

Industry sponsored R&D in Universities in India – Needs and Challenges

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- Emerging Context and increasing importance of Knowledge based wealth generation
 - Examining roles in the value chain
 - Some observations on relationship between Universities and Industry in India
 - the talk targeted towards invoking introspection and discussion in the spirit of “folding the future in”
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Knowledge important

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- Knowledge based wealth generation offers India the best chance
 - to migrate up the value chain,
 - create prosperity,
 - employment and inclusive growth
 - to enable us to make a move of great significance
 - This can happen only with synergy of industry and universities !!
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- Knowledge as a leverage
 - **Doing new things**
 - New technology, new products, new services
 - **Doing things better**
 - Quality, performance, looks, user interface
 - **Doing things at lower cost**
 - Production efficiency, transaction cost, or life cycle costs
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- **Doing new things**

- e.g. STD PCO – instant print out of call charges – private attended pay phone service
 - New technology, new products, new services

- **Doing things better**

- e.g. new batteries for cell phones
 - Quality, performance, looks, user interface

- **Doing things at lower cost**

- e.g. Aravind Eye hospital – Intraocular lenses \$ 4 - \$ 8 vs \$100
- e.g. DVD of bollywood films – Moser Byers
 - Production efficiency, transaction cost, or life cycle cost

Some observation on current
scene

And emerging needs

Current Scene - India

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- **Relationship** between Universities and Industry in India, has at best been **ambivalent**,
- with each operating in its **own “world”** with **some misgivings** for the other.
- In the past **industry, by and large, did not have that compelling a need** for major R&D as technology was mostly acquired
 - IPR rights were not easy to protect
- At the same time, faculty at most of the Universities, did not have much industry exposure .. Result !!
- **“Thinking”** was reserved for the **universities**, and **“Doing”** was seen as the task of the **industry**

Emerging Need

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- In the **new economy, ideas and intellectual capital** have replaced natural resources and mechanical innovations as the **raw material of economic growth**.
 - The **university** becomes more critical than ever as a provider of **talent, knowledge, and innovation** in the age of knowledge-based capitalism.
 - It provides these resources by conducting and openly publishing research and by educating students
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US experiences

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- Industry has become more involved in **sponsored research**, and universities have focused more on licensing their technology and creating spin-off companies to raise money
- Between 1970 and 1997, for example, the share of **industry funding** of academic R&D rose sharply **from 2.6 percent to 7.1** percent, according to the National Science Foundation (NSF).
- Patenting by academic institutions has grown too !!
 - The top 100 research universities were awarded
 - **177** patents in 1974, **408** in 1984, and **1,486** in 1994.
- Universities granted roughly **3,000 licenses** based on these patents to industry in 1998--up from **1,000 in 1991**--generating abt **\$500 million** in royalty income

More on US

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- Joint university-industry research centers have also **grown dramatically**, and a lot of money is being spent on them
 - A 1990 CMU study of **1,056 of these U.S. centers (those with more than \$100,000 in funding and at least one active industry partner)**, showed that these centers had total funding in excess of \$4.12 billion
 - The centers involved **12,000 university faculty and 22,300 doctoral-level researchers**--a considerable number.
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Talent pool helps the region *Madhu Mehta*

- A key and all too frequently neglected **role of the university in the knowledge economy is as a collector of talent**--a growth pole that attracts eminent scientists and engineers,
 - who attract energetic graduate students, who create spin-off companies,
 - which encourages other companies to locate nearby
 - Still, the **university is only one part** of the system of attracting and keeping talent in an area
 - the opportunities and amenities required to make the region attractive to that talent has to be provided
 - If the region does not have the opportunities or if it lacks the amenities, the talent will leave
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Emerging Ecosystem

Research, Creativity,
Knowledge, Innovation,
Entrepreneurship

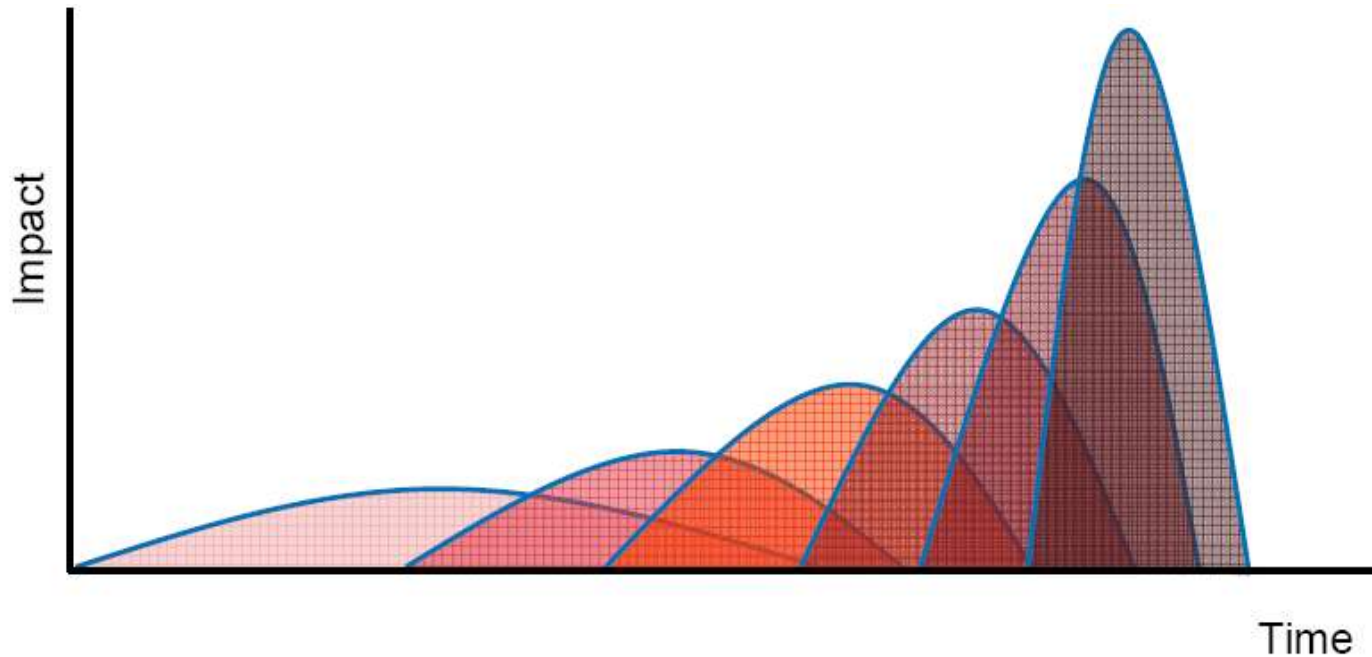
New eco-system

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- Knowledge based wealth generation requires amalgamation of
 - Creativity,
 - Knowledge,
 - Innovation,
 - Technology and
 - Entrepreneurship
 - Universities abroad, notably like Stanford and UC-Berkeley, have played a key role in such value creation.
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Innovation Impact

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- Innovations are having a larger impact
- The lifecycle of innovations is getting shorter

The creation of the iPod: 6 months, a technology entrepreneur and a start-up partner - a benchmark of openness and speed

An entrepreneur with an idea comes to Apple

- Independent contractor Tony Fadell develops complete iPod/iTunes product solution in 8 weeks after he proposes it to Apple



Carte blanche to hire partners & team
Steve Jobs takes personal interest

- Apple hires Tony to create and lead 35 person team from Philips, IDEO, General Magic, Apple, Connectix and WebTV to develop the iPod
- Apple developed the user interface and design leaving PortalPlayer in charge of the technical design

PortalPlayer manages technical design and earns annuity revenue stream



- PortalPlayer, provides the platform and produces the reference design in collaboration with Apple based on list of desired features; selects other design chain members and manages the design process
- PortalPlayer makes \$15 / iPod sold



TOSHIBA



6 months !!!

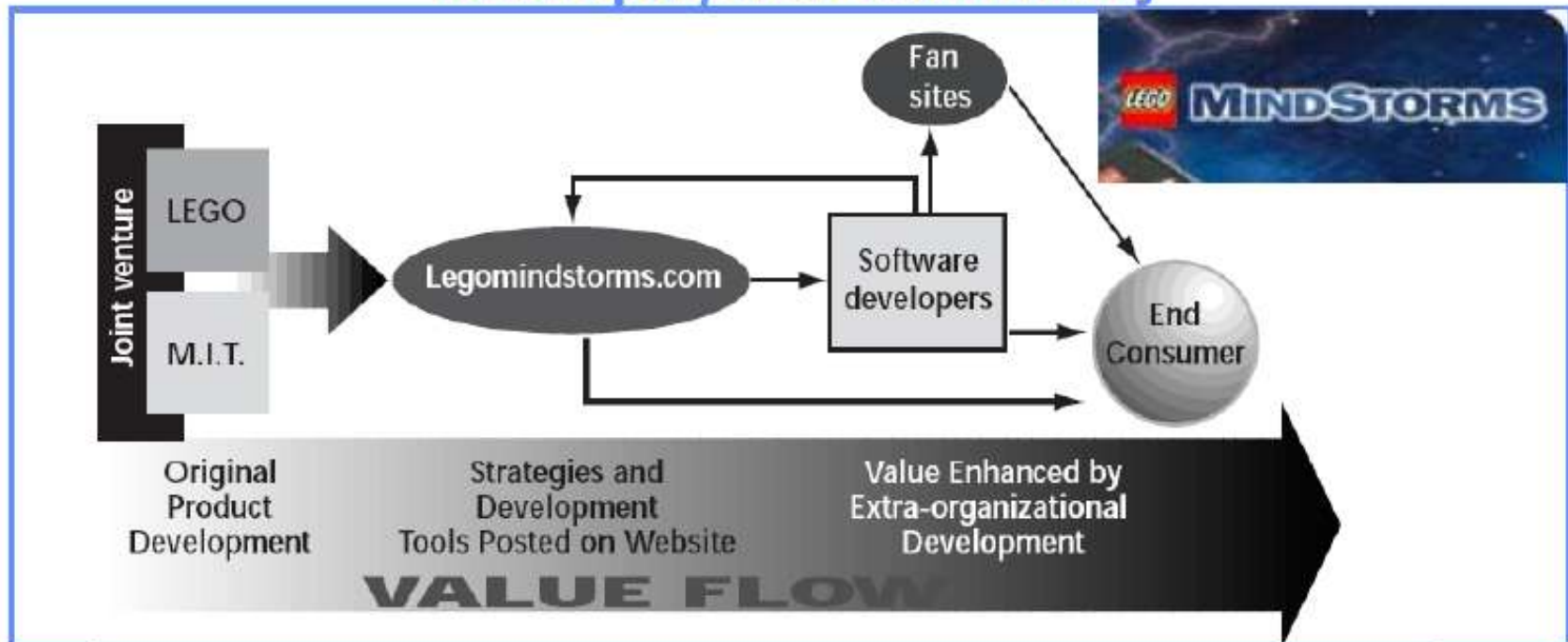
iPod



iPod critical success factors:

- Business system innovation
- Openness of development process
- Fast decision making
- Iterative collaborative relationship with PortalPlayer and other partners

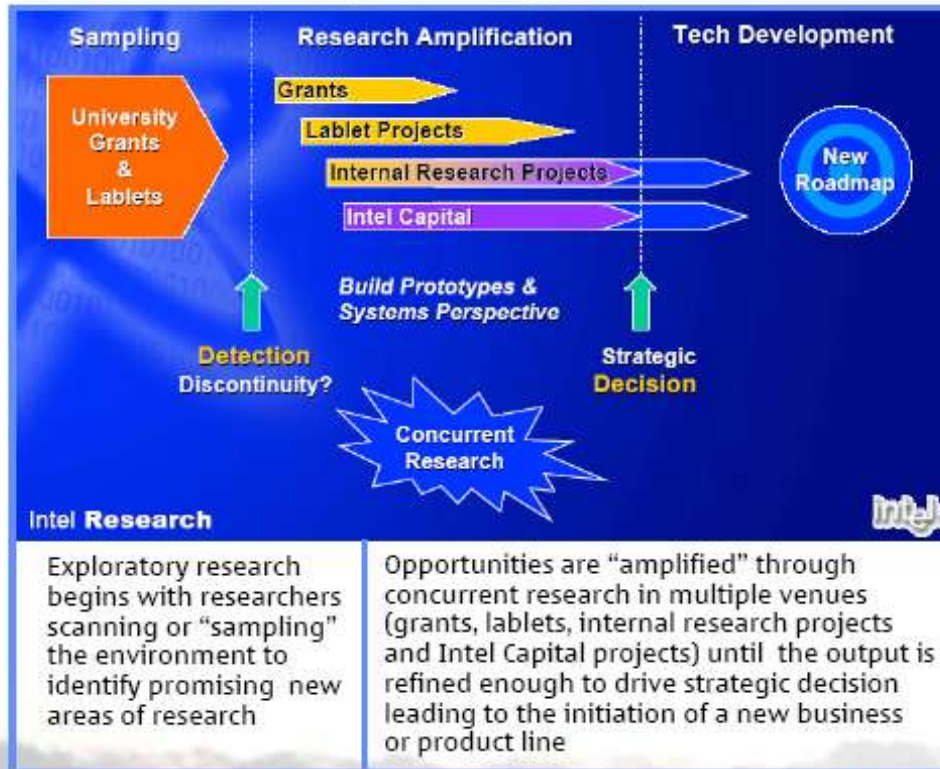
Lego MindStorms – unlocking innovation in the developer/user community



- JV between MIT faculty and students and Lego creates MindStorms
- 2 weeks after launch hackers decipher part of proprietary code, post it on the internet and start writing advanced new software for their robots and even creating a new operating system
- Despite fears of competitors copying the product, **Lego decided to not sue the hackers** and on the contrary released a developer's kit and incorporated the hackers' best ideas into the 2.0 version
- Lego hackers turned into an **volunteer team of beta testers and product development specialists** who developed MindStorms much beyond what the internal PD team could do and was planning to do
- *The MindStorms open source community has accelerated product innovation and turned Lego MindStorms into a highly profitable product for Lego*

Open Innovation at Intel: universities as networked "idea switches"

Intel Exploratory Research



Coordinated effort between 4 key components

- **University research grants** (500+ universities, up by 1/3 since 1999)
- **Lablets:** Open and collaborative labs near universities
- **Proprietary internal research projects** (also pushed out to the lablets to move the research forward)
- **Corporate venturing** (Intel Capital)

Networked creativity

- "In the past it was possible to hire as many as 30% of the top researchers in a given field under one roof; today it's hard to get 1%; only solution is to bring them into a virtual lab" – David Tennenhouse
- Small like-minded groups around the world will work on the same subject united by research interests rather than physical proximity; the lablets will serve as focal points of these efforts

◆◆◆ "Networking like this is the only way to get critical mass in the future"

– David Tennenhouse, VP of Corporate Technology Group

Key benefits of Open Innovation

A MORE AGILE R&D PROCESS

Increased ability to “turn on a dime” and adjust to unpredictable market shifts

A HIGHER NEW PRODUCT HIT RATE

Increases the potential for truly innovative products and commercial successes that could be brought to market and benefit commercially from even if not innovate itself

A GREATER EFFECTIVENESS of R&D

Higher new product success rate through iterative researcher & customers contact
Faster time-to-market and lower development spend; however potentially higher research spend

DECREASED RISK of MISSING MARKET OPPORTUNITIES

Fewer “false negatives” given early exposure to market and alternative development paths; also less risk of being “blind-sided” by competitive product, technology, service introductions

RENEWAL

Folding the future in

what needs to be changed
at both ends

Raise the question

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- Rather than asking why it is the way it is, let us target towards invoking introspection and discussion
 - in the spirit of “folding the future in”
- How do we get a level of
 - Close co-ordination,
 - A degree of mutual respect with
 - Understanding of perspectives and needs, between Universities and Industry in India,
- so that we can get them to play effective complementary roles ??

For the Industries

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- Recognise and proactively initiate action
- Identify problems rightly suited for university involvement
 - independent, well defined scope with clarity on goals, with “lax” timetable
- Get someone involved to track progress, remove ambiguities, clear road blocks, and provide support
- Encourage right people .. Help them make transition ...

For the Universities

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- Get industry exposure to appreciate its trade offs
 - Mutual respect, seek complementary roles
- Project heads develop liking to work with industry counter parts
 - Respect commitments
- Create sensitivity to budgeting time .. and money needs – make sincere bid to get there within “the budgets”

Introspection and Discussion

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Thank you

