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University-Industry Collaboration: An Open Innovation Approach at Hewlett-Packard

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Abstract

In the pursuit of innovation, global firms try to deploy different strategies for innovation. The universities constitute a very important segment for sourcing innovation and working on pre-competitive technologies which have a long term impact. This research assesses the open innovation approach deployed by firms. It also looks at the approach adopted by Hewlett-Packard to focus on technologies which have a long term impact and developed by an open approach involving technical communities around the globe. It tracks the development of technologies such as D Space and its applications and challenges. It also looks at the strategy towards developing Cloud Computing frameworks. The other initiatives include the implementation of the Innovation Research Program spanning the universities across various countries. The opportunities and challenges associated with the open innovation approach are then suggested based on interaction with over two dozen leading academics and industry practitioners.

Keywords: Open Innovation, University Industry Collaboration, HP Labs, Research Communities.

INTRODUCTION

Globally firms are trying to move over to the paradigm of open innovation.

"Open innovation is a purposive flow of inflows and outflows of knowledge to respectively, accelerate internal innovation and expand the market for external use of innovation," (Chesbrough, et al, 2006, pg.1) (cited in Vrade et al, 2009). There is a huge debate in management literature in the last few years on the scope and implementation of the open innovation approach.

Open Innovation approach has been seen primarily in the high tech segment but there are evidences in literature of the same being implemented in other segments as well.

There are multiple approaches to open innovation:

1. Inbound or outside in Approach:

   This is the practice of leveraging the discoveries of others and entailing opening upto or establishing relationship with other organisations with the purpose to access their technical and scientific competencies for

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improving firm's innovation performance (Chiaroni et al., 2009). It also involves enriching the companies own knowledge base through external integration of suppliers, customers and external knowledge sourcing (Enkel et al., 2009).

2. Outbound or inside out innovation: Rather than relying entirely on internal paths to market, companies look for external organisations with business models better suited to commercialise a given technology. (Chiaroni et al., 2009).

Chiaroni et al. (2009) in their work have discussed multiple dimensions of open innovation of open innovation approach. They categories different dimensions of open innovation in three broad areas:
1. Dimensions of Innovation which could be:
   a. Inside Out
   b. Outside in
2. Managerial levers for Open Innovation:
   These are about the following factors:
   a. Knowledge management systems
   b. Evaluation processes
   c. Organisational structures
   d. Networks
3. The third key dimension is about the process of adoption of open innovation. This relates with unfreezing, moving and institutionalising of open innovation.

Enkel et al. (2009) have also delved upon the concept of open innovation. This involves the following two key components:
- **"The *outside-in process:*** enriching the company's own knowledge base through the integration of suppliers, customers, and external knowledge sourcing.
- **"The *inside-out process*** refers to earning profits by bringing ideas to market, selling IP, and multiplying technology by transferring ideas to the outside environment. Creating new spin offs and also splitting businesses could be a part of this process.

Vrande et al (2009, pg. 428), have surveyed the open innovation practices. They have categorized it into technology exploitation (which includes venturing, IP licensing and employee, involvement). The technology exploration is related to external networks with customers, other firms, partners, outsourcing and inward IP licensing.

Knowledge management capabilities are a key driver to a firms' ability to manage innovation processes. By considering knowledge exploration, retention and exploitation inside and outside organizational boundaries, an integrative perspective on knowledge management capabilities of a firm can be derived (Lichenthaler and Lichenthaler, 2009). They cite for internal knowledge management they discuss about inventive, transformed and innovation capacities of the firm. For external knowledge management they discuss about absorptive, connective and adsorptive capacity of the firm.

MOTIVES TO ADOPT OPEN INNOVATION PRACTICES

Based on the examples cited by Vrande et al. (2009) the motives to adopt open innovation practices could be categerised into the following:
- Exploration on next level of growth-laying big bets.
- Convergence and fusion of technologies redefing the frontiers of business models.
- Lack of internal capacity
- Optimal utilisation of external networks.
- Costs and financial efficiencies

In the pursuit of an open innovation approach, the firms face numerous challenges.These could be related with the following:
1. Management related: These include aspects such as administrative mechanisms. These also include elements of financial budgets and flexibility in the execution processes.
2. IP Policy: The IP policy could be a big impediment. Institutions world over appreciate a more open policy specially in a collaborative environment.
3. Culture: The leadership orientation has a big influence on the company's approach towards an adoption of an innovation policy.
4. Competencies and skill level of employees: They need to have a combination of knowledge and skills to implement the open innovation processes. The skills required could be strategic planning and implementation, capability to develop alliances,
5. Quality of partners: This also influences the nature of engagement with external entities. A mature environment helps to precipitate a higher level of engagement.

RISKS AND BARRIERS IN ENGAGING IN OPEN INNOVATION

Enkel, Gassman and Chesbrough (2009) mention about a study of 107 companies constituting European SMEs and large firms mentioning that firms adopting open innovation are susceptible to following risks:

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- Loss of knowledge (48%)
- Higher coordination costs (48%)
- Loss of control and higher complexity (41%)
- Barriers in finding the right partners (43%)
- Imbalance between open innovation activities and daily business(36%)
- Insufficient time and financial resources for open innovation activities

HEWLETT PACKARD COMPANY AND ITS APPROACH TO RESEARCH

HP is the world's largest IT company with a very diversified portfolio .The portfolio ranges from products, solutions, services, systems engineering, R&D, help desks and BPO. HP serves more than one billion customers in more than 170 countries on five continents. It a Fortune 14 company and aims to simplify the technology experiences for the consumers. The organization has

- 321,000 employees
- 145,000 sales partners
- 210,000 service partners

The focus is shifting from how technology performs (uptime, etc.) to what technology can deliver to the business in terms of tangible business results. Business outcomes is a very important concept and core to understanding this new era of business technology.

HP Labs drive the research at HP which is futuristic and has mid to long term impact. There was a change in leadership at HP Labs in 2007 to bring in a greater focus and channelize the research investments in areas which could result in bigger returns for the organization. These are represented in the figure below:

Figure 1: High Impact Research Areas being pursued by HP Labs

The research strategy at HP Labs is to focus on the following:

- High-impact research
- Open innovation
- Technology transfer

The research strategy show a shift from the an earlier thinking of a closed innovation approach in which all internal projects would be considered for commericalisation to an open innovation approach wherein both internal and external projects had to compete for commercialization and developing new technologies. Leveraging external resources such as research groups, business groups, universities, governments, international organizations became an important element in going ahead with research investments. Many small projects which were internally conducted were re –evaluated and these were then classified into few strategic areas as indicated in the diagram above. Bigger investments were committed to these areas.

Like many other companies, HP not only looked at research engagements in US but also in UK , Europe and Asia-Pacific among other destinations. This actually is well aligned with the global trends as indicated in the figure 2 below. The figure 2 indicates that total public and private research investments in Asia constitute almost 30.2% as compared to 36.8% in North America and 2.2% in South America. Availability of technically trained resources and lower costs coupled with incentives from the government have been the key driver for research investments in Asian region.

Estimated R&D expenditures and share of world total, by region: 2002

Source:National Science Board,Science and Engineering Indicators 2008 NSF
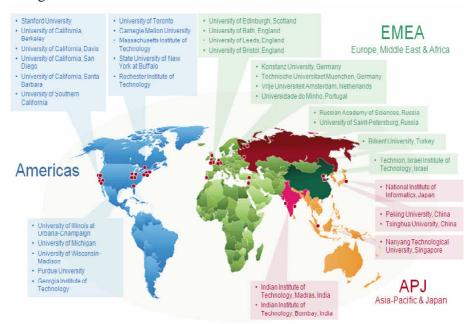
Figure 2: World estimated R&D expenditures

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The HP Labs in India has been focusing on the following areas:

- Human-Machine Interfaces
- Paper in the digital enterprise
- Simplifying the mobile web
- Technologies for Education

From 2007 to 2009 the Open Innovation Office in India helped in fostering external research alliances for HP Labs India. The Innovation Research Program(IRP) which was launched by the Open Innovation Office worldwide helped to foster the global alliances with more than 50 universities globally. The figure below gives a snapshot of the universities which have been recipients of the IRP awards in 2008 for working on the strategic areas of research with HP Labs researchers.
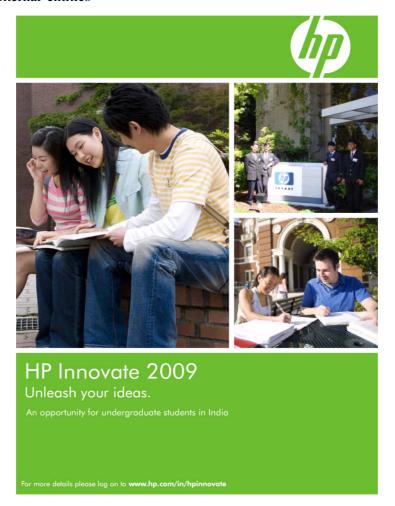

HP INNOVATE

This was another area where HP Labs Open Innovation Office led a nationwide campaign for expression of innovative ideas from engineering graduates. This was launched in 2007 and the first initiative was concluded in the year 2008. It targeted more than 200 engineering institutions. More than 300 students participated across 17 technology themes with their prototypes and business plans from all across India. In the second year of

the program the number of students which participated increased to 625. The number of submissions for various tracks increased from 100 to 206.

The objectives for the intervention was :
- To create a forum for innovation for young engineering graduates
- To create an opportunity for recognition of young engineering talent
- To explore possibilities of commercialisation by collaboration with external entities

The top teams were invited for presentations of technical papers. The winning team was taken to Palo Alto for interaction with HP Lab researchers. Explorations for commercialization of student ideas by creating an interface with venture capitalists was also explored.

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CREATING TECHNOLOGY COMMUNITIES

HP has also championed the development of open research communities to reach out to the researchers globally and create centres of excellence globally. Some of the technology communities which HP has generated are as follows:

- Gelato Federation – Linux Itanium Federation
- Digital Publishing Federation – Workflow, pilot projects, PRISM
- Tiramisu – Worldwide Grid/Utility Computing partnerships
- Planet Lab - Planetary scale overlay network
- Archiving - DSpace and DMP
- Mobility – Applying mobile technology in learning environments
- Nanotech – Support HPL research with large University alliances

THE FORMATION OF DSPACE

D space is a technology which was developed by HP Labs and MIT to improve the accessibility of archived digital data through the use of open source technologies. DSpace is an out-of-the-box open source repository application for delivering digital content to end-users. Today there are over 750 digital repositories using DSpace software. Globally it is the most widely used open source repository software for institution repositories and open access repositories. DSpace has been installed all over the world by organizations, especially libraries, as a way to provide access to research output, scholarly publications, library collections, and more.

The DSpace application has many features and tools for managing digital content and enabling digital preservation. DSpace stores any type of content and offers built-in workflows for content submission and review. Organizations can easily make their digital collections.

In India the community was brought together in 2007-2008 by way of symposium involving leading academic institutions and public sector organisations . National Informatics Corporation also participated which comes under Ministry of Information Technology India. There was a a pilot conducted for digitising the proceedings for Upper House of Parliament. This had to be then scaled to Lower House of the Parliament, Supreme Court as well as all State level legislative assemblies. A Centre of excellence was set up by at Chennai by NIC with some support on technology from HP jointly making investments and pilot testing some of the applications.

Some of the D Space Installations in India are:

- DSpace at NCL (National Chemical Laboratory, Pune, India)
- Vidyanidhi Digital Library & E-Scholarship Portal, University of Hyderabad (India)
- Dspace at Delhi College of Engineering,Delhi
- ETD of Indian Institute of Science, Bangalore (etd@IISc), India
- Indian Statistical Institute, Library, Bangalore, India
- Information And Library Network Centre (INFLIBNET), India
- Librarians' Digital Library (LDL) at DRTC, Indian Statistical Institute, Bangalore, India

CLOUD COMPUTING INITIATIVE

Open Cirrus is a cloud computing testbed that, unlike existing alternatives, federates distributed data centers. It aims to spur innovation in systems and applications research and catalyze development of an open source service stack for the cloud. (Avetisyan et al., 2010)

The global testbed was launched in 2008 and has now 10 members. Each of the 10 current sites consists of a cluster with at least 1,000 cores and associated storage. The testbed offers a cloud stack consisting of physical and virtual machines and global services such as sign-on, monitoring, storage, and job submission (Avetisyan et al., 2010).

The preparation and launch of such an open-innovation effort required a federation of efforts from all the participants. In such a community, each members brings its unique capabilities (in terms of infrastructure, people and knowledge) and the assumption is that the sum of all these contributions will build a unique result that no individual member could achieve alone.

LEARNING FROM HP LABS OPEN INNOVATION EFFORTS

There is a lot to learn from early open innovation efforts at HP and other companies. There is a need to balance the stakeholder's expectations. There are numerous stakeholders and each one of them have their own expectations. The key stakeholders being:

1. University
2. Industry
3. Government and other International Partners

Each stakeholder struggles with different challenges such as the following:

1. University community

The universities struggle with the following resources and also their priorities are related with generation of IP and top tier research as well.

- Funds
- Resources- manpower
- Equipment- maintenance and other technology challenges
- Publications, patents, commercialisation
- Peer review based reward system
- IP

2. Industry

In any collaboration industries mostly assess the resonance of the initiative with the vision and also the return on investment on the their investments, time and other resources spent. Important parameters are:

- Industries own outcomes in terms of influencing the vision
- IP and commercialisation
- Return on own investments
- Goodwill and relationships

3. Government and International Partners

The government is concerned with the impact on society or industry as an outcome and how will it contribute to the nation's developmental initiatives. In their investment priorities they will always look for the following:

- Big and transformational partnerships and investments
- Challenges with the bureaucratic hurdles
- Involvement of multiple institutions
- Pilot testing with smaller sums of money is challenging
- Relationships play a key role which are nurtured over very neutral platforms by demonstrating capability and excellence.

Considerations for deploying effective partnerships

COLLABORATION CHEMISTRY FACTORS

Whenever collaborations have to be fostered with multiple stakeholders, it is very imperative that local conditions and approach of the universities and governments should be taken into account. The differences in approach across geographies are so stark that the initiatives have to be tailored to local requirements (Glion)

- ž In BRIC nations, the initiatives around curriculum development, technology alliances and training interventions are more important rather than in developed countries where thought leadership in key technology domains is a key priority.
- Attitudes of people reflected through institutional communication plays such a big role in success and failures of the partnerships.
- Leadership and industry standing influences the strategy.
- The organisation factors such as structure, culture, rewards and resources are a key influencer in realisation of the innovation vision of the organization.
- Complexity of matching leadership aspirations for research and country level approach.
- Approach of the researchers and research leadership towards commercialization and investments and IP issues.
- Networks play a big role in setting up technology communities.
- Ultimately it is the passion for research achievement and community solutions that brings diverse groups and cultures together for mutual success.

REFERENCES

Avetisyan, A. I. et al. (2010) 'Open Cirrus: A Global Cloud Computing Testbed', Proceedings of the IEEE Computer Society, April.

Chesbrough, H. and Crowther, A.K. (2006) 'Beyond high tech: early adopters of open innovation in other industries', *R&D Management*, 36:3, 229-236.

Chiaroni, D., Chiesa, V. and Fratlini, F. (2009) 'The Open Innovation Journey: How firms dynamically implement the emerging innovation paradigm', *Technovation.* Doi: 10. 1016 2009.08.007 Elsevier: Science Direct Database.

Enkel, E., Gassmann, O. and Chesbrough, H. (2009) 'Open R&D and Open Innovation: exploring the phenomenon', *R&D Management*, 39:4, 311-316.

Lichtenthaler, U. and Lichtenthaler, E. (2009) 'A Capability-Based Framework for Open Innovation: Complementing Absorptive Capacity', *Journal of Management Studies*, 46: 8, 1315-1338.

The Glion Coloqium www.glion.org

Van de Vrande, V., et al. (2009) 'Open Innovation in SMEs: Trends, motives and management challenges', *Science Direct, Technovation,* 29: 6-7, 423-437.

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