A good place to begin the journey through a process of development is to get an early glimpse of what most practitioners dealing with complex products consider “best” practices. Although these might not be precisely in the order of implementation, they will orient discussions of successful principles and practices. A number of these best practices are highlighted here, with the text providing amplification as to what will govern evolution of the development processes that follow.

**Product and System Development Best Practices**

Before identifying and discussing those practices dedicated to delivery of value, there is a body of activities in the life cycle of development that may be represented as best practices. Although not listed precisely in the order covered in the book, they do offer guideposts for understanding the framework for successful product and system development.

1. **Value analysis.** The first practice cited lies in the generation of value analysis. Since the term is often seen as ambiguous, we spend some pages on the definitions used in this book, as well as how various industries, government, and other organizations affected interpret and express them. Value analysis of a project stems from the culture of the organization or the history of the stakeholder who is making judgments. It is intrinsic to understanding and generating the needs of customers and other stakeholders for a product or system, as well as providing the basis for deriving the requirements that will become the design development drivers.

2. **Systems engineering and design approach.** Systems or holistic thinking must be at the heart of any design development activity. It provides a framework
for addressing all activities in planning and ensuring that project goals are met. These cover translating stakeholder values to their prioritized requirements, establishing baseline designs, and carrying via an architecture and suitable evaluation of options the derivable failure and risk analyses. Thus, by verifying the quality of the product or system and all interfaces, the customer and user expectations will be validated so that the desired end value can be delivered. This approach is initiated in Chapters 2 and 3.

3. **Front-end emphasis to ensure customer requirements.** Discussion in the early chapters emphasizes the fact that investment in the front end of a development cycle pays off in multiples of the time that might be wasted later in reconciling requirements, defining real return on investment, and the measures by which the outcomes can be assured. In keeping with these goals, generating the requirements that will direct development is not intended to preclude “out of the box” creativity, but to provide a framework for how a development project can proceed and to ensure common understanding among all the players as to goals, constraints, and the environment surrounding process and product utilization. It is also important to recognize the need to review requirements as one makes design decisions and eventually validates the expectations of customers and stakeholders.

4. **Involving all stakeholders early and often.** To ensure the inclusion of all factors, it is necessary to involve key stakeholders early and often. Certainly, customers and users are primary, but there are many players whose values and expectations can influence and affect the goals desired and the means by which these are achieved. The range of these “influencers” may cover top organization policy-makers, financiers, regulators, producers, maintainers, and others. As this set is defined in more detail, it will be evident how their values can be dealt with, including understanding the priorities that should be placed on these in the overall development of value for customer and user. This concept, initiated in Chapter 1 but intrinsic to all aspects of the development process, is addressed many times throughout the book.

5. **Integrated product and process development.** The use of integrated product and process teams is a valuable organizational arrangement, facilitated either by proximity of participants or by virtual means, the goal being rapid intercommunication. This grouping is often termed an integrated product team, designed to facilitate integrated product and process development. Chapter 13 is dedicated to this subject which is implicated in many stages of the process.

6. **Integrated hardware and software development.** Along with that consciousness of integration, particularly in today’s multifaceted products and systems, is the necessity of linking hardware and software aspects from the very beginning. This means identifying and allocating the roles to be played by each in design, production, use, and sustainment, suggesting the use of integrated product teams in developing the bases for each of these activities. This practice is cited in Chapters 12 to 15.

7. **Designed-in capability to grow and adapt.** Another consideration, driven by the pace of technology and knowledge, is the requirement to think downstream in

---

**PREVIEW OF BEST PRACTICES**
defining, planning, and designing for the entire potential life cycle of a system or product. This must not only anticipate what happens in use and maintenance, but also the need to grow and/or adapt to changes in need, environment of deployment, or even change of users. This recognizes as well that the array of stakeholders may not be the same over the development life cycle. Thus, the ability to foresee such considerations as regulation changes, competitive environment, need for upgrading, and so on, is another important subject. This pervasive element is often implicit in the text, but the specifics are examined in Chapter 14.

8. **Database linkage throughout the product development cycle.** One way to ensure common visibility for all participants is to commit to linked databases. Thus, there should be no need for producers, whether in-house or outsourced, to require translation or conversion of data in all forms. Although this seems a straightforward understanding, examples will show both how few projects and organizations have been able to meet this standard, as well as the implications of failing to do so. Parts of Chapters 10 and 17 are dedicated to this process.

9. **Minimization of documentation and handouts.** Along with the evidence of truly managing the process and the value stream is a recognition that no matter how simple or complex a product of development, there are common means to limit the complexity, as well as the life-cycle cost and schedule. This is one of the “lean” practices, leading to limiting waste throughout the process to the benefit of all stakeholders. This can also be seen as an extension of the foregoing practice, database linkage, and as an outcome of management and value stream mapping (Chapters 15 to 18).

10. **Use of off-the-shelf tools and common computer-aided design and manufacturing.** This stems from the two preceding practices, as it facilitates minimization of documentation and handovers wherever possible by virtue of common vocabulary and capabilities, as well as the reduction of “reinvention,” which generates a waste of resources and time. See also the discussion of lean practices in Chapter 17.

11. **Optimizing the product development value stream.** All the practices cited above provide approaches to optimizing the value stream toward the efficient use of resources without stifling creativity. Such considerations as single-piece flow and “pull” are used to facilitate the flow of activities intrinsic to development. This concept is the object of Chapter 18.

**RESOURCE AND NOTE**


This book is a classic that describes a philosophy of creating value based on the auto and electronics industries. Although the book includes many references applicable to best practices, these are thought best cited at the ends of chapters explaining these practices.
REVIEW CHECKLIST

☐ Have you bookmarked this chapter for reference checks on your development projects and to add your own lessons learned?