

IE 101 | Innovation and Entrepreneurship 101

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CHAPTER 09 | INTEGRATE The Solution Explained in 12 Principles

Figure 16. Every innovation project is a journey.

Every Innovation Project is a Journey As we formally defined previously, Innovation Engineering is a framework to create or transform anything aided by aligning human talent in an efficient, effective, and positive manner. This framework offers practical guidance useful in large firms, research labs, new ventures, or even innovative student projects. Also reproduced from the first chapter is the illustration below. It shows that an innovation project is a journey and it outlines the elements of any successful innovation project: i) Initial conditions ii) A compelling story/strategy iii) Execution while learning iv) Innovative leadership, behaviors, and mindsets

As in the illustration, the Innovation project is a journey or sequence of steps. Framework Preview with 12 Principles Building upon the concept of a project journey, this section provides a preview of the major concepts of Innovation Engineering. It is written in the form of 12 principles. These concepts are explained in question and answer format and they characterize how teams successfully navigate innovation projects. Warning, this next section densely packed. We even use some terms without definition. This section is written in this manner to quickly preview the concepts of the book. In subsequent chapters, we will clarify these terms and expand these concepts.

Q1. How do Successful Projects Start? Principle 1. Start with Story: Innovative projects start with a story narrative. (E.g. NABC, AxB, "low-tech demo", or inspiring product demonstration). Many projects go wrong because they start with a list of requirements. However, by starting with a story such as a venture pitch, a "low-tech demo", or NABC narrative (which was used by SRI during the invention of Siri), it allows the everyone to better understand and agree on the objective of the project from the beginning. Reference: Berkeley Method of Entrepreneurship (BMoE), Oracle Case, Netscape Case Q2. What is the difference between Story and Strategy? Principle 2. Strategy: Remember that strategy should be set by the question of "how will the project win" in context of your mission. Example: Story = Problem + Solution: People need to eat + we offer a new restaurant Strategy = What unfair advantage will we create? What actions will you take so that others will not be able to do it cheaper, better, or faster. Business strategy is a set of investments and activities that allow a firm or project to have an unfair advantage. It is not enough to be able to offer a product or service, the offering must be produced at a lower cost, or have a capability that cannot be copied, serve a niche, or be differentiated in another way that others cannot easily copy. Reference: Strategy definitions of E&Y and others

Q3. What is Technology Strategy? Principle 3. Technology Strategy: A team should set technology strategy to achieve flexibility, speed, and ease of incremental development. Besides creating a strategy for the overall project, a technology strategy creates an advantage in the way that the product or service is put together. The choices of platforms, tools, and components can make a very large difference. It can be a great advantage when these choices make the speed of development faster or when they enable quick changes. In the NVIDIA case example, the product allowed the advantage of ease of programming not for itself, but for its customers which opened a new market for GPU processors. In addition, the most successful innovators also know how to solve complex problems by breaking them down to a systems-level, all while keeping the design as simple and effective as possible. Reference: NVIDIA Case Q4. What is the first decision to make to define a new project or product category? Principle 4. Project Scope: Choose a project scope or objective which the ecosystem will support. The project plan may include partnerships, ecosystem development, or internal stakeholders from the start. For example, when Caviar, the food delivery app, was first being created, they chose the scope of business to be food delivery services because they realized that restaurants would not mind giving up that service to other companies. The delivery service function was actually considered to be a distraction to the main business of most restaurants. Reference: Caviar Case Q5. How can we know if an early stage team is making progress? Principle 5. Team Evaluation: A successful project should have:

1. an exciting story

2. high powered execution

3. social progress

Not every team member has to have all capabilities, but trust and mutual appreciation among the team members is necessary. When investors or managers think about supporting a project, they need to consider all of these factors. Available at berkeleyinnovationindex.org, there is a BMVS survey of under 10 questions that can help managers and investors evaluate a team based on these factors. Reference BMoE Q6. How does a team learn to execute something new? Principle 6. Execution while Learning: A team should use inductive learning and reflection to execute in new areas. Learning may occur in areas such as technology, tools, validation, business model, descriptive language, sales cycle or other areas. For example, for an innovative team with primarily technology-oriented members, the team may have to develop business acumen at the same time as building the product itself. As we will see in the next chapters, this type of learning advanced by observing the environment, separating knowns from unknowns, and repetitive self-reflection. Reference: BMoE Q7. How is inductive learning embedded into project execution? Principle 7. Agile Increments: Project execution is accomplished in agile increments, generally starting from the user's touch point. This means that while the team is following its strategy, it develops the complete project increments. After each incremental step, a reflection process is used to understand what is working, what is not working, and what is most important to correct in the next incremental step. This is in contrast to mindlessly following a plan only to find that the resulting project has missed its objective. Reference: Design Thinking, Experiential learning

Q8. What does the team need to do after making a hypothesis? Principle 8. Test or validate everything: Always be able to separate what you know will work and what you don't know. Seek truth, avoid spin. For example, when NVIDIA was testing its Fermi project, the product had a problem, but the obvious or simplest explanation turned out to be wrong. The best practice is to verify every assumption while trying to figure out the issue. The same is true for business and customers. Every assumption about what a customer wants must be validated no matter how obvious it seems. Reference: culture in NVIDIA Case Q9. To be an effective innovator, a person should know ____? Principle 9. Powerful tools: Learn to use enough powerful tools. Whether we are talking about software tools we teach in Data-X, the command line interface of a router, or business applications in a given industry, it is important to be proficient with multiple tools. The same is even true for theoretic tools. Richard Feynman, the famous Nobel Prize winning physicist, said that as a punishment, he was assigned to solve integrals in many ways. It turned out later that in solving complex problems, when others gave up, he had more "tools" that he could try, while others just did not have enough options. Reference: Richard Feynman, Data-X Q10. What is the job of the innovation leader? Principle 10. Innovation Leadership: A leader's primary job is to select, recruit, support, and align the best team. The most important element within the team is trust. An innovative leader's downfall is insecurity and ego. The innovative leader should welcome feedback and develop the strength to avoid egotistical or insecure habits. (Reference BMIL)

Q11. What are some of the behaviors and mindsets needed by the team? Principle 11: Behavior and Mindset: Innovation behaviors across the team should include wide comfort zone, EQ, grit, and a balance of broad thinkers and reliable, operational/functional experts. The original team starts with mostly broad thinkers. Positive mindsets include • "I can accomplish or learn anything" (growth), • "Resources are abundant" (to avoid over-competition) • "Adversity can be channeled to become a source of strength" (motivation). Team members should affirm positive beliefs about themselves (confidence). (BMoE, BMIL, VMware Case). A related example made famous by Nike, suggests "Just do it" which is both growth-oriented and self-affirming in mindset is a better than "We are good at making shoes" which is a factual, but fixed mindset that may even constrain the company's growth into new areas. Reference: BMoE, Dweck, Covey Q12. How can we make any environment better for innovation? Principle 12. Innovation Environment: An environment that fosters innovation should allow intellectually diverse types of people to mix/collide together under pressure and common purpose. It has been a hallmark of innovation at Berkeley that mixing talented people with different backgrounds and ideas, and putting them together on projects with common purpose has been a key to innovation. That innovation is stronger when people are mixtures of different professional segments from on-campus and off-campus. Whether you are creating or joining an incubator, a design firm, or innovative corporate environment, the key is the mixing and trust building of intellectually diverse, capable people who can find

common purpose together. Reference: Innovation Collider at Sutardja Center Summary In this section, we previewed the concepts of Innovation Engineering in 12 Principles. In the next chapters, we will explain these concepts in the form of as a

step by step guide and in the order that maximizes their value for a project's success.