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A MODEL FOR DEVELOPMENT OF INTELLECTUAL ENTREPRENEURS

Abstract

Given the newer information technologies and rapid telecommunication exchanges that are powering our economies and societies, the theme of this third Knowledge Café project “Intellectual Entrepreneurship Through Higher Education” addresses a vital topic. The societal want for speedy enhancement of material living requires the increase of ‘active’ intellectual entrepreneurs. Those intellectual entrepreneurs who are capable of commercializing their skills, for the betterment of society. My natural predilection towards entrepreneurship and wide experience in higher education makes it a pleasure for me to participate in the above project. Throughout the article it is understood that globalization is an overarching infrastructure because even if your firm is not going international, foreign MNEs are invading your home markets. Therefore you are in global competition willy-nilly. Thus, without further detailed elaboration, the points made in the article apply as well to the development of ‘international’ intellectual entrepreneurs.

My contribution is offered in five steps. First, is an introductory section showing the contribution of entrepreneurship to economic growth. Second, is a discussion of what are intellectual entrepreneurship, intellectual capital and intellectual products. Also why, in today’s world, this particular form of entrepreneurship is important enough to warrant especial attention. This section will rely heavily on the work that has already been done through Kwiatkowski’s leadership via his previous “Knowledge Cafes.”¹ Third, to analyse which provider of higher education is ‘best’

¹ Kwiatkowski, Stefan and Leif Edvinsson, eds. *Knowledge Café for Intellectual Entrepreneurship*, and Kwiatkowski, Stefan and Charles Stowe, eds., *Knowledge Café for Intellectual Product and*

suiting to aid the development of intellectual entrepreneurship. Further to discuss the ethical and societal problems that arise if a public sector funded provider makes money from the endeavour. Coupled with this, to discuss the paradigm change necessary in the objectives of such a provider. Fourth, whom to teach in order to develop 'able active' intellectual entrepreneurs quickly and in significant numbers. Fifth, what to teach and how 'best' to teach intellectual entrepreneurship so that development of the 'able active' ones occurs rapidly.

Entrepreneurship: Contributions to Economic Growth

Historically, advanced market economies have always benefited from the activities of entrepreneurs. Since World War II the quantum of GDP in such economies arising from the economic activities of small and medium sized companies (SMEs), often led by entrepreneurs, has tended to be equivalent to that arising from large companies. One of the major reasons for this has been the rational tendency of large companies to outsource portions of their work. They found SMEs who were capable of doing the jobs cheaper. The movement towards just-in-time production is one manifestation of this. Moreover a most significant industrial and service sector, which has grown out of this rationale, is that of franchising. Today in the U.S. franchise outlets contribute some 25% of total output. Furthermore SMEs, as a group, have been found to be larger employers of labour than the larger companies; in fact the latter have been automating activities and shedding labour. Moreover many of the entrepreneurs leading SMEs have been 'double loop' learners. These are persons who exploit the opportunities thrown up by the business environment rather than 'single loop' learners who are merely better at adjusting to changes in the environment. The contribution of the 'double loop' learner entrepreneur has helped significantly in causing the SME sector to be vibrant.

In today's world of the 'New Economy' the role of intellectual entrepreneurship has vaulted to the forefront and warrants especial attention. The fundamental fact of the New Economy is that it is a knowledge based economy in which the technological revolution has brought in an accelerated velocity of information exchange, information use in the transformation of production factors, and change in every facet

Intellectual Capital, Leon Kozminski Academy of Entrepreneurship and Management, Warsaw, Poland, 1999 and 2001 respectively.

of the world's economic structure. The better traditional entrepreneurs live in a world of 'double loop' learning.

The 'New Economy' demands an intellectual entrepreneur who can live 'beyond double loop' learning; who can move from the existing environment, which experiences rapid technological change and chaos, to help form a new environment.

Will the 'New Economy' lead to greater growth? The Schumpeterian answer is YES. He was saying almost a century ago that growth depends more on ideas and knowledge than on savings or investment rates, or on governorship of natural resources. Today's New Economy proves his point. Many economists are still saying that for a country to grow one must increase the rate of investment.² Such logic is premised on a low input from new technology. However the New Economy has emphasized that growth to a pronounced extent is coming about through new technologies that are underpinned by computer use and access to the Internet and its explosive expansion of information availability. The fact is from 1995 in the U.S. productivity growth per worker almost tripled from 1% to 3% annually.³ This rate has been partially fuelled by using the new internet information technologies to eliminate large numbers of intermediaries, such as bank tellers, stockbrokers, and travel agents. But even when these are gone there will be other products and services. Intellectual entrepreneurs can use slack material resources and build virtual industries, for example Internet Newspapers.

Intellectual Entrepreneurship, Capital and Product

Entrepreneurs in the American model typically have certain basic qualities, which distinguish them from others. These qualities have been noticed as the following:

- Vision, in the sense of seeing opportunities
- Motivation, allied to risk taking
- Ability to assemble resources, through understanding leverage. Create something from nothing
- Implementation capability

² Tanzi, Vito, Distinguished Lecture Series No.2, "The Rise of the New Economy and its Implications for Fiscal Policy," 2001 Leon Koźmiński Academy of Entrepreneurship and Management, Warsaw, Poland, 8.

³ *ibid*, 6

This model applies in many Western societies. However in group civilizations, such as Chinese and Indian, joint families can and do contribute resources. This obviously means the risk taking ability is not required to the same extent. Thus the basic requirements remaining are:

- Vision
- Motivation
- Implementation capability
- Understanding leverage

In the note inviting contributors to this third Knowledge Café it is stated, and has my agreement, that Intellectuals could be defined as people with the following characteristics:

- Broad and diversified knowledge base
- Critical
- Unattached

But, it is further stated; it was found that intellectual entrepreneurship could be understood as:

- Business venturing undertaken by “intellectuals”, and / or
- Intellectual features of any successful venturing undertaken within knowledge intensive environment.¹

The second statement could be interpreted as a descriptor of the successful venturing, which is not linked to the originator, the intellectual entrepreneur. Within a knowledge intensive environment any formation is likely to have intellectual features; at the extreme of convergence, the two terms, intellectual entrepreneur and knowledge intensive can be thought of as being linked in a kind of tautology. However successful venturing can arise by the actions of entrepreneurs who are not necessarily intellectual entrepreneurs. The question is whether the former type of entrepreneurs can change and achieve an equivalent performance in a different situation? If they are traditional entrepreneurs, they have been defined earlier in the literature as those who only reach

¹ See Etzioni, Amitai, *The Active Society*, 1968 and Stefan Kwiatkowski, *Spoleczenstwo Innowacyjne (The Innovative Society)*, Warsaw, Poland, 2000

‘double loop learning’ ? ² Those who exploit the opportunities thrown up by the existing environment. If they are ‘intellectual’ entrepreneurs who can go beyond double loop learning and form a new environment, then one only needs the early statement: Business venturing undertaken by “intellectuals.”

In this article, the subject of discussion is the intellectual entrepreneur. This is a person who amongst other attributes has “combining information screening and absorption capacities which leads towards a particular learning mode that transgresses double loop (the person is conversant with and knowledgeable about more than one professional area. S/he is capable of acquiring and utilizing different information at practically same time. Access to diverse information invites unexpected associations, ideas and solutions, which are not expected from a more *traditionally seasoned entrepreneur*).³

Earlier literature closely relates the phenomenon of intellectual entrepreneurship to intellectual capital and intellectual product.⁴ One is told intellectual capital can be considered as capitalized knowledge. Specifically, knowledge assets that are capitalized and put into productive use. Further, that the same knowledge might be also placed on the market as a product or service of purely, or almost purely, intellectual character e.g. consultancy or information retrieval systems.

Education Provider to Develop Intellectual Entrepreneurs

The major provider could be the infrastructure of the country itself. In the USA the infrastructure as regards information and finance is very powerfully developed. Information technology is widely available in the shape of computers, servers, and software programs. Further numerous sources of information exist, ranging from governments, universities, and industry associations to consultants, private businesspersons and trade schools. The finance infrastructure also is full of banks, finance houses and venture capital firms willing to aid the entrepreneur who has an idea with commercial possibilities. No other country has the same plethora of public sector and private infrastructure support. But on a scale of 10 marks for the USA other industrial countries would range down to about 6. Further below will be economies in

² Op cit Kwiatkowski and Edvinsson, 1999

³ ibid

⁴ Op cit Kwiatkowski and Stowe, 2001

transition and even further below them will be LDCs. Therefore in most countries the intellectual entrepreneur is likely to need other higher education providers. The term higher education is used because the word intellectual itself implies development of the mind. In turn this implies that years of education are required.

One can construct a hierarchy of providers. The best heavily resourced education providers are the heavily resourced tertiary (higher) education universities. Below them are MNEs, which can provide more but may or may not provide resources to that extent depending on the importance they give to the activity. Below these are specialized institutions, which are resourced by public and private sector benefactors. At lower levels are colleges and other general institutions. Most such latter organizations are providers of general tertiary level education to traditional college level students. They give many product offerings in a variety of different disciplines.

Thus there is a requirement for higher education Centres / Departments within Universities or more specialized institutions, which will educate intellectual entrepreneurs. But three issues arise:

- What is the appropriate role of public sector funded universities in economic development?
- Who should own the intellectual property created at such a university?
- How to resolve conflicts of interest between public and private gain? ⁵

Such Centres are intended to further the development of business education in entrepreneurship and/or generate additional revenue from consultancy and research activities, including incubator schemes. These incubator schemes are intended to lead to effective businesses. The first activity of developing business education in entrepreneurship fits in with the aim of tertiary level education institutions and is important for enterprise development. Furthermore these Centres / institutions should also impact on other stakeholders in society. Thus through their research work and publications they must analyse and propose improvements to the country infrastructure to enable entrepreneurs to start and function. An obvious improvement worth further research is the lowering of tax rates for SMEs and other firms producing intellectual products. Other improvements could be in the area of advising

⁵ Schwartz 1999, in David Carson and Audrey Gilmore, Vol. 34,9/10,2000, European Journal of Marketing, 1030

governments how to build the infrastructure for encouraging the growth of intellectual entrepreneurship. This thrust could address issues about simplifying bureaucratic requirements and regulations, applicable to specific industry sectors. However, this first activity of developing business education in entrepreneurship always might be only of mild interest to active and potentially active entrepreneurs.

The second activity of generating additional revenues can bring conflict between the public sector funded University's "community service" and the exploitation of opportunities for "unfocused gain." But this second activity is absolutely necessary in this knowledge age to breed intellectual entrepreneurs and raise economic growth. The Centres need to become entrepreneurial "magnets."⁶ In most good universities research is done in many fields. Therefore Centres in good universities have a greater potential to produce distinctive competence and a wider range of intellectual products as compared to corporate research centres, which tend to be industry specific. But this requires a paradigm shift at universities towards an entrepreneurial business mindset. However, today it is a goal worth pursuing when the profits from the "magnet" activities can be ploughed back into development of intellectual entrepreneurs.

- Traditional entrepreneurial education tended to focus on Human actors + Environment. The creation of businesses was left to the choices made by these educated persons and the career paths they chose to follow. If education is to foster more direct entrepreneurial action leading to the creation and growth of SMEs, it must go further. It must systematically help to construct provisions for the cognitive, social and economic preconditions for new businesses, and their fusion and eventual launching. This requires a paradigm shift to a business generating strategy.⁷ In the positive case it should move towards an endogenous, self- sustaining survival and growth education model with four interdependent components:
 - Human actors
 - Environment, which includes market opportunities, regulatory and support policies
 - Products and processes

⁶ Carson, David and Gilmore, Audrey, "Entrepreneurship Centres in Universities: What is Their Purpose and Function," *European Journal of Marketing*, Vol.34, 9/10, 1030-1032

⁷ Laukkanen, Mauri, "Exploring Alternative Approaches to High-Level Entrepreneurship Education: Creating Micromechanisms for Endogenous Regional Growth," *Entrepreneurship & Regional Development*, Vol.12, 1, January – March 2000, 25-48

- Resources, including socio-cultural elements

Resources used to be thought of as just seed or venture capital finance. Today, knowledge and social capabilities e.g. production and systems knowledge, market intimacy – trust, and network relations may be critical.⁸

Assuming most of its intellectual entrepreneur students come from the neighbouring region and wish to locate in the region, the university provider Centre can be a virtual impact region within this given regional area. It can facilitate and help with R&D linkages and educational programs, can be more generative and proactively facilitate innovations their transfer by licensing new products / processes or spin – off ventures. It can also help to draw and anchor new and existing organizations through multiple dependencies and sustained innovative processes. A major task for the Centre is to monitor how courses and practices contribute to each of the Business Generating Model’s components and fusion is created and maintained. An example is Halmstad University’s Innovative Engineers Programs. In terms of direct impact, 22% of students have applied for patents and 23% have started their own ventures. This parallels results of programs for faculty member entrepreneurship.⁹

Whom to Teach

The aim is to develop significant numbers of ‘able active’ intellectual entrepreneurs quickly. This knowledge century will yield large dividends to those countries that will have these entrepreneurs. They are needed to participate and impact on the onward growth of societal welfare. The optimum way to develop these entrepreneurs is to simultaneously educate faculty members in tertiary level organizations and students, both traditional and nontraditional. The educational thrust must be heavily on ‘training the trainers’ so that in the second round one can energize the system. Thus larger numbers of intellectual entrepreneurs will be produced.

⁸ Van de Ven, A.H., “*The Development of an Infrastructure for Entrepreneurship*, Journal of Business Venturing, Vol.8, 1993, 211 - 230

⁹ *ibid* 219, and Johannisson, B., Landstrom, H., and Roseberg, J., “*University Training for Entrepreneurship: An Action Frame of Reference*,” European Journal of Engineering Education, Vol.23, 4, 1998,477 - 496

Students

The traditional student is in the 18 – 26 year old bracket. The nontraditional student is in the older age groups and wants or has to learn different things. In regard to traditional fulltime students, one can expect that up to ten percent of the business school students at universities is the catchment group. This is stated since the other 90 percent are almost certainly looking for secure employment with governments and / or large organizations.¹⁰

Aside from the traditional fulltime student, there is the nontraditional fulltime and / or part-time student, plus the traditional part-time student. This category of nontraditional fulltime student is possibly one who participates in an Executive MBA or some other Executive fulltime course. Most of these students are already working in large organizations. But surprisingly a significant percentage of them are taking these degree programs in order to strengthen their resumes and obtain better jobs. Their goals being to better themselves in other large organizations or to strike out on their own as entrepreneurs.

The part-time students, traditional and nontraditional, are often just catching up on what they should have done earlier, in order to improve their chances in the job market. However, they are many more in number and in large cities can constitute a larger group of individuals than the fulltime students. Thus the sheer large numbers in the part-time category should allow for reasonable numbers of those who can be motivated to proceed on an entrepreneurship path. Especially those who may not be satisfied with their present jobs.¹¹

How Best to Teach Vision, Motivation, Implementation Capability

In earlier industrial times, the contribution to society from entrepreneurs was not that great compared to what was coming from the entrenched firms in industrial sectors. The service sectors were limited. In the case of the traditional entrepreneur, the major need was to teach the functioning of a business on a ‘how-to’ basis. What the term implies is to teach the tools of the trade; in a nutshell how to make business plans. This enabled the traditional entrepreneur to make and market their product or

¹⁰ Author’s own experiences from teaching many programs in various different countries

¹¹ ibid

service, and go to the bank for finance. Thus the main teaching aim was to build implementation capability. The teaching organizations had limited capacity in this sector and correspondingly were accepting students in relatively small numbers. The students who arrived were motivated anyway. Therefore there was no need to teach motivation. Moreover vision was not an attribute necessarily required for the average SME to be successful.

In today's knowledge world, with the realization that intellectual entrepreneurship is required for economic growth and more employment, entrepreneurship programs and course work has become a higher education growth segment in the EU and USA.¹² However, there is no uniform agreement on how best to teach entrepreneurship. Ill-structured approaches that match the low structure found in the entrepreneur's world have been advocated. The present author disagrees with the above approach.

For the intellectual entrepreneur, in today's commercial world the approach should be well structured. There should be no problem doing this, as there are many professionals from various disciplines available. Others have advocated the use of degree programs focused on an entrepreneurial approach to business learning, and still others advocate short courses on a variety of subjects aimed at enterprises at different stages of development. But today, many have gone beyond this and use consultations, enterprise visits, internships, making venture capital proposals, and writing business plans as learning experiences.¹³ At MIT, the Director of the Entrepreneurship Center focuses on networking skills classes.¹⁴ The 'Best ' Way to teach is to use incubators, special courses, and Teamwork. Incidentally, the potential for business games to teach entrepreneurship seems small. One investigative study found that relatively few simulations are available and are very limited in their ability to cover topics typically taught at collegiate level.¹⁵

¹² Brockhaus, R.H. Sr., "Entrepreneurship Education and Research in Europe," in D.L. Sexton and J.D. Kasarda, eds., *The State of the Art of Entrepreneurship*, Boston, PWS-Kent, 1992, 560-578; Hisrich, R.D., "Entrepreneurship: Past, Present and Future," *Journal of Small Business Management*, 26, 1988, 1-4; and Timmons, J.A., Smollen, L.E. and Dingee, A.M., *New Venture Creation*, Homewood, IL., Irwin, 1985

¹³ Leepson, M., "Building a Business: A Matter of Course," *Nation's Business*, Vol.76, 4, 1988, 42-43

¹⁴ Harrington, Ann, "I'll Take That Pitch with a Dash of Politesse," *Fortune*, Vol.141, 12, 6/12/2000, 334 - 335

¹⁵ Wolfe, Joseph and Bruton, Garry, "On the Use of Computerized Simulations for Entrepreneurship Education," *Simulations and Gaming*, Vol.25, 3, September 1994, 402-416

How Best to Teach Vision

In today's increasingly knowledge dependant society, for an intellectual entrepreneur vision is necessary for solid success. The business environment knowledge landscape is changing rapidly with advances in technology across the board. Given such advances, business opportunities are burgeoning. But it is vital to know the trends and their implications in order to spot the opportunities. Therefore a general background course in the impact of the new technologies must be there. Further there must be a course dealing with knowledge-based opportunities for an intellectual entrepreneur. Furthermore a course in design could be very useful in expanding one's vision. The whole field of design is receiving growing prominence. Attractive and functionally useful design is becoming the cutting edge for obtaining and sustaining commercial success. Examples abound in major industries such as automobiles, clothes, houses and office buildings. The emphasis throughout all these courses should be on vision generation. The methodology could be based on idea development environmental sourcing for new ideas, self – generated ideas, and building small ideas to support some big new ideas.

In the group of three courses mentioned above, concepts should be taught that would encourage a relevant vision to grow among those interested in intellectual entrepreneurship. The first course should be an overview course. This overview will be provided by a general background course on the impact of the new technologies on all stakeholders in society, and on the business environment in particular. This course could be based on a core of readings. These readings will be selected because they have relevant data, logical analysis and thought provoking opinions. The second course in the series should be a 'Specific Opportunities' course, which will be knowledge based to help intellectual entrepreneurs pursue particular areas. The teaching methodology in the course could utilize readings, existing published cases, and a project report on a specific opportunity topic. Participating students will be formed into teams to replicate the grouping that intellectual entrepreneurs generally have to adopt to achieve success. The knowledge field is fast changing as new areas come up. Therefore the course can introduce new opportunity areas from time to time as warranted. An example is the opportunities in the sector of distance education software. The third course focused on design will also have students working in teams. But in this case the teams will comprise one inventor and /or potential

inventor– for instance an engineer, scientist, or information technologist – with one artist and / or graphic designer, and two or three other students, each from different business management disciplines.

How Best to Teach Motivation

The teaching of motivation requires a different approach. This approach is based on participation and discovery. This approach will rely heavily on incubators and mock incubators. The incubator will comprise a team with an inventor who wishes to commercialise an idea and is brought into the team in a University, or equivalent level institution of higher education, with a group of business management students. The inventor will be tremendously motivated and this enthusiasm should catch on amongst the team members. The bonus for the business management students takes place when the team agrees to work together and carry on their partnership into making the product / service an actual success.

At a number of U.S. tertiary level business schools the goal for engineering students is to create engineer-entrepreneurs able to communicate technical information clearly, and shape their ideas into innovations that fill real world needs. Universities hoping to teach entrepreneurship have to adopt their own methods for inducing engineering students to work with MBAs in teams. Some throw engineering and MBA students together in entrepreneurship courses such as “Fundamentals of Venture Capital.” This is unlikely to be enough to produce consistently significant business results.

When there is an actual intellectual entrepreneur- inventor with an intellectual product, the team comprised of this person and business school students can be placed in what has been termed an incubator. However, inventors are in a minority and thus the alternative is a ‘mock-incubator,’ with the same method of functioning except that the inventor’s seat will be replaced by an engineer, scientist, or information technologist, who aspires to be an inventor. The incubator or ‘mock-incubator’ study should be judged equivalent for academic credit purposes to two academic courses at the Master’s level in a University. The teams involved will have to make a business plan and also could write a case around their project idea. In this author’s opinion, the incubator concept is central for Universities who want to take the lead in developing intellectual entrepreneurship and active businesses. Examples of incubator success follow.

A case is reported of a young engineer at Rensselaer Polytechnical Institute who won the school business plan competition for his ophthalmology invention and is now helping to nurture a new company at the school business incubator. A similar case is

reported at MIT of an aeronautics Master's student working with three MBA students as consultants to an optical fibre start-up SME. Stanford University has a Technology Ventures Program, which has many of its engineering students going to work for start-up SMEs.¹⁶ At the University of California -Santa Barbara a business plan contest awards scholarships to top competitors, plus the potential for venture funding. It is reported that this induced a computer science Ph.D student to attend classes at the Entrepreneurship Center.¹⁷ At the University of Maryland at College Park in Garrett Hall there is an electronic dormitory furnished with the latest multimedia and wireless communication equipment. It is hoped that the technology rich living – and - learning environment can help their students learn about entrepreneurship. 21 undergraduate students live in the dormitory and 66 others are spread around the campus. All the students take part in the meetings, conference calls and the networking. They do all the things entrepreneurs do. They come up with ideas for new businesses, work in teams, write business plans, seek, venture capital, make presentations, and if successful manage the growth of their businesses. This residential program has attracted students majoring in architecture, business, classics, computer science, economics, engineering, journalism, and life sciences. The program is called the Hinman Campus Entrepreneurship Opportunities. It started with a gift from Brian Hinman, who is an intellectual entrepreneur. He makes video – teleconferencing equipment and home networking technology that gives high speed internet access from telephone jacks anywhere in a house. The students can also enter the four year Entrepreneurship Citation Program.¹⁸ Case Western Reserve University has recently launched a Physics Entrepreneurship Master's Program; similar programs also exist for engineering and e-business entrepreneurs. In their thesis students focus on an innovation which can be the basis of an entrepreneurial start – up or the solution to a problem posed by a corporate partner.¹⁹

How Best to Teach Implementation Capability

¹⁶ Rae-Dupree, Janet, "Get Technical Skills Plus Start-Up Smarts," U.S. News & World Report, Vol. 130, 14, 2001, 72-73

¹⁷ Jonietz, Erika, "Physicists as Entrepreneurs," Technology Review, Vpl.103, 5, September / October 2000, 29 - 34

¹⁸ Olsen, Florence,"*Electronic Dorm Gives Maryland Students an Entrepreneurial Environment,*" Chronicle of Higher Education, Vol.47, 18, 1/12/2001,A32 - 37

¹⁹ Op. cit Jonietz

The teaching of implementation capability for intellectual entrepreneurs, in this knowledge age, which is dependent on information technology, requires many courses. First the requirement is for at least two courses in computer software and use. Then there ought to be another two courses in information systems, followed by an advanced course is required in computer applications for industry. Additionally courses are needed in organization theory and behaviour, and in marketing to segments in the service economy that intellectual entrepreneurs will be approaching. The courses in this latter section must include ones on consumer and industrial behaviour in this service product age, and on business and marketing research methodology. To round out the business education, there should be standard courses in accounting, decision sciences, finance, and management information systems. To top all this off, there must be a course in how to assemble resources and the understanding of leverage, and a final capstone course on international business strategy. The final course is necessary since the environment of globalization now engulfs all countries and cultures.

Conclusions and Discussions

Today we have in the U.S. an individualistic entrepreneurship education strategy focused on individuals. After graduating, the individuals are expected to turn into economic actors or agents. The education strategy is to produce entrepreneurial persons with action tendencies and learning capabilities equipped with appropriate know – what and know – how. European contributions have added to this base the dimensions of know – who, useful social linkages, and know – why, implying entrepreneurial values, goals, and perseverance. These objectives need some addition to produce businesses led by intellectual entrepreneurs.

The university historically has concerned itself with two tasks: teaching and research. But, in recent years, increasingly universities have realized that they have three tasks: teaching, research and the transfer of technology, and relevance. The latter task of relevance to society suggests that a university ought to be conceptualized as a societal innovation system. Entrepreneurial education when embedded in this system can be looked upon as not only producing entrepreneurial oriented competent people. But as reproducing social mechanisms that underpin and facilitate birth and growth of businesses. Thus two education streams are needed; entrepreneurship education,

which stresses new business and wealth creation. Plus small business management competence, which is more occupied with management and business function know – how in SMS contexts.

For good teaching, this author's belief is that there should be a marriage of entrepreneurship theory and practice. Further, one must create the existence of synergy between research and education. Research oriented centers are better prepared to boost modern engineering skills and foster innovation attitudes, including motivation for entrepreneurship. But education for innovation is different from teaching to be a manager.

The social context plays a major role in developing entrepreneurship. The new educational concept should be of building, not only knowledge, but also abilities, attitudes, and an entrepreneurial culture. Then the above should be combined with a good research system, which is both financially and politically supported. This is the key to success of the modern university system in the 21st century.²⁰ Already career and technical teachers find entrepreneurship education the way to help students meet the challenges of this new century. Students say it gives them tools to use in their own business or in any career.

Moreover the dominant linear undergraduate → degree → job somewhere model is no longer sufficient for economies, which are increasingly open, volatile and small unit dominated. The future requires individuals to have more autonomy and personal control capabilities e.g. to create their own jobs and do this more than once in a lifetime. The dominant old model underplays the role of teams, and possibly of context. Team fostering skills ought always to be emphasized. Today, students must also be taught future action contexts and the relevant knowledge and skills needed to function optimally in those contexts. The new emphasis must wean graduates off the dominant old business school style of learning. That style is based on problem finding and a hierarchical based analytic orientation. Instead, students must be taught problem solving, and learning skills and attitudes. Furthermore they must be encouraged to develop a mindset that stresses action learning and accepts openness and uncertainty.

Finally a word on the impact of the new globalization environment on the development of intellectual entrepreneurs, who have produced products / services that can participate in the global market from startup. These entrepreneurs with

²⁰ Casar, Jose R., "Encouraging Students Attitude of Innovation in Research Universities," European Journal of Engineering Education, Vol.25, 2, June 2000, 115 -21

technology based new firms need, at the outset, to be taught internationalization and how to participate in it. They must be given the education, and thereby the chance to become 'born globals'. Since they are firms that can possibly succeed profitably in a global market from their inception. Thus they can contribute most to the economies in which they were created.