

Product Development as a Vehicle for Organizational Change

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Introduction

In its essence, product development is all about change. And yet product development has been ignored for its role in changing the organization. Why is this? Today's organizations value product development for its ability to realign a business with its external environment, consumers, and markets. Product development has become synonymous with the creation and production of goods people want to buy. It has turned into the corporate response to challenges posed by social trends, economic forces, and technical advances.¹ As a result, organizations think of product development when they think of external change. This essay explores how product development might be a way to think about internal organizational change.

Why Change?

Every day, organizations face some kind of new challenge: new laws apply; economic conditions shift; revolutionary technologies call for implementation; and customers' needs change. Each novel situation can become a threat to the organization. Operational inefficiencies due to outdated equipment or work processes make it difficult to compete; ignoring customers' needs risks eroding a loyal base of buyers. Accordingly, organizations have to change unless they want to become irrelevant, or worse, extinct. This is the paradox of the organization: it needs stability to function well, but it needs change to survive.

Organizational change has become a topic in both management practice and organization research. Organizational change generally aims to improve an organization's internal processes.² Ultimately, performance metrics capture monetary gains or losses that can be linked to efficiency levels within an organization. But just what makes an organization efficient is in dispute.

For some, efficiency refers to a workflow that steadily leads to an increase in productivity. Under the dictum of minimizing input while maximizing output, this interpretation focuses on a smooth operation with as few interruptions as possible. Here, all effort is directed at eliminating delays and other disturbances in the workflow. For others, reducing overhead cost represents an alternative

1 These are what Jonathan Cagan and Craig Vogel describe as the "SET Factors." For more on the theory of SET factors, see *Creating Breakthrough Products* (Upper Saddle River, NJ: Prentice Hall, 2002).

2 See Steven J. Ott, Sandra J. Parkes, and Richard B. Simpson, *Classic Readings in Organizational Behavior* (Belmont, CA: Wadsworth/Thomson Learning, 3rd edition, 2003).

understanding of efficiency within an organization. Inefficiencies are measured in dollars allocated to tasks that do not directly contribute to profitability (i.e., do not generate income). Yet others count their “brain capital,” and equate efficiency directly to the brainpower and skills they can attract and maintain. In this case, efficiency is about successfully accessing and utilizing people’s skills and knowledge as sources for invention and continuous growth.

Recently, organizations have found customer experience to be a rewarding appraisal of their business efforts. This is a noteworthy development because it is a gauge that, at least at first glance, rests outside an organization’s internal workflow and structure. Organizations are beginning to recognize that their internal operations may be intimately linked to the overall customer experience they provide. These organizations are seeking to move their organization from one centered on optimizing workflow and operations research to one centering on the people they serve. Often, however, they do not even know how to begin reinventing themselves. The task can seem so overwhelming that it is easier to revert to familiar ways of improving efficiency.

Radical Transformation and Revolutionary Products

Denise Rousseau differentiates two kinds of planned organizational changes: Organizations sometimes change in increments to accommodate new situations and, at other times, perform a “radical surgery” that transforms the organization itself.³ Similar distinctions are being made in product development. New products that are based on changes to an existing product line are called evolutionary (i.e., incremental), while new products that establish a new market or solution within a market are deemed revolutionary (i.e., transformative).⁴ Revolutionary products and organizational transformation both depend on a change in people’s fundamental assumptions.

According to Rousseau, fundamental assumptions are “the often unconscious beliefs that members share about their organization and its relationship to them.”⁵ Fundamental assumptions have a stabilizing effect on the organization. They form the core of an organization’s culture around which behavioral norms, values, behavior patterns, and artifacts, or products, evolve. Without understanding and articulating an organization’s conscious and unconscious beliefs, significant change is elusive because existing systems try to maintain implicit system goals.⁶ Unless these goals are made explicit, any attempt at change is bound to miss its target. Neither incremental changes due to accommodations, nor evolutionary product development strategies, affect inherently fundamental assumptions. Revolutionary products and organizational transformations do.⁷ Organizational change and new product development therefore can go hand in hand. However, can it be planned? Can product development be a strategy to surface and change funda-

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- 3 Denise M. Rousseau, *Psychological Contracts in Organizations: Understanding Written and Unwritten Agreements* (Thousand Oaks, CA: Sage Publications, 1995), 50.
 - 4 Cagan and Vogel, *Creating Breakthrough Products*, 52.
 - 5 Denise Rousseau, *Psychological Contracts in Organizations*, 50.
 - 6 Peter Senge, *The Fifth Discipline* (New York: Doubleday, 1990), 81.
 - 7 Ulrich and Eppinger state correctly that many of the steps and activities involved in the product development process are of an intellectual and organizational, rather than a physical nature. However, their process does not question current fundamental assumptions of the organization. Instead, it appears that their development process derives its cues from exactly these value and category systems. This kind of product development process may serve the organization well if its objectives are accommodational changes that do not require a change in norms, beliefs, and values held by the organization. Karl T. Ulrich and Steven D. Eppinger, *Product Design and Development* (New York: McGraw-Hill, 1995).

mental assumptions? The answers to these questions require some reflection on the role products and product development assume within organizations.

What Is a Product?

Traditionally, products have had a fundamental role in closing the gap between organizations and their environments. A look at popular definitions of the term “product” confirms the emphasis on the product being a commodity for sale by an organization to people not part of the organization. For example, a product is described as “something sold by an enterprise to its customers,”⁸ or as “a device that provides a service that enhances human experience, always part of a company that provides service to its customers.”⁹ Alternatively, it is defined as “anything that can be offered to a market for attention, acquisition, use, or consumption that might satisfy a want or need. It includes physical objects, services, persons, places, organizations, and ideas.”¹⁰ Common to all of these definitions is an understanding that a product is a fundamental part of the transaction an organization has with its customers.

Victor Margolin provides a different perspective. He describes products as “the human-made material and immaterial objects, activities and services, and complex systems or environments that constitute the domain of the artificial.”¹¹ According to this definition, an organization can be a “product” in its own right. Consequently, product development activities become relevant for the organization itself. But as we will see in the next section, the focus on products as transactions has had a paralyzing effect on the activities that constitute product development.

What Is Product Development?

Product development today is defined as “a set of activities beginning with the perception of a market opportunity and ending in the production, sale, and delivery of a product,”¹² “a strategy of increasing sales by improving present products or developing new products for current markets,”¹³ or “a phase in which the organization determines if it is technically and financially feasible to produce a new product.”¹⁴ In each of these definitions, the organization limits the realm of product development activities. As a phase, the value and role of product development to the organization is minimized, since its activities are merely something that the organization needs to contend with temporarily. Once the “phase” is over, the organization can go back to business as usual. By treating product development as a phase, the organization stabilizes and reinforces existing assumptions under which product development then has to operate. Similarly, product development as a cost turns the development activities into a budget item that can either be cut or raised. In this sense, product development only can affect the organization in

8 Ibid., 2.

9 Cagan and Vogel, *Creating Breakthrough Products*, 3.

10 See Philip Kotler and Gary Armstrong, *Principles of Marketing* (Englewood Cliffs, NJ: Prentice Hall, 10th edition, 2003), Glossary G-8.

11 Victor Margolin, “The Product Milieu and Social Action” in *Discovering Design: Explorations in Design*, Richard Buchanan and Victor Margolin, eds. (Chicago: University of Chicago Press, 1995), 121–145.

12 Ulrich and Eppinger, *Product Design and Development*, 2.

13 Philip Kotler and Gary Armstrong, *Principles of Marketing*, Glossary G-8.

14 Sally Dibb, et al., *Marketing: Concepts and Strategies* (Boston: Houghton-Mifflin, 4th edition, 2001).

financial terms. Again, the organization makes every effort to retain its existing framework rather than engaging in an inquiry about its relevance or feasibility.

Finally, the idea of product development as process is problematic, since it easily misleads people into thinking about product development as some kind of a mechanism. A process typically suggests a predetermined, or at least a predictable, path. In its extreme, it is akin to a formula. For a process to work, one needs to decide the variables and factors that go into producing the desired outcome. This is in direct opposition to the “Fuzzy Front End” that marks new product development, and in which neither all variables nor all factors can be known or decided upon in the beginning.¹⁵ Organizations that liken product development to a “process” are prone to focus on process improvements. Achievements in this area include savings in time and cost but, unless the organization itself can change in this “process,” the abilities of product development to deliver the desired outcomes are limited to innovations of a technical nature.

This also means that the possibilities for discovery are limited when they are confined to cutting cost, expediting schedules, and improving existing processes. When an organization assigns such artificial boundaries to design thinking and design methods, it closes the door to many possibilities right from the start. As a result, product development tends to retreat to the discovery of the material possibilities within the field of forces (for example, financial, technological, procedural pressures) the organization provides. While forces can be redirected, bent, and tweaked, they cannot be substantially changed or completely ignored. Bowen et al. provide an example of this kind of product development in their report on the findings of the “Manufacturing Vision Group.”¹⁶ A manufacturer of personal printers is looking for the next big product to help them maintain their market position. Market analysis indicates that the market is ready for a printer that sells for less than one hundred dollars. Thus, the product begins to take shape. The company turns the product specifications over to the product development team. All that is left to do is for the development team is to come up with a fully functioning printer that meets the specifications, in the shortest time possible. Of course, this presents a challenge in itself, but one that remains focused on material discoveries within the parameters already *given*—the organization’s own field of forces. Design in this context is viewed as a “functional specialism”: decisions related to marketing and manufacturing in this category are dictated by other functions.¹⁷

The activities of creating a new product come to resemble the way a pharmacist fills a prescription. A pharmacist does not need to know how to invent, but how to fill a medication “to order.” This frees the pharmacist to devise ways of refilling medications faster than his competitors at a lower cost to customers. A pharmacist

15 Cagan and Vogel discuss the Fuzzy Front End. See their *Creating Breakthrough Products*.

16 The five-year study by the Manufacturing Vision Group marks an early attempt to illuminate the role of product development within the organization. However, it focused merely on product development as a technical capability of the organization, and held onto a traditional product definition. See Kent H. Bowen, Kim B. Clark, Charles A. Holloway, and Steven C. Wheelwright, *The Perpetual Enterprise Machine* (New York: Oxford University Press, 1994).

17 Helen Perks, et al., “Characterizing the Role of Design in New Product Development: An Empirically Derived Taxonomy” in *Journal of Product Innovation Management* 22:2 (2005): 111–127.

typically is not interested in changing the way the doctor's office is run. And that is fine for both the doctor and the pharmacist. But for organizations, the situation is strikingly different. They depend on innovation and change. Organizations that deny product development an active role should not be surprised to receive refills of the same medication at an ever-higher dosage.

The "Manufacturing Vision Group" concluded that product development *can* serve as the source for creating new organizational core capabilities, particularly technological know-how which, in turn, can renew the corporate enterprise machine. Yet the same study found that the majority of the companies being studied did not take advantage of this potential. One of the participating corporate members observed an "expectation boundary that limits any kind of change except technical change" among product developers. More important, he explained the reason for product development's conspicuous absence in matters regarding organizational change: "There is a tendency to specifically not use product development as a change agent" for fear that it would put the technological development at risk.¹⁸ Barely ten years later, the debate in product development has shifted from innovative technology to innovative design.¹⁹ This calls for a more active role of product development within the organization. It also means that if organizations want to take full advantage of their abilities to innovate and change, their idea of product development needs to change first.

Product Development as Inquiry into the Organization

When product development is allowed to be an active agent, the activities through which a product takes form simultaneously can become an inquiry into the organization. An organization that "allows" product development to explore product opportunities by conducting its own research into the context of the product acknowledges product development as a valuable organizational activity in its own right. If properly understood and applied, product development can be a tool²⁰ for managers who seek to transform their organization.²¹

In the development of a product, many aspects of the initial situation are indeterminate. What can be made? What should be made? Not only is it necessary to find answers to these questions, but equally, or even more important, is the *ability* and *responsibility* to generate *the criteria* to answer these questions. "Ability" here refers to the methods and skills that are needed to identify and define relevant criteria for a new product. "Responsibility" points to the ethical component of product development; the need to engage not only with the direct matter on hand, but also with its intentional and non-intentional potential consequences. "Criteria" form the base for judgments and decisions necessary in the development of a product. Without examining existing criteria carefully, and without redefining some of them, products are limited in the way they acquire new

18 Bowen, et al. citing Hewlett Packard Co. VP, Special Projects, Edmondson (retired) in *The Perpetual Enterprise Machine*, 279.

19 "When people talked about innovation in the '90s, they really meant technology. When people talk about innovation in this decade, they really mean design," states Bruce Nussbaum in an online article "Getting Schooled in Innovation," *Business Week Online* (January 3, 2005): www.businessweek.com/bwdaily/dnflash/jan2005/nf2005013_8303.htm (last accessed August 7, 2007).

20 A "tool" in the context of this essay is something that supports or facilitates a person's efforts in pursuing a particular goal or outcome. Thus, a tool can take a tangible or intangible form.

21 This situation is reminiscent of John Dewey's "body and mind problem": the organization itself presents the mind responsible for vision, strategy, and goal-setting, while product development acts as the body that turns the vision into a tangible product. See John Dewey, *Human Nature and Conduct—An Introduction to Social Psychology* (New York: The Modern Library, 1930), 67.

forms, meanings, and functions. For the product development team, every newly discovered criterion that is relevant serves as an additional guide in an otherwise fuzzy enterprise. With that, product development assumes the character of an inquiry. In fact, product development becomes the kind of inquiry John Dewey had in mind. In his book *Logic: The Theory of Inquiry*, he defines inquiry as:

... the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole.²²

Following this definition, the outcome of product development is a unified whole that is neither arbitrary nor is it determined at the beginning of the development process. Instead, the product emerges in the context of an inquiry into the organization—an inquiry into its people, structures, resources, and purpose. When product development becomes an inquiry, design thinking and design methods apply.

Designers continuously challenge people to reconsider what the world is about. In order to create new useful, usable, and desirable products, designers have to inquire about why things are the way they are and envision how things might be different. Designers inherently are concerned with bringing people, structures, and resources into alignment around an articulated purpose. For organizations, this purpose is to serve their customers. By introducing the user perspective to the internal organizational context, human-centered designers can assist organizations in reorganizing themselves in a way that enhances their customers' experience. This includes the invention of new products to close gaps in the paths users pursue when they seek to accomplish a task using the organization.

Designers therefore can generate and articulate a human-centered vision. They have the tools to communicate a vision to diverse groups of people and, with this vision in mind, to develop guiding principles and products that provide organizations with an incremental path to realize their vision. Because designers participate actively in "making" the change happen, they do not merely prescribe what needs to be done to reach a desired outcome. In the activities of making and creating, the learning is put into action. Learning and acting on that which has been learned are necessary preconditions for fundamental organizational change. With that, human-centered product development offers an avenue for organizations to learn about their customers and themselves. The organization develops and changes in the development of a new product. A more human-centered organization is one of the development outcomes.

22 John Dewey, *Logic: The Theory of Inquiry* (New York: Henry Holt and Company, 1938), Chapter VI, "The Pattern of Inquiry," 104.

The Organization as a Human-Centered Product

The more people an organization serves, the more complex are its systems and the more complicated becomes the task of organizing. Organizing a random assembly of things in a way that serves the needs of one particular individual is much easier than organizing the same items so that they make sense to radically different groups of users. Yet this is the task of large corporations and governments. Charles Perrow points out that any complex system is too overwhelming to be understood by an individual person and that, without functions and processes, complex systems remain inaccessible to people.²³ But the mere existence of functions and processes does not alleviate the problem unless organizations focus and clarify their operation for customers, employees, and managers according to Richard Buchanan. He refers to this as “a shift of our perspective from the massive totality of the system to the pathways of individual human experience.”²⁴ Looking at the problem of organizing from the perspective of the individual human experience allows us to redefine the meaning of *being organized*: being organized means to have prepared the path for a specific action. Implicit in this definition is the recognition that an organization is always *organizing* yet seldom *organized*.

Organizing is crucial to the activity of preparing the path for a specific action. Organization facilitates action because, in the process of organizing, unrelated pieces and bits are put into purposeful relationships. Meaningful roles and functions emerge that clarify responsibilities, the kinds of tasks needed, and their sequences. These, in turn, build the foundations for intuitive paths that support the successful accomplishment of a given task. Things that do not indicate their potential use in time or circumstance are of little use to most people. In contrast, things that are organized in a way that makes sense to their users can become meaningful tools, since they are easily identified, readily available, and clear in their function when needed.

This may be the reason why much of human life involves organizing. People sort out documents so they can find important papers in case of an emergency; they coordinate events and persuade other people to share their cause; and they arrange their environments in a fashion that supports the way they want to live and work. While every form of organizing involves people, resources, structure, and purpose, an *organization* requires a group of people that utilizes available resources in an agreed manner to pursue a *common* or shared purpose. Consequently, four distinct systems interact with each other to produce the most complex system: the organization itself. People live and act within a social system; resources reside in the realm of physical systems; structure represents the management or decision-making system; and, finally, purpose belongs to the value system that provides the rationale for a particular undertaking.

23 Charles Perrow and Scott Forsman, *Complex Organizations: A Critical Essay* (New York: Random House, 3rd edition, 1996).

24 Richard Buchanan, “Management and Design: Interaction Pathways in Organizational Life” in *Managing as Designing*, Richard Boland and Fred Collopy, eds. (Stanford: Stanford University Press, 2004), 54–63.

An integrated organization is one in which all four elements—people, structures, resources, and purpose—work in unison to enable the people it serves to accomplish their goals. An organization so integrated also fulfills the important criteria of efficiency and productivity, because clearing the path for people means to remove obstacles that not only hamper people’s ability to reach their goal, but waste the organization’s time and money. The design of a product can become an organization’s strategy for internal change when the goal is to create new paths of interaction for customers and employees.²⁵

Human-Centered Product Development as a Strategy for Change

Human-centered product development invites organizations to see the world differently. It introduces the perspectives and experiences of “other” people—people who are not familiar with acronyms, processes, hierarchies, or standards created by internal experts. These people include customers, suppliers, and employees alike. To make the organization and its products work for them, organizations need to change around their experience—from the outside in.

In many organizations, interactions with customers still resemble a mechanistic man-machine interface in which the organization represents the machine to the customer. Customers have to fit the roles assigned by this “machine.” The organization as machine represents a design from the “inside out”: a mix of internal criteria (i.e., technological, operational, logistical concerns) shape its form and being. Because of this unidirectional focus, the impetus for change can only come from within the organization. Alternatively, the organization can change from the “outside in” by creating human pathways into the organization.²⁶ Embracing the needs and abilities of its customers, the organization can shape itself around them. In order to become “outside in”—that is, customer-focused—organizations need to change from the outside in.²⁷

Human-centered product development can be a strategy for changing from the outside in because it constitutes a systematic approach that links and unifies the four elements of the organization, and therefore views product development as a relationship-building activity. Only by integrating all relevant elements into an appropriate form can the product assume its proper role as mediator between people.²⁸ As part of the strategy, human-centered product development inquires into the organization, its core principles and purpose. In doing so, it generates and establishes key principles that guide future product development.

One of the key characteristics of a human-centered product development is the early production of prototypes. Prototypes allow both the design team and the members of the organization to see the emerging work. At the same time, early prototypes serve as explorations of new possibilities since they provide the space and place to approach and visualize problems in a somewhat noncommittal and

25 Ibid.

26 Ibid.

27 Outside-In Design™ is a trademark owned by Australian design researcher Tony Golsby-Smith. He talks about “becoming outside in” in his work with organizations. For more on his work, go to: www.seconddroad.au.com.

28 See Richard Buchanan, “Rhetoric, Humanism and Design” in *Discovering Design: Explorations in Design Studies*, R. Buchanan and V. Margolin, eds. (Chicago: University of Chicago Press, 1995), 23–66.

thus less threatening way. Scheduled review sessions of prototypes are one way to involve members of an organization in the development process. Such workshops provide a forum for employees to discover and discuss the problems that the current system poses. One of the many roles of the prototype here is to trigger a discussion that encourages fundamental assumptions to surface. Once these assumptions are articulated, they can be openly discussed and, in the process, reevaluated.

Prototypes lead to products. Each individual product can serve as an “intermediate act” that collectively and successively transforms the organization.²⁹ The important difference between incremental changes in the traditional sense and incremental changes due to human-centered product development is that, in the latter, the increments are part of a planned and systematic approach. Organizations tend to see products as ends, not as intermediary acts. Thus, a number of products have been mislabeled as “failures” instead of being recognized for their role as necessary intermediaries without which an emerging radical new approach would not have been possible. San Jose, California-based Apple Inc. based no less than three of its most successful products on a product that never made it to the market. One might look at these intermediary products from a merely technical and marketing point of view. The technical skills acquired during the development of the earlier products likely contributed to the company’s core capabilities in the sense Bowen et al. had in mind. But this would lead us to overlook the least visible, yet most significant, impact of these projects on their organization: the generation of insights and information about how the organization as a whole would need to change in order to deliver the kinds of experiences envisioned in each project.

Unlike other organizational change efforts, human-centered product development does not need to start at the core of the organization. Instead, it offers the possibility to put new principles and ideas to the test in increments at the fringe of the organization. The larger goal in organizational change is to move closer to the organizational core with every “act” or product. Dewey’s observation that “unless one takes intermediate acts seriously enough to treat them as ends, one wastes one’s time and effort at changes of habits” very much applies to organizations. Pursuing a human-centered product development strategy, every new product inquiry moves to greater complexities and involves more people than the previous one. Thus, change can develop its own snowballing, or cascading dynamic that creates knowledge and products from the outside in.

This also represents a departure from traditional top-down or bottom-up approaches common to ordinary organizational change efforts. In human-centered product development, the direction is more horizontal. But the line is neither neat nor straight. Rather, the iterative and inclusive nature of the inquiry creates a path that “zigzags” through the organization from the outside in—and also

29 This follows Dewey’s idea that means and ends are instances of one and the same, and are distinguishable only by the way we judge them. John Dewey, *Human Nature and Conduct*, 35.

from the inside out. These product development activities bring design *into* the organization, utilizing design thinking and design methods to develop products that improve individual organizational interactions to increase overall efficiency. They actively involve people generally thought to be external to the design process, thus literally bringing people from the outside in. Their participation, in turn, allows the organization to see itself through the eyes of people who experience the organization as external users: customers, field employees, suppliers, and others.

Many employees feel anxiety about changes in their organization. Being involved in a change process gives people control and information in addition to offering an outlet for their fears and concerns. This, in turn, makes them actively engaged participants. People who work with or witness change implementers who continuously keep asking pointed questions and encourage others do so provide an example of the culture they are hoping to create.³⁰

For the organization, involvement in the product development process can mean a new level of learning, since this process builds on the sharing knowledge and the contribution of individual expertise to a shared problem. Argyris and Schön have pointed out the existence and the need for such “double-loop learning.”³¹ Yet what has been missing so far is a practical path for organizations to engage in double-loop learning. It is one thing to understand the need and the value of double-loop learning. It is another to make it happen in an entrenched organizational framework. The iterative and participatory nature of human-centered product development presents a viable path for double-loop learning.

Conclusion

This essay set out to explore the possibility that product development, which in its essence is all about change, can be a way to think about organizational change. The discussion shows that product development can be a strategy for generating and implementing internal changes. In particular, design activities such as prototyping are conducive to the surfacing of fundamental assumptions. However, for organizations to take advantage of these tools, they need to think of product development as an inquiry into the organization. Doing so opens the way for the organization to be a product to which design thinking and design methods apply. The integrative nature of human-centered product development, and its use of user research, participatory design and iterative processes facilitate organizational learning. Goodman and Rousseau have pointed to the need for linkages among different organizational areas for successful, observable organizational change.³² It appears that human-centered product development can be this link.

30 See also Todd Jick's case study about implanting change in an organization: "Implementing Change," *Harvard Business School Case* N9-491-114 (1991).

31 Chris Argyris and Donald A. Schön, *Organizational Learning II: Theory, Method, and Practice* (Reading, MA: Addison Wesley Publishing Company, 1996).

32 Paul S. Goodman and Denise M. Rousseau, "Organizational Change that Produces Results: The Linkage Approach" in *Academy of Management Executive* 18:3 (2004): 7–19.