Financing Technology Startups: an Entrepreneur's Dilemma

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Aluru Karthik Prasanth was excited about his meeting with Dr. Kumar. Walking briskly on Delhi Avenue in the IIT Madras campus, Karthik reached Dr. Kumar's office at the Department of Management Studies well on time. As he waited to be called in, Karthik was aware this was a watershed moment in his life. Karthik was at cross roads; he had to decide what he wanted to do in the next few years. He had just completed his engineering course in Computer Science from JNTU Hyderabad, India. He had topped the Graduate Aptitude Test in Engineering (GATE)[i] in 2011 which meant he could walk into any of the premier institutes in the country to pursue a Masters in Technology (Exhibit 1). Karthik was very clear that after completing his education he would pursue a career in India, and do something different at that. Appearing for GRE/GMAT and pursuing graduate studies in the US which seemed to be a craze preoccupying his peers did not appeal to him at all (Exhibit 2).

Dr. Kumar, renowned for his ability and passion for nurturing entrepreneurial talents was also famous for his punctuality; he called Karthik as the clock ticked 4pm. After welcoming Karthik warmly, Dr. Kumar gently steered the conversation over to Karthik's dreams, aspirations, abilities, and a whole lot of exciting possibilities. Long after, Karthik would remember this conversation as one of the most stimulating and motivating conversations he has ever had.

As Karthik discussed his career plans with Dr. Kumar it became clear that he was not cut out for a regular, structured, safe path of pursuing a Masters degree and then taking up a job in a secure IT company. Karthik told Dr. Kumar how during his

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engineering college days he had started publishing a magazine solely aimed at budding engineers; it was his first entrepreneurial venture. But after a couple of issues the magazine had to be folded up, as the initiative requirement additional investment in both time and money, which Karthik could not afford at that time. Dr. Kumar could identify the zeal and enthusiasm in him to become a successful entrepreneur.

An hour long discussion with Dr. Kumar regarding the various options available to him, helped Karthik to get things in perspective and he decided to opt for an MS degree in Entrepreneurship at IIT Madras as the most appropriate path for him. The program MS (Entrepreneurship) is designed such that it nurtures the entrepreneurial talent of the students and gives them the opportunity to experiment with their ideas and incubate the entity. Enrolling for the program would give Karthik the chance to learn from the best in the field and at the same time sharpen his technical and managerial skills. With his own original idea and articulation of his career goals, Karthik secured admission to the program and decided to follow his passion of becoming an entrepreneur.

The Project Idea

Karthik was interested in developing and commercialising an IT product. One of his ideas, which he has named "Dhara", is a peer to peer framework for video on demand over the Internet" (Exhibit-4). Online video, a recent phenomenon both on the Internet and the private networks, has seen steady growth over the past few years. Online video offers its consumers an active on-demand access to the videos over the network, unlike the traditional video viewing on television wherein one watches content broadcast by the channels. This new phenomenon of online video, due to its on-demand nature, not only requires specialized hardware but also consumes enormous amount of bandwidth, thereby putting constraints on the content distribution model of the networks. The regular centralized distribution

approaches to online video has issues with scalability and performance due to the bottlenecks in bandwidth arising at the server end. Accordingly, new adaptations have come in the content distribution network chain to optimize the quality and cost of online video services. Depending on the nature of the online video service, various decentralized distribution mechanisms have been proposed in the past and are now in the early stages of adoption; one of the approaches includes a peer-to-peer supported distribution system.

As per the plan discussed with Dr. Kumar, Karthik joined IIT and apart from crediting the basic courses in management he spent time in fine-tuning the project idea. In addition, he was also constantly discussing the possible project ideas with the faculty of both the computer science and management departments. Karthik was also bouncing his ideas with other incubates in the Department of Management Studies and with some of his seniors in the MS (Entrepreneurship) program who were at different stages of idea development, financing and commercialisation.

Karthik started crediting courses on new venture financing (Annexure-1) as part of MS and was quick to realise that for an entrepreneur, financing a new product in a timely fashion makes the difference between survival and going out of business. It was very evident to him that many new firms start with their own resources before contacting outside investors such as banks and private equity investors. The course helped him realise that debt financing for a new venture is not an option as they are yet to realise profits or have assets to mortgage. Consequently, entrepreneurs tend to rely on four broad sources of financing: personal funds, venture capital funds, angel investors and corporate investors. Personal assets, such as savings, re-mortgaging personal property and credit cards are the most common initial sources of funding for small businesses. He also learnt that the entrepreneur's friends and family form the best and first source for both loans and equity deals as they are typically less stringent regarding credit and expected return on investment. The next

best option was personal savings, the most-readily used source of funding a new business with no interest or penalties for withdrawal. Further, formal sources of funding for start-ups are Angel investors who fill the gap between personal funds and venture capitalists. Angel investors provide capital at a much earlier stage and generally provide only few post-investment support services. Another important source is from corporate investors investing in a variety of ways, including direct investments via corporate venture funds and indirect investments via independent venture funds. The last source of possible funding is Venture Capitalists which has become an increasingly popular source of funding. Venture capitalists expect to provide a variety of support services to their portfolio companies, including developing a business plan, assistance with acquisitions, help facilitating strategic partnerships, and the design of employee compensation plans.

With a clear grounding on financing part Karthik wanted to gain basic knowledge on the different "Innovation to commercialisation" models which prompted him to credit a course on 'Business models' (Annexure-2). He spent considerable time in understanding the different commercialisation models. Karthik started with Randall Goldsmith's[ii] commercialization model which is a road map of strategies and actions for the commercialization of advanced technologies. The model provides twelve activities that describe the process to maximize the chances for business success. The next interesting model on commercialisation was that of Andrew and Sirkin's model[iii]. The model is divided into a couple of phases with the two initial phases corresponding to idea generation (research and development, conferences, etc.) and commercialization, investment in the project is deficient (cumulative cash). The model also addresses issues of indirect benefits derived by exploitation of intellectual property rights through royalties on patents and copyrights. The model of Rothwell and Zegveld[iv] shows that commercialization is an integral and critical component of the innovation process. After going through various models Karthik

finally learned the importance of product innovation and how it is about exceeding customer satisfaction.

As a next step Karthik decided to have some focused group meetings with current incubates and with entrepreneurs incubated out of IIT Madras, some of whom had started IT product ventures. He also decided to study three enterprises on their journey from "idea to commercialization" to get a thorough understanding of issues faced by the entrepreneurs at different stages of their journey. He chose two IT product companies and one IT services entity. Of the three, two were close to ending incubation and beginning full scale operations and one was an entity which had crossed the initial stages of operations and was successfully commercialised.

Site 1: SamekshaShali to Bodhbridge

The first enterprise Karthik chose was Bodhbridge - Mr. Balaraju's second venture. Balaraju, who had just completed his MS (Entrepreneurship) at the Institute had started a venture called 'SamekhsaShali' to develop IT security products for banking and insurance related operations, and the focus was completely on Internet security. The promoter had filed four patents for the product. With the initial prototype and filing of patents the promoter felt the need for an additional investment of Rs. 500,000 if he were to go ahead with commercialisation. This included his own cost based on the time he would be spending, development cost and other expenses. He made several unsuccessful attempts at attracting funding for the commercialization.

Balaraju initially contacted banks and financial institutions for obtaining funds. When the bankers realized that what Balaraju required was product funding, they wanted to see something physical or tangible which they could hold as security to disperse funds. He found that despite the IT boom in India, the traditional financers were generally not used to accepting a product idea and funding it. In this situation Balaraju approached Angel investors, but they too developed cold feet; they wanted

to see the proof of the concept, the possible client list and the time frame for an exit before funding. They were more comfortable funding an IT service entity as the risk involved was relatively low and the gestation period was less as compared to an IT product. The promoter felt that India is not the place for IT products as they need sustained financial support for a long period. Balaraju felt that the same idea or a product in the same space would have fetched him millions of dollars in the US as there were similar products at that time there, which were attracting funds.

When Balaraju could not get funding he focused on attracting a partner. The promoter also felt that even if he got Rs. 250,000 from an Angel investor, it would solve the problem only for a limited period as there would be a constant requirement for funds till the revenue stream started; and this took months or even years in some cases; hence his search for a partner.

Also, the risk factor associated with starting a venture was another reason why Balaraju was not confident. As a graduate fresh out of college he lacked experience and was not confident about his ability to take it to the finish; and so he did not pitch with his product for the Angel funding in the bay area. Thirdly, there was actually not much money flowing into India for these products from the US; and finally he also felt that this space was becoming big and the industry was maturing. Even to bid for a product one required a 500 million rupee company because bigger players had started emerging in the market. There was no space for smaller players in the product space and finance also did not happen easily.

As Balaraju could not get the required funds to mature his product suitable for commercial use, his search for a partner intensified and finally Lazersoft (a Polaris company) joined the fray. After discussions with Lasersoft it was agreed that Balaraju would spend 50% (measured in terms of his time and others aspects that went into developing the basic product) and Polaris would spend the remaining 50%

for commercializing the product. Thereby Balaraju sold the product to Lazersoft who productised it. Their first sale happened after one and half years, but this wait was a little too long for the entrepreneur; in the meanwhile he had started dabbling with a couple of things and hit out at the next idea.

After toying with various ideas, Balaraju launched the portal *Btechguru.com*[v], which started as a free social site without any business interest. To his surprise the site was getting a lot of hits and therefore he decided to turn it into a business idea. He named the venture "Bodhbridge"(current venture) and provided online educational services. The objective was to edit materials available in the IIT local area network, help those students aspiring to pursue higher education abroad with visa interviews, recommendation letters, and also creating discussion forums for enrolling into M.Tech courses and to institutions like NITs and IITs. The initial capital requirement of Rs. 3 to 4 hundred thousand was raised through friends and from the reward money from winning business plan competitions.

Balaraju quickly realised that there was no big player in this space and that he could easily pitch the market for any college. Bodhbridge continued to grow and became one of the big players in this segment. That was a shift form a product company to a more service oriented company.

Funding requirements were clear; the promoter required about Rs. 50,000 to Rs. 100,000 every month to meet his working capital requirements as most work was service based. He was mainly operating with interns from IIT. Balaraju was very clear that this time around he was not approaching any bank or financial institutions for funding but was rather going to manage with internal accruals or Angel funding, if he got one. He felt that the time he would spend in processing the paper work for funding from financial institutions would be better used for getting more business. There was some publicity to attract these funding options also. The promoter and

the portal got covered in Economic Times which prompted an NRI investor to contact the promoter through LinkedIn and also fund the project based on discussions, business plans and his own valuation. The valuation of his company made by the promoter when he was approached by the NRI Angel was about 14 million. Based on his understanding of operations in the Bay area a pre-money valuation of 5 to 10 million was reasonable; and on a revenue based model about 10 times the revenue would be reasonable. The promoter anticipated revenue of Rs. 1 to 1.5 million per month from the business. The NRI investor gave him about Rs. 1.15 million in 2009, as he was very clear about the space he was investing in and was confident that the promoter had a thorough understanding of the business end to end.

For possible additional funding Balaraju pitched the business plan to 10 venture capitalists by participating in an investor's summit in Bombay where he was given 20 minutes to make a presentation. No funding came his way because many of the investors had not seen the space; they felt that it was not a scalable model and would not work. At this point Mr Sudhakar Ram, an Angel investor, who liked the plan entered the scene. An HNI (high networth individual), he first funded about Rs. 2.5 million in 2010, but since the promoter required Rs. 8 million of funding, he promised to give more money as business grew. This funding gave Balaraju a much required impetus.

The entity got to a good start and they were developing new products at every stage and for every product the requirement was only around Rs. 500,000 to 800,000, which was managed from internal accruals. Till 2010 and 2011 the progress was very slow, so Balaraju decided to move on and looked around for aggressive funding as he needed to develop big products. The two years that he had spent in this space had taught him many things and by then he had 3 to 4 products ready- localguru, btechguru and nptel - all based on service revenues.

In addition, Balaraju had a close association with many colleagues who were his customers and with whom he had built long term relationships; now he was looking to develop the 3 to 4 future products, which he believed were good and would take the company to next level. The promoter believes that he will not change the target market and would remain in the same space as it is all based on his relationship with the engineering colleges where he has a strong presence.

Site 2: Vdime Innovative Works (1000 faces)

Debt financing for a software product does not exist in our country. Software product is a sin and an investor in software product is a sinner - that is how the bankers perceive. They are willing to invest in a service driven activity. Service models get funding but not product startups.

--Vasan, Promoter of Vdime

The second company Karthik studied was Vdime innovative works, which was also incubated at the department of management studies, IIT Madras. Vdime Innovative works specialised in face and hair make over products. This product is the brain child of Vasan, a Java architect in the US, who after having worked for almost 10 years decided to set up something on his own. Vasan had developed a technology product, which could be used either for face makeovers or for hair-dos. The product was loaded on to an ipad using an application developed by Vasan. The photograph of the person who wants a hair-do or a face make over done is captured on an ipad. The software has a pallet for selecting hair-dos; each of these hair-dos can be applied on to the photograph so that the person gets to see how he or she would look with that specific hair-do. This is also applied for a face makeover, where every aspect of the makeup can be adjusted or modified to suit the person's preferences or features. The uniqueness of this product is in that it helps one to view how he or she would

look with different makeovers and then select the right combination of these makeovers, before actually trying them on.

Before Vdime, Vasan promoted a product called Humicon in January 2008,, the result of the efforts of five people whom he had recruited from rural backgrounds to write code for him. At that stage, to meet the expenses in terms salary and other running costs Vasan required about Rs. 100,000 per month ranging up to approximately Rs. 1.5 million a year. Vasan knew that in India he would not be able to raise funds from external sources for an IT product, so he was prepared to fund the entire operation on his own from the very start.

When Humicon was launched in November 2009 it became clear that it was not going to make money but could help in developing other ideas. In fact, the first sale happened only after 2.5 years of starting the company. Vasan claims that, with help from his relatives, till date he has spent close to Rs. 18 million. He used to work in US for three months and move back to India for another three months to fund his venture. The whole aim at that stage was to save Rs. 5 to 6 million to fund this project till it started generating cash, and once the cash flow started he quit his job to devote all his time on the project.

Vasan's experience suggests that in India everybody wants to fund a service kind of business model with guaranteed revenue. In the case of Humicon, initially a lot of work was done to bring in more players; but then the bankers always came up with reasons for not funding it. Till November 2010 it was rough going for the entire project. Vasan demonstrated the product to all the professors in the computer science department of IIT Madras and he elicited comments and ideas on how to generate money from the product. The advice he got from most of them was that he should immediately to sell it to RAW, Immigration or Intelligence. It was at this point that a small girl with wheatish complexion asked him to do make up on a

photograph of hers, and that gave the idea for Vdime. Humicon was allowed to die and the new idea was developed. The first demo happened in January 2011, and subsequently Vdime Innovative works was born.

All the major technical inputs for the product, including the algorithms came from Vasan. In January 2010 the virtual make over kit was started, and in December 2010 Vasan launched '1000 looks', the product of Vdime, for which, instead of focusing on the web based version he focused on iphones and ipads, driven by the innovation from Apple. The product development expenditure for '1000 looks' was in two parts: First was infrastructure in terms of a Mac mini or Mac book pro, about 5 to 6 laptops, and 3 to 4 iphones, which cost about Rs. 600,000, (the cash burn per month was about Rs. 250,000); and second was the development cost, which amounted to Rs. 150,000. This brought the total expenditure including the capital equipment to about Rs. 2.5 million. Initially the plan was to do a vanilla version online, wherein one could upload a photo and try various combinations on the website. This was the B to C model which subsequently failed.

Vasan subsequently tied up with Schwarzkopf[vi] for marketing the hair-do product. The limiting clause in the agreement between the two entities was that he couldn't sell it to Schwarzkopf's competitor L'Oreal. Vdime only provided the technology but the exact features were worked out by the client company; in this case Schwarzkopf. For example, the knowledge of hair colouring is specific and unique, it involves chemistry and the combinations are worked out with molecules and particles - these inputs are given by Schwarzkopf to suit their products.

Another product, 'Facemakeover[vii]' is now being tested in Health and Glow outlets. Currently, women who want to buy cosmetics, see the industry booming but there is no standardization. Usually the cosmetics shops advise women to try it on their hand, to be precise their fist. The skin color in the hand and face are usually

different. The shade on the hand/fist will look at least 30% lighter than it appears on the face. The second aspect that affects this sort of trial is that when the product is tried on the hand there is no direct light falling on the hand, whereas usually there is direct light on the face of a person, thus making the same shade look different on different body parts. With 'Facemakeover' even the nail polish shade can be tried on the picture of the nails and see how it would appear. The skin tone of the model's hand in the screen can be adjusted and various combinations of nail polish can be tried to select the one matching the skin tone. Even glitters can be added to the nail enamel and both can be adjusted to suit the skin tone. The company has extended this feature in the case of jewellery too. Similar to the Facemakeover one can check out how s/he would look in specific item of jewellery or with a various combinations of jewellery like pendants, chain, ear ring, necklace etc.

Vasan has spent Rs. 5 million and has learnt a lot from his mistakes. He now needs about Rs. 350,000 to 400,000 per month to survive for one year; and to generate this he has pledged his home for Rs. 3 million, which would take care of financial needs till December 2012. When his revenues comes down to Rs. 10 million, Vasan intends to tap Venture Capital funding primarily for scaling up. Getting funding at that stage, especially for scaling up, would be good as valuations would not be too low. According to Vasan, Indian venture capital firms are busy funding ecommerce where they feel there is absolutely no risk - they invest 'X' now to get X + or 2X in the subsequent month. For Vasan's products, it would roughly take about three years to get returns. Most of the investors in our country do not like to wait for three years; they like to see immediate cash flows. These products have various applications but the focus of this company is only on virtual make over.

Vasan's expectation of VC funding is to the tune of USD 10 to 15 million; he wants to essentially tap the market in different countries. Later this year Vdime is expected to touch revenue of Rs. 10 million which will enable Vasan to tap the venture capitalists.

After 3.5 years, Vasan believes that this year is going to be a turning point or path breaking year. Karat Lein, the biggest jewellery online store has indicated that their conversion rate is less than 0.2% of hits. In one of the up-market beauty salon's in Chennai, Vasan had a demo for two days and was seen by 8 people during that period; they were able to convince two to change their hairstyle and one to go for hair coloring. The salon's revenue was about Rs. 5000/day, which was enhanced by about Rs. 4000/ day with the new product.

According to Vasan, to raise 10X million he needs to have strong base, and he is working on that now. After seeing the product, the VCs are chasing him now, but Vasan argues that they are not buying the product, they are just eying his impressive list of potential customer base and some tie-ups, for which they are prepared to queue up.

Site 3: Rails Factory

The third entity that Karthik decided to study was an enterprise that did not enjoy the advantages of having been started in an incubation centre, so that he could get a good idea of the ground realities. He chose to study the Rails Factory based in Chennai. This company was started by Senthil, a college dropout who was deeply interested in computer programming. Senthil, a hardened net surfer, was keen to learn new technologies. During one of these pursuits he hit upon an application development using the *Ruby on Rails*[viii] platform.

Senthil had been dabbling with various ideas. In fact, he had opened an Internet browsing centre about a decade ago in Tirunelveli, a large district in Tamil Nadu, in south India. Though he was constantly discussing business ideas with his friends, he did not actually make the start or shift. With the proliferation of computers in every household Senthil soon realised that operating a net browsing centre was not

profitable anymore. He then took up a job with a lesser known IT firm; in the next two years, he changed jobs and worked in a couple of firms, but he was unhappy because being a college dropout he was always getting a raw deal, although technically he was over skilled for the jobs. This put a lot of mental pressure on him and during one of the business idea discussions with his boss he put forth the idea of working on Ruby on Rails which was not only brushed aside but also cost him his job finally.

That was when Senthil decided to start a venture on his own again. He started the outfit with the one laptop that he owned; the plan was to develop a platform on Ruby on Rails. In the meanwhile, Senthil was also scouting for clients who would be willing to give him projects on Ruby on Rails. He used his savings of Rs 20,000, which he had built over the previous two months, to rent a small 2 bedroom apartment as office space. At that point of time there were only 2 machines, one his laptop and another, a desktop given by his friend. After working very hard and making extensive efforts for more than a month, Senthil and his friend managed to get a small project which they felt would help them sustain the current level of operations for a couple of months. They required work force but they did not have the money to pay salaries. They tried to hire some interns, who they thought would help in development, but the problem was that they had to be first trained on Ruby on Rails before they could handle projects. The situation became complicated when a couple of interns joined and then quit soon after. Senthil had rented couple of computers for the interns, which had escalated his monthly outflows. This put him in a very tricky situation as he required hands to work but could not employ anyone because of lack of funds.

Senthil did try to raise capital from various sources but was quite unsuccessful. The banks were a clear no go. Other financial institutions wanted a guarantor. The Angels and VC's wanted a clearly laid out business plan with a client profile and

moreover they were also not very sure about this specific technology. The only way Senthil could expand his business was by getting more projects and work on it alone - this again posed a problem because clients were not willing to give projects to individuals. In this juncture, Senthil was advised to incorporate the project into a company - thus Rails Factory was born. This was indeed a fortuitous move because Senthil slowly started getting small projects. He decided to employ people as and when he got projects. His first employee was his cousin who had just finished her engineering and was looking for a job. Once he started getting more projects, Senthil started augmenting the manpower, and gradually it touched 14 employees. It was now that Senthil decided to aggressively expand the operations. But even at that stage he could not raise finance because:

- He was a college dropout without any University degrees, which was a major issue for investors.
- Technology was quite new which did not infuse confidence in the funders.
- He did not have a professional setup.
- Funding agencies wanted to see the complete client profile.
- He had not worked for any of the big companies.

These problems were universal be it banks, financial institutions, angels or VC'S. From a two bedroom flat Senthil now moved to a community hall which was under construction. He operated on the same policy of recruiting and training staff as and when he was getting projects so that he could fund his project purely through internal accruals. Within a span of 11 months Senthil had employed 45 people and he started looking for a better place. He again shifted his office to a building which could accommodate about 80 seats; he continued to focus on the same Ruby on Rails platform for which there was sufficient demand. Senthil felt that since there were very few people who were trained on Ruby on Rails he could cash in on that as he had the first mover advantage. His growth in terms of the number of employees was directly linked to the number of projects that he was getting. After moving to this third office, for the first time Senthil managed to get a bank loan of about 10% of his

company's turnover. Although his clients were very big players in the market, he had a very low bargaining power given the size of his outfit. Now he was getting more and more projects but was finding it very difficult to attract talented staff because of the low scale of operations, non-professional management, poor ambience and location of the Rail Factory. After about 11 months in the third location, armed with good projects, and with revenues multiplying around four times, Senthil decided to spruce up the entire outfit and put it on a fast track. He decided to move to an 18000 sqft space in the heart of Chennai, convert it to a professionally managed organization by appointing professionally qualified managers and making the entire operations process driven. Senthil again approached a bank; even at this stage he could borrow only about 12% of his turnover which was again used for furnishing the new outfit. Rail Factory moved to the new location on November 2011 and now has 150 staff with capacity to scale up to 250. The second bank loan was possible purely because of the impressive list of clients; and a turnover growth of about 50% also obviously helped. Now Senthil feels that he can attract banks, VC's and other sources but he is not interested as he may have to forego a huge stake which he has built very carefully over time. In fact Senthil is confident that he can manage without any external funds and would rather look at the option of exiting in the next couple of years.

The THOUGHT

Karthik observed with interest that in all the three cases, irrespective of the place of incubation, the problem of funding was universal. Two of them had very good product ideas to start with but found it extremely difficult to raise funds despite very strong professional advocacy. In fact, the problem faced by all the three was identical when they approached the banks / financial institutions with the product idea because in India these institutions are only used to lending to the manufacturing sector which is able to show assets in the form of plant/machinery/building/stock/ etc as security. In the case of software products

there is no physical asset that can be produced as security and when these institutions do not see a physical asset they are confused, and this affects approval of loan. The VC's and Angel funding agencies operating in India prefer to invest in a business where they see a clear line of expected cash flows, list of client profiles and very strongly projected turnovers. In addition, they are also vary about investing in new technology/ software products, and would rather invest in an IT service provider where the revenue generation is faster and almost guaranteed. The gestation period for revenue generation for a software product firm is far higher compared to an IT services firm.

In the case of Balaraju's outfit, though it started as a product entity, it could not sustain due to financial constraints. This prompted him to shift to a software services entity which has helped the company attract Angel and VC funds. In Vasan's case, he was very sure right from the start that he would not be able to attract funding and so the entire investment was made by him. Since he was very focused and believed in the efficacy of the product idea, he stuck to it; now with the product being commercialised and with his impressive client list, Vasan is possibly able to attract VC funds. In Senthil's case, the issues were no different, rather they were even more complicated because unlike the other two, there was no professional outfit backing him.

Karthik's Dilemma

Now Karthik is facing a very tough situation – he has to take a call on whether or not pursue his original idea. He searched for some recent market research studies and found that access to finance might be easier in near future (Exhibity-4) and IT and telecommunication sectors provide most attractive opportunities for entrepreneurs in India (Exhibit-5). A recent NASSCOM[ix] survey also reported that Indian IT firms showed growing revenues from software products business (Exhibit-6). However he is a little worried given the experiences of his friends in pursuing a product entity.

The question that is bothering him is, should he stick to the idea of a product entity or should he shift to some other idea on IT services which would enable him to attract funds more easily. Karthik is clear that his heart is not in services and he would not be very excited in starting a services outfit. The other option is to repeat what Balaraju did but in the reverse direction – start a services outfit and with the revenues of the services outfit shift to a product space. The question is, would that kind of reverse shift be possible? Would he have the time to pursue it? Will the product idea wait till then and to top it would he be really enthused to operate a services outfit?

Karthik has just completed his education and clearly has no savings. Though his father is a senior executive in a commercial bank, he is very clear that he is not going to put his father in an embarrassing position by asking him to use his bank to fund his project. At most Karthik's father can support him to the extent of Rs 500,000 to 600,000 of personal funding to start the venture. Karthik's mother, a homemaker is keen to see her son succeed and do well in the next few years. His only sibling, who is younger to him, is pursuing her graduate studies in the US. There is no other additional informal source from where Karthik can borrow funds. The obvious advantage he had was to get his company incubated in IIT, which would save him cost on physical infrastructure in terms of space, communication and power.

Karthik felt it was time to meet his mentor, Dr. Kumar once again.

Exhibit-1: Trend in number of candidates appearing for GATE

Source: Banerjee, R. and Muley, V.P. (2008), Engineering Education in India, Department of Science and Engineering, Indian Institute of Technology Bombay.

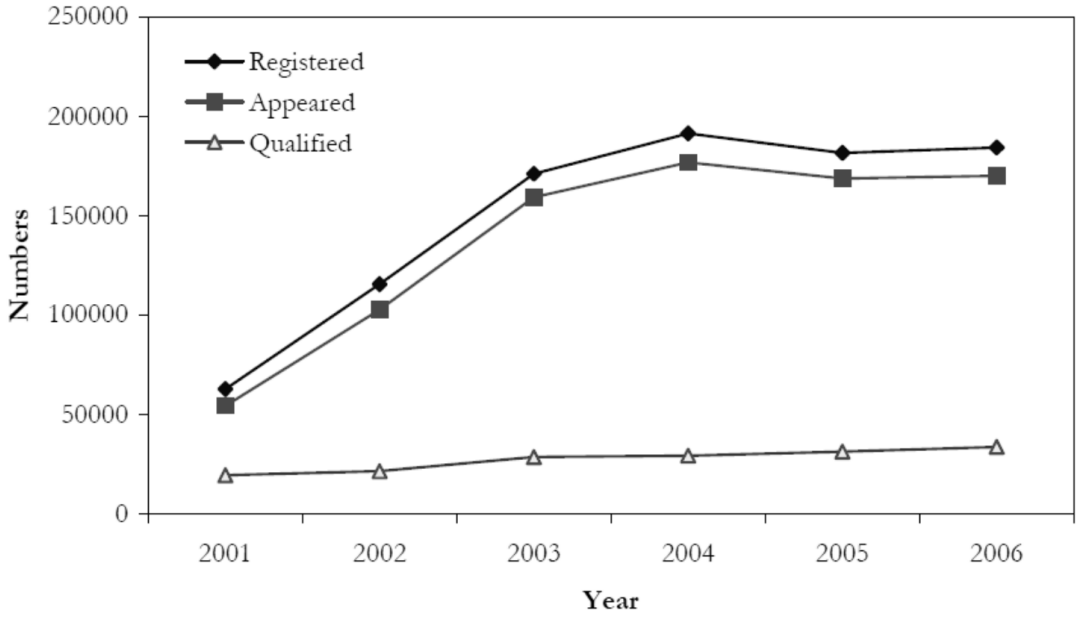


Exhibit-2: GMAT tests by testing year and age

Source: Roads destination success, http://www.edroads.com/our-services/study-abroad-test-prep/gmat/about-gmat/gmat-statistics/

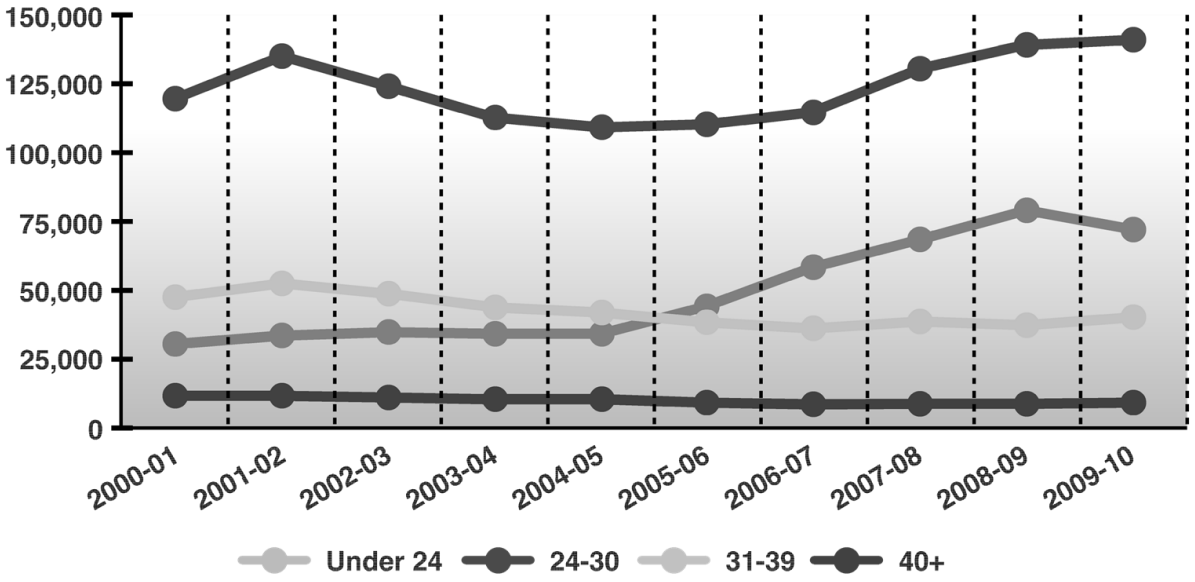


Exhibit-3: India's higher education and GDP

Source: Banerjee, R. and Muley, V.P. (2008), Engineering Education in India, Department of Science and Engineering, Indian Institute of Technology Bombay.

Year	Population (Million)	GDP (000 crore)	Graduates	Masters	Doctorates	GDP/mPop	E/mPop
BAU							
2007	1112	2838000	237400	19900	1030	2553	214
2012	1223	4760000	502700	38100	1465	3893	411
2017	1324	7324000	901600	54700	2300	5532	681

Exhibit– 4

Project Proposal

DHARA: A PEER-TO-PEER FRAMEWORK FOR VIDEO ON DEMAND OVER INTRANETS

Online Video, a recent phenomenon both on the Internet and on private networks, has seen steady growth over the past few years. Online Video offers its consumers an active On-demand access to the videos over the network. This is unlike the traditional video viewing on television which provides an experience where in one can sit back and watch the contents broadcast by the various channels. The On-Demand nature of Online Video not only requires specialized hardware but also consumes enormous amount of bandwidth. Hence, this new phenomenon of Online Video has put a strain on the content distribution model of the networks. The regular centralized distribution approaches to Online Video has issues with scalability and performance due to the bottlenecks in bandwidth arising at the Server end. Accordingly, new adaptations have come in the content distribution network chain to optimize the quality and cost of Online Video services. Depending on the nature of Online Video service, various decentralized distribution mechanisms had been proposed in the past and are being adopted at present. One of such decentralized approaches includes peer-to-peer supported distribution systems.

Peer-to-peer systems have the inherent advantage of being scalable and cost effective in distributing large content over the networks. However, when it comes to streaming of Online Video (which is termed to be 'video streaming'), peer-to-peer systems have some inherent disadvantages viz. unreliability (peer failure and unreliable capacity) and limitation in bandwidth capacity. Implementing video streaming using peer-to-peer systems needs optimal utilization of resources at the peers, namely bandwidth, storage and computing resources. Unlike traditional file distribution, where content can be downloaded in random parts and assembled together at the end of the process, video streaming requires that the video content be downloaded sequentially within a limited and small time window. This real-time nature of video streaming, coupled with the resource intensive nature of the video service and the networks, pose interesting technical challenges. In this thesis, a peer-to-peer based framework for providing Online Video services over the intranets called Dhara has been proposed.

Though there are few successful instances of P2P VoD over the Internet, the platform that enables network operators to offer P2P based VoD service within their intranets does not exist. The rising need for a cost-effective VoD solution at a local level has not received the required attention. This is especially true in the case of the Indian market which is riddled with Internet service problems, thereby limiting the utility and experience of VoD solutions. Many organizations and institutions are seeking software/hardware solutions to implement VoD within their LANs or intranets. Dhara can be used create a viable product for a niche market segment like educational institutions that provide NPTEL videos to their faculty/students.

Dhara can be extensively tested before it is ready to be rolled out. For the purpose of hosting NPTEL courses in LANs, Dhara can be primarily targeted at educational and engineering institutions. According to AICTE there are about 2388 recognized engineering colleges across India. Based on some detailed estimates the cost of developing the Dhara framework is Rs. 1,584,000. The estimated cost involved in commercialization of the product over a period of 2 years is projected as Rs. 2,071,500; the estimated revenue over a period of two years is

Rs. 4,024,400. Break Even Point is expected to be reached well within the second year. Gross Profit at the end of three years is calculated to be Rs. 3,150,586.

Exhibit-5: Growth opportunities in various sectors of the Indian economy
Source: Gamster, N. (2011), The Legatum Institute Survey of Entrepreneurs, India 2011.

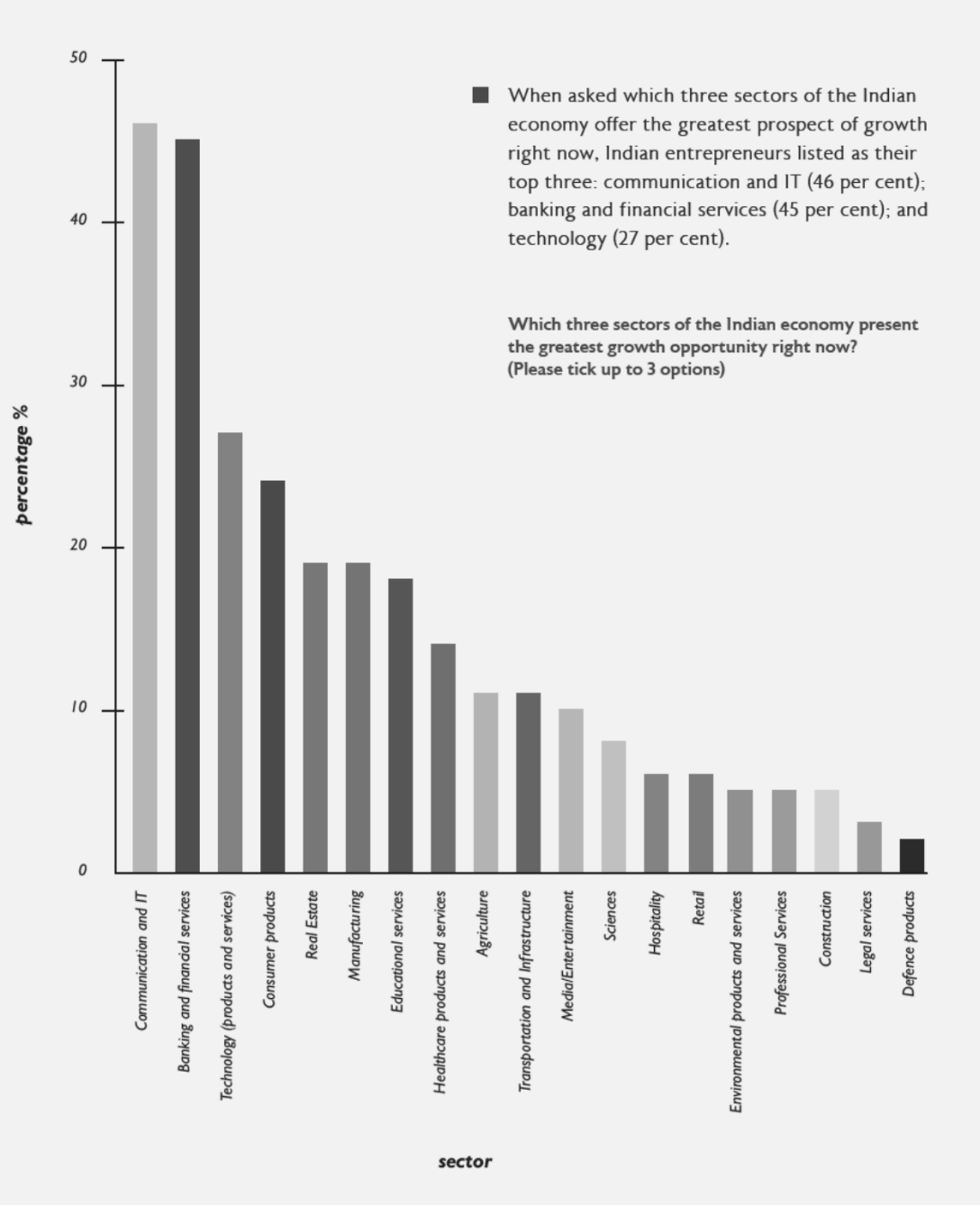


Exhibit-6: Survey results on ease of access to Finance

Source: Gamster, N. (2011), The Legatum Institute Survey of Entrepreneurs, India 2011.

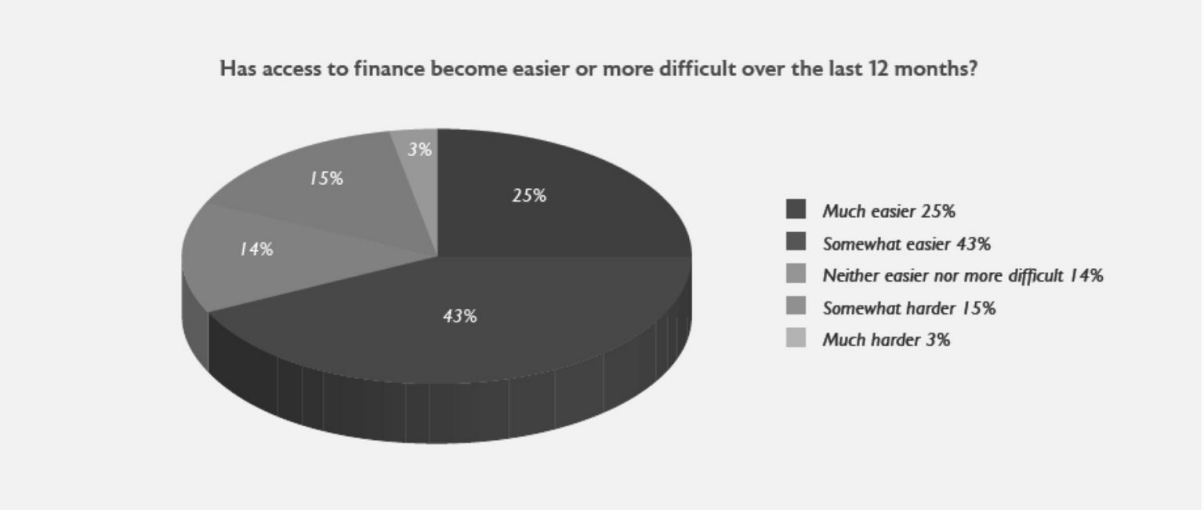
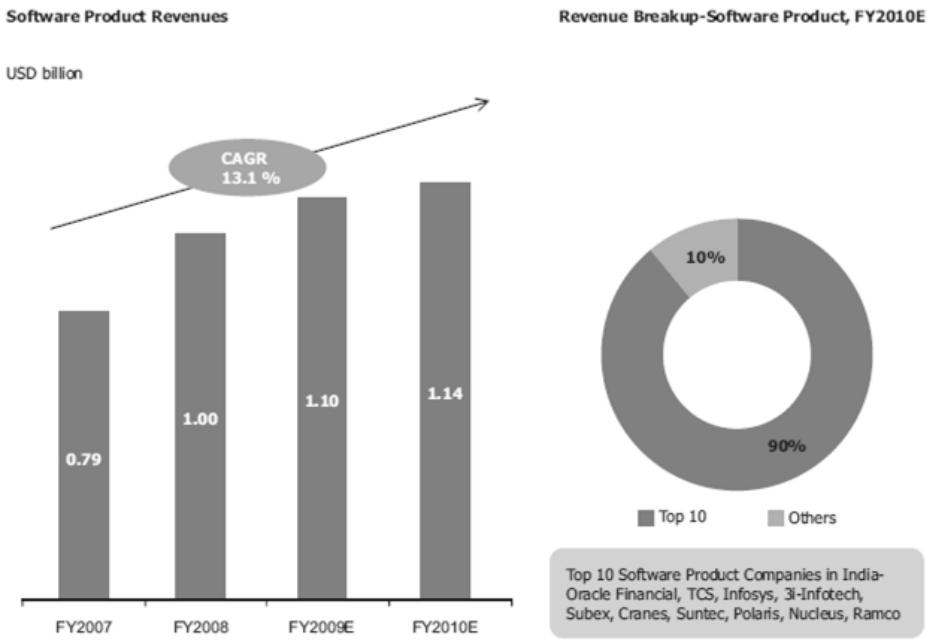


Exhibit-7: Revenues from software products to Indian IT sector

Source: NASSCOM IT-BPO Strategic Review 2010



Annexure– 1

Sources of Funding for New Business Ventures

For the entrepreneur, financing a new product in a timely fashion makes the difference between survival and going out of business (Dean 1986). Many of these new firms start with their own resources before contacting outside investors such as banks and private equity investors (Bhidé, 1999; Baeyens and Manigart, 2005; Cosh et al., 2005). Since these startups not yet profitable, lack tangible assets and an established credit history, debt financing is usually not an option. Consequently, entrepreneurs tend to rely on four broad sources of financing: Personal funds, venture capital funds, angel investors and corporate investors. Personal assets, such as savings, re-mortgaging property, credit cards, and personal property, are the most common initial source of funding for small businesses. In addition depending on the entrepreneur the type of funding varies. For instance, a life-style entrepreneur may be very interested in keeping control of the venture after early investors (business angels, venture capitalists) have exited. This contrasts with a serial entrepreneur, who aims at renewing past successes by starting new companies, and therefore is less concerned about control over the companies he/she currently nurtures. This may ultimately affect the shape of firms as they may pursue different strategies to achieve similar goals. Most common sources of funding are as follows.

Friends and family are still the best source for both loans and equity deals. They are typically less stringent regarding credit and expected return on investment. Credit cards are a great tool for cash flow management, assuming it is used just for that and not for long-term financing. Bank loans are much easier to obtain when backed by assets (home equity or an IRA) or third-party guarantors (e.g., government-sponsored SBA loans or a cosigner). Leasing is easier with big-ticket items such as equipment, vehicles, or even computers. Personal Savings is one of the most-readily used resources for funding a new business as it has the most flexibility with no interest or penalties for withdrawal. Home Equity Loan especially for home-based business owners, seems like a logical choice when searching for money to invest in a business. The option is that one can chose between fixed or floating rate, each having its own pros and cons. Peer-to-Peer networks connect credit-worthy borrowers

with lenders where borrowers list the needed amount and details about their business, while many small lenders make loans. But microloans generally carry higher interest rates than bank loans. In all these borrowings there is no professional advice on further business plans and strategies offered by the lenders. Since personal funds are used the entrepreneur should be very careful in not attaching his entire savings to the business which generally happens.

Angel investors fill the gap between personal funds and venture capitalists. Angel investors provide capital at a much earlier stage and generally provide only few post-investment support services. National Venture Capital Association estimates the size of the angel investor market to be roughly US$100 billion as of January 2000 (Wong, 2002). Angel investments are typically smaller, hence can lend to startups that are typically less finance intensive and tend to invest in companies that are in close geographic proximity(Denis,2004).

Corporations Investors invest in entrepreneurial firms in a variety of ways, including direct investments via corporate venture funds, indirect investments via independent venture funds. Corporate venture capital investing can be hindered by inherent conflicts of interest between the corporation and the entrepreneurial venture, agreements on the pay-off for the manager handling the funding and his incentives etc.(Denis,2004).

Venture Capital has become an increasingly popular source of funding. National Venture Capital Association estimates the size of the independent venture capital market to beUS$48.3 billion as of January 2000 (Wong, 2002). Venture capitalists expect to provide a variety of support services to their portfolio companies, including developing a business plan, assistance with acquisitions, help facilitating strategic partnerships, and the design of employee compensation plans. Venture capital investors (both independent and corporate) invest at a later stage and provide a substantial amount of support services. Venture capitalists specialize in financing larger amounts, and thus find business plans with relatively small, initial capital amount sun attractive. This makes it difficult for entrepreneurs to secure venture capital finance in the start-up stage, since they do not attract the attention of venture capitalists.

Annexure– 2

Innovation to Commercialization – The framework

One of the first (conceptual) frameworks developed for understanding the relation of science and technology to the economy has been the linear model of innovation. The model postulated that innovation starts with basic research, is followed by applied research and development, and ends with production and diffusion(Godin, 2006).Very few people defend such an understanding of innovation anymore: "Everyone knows that the linear model of innovation is dead," claimed Rosenberg (1994) and others.

Basic research → Applied research → Development → (Production and) Diffusion

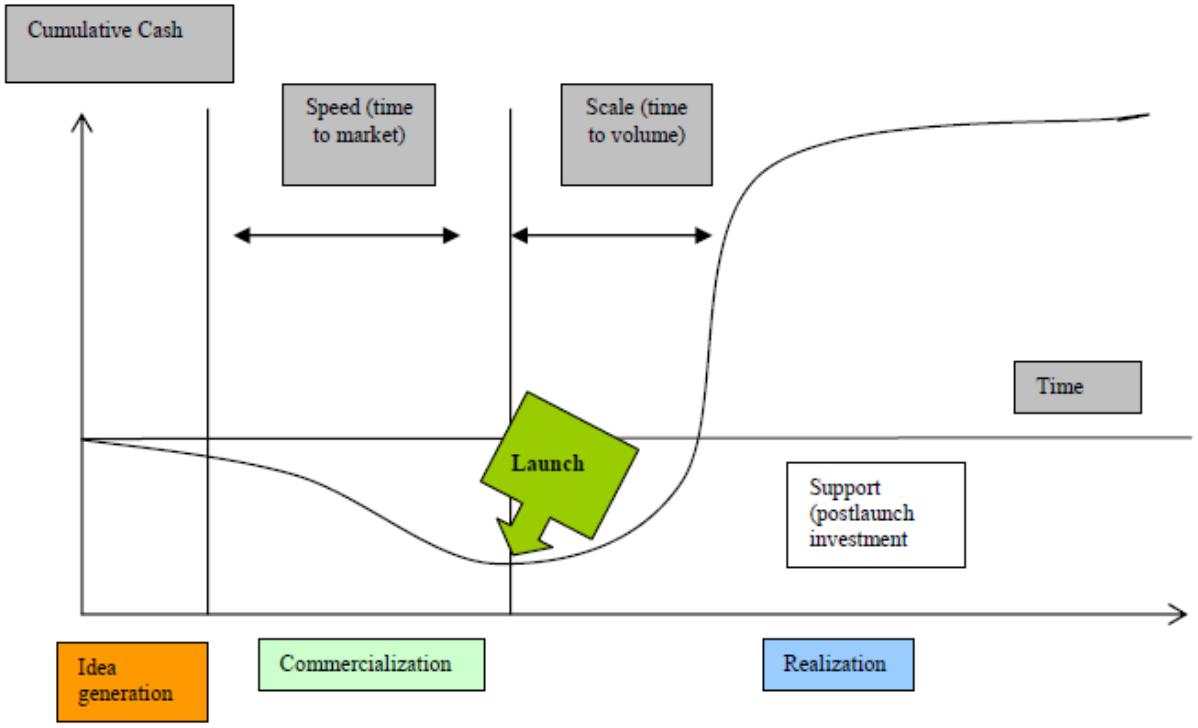
Randall Goldsmith's commercialization model is a road map of strategies and actions for the commercialization ofadvanced technologies. The model breaks down into twelve activities that describe the process to maximize thechances for success. Each sequence has a technical stage, a market stage and a business stage.

	Concept phase	Development phase	Market entry phase	Market expansion phase
Market	Initial market and opportunity assessment Lead customer identification and engagement	Develop marketing plan including segmentation, channel and customer relationship strategies	Implement promotion plan Perform competitive market intelligence	Target vertical and adjacent markets and increase market penetration Enhance partnership delivery channel and CRM
Business	Identify financial, physical & HR requirements	Secure required financing Establish management team, financial and business plans Determine break-even point	Manage financing, skills and production needs Adjust strategic and business plans to respond to market opportunities	Diversify internal and outsourced skills required to meet ROI objectives Establish international partnerships
Technical	Determine features and performance requirements Perform competitive technology intelligence – Patent search	Move development into prototyping, testing and production phase Source raw materials and establish Q&A systems	Establish manufacturing facilities and product technical support	Determine incremental product development cycle Continuously assess competitive product functionality and emerging technologies for adoption

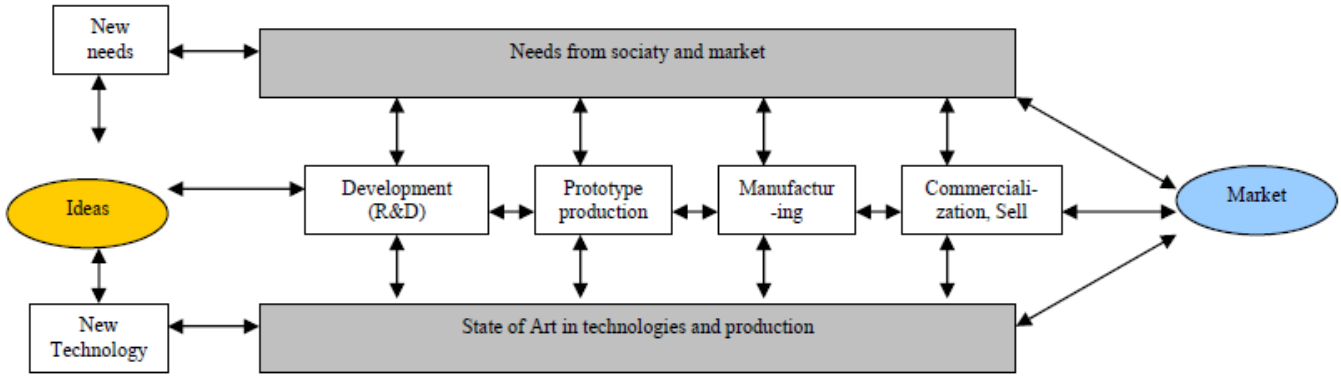
Source: Based on Dr. Randy Goldsmith, Oklahoma Technology Commercialization Centre with modifications by Acorn Growth Companies.

The diagrammatic representation of Andrew and Sirkin's model below shows a series of sequences in the commercialization process. In the two initial phases corresponding to idea generation (research anddevelopment, conferences, etc.) and commercialization, investment in the project is deficient (cumulative cash). In this model, the transition period between these

first two phases is decisive for profitability and successful marketing. After the product is brought onto the market, the time to volume corresponds to the time needed to reach a profitability threshold. The sooner the product or service reaches the optimal production scale, the more quickly it will be able to generate profits, and it is the market response that will determine commercial success or failure. The third phase (realization) puts the emphasis on the profitability of investments. This profitability is not always achieved, since the costs of technical support, advertising and development may exceed returns on investment. Nevertheless, such a situation may be tolerated in order to derive indirect benefits from it through the exploitation of intellectual property rights via royalties on patents, copyrights, etc. In other words, commercial success can also be measured by this type of indirect benefits.

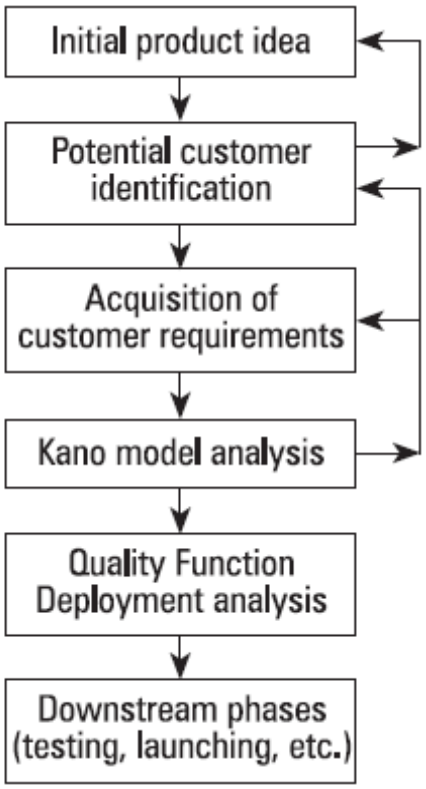


The model of Rothwell and Zegveld (1985) shows that commercialization is an integral component of the innovation process. The heart of this model lies in the interaction of its components. According to this approach, it is the combination of market needs (market pull) and technological opportunities (market push) that gives rise to innovation. Like Goldsmith's model, this model is sequential, but it allows feedback between components.



Source: Rothwell et Zegveld, 1985.

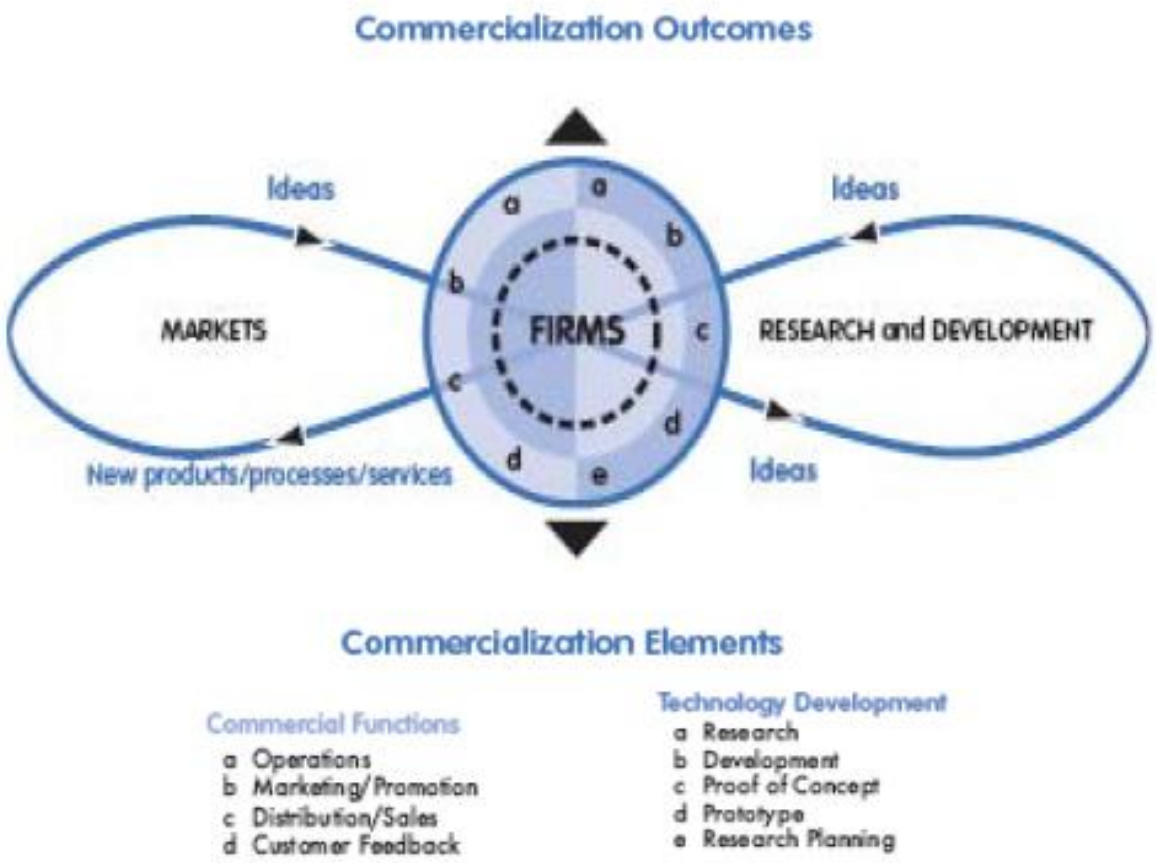
A paper by Shen et al. (2000) analyses the notion of customer satisfaction based on the Kano model and points to the importance of product innovation in exceeding customer satisfaction. It further proposes an integrated process model for innovative product development by incorporating Kano's model and the quality function deployment (QFD) technique. Analyses suggest that the proposed approach would contribute to the creation of attractive product attributes and product innovation.



The R&D and commercialization components interact to create technological opportunities and satisfy the demandsof the market. Chiesa (2005) notes that linear models prevailed during the 1960s until the early 1970s; from then until the mid-1980s, it was linear models with feedback, called interaction and linkage models that dominated.Gradually, from the 1990s to the present, models emphasizing the sequential process of innovation andcommercialization have given way to models in which function takes precedence over linearity. In this generation ofmodels, the R&D, commercialization and financing functions interact in no particular order. Throughout this process,suppliers and customers, upstream

and downstream in the process, provide continual feedback on the functions.This type of model also assigns a greater role to horizontal (external) partnerships.

The model below (an adaptation of the model developed by the Canadian Expert Panel on Commercialization) isdesigned to present the different functions of the commercialization process in a non-temporal framework includingall elements necessary to commercialization that firms may adopt on the basis of their individual needs.



[i] GATE is a national level examination conducted in India for admission to Master's program in engineering and technology.
[ii] Randall Goldsmith
[iii] Andrew and Sirkin
[iv] Rothwell and Zegveld (1985)
[v] For more details, visit http://www.BTechguru.com
[vi] More details at http://www.schwarzkopf.com/sk/en/home.html
[vii] A demo of the product is available at http://www.vdime.com/pro1.htm

[viii] Ruby on Rails is an open source web development platform, for more details visit: http://rubyonrails.org/
[ix] National Association of Software and Services, http://www.nasscom.org/