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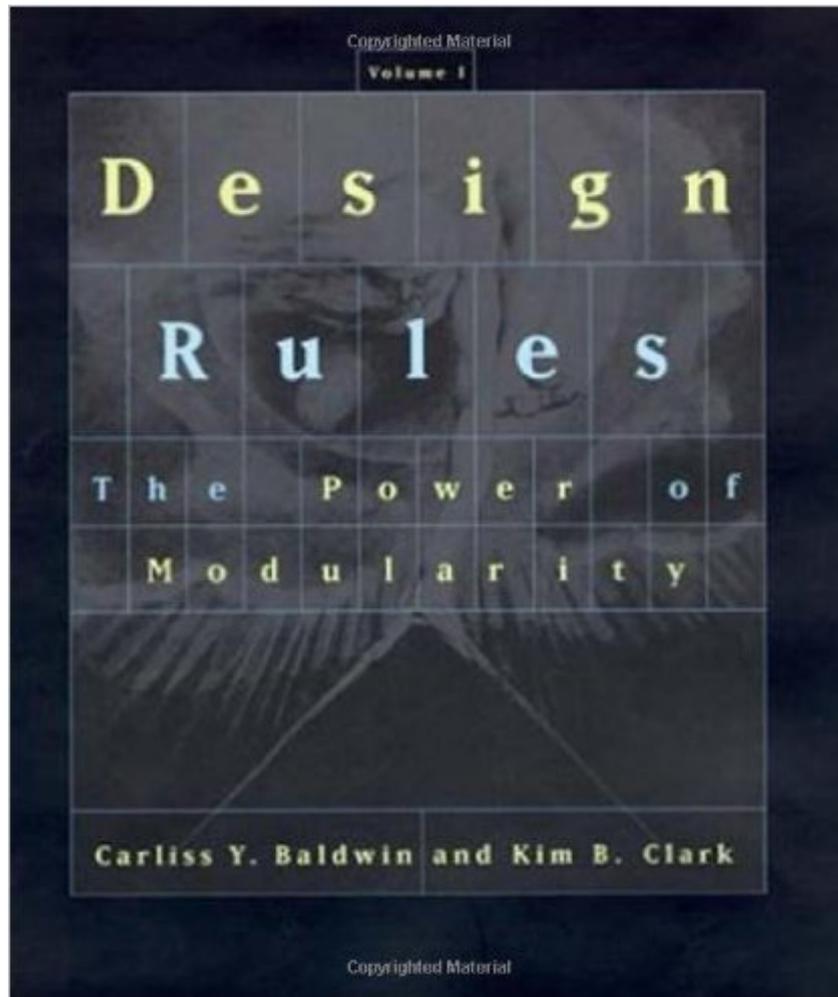
Design Rules, Vol. 1: The Power Of Modularity

Synopsis

We live in a dynamic economic and commerical world, surrounded by objects of remarkable complexity and power. In many industries, changes in products and technologies have brought with them new kinds of firms and forms of organization. We are discovering news ways of structuring work, of bringing buyers and sellers together, and of creating and using market information. Although our fast-moving economy often seems to be outside of our influence or control, human beings create the things that create the market forces. Devices, software programs, production processes, contracts, firms, and markets are all the fruit of purposeful action: they are designed.Using the computer industry as an example, Carliss Y. Baldwin and Kim B. Clark develop a powerful theory of design and industrial evolution. They argue that the industry has experienced previously unimaginable levels of innovation and growth because it embraced the concept of modularity, building complex products from smaller subsystems that can be designed independently yet function together as a whole. Modularity freed designers to experiment with different approaches, as long as they obeyed the established design rules. Drawing upon the literatures of industrial organization, real options, and computer architecture, the authors provide insight into the forces of change that drive today's economy.

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Customer Reviews

Opening the "black box" of technological and industrial progress, Baldwin and Clark introduce the

notion that technology is a set of tasks and the organization mirrors the design of the artifact that it produces.The authors model builds upon the work of John Holland, Stuart Kauffman and Brian Arthur (from the Santa Fe institute) on Complex Adaptive systems (CAS). CAS have four properties:1. Each of these systems is a network of many agents acting in parallel. The control of these agents is highly dispersed.2. The CAS has many levels of organization, with agents at any one level serving as the building blocks for agents at the higher level. Furthermore, CAS are constantly revising and rearranging their building blocks as they gain experience. Baldwin and Clark carefully document four layers operating in the computer industry, The global financial system, the markets for goods and labor, organizations, and the design and production of computers. In Addition, the authors describe the six "modular operators", the complete set of options that can be used by agents to modify the system that can be used at any level.3. All CAS anticipate the future. The various models, whether implicit or explicit assumptions, are constantly tested, refined and rearranged as the system gains experience. Baldwin and Clark assume that designers "see and seek" value, with value being measure in the global financial system.4. CAS typically have many niches, each one exploited by an agent adapted to fill that niche. Moreover, the very act of filling a niche opens up new more niches. Thus, there is no equilibrium in these models, it is not about a "punctuated equilibrium".

This is one of the most useful and practical business books I have read. At my companies we apply it at two levels.We use the modularization rules in the design of systems and businesses. These rules (i) define what is needed to modularize a system - interfaces, communication rules, aggregation rules and (ii) a set of operators that can be used to evolve modular systems. It is best practice to design all of these (interfaces, communication rules and data exchange, aggregation and disaggregation rules and the modularization operators) into business systems. This is even more important than ever in a time of rapid cycles and transformational change.It is also useful, especially when combined with the work of Clayton Christensen on disruptive inovation, to understand the evolution of industry ecologies. I have heard that the next volume (if it ever comes out) will go further in this direction. One needs a point of view on value-web evolution to make strategic bets. Of course one will often be wrong, the future will always surprize us. The real purpose of strategic thinking is to help us realize we are wrong more quickly so that we can respond and shape the emerging change.Design Rules also serves as history of evolution and differentiation in the mainframe industry (there are rich veins of historical data), introduces or reminds us of variable analytical tools, and it is physically a lovely book, well designed, well bound.Software people

reading this review may think 'so what' we know all this stuff about information hiding and modularization. But I wonder, how many software systems are designed to evolve? Most decay with change.

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