

BOOTSTRAPPING AND THE HANDBOOK CYCLE

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Abstract—This article describes the “Bootstrapping Strategy,” a particular strategic approach for guiding and accelerating the coevolution of human tools, skills, and knowledge to afford maximum leverage in this extraordinary augmentation effort. A primary ingredient of the Bootstrapping Strategy is the deliberate collaboration among carefully selected pilot projects, across organizational boundaries. This strategy is best illustrated by focusing on the heart of any collaborative effort: the process by which it evolves its knowledge base, which is called the “Handbook Cycle.” Requirements for technologies, methodologies, explicit organizational roles, and industry standards are addressed in this article.

THE BOOTSTRAPPING STRATEGY

What is bootstrapping?

In engineering, the term “bootstrapping” describes the process wherein the results of a given effort are fed back into the activity in a reinforcing way, so that less internal energy is required to achieve bigger results faster. In life, this process is “lifting oneself up by one’s bootstraps.”

Consider the investment leverage achievable by applying this model to augmenting organizational capabilities, that is, by simultaneously boosting the knowledge-work capability and the evolutionary capability of organizations. This leveraged, dual-result approach is called a “Bootstrapping Strategy” (Engelbart, 1988a).

Employing the Bootstrapping Strategy

How do we best employ the Bootstrapping Strategy to our goal of markedly boosting organizational capabilities? The model proposed here involves a three-tiered support structure of organizations and their evolutionary “improvement project” (see Figure 1). The improvement efforts employed in each tier would be invested with as much bootstrapping leverage as possible, not only to boost that tier’s capability to do its job, but also to improve its capability for subsequent, effective evolution.

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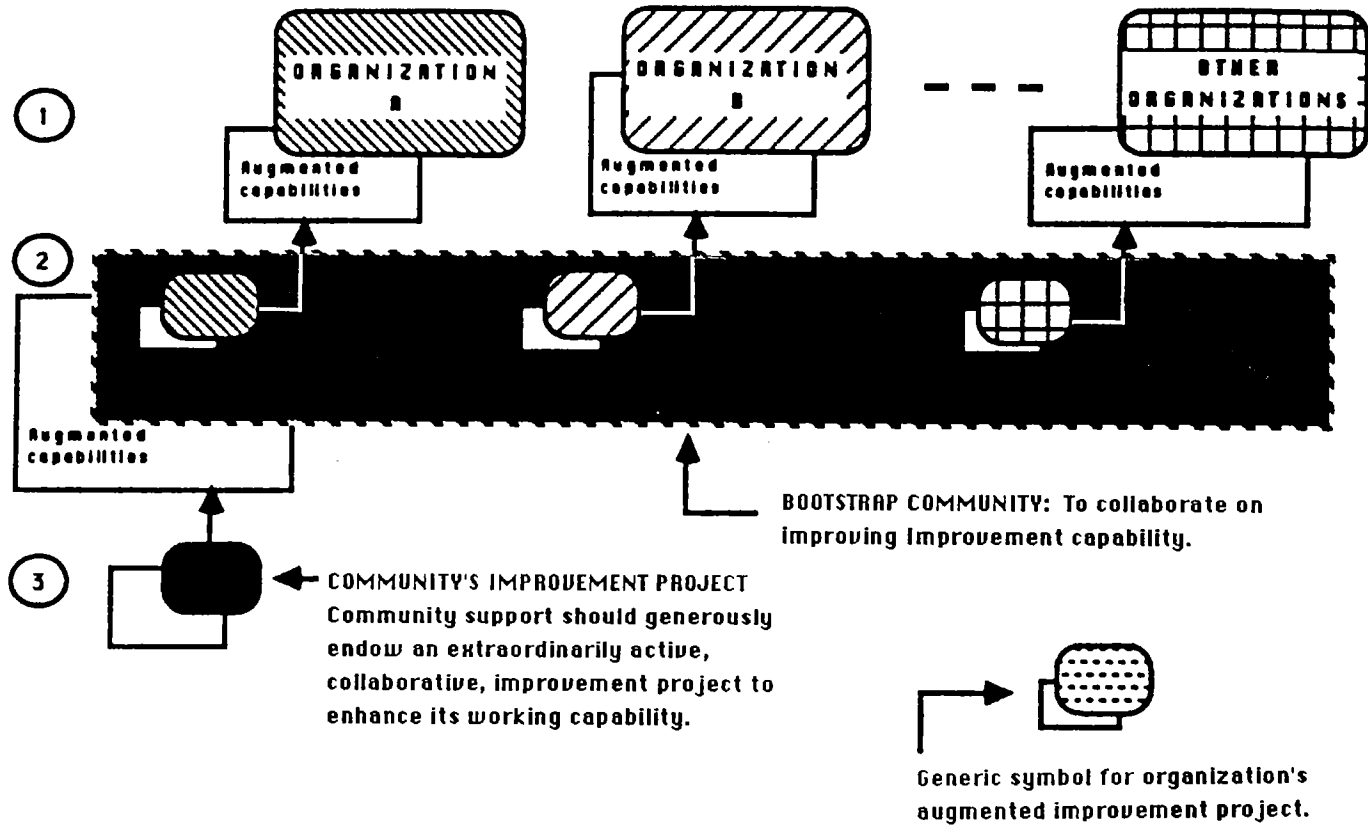


Figure 1. A "Bootstrap Community."

The organizational "improvement project"

Every organization, whether a corporation, a national task force, special-interest society, or university, experiences natural change. To affect purposeful change, an organization needs to set up a formal organizational unit of some kind, often involving committees within a distributed "community" including internal stakeholders and external consultants. This "improvement project" is a key element in the Bootstrapping Strategy.

A consortium of improvement projects

Assume that there will be many improvement projects exploring better ways to augment their organizations' capabilities. Wouldn't they be that much more effective if they were able to collaborate among themselves?

In the spirit of the Bootstrapping Strategy, suppose a community of improvement projects were formed, not only to share experiences, but to attract and pool other resources such as consultants, university participation, and vendors. This "Bootstrap Community" would employ specially augmented collaboration tools and methods, both for interagent and their improvement-project work (Engelbart, 1982a).

The bootstrap community's improvement project

The Bootstrap Community is made up of representatives from improvement projects who facilitate change within their respective organizations. There is yet another improvement project which in turn facilitates change within the Bootstrap Community.

This "Community's Improvement Project" would guide the design and development of the special collaboration tools and methods employed by the Bootstrap Community. This would simultaneously boost the ability of the Bootstrap Community to collaborate and boost its own capability to support the Bootstrap Community.

SUMMARY

In summary, the proposed Bootstrapping Strategy involves a three-tiered support structure, as shown in Figure 1:

1. Various organizations' improvement projects,
2. The Bootstrap Community, and
3. The Community's Improvement Project.

Each tier simultaneously boosts its own capabilities and those of the tier above it. By employing the right strategic focus on the right set of capabilities, this boosting process can be considerably enhanced. Notably, early focus on improving collaborative techniques provides a special value because it simultaneously boosts the effectiveness of the entire community.

The next question is, "Where do we start focusing our efforts to optimize this Bootstrapping Strategy?" The answer follows.

BOOTSTRAPPING THE HANDBOOK CYCLE

One of the highest leverage efforts for bootstrapping collaborative capabilities would be to augment the capability for managing and manipulating the knowledge base being developed by and used in a given collaborative effort.

The Handbook

A “Handbook” is what represents the current knowledge state of a collaborative endeavor, such as a project, at any stage of its existence. The Handbook is a dynamic knowledge base encompassing all aspects of the project — all the up-to-date information on current plans, expectations, commitments, and so on, as well as the trail of dialog which led the group to its current state. As such, the Handbook is a critical reference base for all project participants, and a primary learning source for newcomers.

The Handbook Cycle

The Handbook Cycle is the process by which the Handbook evolves. It begins by describing the project concept, formulating a proposal, and then looping on the following for successive versions:

1. Use the Handbook as a reference for study and teaching to stimulate and promote critique.
2. Collect related intelligence — articles, books, literature, convention proceedings, trip reports.
3. Record dialog on the project, on parts of the Handbook, and on previous dialog. (This includes all project documentation, e.g., plans, specifications, etc.)
4. Pull together 1 through 3 and apply some sort of analysis, synthesis, digestion, intellectual comparison, and finally, formal integration back into the Handbook.

Every project, however unwittingly, follows a Handbook Cycle. The proposal here is to develop and employ special tools, highly collaborative methodologies, and an explicit strategic style to intensely augment the Handbook Cycle.

Applying the Bootstrapping Strategy

In the context of the Bootstrapping Strategy, the project of augmenting the Handbook Cycle would ideally be the job of the Community’s Improvement Project — the unit responsible for augmenting the special collaborative tools and methods employed by the Bootstrap Community. In the course of this project, the Community’s Improvement Project would naturally follow a Handbook Cycle of its own, but in this case its product would be a Handbook on how to better manage the Handbook Cycle. Successive versions of this Handbook would then be used to simultaneously boost the Handbook Cycle process in the Bootstrap Community and in the Community’s Improvement Project itself.

Bootstrapping the Handbook Cycle as a primary focus of the Bootstrapping Strategy should optimize the strategic evolution of organizational capabilities.

HUMAN/TOOL COEVOLUTION

Another aspect of the Bootstrapping Strategy is the “coevolution” approach, used to explicitly guide the evolution of organizational capabilities (Engelbart, 1988b).

Model of organizational capabilities

The basic perceptual, motor, and mental capabilities employed in any collaborative effort are supported by a blend of the following two systems:

Human-System. For example, organization, procedures, customs, methods, language, skills, knowledge, training, perceptions, collaboration, and evolutionary capability.

Tool-System. For example, media, portrayal, view/travel, manipulate, retrieve, compute, and communicate.

Inherent in the Bootstrapping Strategy is the explicit coevolution of the Human-System and the Tool-System as one holistic system. As the complexity and urgency facing today's organizations increases exponentially, the need for this coevolution approach becomes absolutely critical.

Pilot Handbook Cycle techniques

The goal of the Handbook Cycle project will be to evolve the most effective combination of Tool-System and Human-System techniques for producing and maintaining a Handbook.

Tool-System innovations. The optimal environment for the Handbook Cycle is on a shared, distributed, hypermedia system. Special features which should be an integral part of the prototypical Tool-System employed by the Community's Improvement Project include: an online hypertext publishing system (e.g., AUGMENT's "Journal"), hypertext links, structured files, multiple windows, shared screens, and meeting support tools (Engelbart, 1982b, 1988c).

These kinds of features must be fully integrated into the users' systems. The Bootstrap Community offers an excellent synergism of collaborative experience for setting the much needed industry standards in this area.

Human-System innovations. Special methods would be developed for collaborating and for integrating the new human/tool capabilities into an organization. Special roles would be established and elevated in prominence in the Bootstrapping Strategy, including: the "Improvement Project" described above; the "Digestor," responsible for analyzing and distilling the mass of information into the Handbook; specially designed pilot operations; and "High Performance Teams," which consist of specially selected individuals trained as experts in high-performance collaboration support techniques, who can provide organizations with the experience and benefits early on.

The above innovations are suggested merely as a starting point for the project. I fully expect the Community's Improvement Project to push the frontiers beyond anything we could imagine today.

CONCLUSION

As the complexity and urgency facing today's organizations increases, so does the need for an explicit strategy for organizational evolution. The high-leverage Bootstrapping Strategy offers both a structure and an environment in which the strategic, holistic

evolution can be launched. Organizations pooling their resources and collaborating in a Bootstrap Community should see tremendous results.

Much change will be involved in this transformation — changes in areas of our work, thinking, skills, and roles that often will be surprising and sometimes quite challenging to accommodate within the culture of today's organizations.

The experience of highly augmented Handbook Cycle technology, strategically introduced through the Bootstrap Community, should ease these “growing pains” and dramatically improve the capability of participating organizations to evolve successfully.

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