The product roadmap shows the evolution of the product family over time.

each product release. The next step is to interpret those features in terms of their contribution to product drivers. What value does the evolving product hold for customers when they make comparisons with competitive products? A new power supply may reduce heat, which in turn allows for improved density. Density is what matters to these customers.

The payoff from this exercise is in the out-years, where you have to make assumptions about where competitors will be in the future. You may know what your product will offer and why it matters to customers today, but you should also know whether the product will remain differentiated. This requires good competitive intelligence and knowledge of competitors' strategy and capabilities.

Technology Section

Technology roadmap (product/manufacturing)

The technology roadmap is the centerpiece of most product-technology roadmaps, and is dense with information. Its novelty and value lie in the way that the technology program is represented. Technology changes are not merely shown as a time evolution, but are also linked with product strategy. The roadmap is organized by priority and only the technologies that significantly

support the product drivers are shown. Most R&D participants find it refreshing to think of technology as a strategy. The temptation is to inventory the technologies as a bill of materials, however.

Figure 5 shows the format of the technology roadmap. One starts by listing the key technology areas grouped by product driver in a spreadsheet. List currently available technologies at the start of each row, and identify future technology changeovers as far as planned. Leave blank space, question marks or multiple alternatives where nothing is decided. The vision column is useful for showing potentially disruptive technologies to begin monitoring or investigating.

Authors and readers should be very clear about the meaning of start and end points for technologies. Misunderstandings on what "available" means can be disastrous. On this roadmap, start and end points typically represent when a technology or capability will be implemented in the product. It is a marketplace view. The development interval (which precedes availability) is not shown here, although it can be in a separate document. The positions must line up with capabilities shown on the platform roadmap and the product evolution plan.

Within each bar on the technology roadmap, the color, shape and typeface can carry special meaning. Color

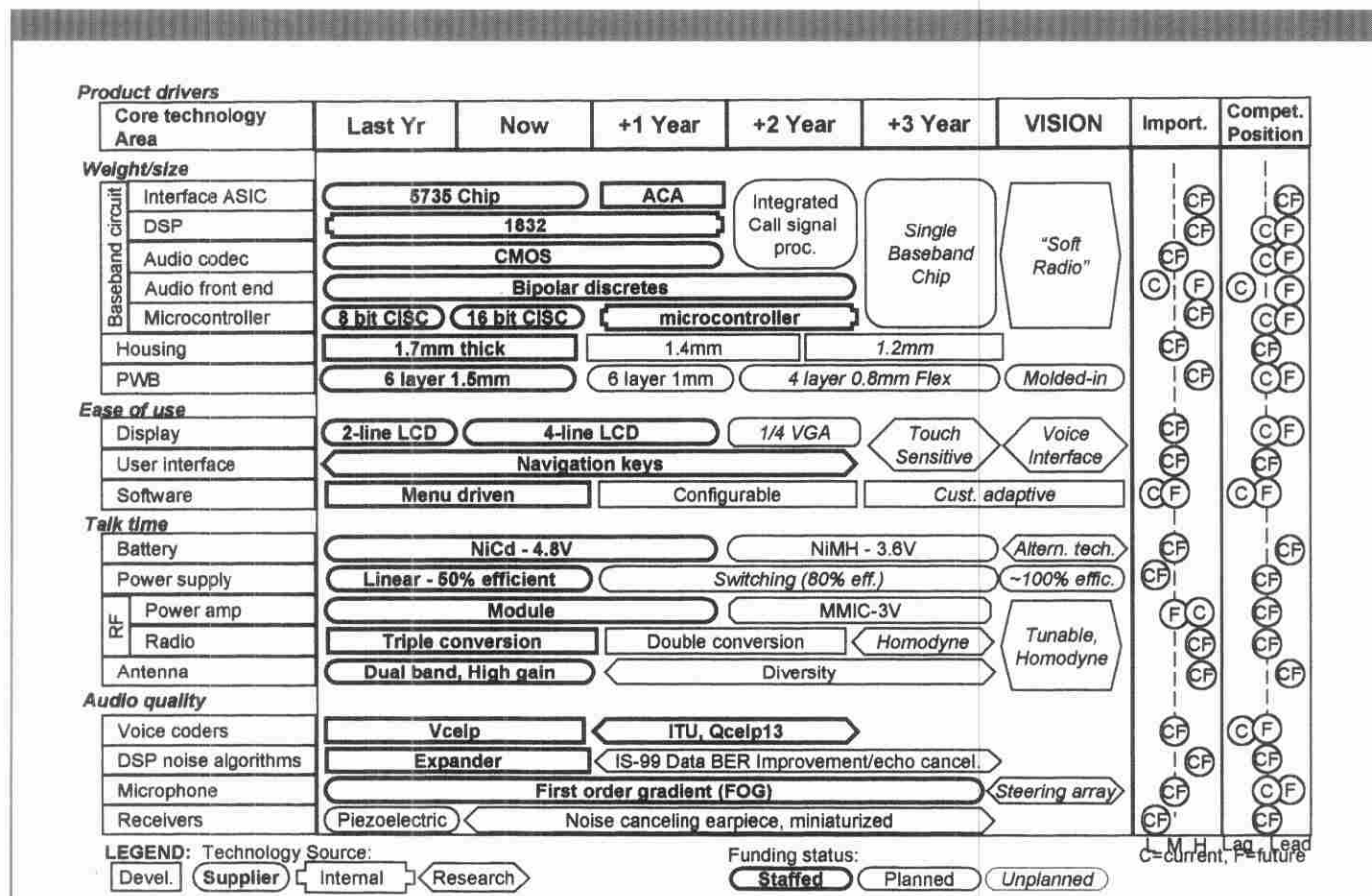


Figure 5.—The technology roadmap is organized by customer/market priority and shows the critical technologies.

may be used to show funding status; shape can represent technology source; typeface is useful for indicating staffing or other planning status.

Finally, the technology roadmap contains a forward-looking assessment of each technology area. If the importance of a given technology area is changing over time relative to others, this is shown using current (C) and future (F) markers on a high–low scale. Similarly, the organization’s competitive position is shown today and projected out on a scale of lag–lead. Movement along either scale suggests a changing investment level and becomes the highlight for an executive summary of technology. We call the summary view the technology attack strategy.

Brevity is essential in order to show priority. Some organizations choose to list all technology programs and also indicate the internal development interval, not just market availability. Both lengthen the roadmap considerably. The technology roadmap then becomes a vehicle for making all funding decisions and an inventory for project management purposes. Its management becomes burdensome, if not impractical, without the use of more sophisticated tools and administrative support. Such tools are available (5), but the startup cost and commitment level cause many organizations to apply the simpler version of roadmapping for only the critical few technologies.

Forward costing

Achieving target costs usually involves inspecting the bill of materials for cost of goods. Showing, by component or category, the cost of goods over time allows one to look for cost reduction opportunities. The target costs can be derived from the experience curve price forecast by subtracting a target margin. The cost of goods breakdown should use some common reference configuration so that the forecasted cost can track the targets from the experience curve (which also carries a time-consistent unit). This exercise can force hard decisions about performance and feature reductions to meet cost targets, treating the cost issue at the system level rather than feature by feature.

Summary/Action Plan

Strategic summary

Sometimes called the attack strategy, the objective of this summary is to define the few highest-priority technologies and identify the action plans for their development. It is an executive view of the technology roadmap, telling a concise story of where development resources are creating vital market differentiation. The format can include a statement of market and product strategy, followed by a set of timelines for a few key technologies. Each timeline would indicate project start and finish,

development resources, and impact on the product drivers.

Risk roadmap

The risk roadmap can be used to identify major “risk events” for monitoring during execution of the roadmap. An example is shown in Figure 6. This chart factors the risk horizon into five categories, each having a different meaning in terms of where items are placed over time. For example, market risks include assumptions about market growth, partners or the future competitive landscape. Market risk events are placed on the timeline where one would expect to learn the validity of key assumptions. Technical risks, such as component performance, are placed where lab tests can assess technical success. Schedule, economic and resource risks are placed where a milestone completion is expected.

Uncertainty on a roadmap has a common-sense meaning of how sure we are about something, and is shown as a probability (0–1) from the author’s viewpoint. Risk then combines that uncertainty estimate with the consequences of failure. Consequences are shown qualitatively as minor, major or “show stopper” by color.

Risk can be managed using this chart in several ways, which should be depicted on the roadmap. The goal is usually to minimize the risk or to limit its impact in some way. One can:

- Separate and move high-risk items earlier in the schedule.
- Assign or share consequences (warranty, joint development).
- Test as early as possible.
- Work multiple alternatives at once.

Linking the Content

When done well, the product–technology roadmap makes obvious the linkage between customer priorities and the key technology areas that drive progress in those areas. It begins with divining a set of market drivers—the few most important criteria used by customers in their buying decision. Because these will depend on the choice of market segment, multiple versions of this list may be necessary. Aiming at markets rather than customers avoids the pitfall of chasing the erratic whims of some customers. List the five or so drivers in priority order, with an estimate of relative weight given to each by customers. Cite the source of this information, which may be the judgment of an individual or team.

The list of product drivers carries the market view into the product realm by translating customer priorities into product priorities. Recall that product drivers are the tangible measures used in the marketplace to evaluate the

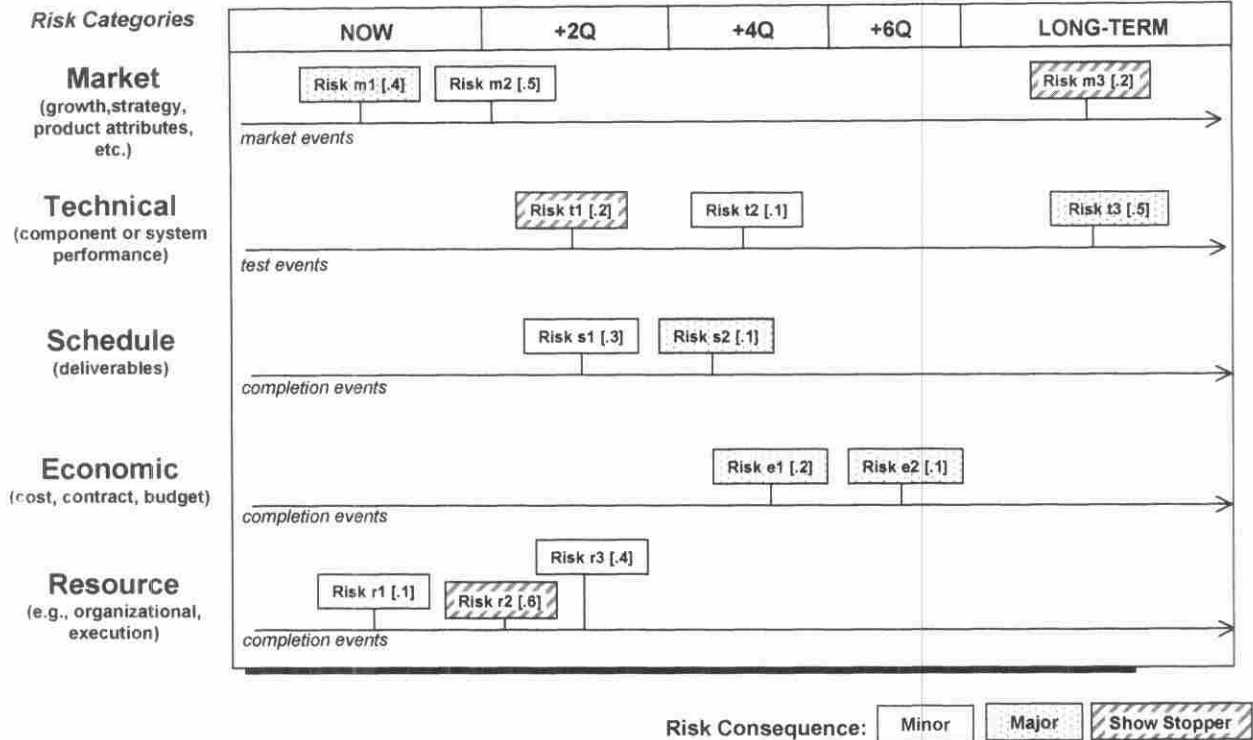


Figure 6.—A risk roadmap identifies the key risks to successful execution of the roadmap.

product relative to competitors. They may be the same as market drivers, or may be smaller components of those drivers.

Key technology areas are the end result of sorting out priorities and setting competitive product targets. The technologies in the roadmap show how the business and product strategies are implemented in technology. The influence need not, and should not, be as one-way as the description has implied up to this point. A firm might have unique technological strengths that could offer sustainable marketplace advantage if only the target markets were different. This interplay between seeking profitable growth markets and exploiting technology assets is negotiated by the roadmap team and documented in the product-technology roadmap.

Using Roadmaps in the Corporation

Roadmaps enable significant improvement in planning in a multi-business corporation. In pairs or groups, reviews of roadmaps can identify common needs and opportunities for reuse. Roadmaps enable the creation of a systematic database of product features and evolution and of technologies that may be used in multiple products. Roadmaps enable specific dialogue with customers and suppliers, helping to align the corporation with both. In cases where several products are combined to form an offer or solution, roadmaps can help synchronize and align plans. Finally, roadmaps help focus the

portfolio and business planning process of the corporation on the future and provide consistent information across the portfolio to aid in decision-making.

A multi-business corporation will have related product lines, serving similar markets or using similar technologies in multiple markets. With completed roadmaps, teams may collaborate in cross-roadmap reviews to identify common technology needs where collaboration can yield benefit to both groups, gaps or needs in one development plan that can be met by actions in another, or strengths in one plan that can benefit another. Cross-roadmap reviews may be undertaken where the business has multiple horizontal businesses using similar technology to serve multiple markets. In these cases, the primary objective is identification of common needs or strengths that can be applied in multiple businesses. Where the corporation has several businesses arrayed vertically to serve a single market, (for example, where a product line of components is used in a second product line), a cross-roadmap review can identify areas for collaboration to create unique competitive advantage for the corporation.

Roadmaps also enable databases for use across the corporation. Individual roadmaps contain important data for their product line. When documented in a common format and stored in a database, roadmaps enable corporate planning across the product lines. For example, a database of technologies enables new product lines to incorporate technologies already developed and

ROADMAPPING— AGENT OF CHANGE

Implementation of a technology roadmapping process resulted in the systematic integration of technology management processes within Rockwell Automation.

Alec McMillan

Eight years ago, Rockwell Automation began a journey, detailed in this article, to redefine and enhance its technology management processes. The goal was to enable better planning and adaptation to changing market conditions. The journey required patience, ultimately commitment at all levels, and learning. Nevertheless, the introduction of technology roadmapping drove a change in the corporate culture as managers gradually “bought into” the process.

With roadmapping as a foundation, Rockwell was able to identify and confirm core competencies and to reveal and address gaps. The roadmapping process allowed the company to clearly determine knowledge “nuggets” essential to its business and to maximize their application. The result was improved business performance through markedly higher alignment among its corporate units and functions, and optimally targeted project selection. Along the way, as needs were identified, additional processes including patent, portfolio and standardization management were successfully introduced or modified. Looking back, it is clear that without roadmapping, Rockwell would have wasted critical time and resources re-inventing and would almost certainly have been blindsided by new technologies.

How It Began

Senior Rockwell management was introduced to technology roadmapping during a Motorola visit in 1995. Rockwell had no formal technology management processes at this time, and management was especially concerned that the company might not be keeping up with important technology and industry changes, including the greater emphasis on software engineering.

Under the guidance of the Technical Council (chaired by Rockwell’s CTO, with technical representatives from the then 22 business units and the directors of the three Advanced Technology Research Labs), a team was

available. A database of competitive product information and performance targets enables product lines to compare performance and identify potential threats from substitution.

Roadmaps permit content-rich dialogue. The ability to show a supplier future product directions enables the question, “How will you be able to help us?” The ultimate goal is to align the supplier’s roadmap with ours. With a customer, a roadmap says, “Here’s where we are going with our product.” This enables a dialogue of alignment, and offers the potential for helping the customer define a future with the team’s product as a key element and the team’s company as a strategic partner. A roadmap can help the customer prepare requirements aligned with the team’s roadmap.

Roadmaps focus portfolio and business planning on the future. Business planning and portfolio management are often focused on the financial performance of each product line. Roadmaps help balance portfolio decisions by including future market, competitive, strategic and technology aspects along with near-term financial performance.

In summary, we have focused on roadmaps and roadmapping activities in a corporation. Roadmaps have been in use in this context for about a decade, but their role is limited in many corporations. Areas for improvement include roadmapping across corporate boundaries with customers and suppliers, building of databases of roadmapping information that can be used to jump-start a roadmapping team developing a new product, and just the simple practice of providing discipline and focus to the planning process. ☺

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