Understanding the Innovation Genome

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From Design to Innovation Genome



a: to conceive and plan out design b: to have as a purpose : c: to devise for a specific function or end

"the act of moving from the current to a future preferred state" - Herbert Simon

design thinking

An paradigm that takes practices from design disciplines to guide the moving from the current state to a preferred state







Hunker Model 1) never go hunting alone The | Hunt testing, dark horse design prototype prototype transport make



Center for Design Research

Body of Knowledge

30+ PhD Dissertations

Numerous journal and conference articles



Design Thinking Research



Body of Behaviors





Ahmedabad, India

IBT ALTOMOT iThena Lagos Industry Leaders Lagos Et Education Industry Finance

Lagos, Nigeria



Design Innovation @ Cenox & KTH

Body of Knowledge

35+ Publications

Numerous journal and conference articles









Body of Behaviors



Environment





Artifact

Behavior



Human Project





Innovation Factors at Individual Level

Innovation Factors at Team Level

Innovation Factors Organizational Level

Innovation Factors Ecosystem Level

Innovation Factors at Individual Level

Innovation: The realization of radical and relevant artifacts and experiences.





Apple 1















Old woman



Young woman



Incubation space for projects

Creative space for deviants



Old woman



Young woman

Conventional status-quo perception



A Plantation



Hwang, V. W., & Horowitt, G. (2012). The Rainforest: The secret to building the next Silicon Valley. Los Altos Hills, CA: Regenwald.

A Rainforest

A Plantation

Excel at you job.

Be loyal to your team.

Work with those you can depend on.

Seek a competitive edge.

Do the job right the first time.

Strive for perfection.

Return favors.

Hwang, V. W., & Horowitt, G. (2012). The Rainforest: The secret to building the next Silicon Valley. Los Altos Hills, CA: Regenwald.

A Rainforest

Break rules and dream.

Open doors and listen.

Trust and be trusted.

Seek fairness and not advantage.

Experiment and iterate together.

Err, fail and persist.

Pay it forward.



Knowledge

Concept

Possibility Imagination

 Logic – The science of correct reasoning. Reasoning – The drawing of inferences or conclusions from known or assumed faxed bout

When solving a problem, one must understand the question, gather all Maybe... pertinent facts, analyze the problem i.e. compare with previous problems (note similarities and differences), perhaps use pictures or formulas to solve the problem.



The capacity to generate and respond to novelty is an important characteristic of an innovation player

Volvo HealthCar

A young employee in your team pitches you a concept for a healthcare delivery system integrated into Volvo cars. She argues that with the always-on connected future of urban consumers, the time we spend in cars is not just commute time, but also family time, personal time or wellness time. Can the car act as your health coach, or your first line of medical diagnosis?

The employee has put together a stellar team of healthcare professionals, engineers and designers to explore this concept and is now asking you for 10 Million dollars to develop and test a prototype. She is young but imaginative with an ambitious plan. Evaluate the concept and decide how you will respond to her. The 10 Million dollars she is asking for need to be sanctioned by the Senior VP and if you agree it would be your job to convince him that this is a good idea.



Problem-solution Mindset

What can go wrong with this concept?

How risky are these problems?

Can we solve these problems?

Is this the right time for solving the problems?

Should I risk my reputation in solving these problems?

Possibility-barrier Mindset

What is everything that could go right with this concept?

How big could this become?

Does the possibility excite and motivate me?

What are the barriers to realizing the possibility?

Who do I work with to address and overcome these barriers?



Innovation Factors at Team Level

Feedback Interaction



Hattie – Feedback is the single factor having largest influence on learning

Proper feedback

Large influence

Giving feedback properly

Summative feedback:

Graded feedback with purpose to tell how well the student meets the learning outcomes – Does not support learning

Formative feedback:

Given continuously during the course with purpose to give information on the student's learning relative the learning outcomes – Support learning

Formative feedback – definition.

"Information communicated to the learner that is intended to modify his or her thinking or behaviour for the purpose of improving learning"

Question: Task-level feedback and Summary feedback

Shute, V. J. (2008). Focus on formative feedback. *Review of educational research*, 78(1), 153-189.

(Shute, 2008)

"Feedback system" to enhance progression and learning in projects

Credits: Number of students: Project:

approx. 30 (divided in 2 teams) Problem-areas, focus on detail design, developing a product from earlyphase (need-recognition) to a physical prototype.

Objective:



- 24 ECTS (March-Dec)

To plan, manage and execute a complex product development work (both in task/challenge and setting).



Idea generating sessions with different structured tasks

Simple prototype building (mock-ups)



Gate 0



Prototypes made during workshop

Ideas generated by alternating the level of functionality and components involved

Berglund, A. & Leifer, L. (2013). Why we prototype! An international comparison of the linkage between embedded knowledge and objective learning, Engineering Education, 8(1), 1-14.

Developed 13 concepts from work shop



Opportunity for addon.products

Gate 1

Final three concepts









Refinements

Gate 2



Timeline



More advanced prototypes for idea presentation purpose



Education, 3(1), 1-14.

Berglund, A., Blackne, J. and Jansson, N. (2014). Proposing a Feedback System to Enhance Learning Based on Key Performance Indicators, International Journal of Quality Assurance in Engineering and Technology









Sample of interactions


Sample of interactions with ideas highlighted



$$\xrightarrow{\mathsf{O}} \xrightarrow{\mathsf{O}} \xrightarrow{\mathsf{O}} \xrightarrow{\mathsf{O}} \xrightarrow{\mathsf{O}} \xrightarrow{\mathsf{O}} \xrightarrow{?} \xrightarrow{\mathsf{O}} \xrightarrow{\mathsf{O}}$$

Findings from team interaction dynamics...

Teams fluctuate between concept space and knowledge space



Black: Knowledge Space

Red: Concept Space

How do you intentionally navigate the two spaces?

Questions and 'Yes and' patterns move a team into concept space



Block-recovery is a learnable skill





Argumentation episodes beget utility



Idea expressions

Team interaction diagnostics



Personalized coaching for improving performance

Innovation Factors at Organizational Level



Decision-making in convergent stages...

Gatekeepers, boundary roles, change agents, product managers, new product managers, and champions.

Strong personal commitment!

Enthusiastic support!

Acting on formal and/or informal power*

Numerous potential innovations are rejected often due to people's natural resistance to change.

Breaking silos matter!

DON'T LOCK PEOPLE INTO PATH DEPENDENCIES



When you couple role dependencies with route dependencies, you creating a situation where people and teams have competing motivations. This greatly increases complexity and wastes energy and kills morale.

Pay attention to empathy and understanding and support dedicated champions!

DO LET PEOPLE ORGANIZE THEIR WORK



When you allow people to be not only independent of roles and route dependencies, they can innovate the workflow design and optimize performance.



Environment

Human-scale design

Non-precious vibe while communicating care

Flexible use spaces

Maker space for prototyping



Environment



Human-scale design

Non-precious vibe while communicating care

Flexible use spaces

Maker space for prototyping



Personal Courage and Organizational Courage





Interpersonal Dynamics

Lowering formality to encourage idea exchange

Coaching a person and not a process

Energizing and then channeling energy towards action





Innovation Factors at Ecosystem Level

Transformation of Silicon Valley from agrarian to a highgrowth technology innovation ecosystem



Stanford and surroundings circa 1919 A new university in the midst of fruit orchards

Stanford and surroundings circa 2009

A top ranked university surrounded by the world's most prosperous ecosystem. Revenues \$450+ billion



Can we imagine a similar transformation for a Swedish city?





What will power this transformation of a region into a highgrowth innovation ecosystem?

Developing intense creative and collaborative behaviors among youth, investors and current technology leaders.

than a mass-production of low-impact startups.

Creating a few high-growth ventures and key technical breakthroughs rather

What will power this transformation of a region into a high-growth innovation ecosystem?



We need to build ecosystem nuclei and establish on-going measurement and diffusion systems

Ecosystem nuclei: Environments where intense creativity and collaborative behaviors can be practiced through Product Based Learning (PBL) for developing high-growth ventures

Measurement and diffusion of key beliefs and behaviors into the surrounding regional ecosystem for developing a culture conducive to high-growth innovation

What will power this transformation of a region into a highgrowth innovation ecosystem?



This will change the *nature of interaction* between individuals such that *capital*, *knowledge, and imagination flows are exponentially accelerated* - creating a *behavioral infrastructure* for rapid economic growth

A high-growth innovation ecosystem requires going beyond existing types of infrastruc



potential

What is behavioral infrastructure?

It is an dynamic set of interactions in which specific behaviors are amplified and new value creation is accelerated

Creative deviants are embraced

Status-seeking tendencies are replaced with novelty-seeking tendencies

Experimentation is preferred over perfection

Individual failure is not stigmatized since it is offset by collective progress through experimentation

Investors work on equal footing with entrepreneurs and professionals rather than letting money create authority

What is behavioral infrastructure?



Behavioral infrastructure for innovation can be compared to a network of neurons in the human brain. When it is effective, capital, imagination and knowledge flow over behavioral infrastructure just as chemical and electric signals flow over the neural network.

We implemented behavioral infrastructure building processes in India and Nigeria.

Center for Design Research at Stanford partnered with local universities, foundations, corporations, investors and governments to form **fully autonomous local** organizations equipped to harness creativity through PBL, launch new ventures, realize financial returns, and enhance local networks.

Our India project lasted 6 years, and Nigeria project lasted 2 years. Both projects included one year of set-up of the facility. Our experience of implementing behavioral infrastructure in Nigeria and India is described on the following pages.

Building Behavioral Infrastructure in Abeokuta, Nigeria A case study

What was our project objective?

Our objective with the Abeokuta-Lagos Innovation Ecosystem project was to develop the process of building an 'ecosystem nucleus' in an emerging market culture.

We wanted to understand what kind of PBL setup we needed to create in response to local beliefs and values, that would nurture intense creative and collaborative behaviors.

Key outcomes from 1 years of CDR engagement in Abeokuta?

16 entrepreneurs participated as Fellows at the Institute for Venture Design, and started 6 ventures spanning automotive, construction, education and information technology sectors.

We observed a transformation in creative self-efficacy of the Fellows that translated into bold actions to start new ventures.

The IVD program shut down after 1 year due to pulling out of the sole investor funding the program. In spite of this, the fellows continued pursuing the ventures outside of IVD.

Building Behavioral Infrastructure in Ahmedabad, India A case study

What was our project objective?

process of building an ecosystem nucleus in an emerging market culture.

We wanted to study the role of capital in innovation ecosystem development.

mediocre entrepreneurs

- Our objective with the Ahmedabad Innovation Ecosystem project was to develop the
- We wanted to understand what kind of PBL setup we needed to create in response to local beliefs and values, that would nurture intense creative and collaborative behaviors.
- Our goal was not to create a mass-market incubator that would graduate hundreds of

Designing an environment that nurtures creative and collaborative behaviors



Stanford CDR worked with local partners to combine design principles for creative behaviors with local aesthetic and values.

Ecosystem participants often reported that this environment was a major reason for them to stay and collaborate with others in the space.



Key outcomes from 5 years of CDR engagement in Ahmedabad?

65 entrepreneurs and 43 investors participated in the VentureStudio program, together starting 20+ registered companies spanning education, IT, energy, automotive, and healthcare.

The ventures and the Ahmedabad ecosystem attracted the attention of global investors and thought leaders. Two of the IT ventures attracted global investor attention, and one was acquired by a Silicon Valley firm for \$4 Million within 18 months of launch.

The VentureStudio program was successful in creating a transformative environment that attracted 'deviants' from all ages (16-37) and differing socio-economic backgrounds to participate and realize their dreams.

Stanford CDR was able to develop a methodology for establishing an ecosystem nucleus in emerging markets.



Key lessons from Ahmedabad and Abeokuta

It is necessary to align with capital sources early in ecosystem development and rolemodel effective capital deployment behaviors.

While the PBL programs in Ahmedabad and Abeokuta were successful in transforming the mindset of innovators, the capital availability for sustained growth of the ecosystem was a recurring problem due to investor short-sightedness and riskaverse mindset.



The developments at ecosystem level need to be made visible through measurement and narrative creation.

It was challenging to sustain an ecosystem-level perception among partners and investors. Most defaulted to perceiving things at venture and institutional level.
Key lessons from Ahmedabad and Abeokuta



It is necessary to groom young leaders who are driven by empathy and novelty to lead the innovation ecosystem.

In both places, the older leadership was more oriented to maintaining power and status positions. This slowed down and in some cases harmed the development of a high-growth innovation ecosystem.



The ecosystem development activities need to involve and improve the existing economic activity in the region.

The existing industrial base in both regions was not leveraged in innovation ecosystem development. Hence the starts-ups developed did not contribute to or benefit from existing economic activity in the region.

So what do you want to do with this knowledge?





