

A Life-Cycle Approach to Technology Transition

Eileen C. Forrester

The SEI matures and transitions technology in roughly predictable and consistent phases. They are: exploration, maturation, outreach, and support. These phases can be used to manage technology portfolios or single technologies and to communicate with our stakeholders, including transition partners (organizations and individuals authorized by the SEI to help others adopt new and improved technologies) and collaborators. If you are a potential adopter of an SEI technology or a potential transition partner, knowing what phase the technology is in can help you make a good decision about how and when to engage with us.

In the exploration phase, we identify potentially high-payoff approaches to DoD needs and other pervasive problems in the software community. During maturation, these approaches are developed in pilot projects with early adopters, and we begin planning for transition. In the outreach phase, a technology of demonstrated value is packaged so that a larger community of practitioners can adopt it more easily. Once we reach the support phase, we work with and through transition partners, whom we rely on to meet most of the increasing demand for the technology. We aim to make the transition self sustaining, and generally change our role from ownership to stewardship of the technology.

The SEI has been using the life-cycle model in Figure 1 since about 1996, particularly to manage transition planning. Many other life-cycle models are available.¹ Depending on the nature of your organization, you may need a different model—for example, one with more emphasis on pure research or one that assumes that you retain clear ownership of the technology.

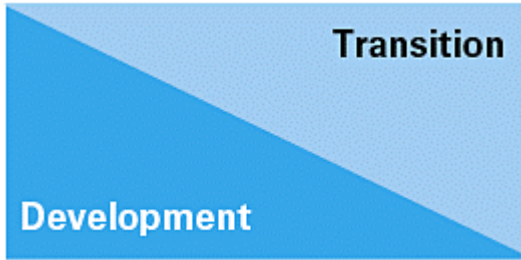


Figure 1: Life-Cycle Model Used by the SEI

Balancing Development and Transition

Ideally, the balance of development and transition actions for a technology (at the SEI or elsewhere) as it moves through these phases looks like the image below.

¹ See, for example, Vijay K. Jolly, *Commercializing New Technologies: Getting from Mind to Market*, Harvard Business School Press, 1997, or Louis G. Tournatzky and Mitchell Fleischer, *The Processes of Technological Innovation*, Lexington Books, 1990.



In other words, transition is something to attend to from the earliest days of a technology, not just at the end of the life cycle. At the beginning, more resources are focused on development of the core technology and less on transition, but some attention should be given to transition. Over time, more resources are focused on transition, and fewer on development of the core technology. Unfortunately, in some organizations, the proportions of development and transition look more like the next image. The result of this imbalance is often a great technology that is never fully used.



We find that transition needs vary depending on the life-cycle phase of a technology (see Table 1). Different skills are needed to advance the technology in different phases. The applied-research skills needed during exploration and maturation are not necessarily suited to the tasks of the outreach phase, which calls for more product-management and customer-support skill. Also, it usually takes a network of people and organizations to support a successful transition. The same researcher who hatched the great idea for a technology is often neither adept nor interested in negotiating and communicating with a growing community of demanding users.

Table 1: Technology Development and Transition Phase Summary

Exploration	Maturation Phase	Outreach	Support
Questions			
<p>What problem are we trying to solve and should the SEI and this program be solving it?</p> <p>Whom should we partner with for development?</p>	<p>What solution provides the most value?</p> <p>How will people use it? Do we have any proof any intended users can use it?</p> <p>What is the transition strategy?</p>	<p>What mechanisms and value network are we developing for transition?</p> <p>Whom should we partner with for transition?</p>	<p>How do we support the technology?</p> <p>How do we support the transition partners?</p> <p>What improvements are most profitable or necessary?</p>
Users²			
innovators	early adopters	early majority	late majority
Strategic Focus			
<ul style="list-style-type: none"> • problem space • collaborators • technical direction • solution 	<ul style="list-style-type: none"> • technical credibility • value of solution • transitionability • strategic advantage for early adopters 	<ul style="list-style-type: none"> • whole product and value network • transition partner prep • standardization 	<ul style="list-style-type: none"> • meeting tornado demand³ • self-sustaining transition • standards of excellence
Activities			
<ul style="list-style-type: none"> • identify needs • select high-payoff technology to meet identified needs • create leadership presence and identify collaborators 	<ul style="list-style-type: none"> • mature the technology • trial use to demonstrate value and transitionability • create transition plan 	<ul style="list-style-type: none"> • package technology for broad adoption • gather reference data and impact data to generate interest from target adopters • create products and partnerships to meet demand 	<ul style="list-style-type: none"> • license technology to transition partners to meet demand • establish standards of excellence • update standards as warranted based on user community experience

Benefits of a Life-Cycle Approach

If a technology-developing organization doesn't have a mental model for how to manage transition throughout the life cycle of a technology, it is likely to make avoidable mistakes. For example, by examining the transition results of SEI and other technologies, we have noted an avoidable failure mode in the second phase, maturation.

² For information on these user types, see Everett Rogers, *Diffusion of Innovations*, Free Press, 5th edition, 2003.

³ A sudden and sustained increase in demand that forces adjustments in how things are done. From *Inside the Tornado: Marketing Strategies from Silicon Valley's Cutting Edge* by Geoffrey A. Moore (Harper Business, 1995).

The key goals in the maturation phase are to demonstrate both technical value and what we call transitionability. It is natural to most technologists to work on the technical value or usefulness of their technology. But have they also validated that someone else, ideally a proxy for eventual end users, can successfully apply the technology? When the transitionability of a technology is not demonstrated and improved during maturation, the rollout to intended users may founder in the outreach stage.

In fact, for some technologies, if transitionability cannot be demonstrated in this phase, this may serve as an exit or stop-work criterion. The developing organization can make a decision to stop development, avoiding cost and waste, rather than continuing to pour resources into something that will not be transitioned effectively. Even better, of course, a technical manager who is alert to this criterion can take corrective action to ensure transitionability at an earlier stage in the life cycle, when costs are lower.

In addition to clear entry and exit criteria to select and guide development and transition work, other benefits come with a life-cycle approach. These include more effective and repeatable transition strategies, faster adoption by intended users, smart use of scarce skills, and greater clarity with stakeholders—including transition partners—about the readiness of technologies for use and marketing. For example, some transition partners are well suited to technologies still in an early stage, because they enjoy co-development, innovation, and being first to make a market. Other partners make a specialty of serving late-majority users who want reliability and superb support.

Through the life-cycle phases, technology organizations such as the SEI are building value, lowering the risks of technology adoption, building transition capability as well as technical credibility, engaging a growing stream of adopters, and fostering communities of practice to sustain the technology.

To learn about technology-transition techniques for your technologies or to inquire about transition-partner opportunities for SEI technologies, contact SEI Customer Relations.

For more information, contact—

Customer Relations

Phone

412-268-5800

Email

customer-relations@sei.cmu.edu