

Introduction to Development Engineering

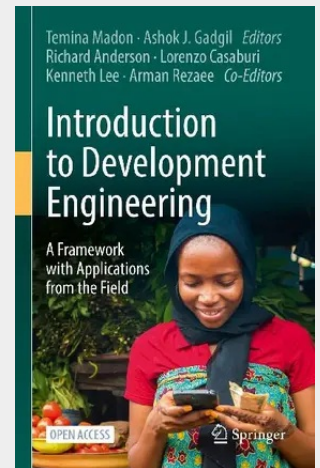
A Framework with Applications from the Field

This open access textbook introduces the emerging field of Development Engineering and its constituent theories, methods, and applications. It is both a teaching text for students and a resource for researchers and practitioners engaged in the design and scaling of technologies for low-resource communities. The scope is broad, ranging from the development of mobile applications for low-literacy users to hardware and software solutions for providing electricity and water in remote settings. It is also highly interdisciplinary, drawing on methods and theory from the social sciences as well as engineering and the natural sciences.

The opening section reviews the history of "technology-for-development" research, and presents a framework that formalizes this body of work and begins its transformation into an academic discipline. It identifies common challenges in development and explains the book's iterative approach of "innovation, implementation, evaluation, adaptation." Each of the next six thematic sections focuses on a different sector: energy and environment; market performance; education and labor; water, sanitation and health; digital governance; and connectivity. These thematic sections contain case studies from landmark research that directly integrates engineering innovation with technically rigorous methods from the social sciences. Each case study describes the design, evaluation, and/or scaling of a technology in the field and follows a single form, with common elements and discussion questions, to create continuity and pedagogical consistency. Together, they highlight successful solutions to development challenges, while also analyzing the rarely discussed failures. The book concludes by reiterating the core principles of development engineering illustrated in the case studies, highlighting common challenges that engineers and scientists will face in designing technology interventions that sustainably accelerate economic development.

Development Engineering provides, for the first time, a coherent intellectual framework for attacking the challenges of poverty and global climate change through the design of better technologies. It offers the rigorous discipline needed to channel the energy of a new generation of scientists and engineers toward advancing social justice and improved living conditions in low-resource communities around the world.

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