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Business Incubator as an important element in establishing the Entrepreneurial University (Case Study: The business Incubators Center Bandung Institute of Technology)[1]

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Abstract

Globalization, new technology and information movement are forces in this new millennium that are causing firms to examine their culture, structure, and system for flexibility and adaptability. We need innovation and entrepreneurial thinking as an essential element to face it. It's important for the entrepreneur to be able to read the technological map, predict technological trend, and act efficiently. University as a center of education research that produces technology has a big potential for creating entrepreneurs.

The entrepreneurial university is being developed to nurture the student intuition and analytical capability. The product of entrepreneurial university is graduates who excel in three dimensions: as a professional/technician, as a manager, and as an entrepreneur. Beside that, the idea of entrepreneurial university is linked to technology transfer-establishing closer links between university research, on the one hand, and industry and commerce on the other.

This paper uses a case study methodology to explore the current practices of the entrepreneurial university in Bandung Institute of Technology (ITB), Indonesia. ITB is one of the first universities to adapt the entrepreneurial university spirit by having the business Incubator center as an important element to encourage the process of establishing new enterprises based on various competencies in ITB by; 1) facilitating the implementation of technology and commercialization, 2) building innovative and ethical enterprises which contribute to the community, 3) improving expertise and facilities utilization and to create a synergy among institutions to support the two points before.

The Business incubator center at ITB (PIB-ITB) faces challenges such as increasing awareness about the business incubator center there and a good system to support the tenants. PIB-ITB as a capable medium has to create entrepreneurs. In this way, it can therefore support the entrepreneurial university. To make the entrepreneurial university successful requires creativity within its membership and support from the head of the university.

Key Words

entrepreneurial university, business incubator, innovation, commercialization.

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Introduction

The pace and magnitude of change will continue to accelerate in the new millennium. The trend toward globalization, the advent of new technology, and the information movement are all forces in this new millennium that are causing organizations to examine their culture, structure and system for flexibility and adaptability. In Indonesia, the change can be seen from two contradictive sides, as an opportunity and as a threat. Looking at the ability Indonesia possesses, one possible positive change can be anticipated as a strong industrial structure in Indonesia. This positive change can already be seen in middle sized and small industries.

Considering this fact the national development program can be a reference in the future when determining and applying policy among the following:

- The importance of disseminating awareness related to entrepreneurship and system development which results in causing new entrepreneurs to start up (business startup)
- Business incubator development, support for middle sized and small businesses and new technology based entrepreneurship, which includes the development of long or middle term venture capital.
- Providing a system (intensive training) to accelerate the development of middle small and new entrepreneurs, through the usage and commercialization of technological innovation, (business partnership which apply technology transfer and supply business facilities in order to modernize and which will result in higher value).
- Increasing the quality of small, middle and new entrepreneurs that have a cooperative spirit by using the potential and expertise in creating a field of jobs.

Based on the statements above, we can say that innovation and entrepreneurial thinking are essential in the strategies of growing ventures. The next step must strive to disseminate awareness of entrepreneurship. University as a center of education research has a big potential for creating entrepreneurship. If one university produces at least 20% graduates as entrepreneurs who open their own businesses, there will be a lot of new businesses created and potential businessmen that can create new fields of jobs. It will decrease the unemployment rate automatically; therefore we need an entrepreneurial university.

Entrepreneurial University

Universities need collaboration with industry, especially since central government funding is decreasing as a source of money to support the operation of the university. The idea that public universities should operate efficiently, make good use of public money, and be accountable is not controversial. We may imagine academics analyzing their activities, discovering and removing inefficiencies (duplicated courses, needless research, underutilized space and equipment) and generating funding through offering a range of services to companies and to the public, winning research contracts, putting on new types of study programs, registering intellectual property, etc. The money saved and generated could be shared equitably between individual, teams, departments, faculties, universities, and society as a whole. Part of the savings and part of the income generated could go to increase academic salaries. University funding comes not only from the tuition and government but a high degree of self-funding by universities is seen as wholly beneficial. It can be achieved by endowment, collaboration with industry, commercialization of technology, etc.

The idea of the entrepreneurial university is linked with the ideas of technology transfer-establishing closer links between university research, on the one hand, and industry and commerce, on the other. Collaboration between universities and industries looks like a good thing but there's a problem, the problem is manifested in a psychological dynamics. A big difference between the two sides has come from the reasons why industry is providing funding to universities. Industry funding of universities was quasi-philanthropic. It was done for all sorts of vague reasons. Industrial funding kept the corporate name around the university and helped establish relationship with the professors. Industry could afford the funding and liked the benefits. But after their downsizing, many industries shut down their basic research labs. They did not have their central research labs anymore, and they were not going to rebuild them. In addition, technology was moving so fast that even those industries that had not shut down their central research labs (like pharmaceuticals) knew they could not do it all by themselves. So they go to the universities now, not philanthropically, but for a business deal. They need new technology, and the universities are a source of that technology.

University research can help fill industry's new product pipeline. Industry gave more money to the universities, acknowledged a greater need of the universities, and also expressed that they would demand more of the universities. It was not just philanthropy anymore. Now industry comes to a university and says, we're paying for it, we own it, and we ought to get to tell you what to do. Issues come up such as ownership of intellectual property, direction of research, ownership of data, and control of publication. The university sees its reason for being as education and dissemination of knowledge. Research is a mechanism for education and for discovering the knowledge they want to disseminate. Industrial sponsorship of research is seen as part of this mechanism rather than an objective. Both sides get positive benefits: The universities educate students who will go out to work for industry and industrial investments improve the transfer of discoveries to the public.

An increasing part of this knowledge is produced in academic research and teaching entities, especially universities. Pure research has traditionally enjoyed higher prestige than applied research and development. The universities also have traditionally taught their students 'how to think' and not 'how to make money'. Therefore we require the mutation of the traditional research and teaching university into an entrepreneurial university. Entrepreneurial university is being developed to nurture the student intuition and analytical capability.

The embodiment of new knowledge in the process of innovation is the core function of entrepreurship according to Joseph Schumpeter (1934, 1991). The evolution of universities and other research entities into regional centers of an innovation will fundamentally influence the innovative performance of a nation and ultimately determine the international comparative advantage of nations.

The new quality of international competition changes the role and function of universities and research system dramatically. If these do not become agents of innovation, entrepreneurial university, they hamper regional and national development and international competitiveness.

An entrepreneurial university can mean three things:

1. The university itself, as an organization, becomes entrepreneurial.
2. The members of university–faculty, students, and employees are turning themselves somehow into entrepreneurs.
3. There is interaction between the university and the environment (government, industry, society, etc)

The realization of the entrepreneurial university requires creating within its members; we also need a medium such as the incubator to support the entrepreneurial university.

Business Incubator

Science parks, technology innovation centers and various permutations of the words business, incubator, venture, research and programmed are all in use to describe the incubation process. There isn't distinction in mode by virtue of the name used by an institution, provided they are in the business of incubation as defined above. They are differences that have little or nothing to do with their nomenclatures.

The National Business Incubation Association (NBIA), Athens, Ohio Defined Incubator as:

"An environment and programme with certain important characteristics: it offers a full array of business assistance services tailored to the client companies; it has an incubator manager on site who co-ordinate staff and outside professionals and organizations to deliver those services; it graduates companies out of the programme (thought not always out of the incubator facility) once they meet the programme goals."

One academic has attempted to explain the different roles that innovation centers and incubator centers play (Swierczek 1992). An innovation center, he claims, is a two-way interaction between the research community and the business community. There is an important openness as to what is happening in the wider environment in the form of new techniques and potentially applicable research acquired through technology scans or in the form of market needs. For the business incubation approach, the key factor is the entrepreneur and the direction that the individual wants to take in the development of the business start-up. If the entrepreneur has a technical background, the business concept will tend to be technology–based. If the entrepreneur does not, then the business concept is likely to be in the service sector, but not usually in technical services.

In this approach, a dynamic relationship is the goal, and entrepreneurs are sought out who may be able to commercialize the output of university research. Entrepreneurs with limited technological expertise are at the heart of high–technology start-ups and links between the business, research, and capital. Entrepreneurs have become much more complex than a "two–way interaction "

The business incubator program should have its focus on the added value that it brings to small business "tenants" in terms of strengthened business skill, access to business services, improved operating environment, and opportunities for business networking, etc to nurture early–stage small businesses, increasing their prospects for business survival and growth, compared with the situation outside the incubator.

Four major types of incubator exist and the objectives of each type tend to vary:

1. Public-Sponsored; these incubators are organized through city economic development, department, urban renewal authorities, or regional planning and development commission. Job creation is the main objective of the publicly sponsored incubators.
2. Non profit–sponsored: these incubators are organized and managed through industrial development associations of private industry, chamber of commerce, or community based organizations with broad community support or a successful record in real estate development. Area development is the major objective of nonprofit-sponsored incubators.
3. University-Related: many of these incubator facilities are spin-offs of academic research projects. Most are considered science and technology incubators. The major goal of university-related incubators is to translate the findings of basic research and development into new products of technologies.
4. Privately sponsored: these incubators are organized and managed by private corporations. The major goal is to make a profit and, in some cases, to make a contribution to the community.

At least five generic forms of business incubators have emerged over the past 40 years (see figure below).

	For-profit property development incubators	**Non-profit development corporation incubators**	**University incubators**	**For-profit investment incubators**	**Corporate venture incubators**
Main goals	Property appreciation Maximize occupancy Sell services to tenants	Job creation Encourage entrepreneurship Diversify economic base	Faculty-industry collaboration Commercialize university research	Make substantial capital gain, quickly	Get into related markets quickly and inexpensively. Have a window on related technologies
Subsidiary goals	Create investment opportunities for more property	Generate sustainable income to break-even point Use vacant premises	Exploit investment opportunities Create goodwill in local community	Develop synergies in investment portfolio	Provide entrepreneurial opportunities for staff Make money

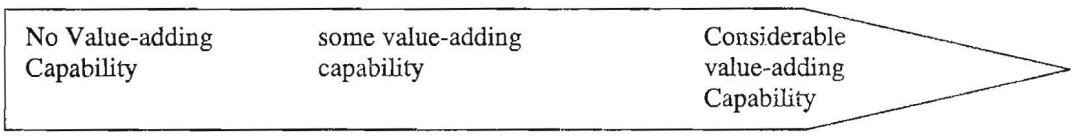

Figure 1.
Business Incubator, by type and value adding capacity
(Adopted: Colin Barrow, 2001)

According to the Kellog Tech Venture Team (2001) an entrepreneur has to take 3 basic networking steps for evaluating the business incubator and process incubating needs. These are:

- Introduction evaluation: This includes considering the importance of market change and networking that impacts the research backup need supply.
- Incubation process evaluation: This includes what the incubator needs in services supply (infra structure, developing research, capitalizing and networking) and involvement level (strategic creation, taking decision need and supervision).
- Harmonizing the need and the ability.

The important elements that have already succeeded in the incubator program (Barrow, 2001) are:

- Financial support
- Demand from the local entrepreneurs who are developing business (at the first step)
- Facilities and services support for businesses who join the incubator program
- Effective incubator management
- New entrepreneurs emerging.

The basic purpose of an incubator is to increase the chances of survival for new start-up businesses, which build entrepreneurs. Successful keys to being an entrepreneur are differentiation and innovation.

The innovation process can be seen as a chemical analogy in a process that is expressed with an innovation chain equation. Innovation that results in commercialization needs the following phases:

- Scientific Invention
- Engineering Development
- Entrepreneurship
- Management
- Recognized Social need
- Supportive Environment

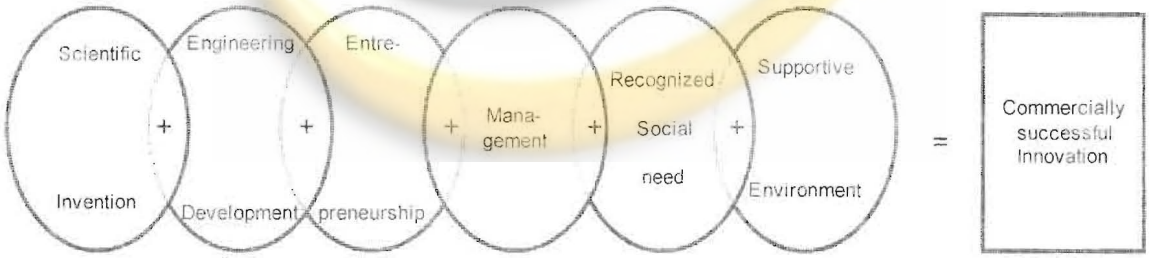

Figure 2.
Model of Innovation Chain
(J.C.Martin, 1994)

An entrepreneur who exploits the innovation uses it as an opportunity for creating. An innovation is not just limited to the new technology but it can make strategy, new price, product, service, risk management, market or new distribution links/ line.

Entrepreneurs build and grow the company which brings the innovation to the market. Entrepreneurs provide resources including capital, management, human, business strategic and transformation the invention into a product, process and services to the market.

Technology Commercialization

Technology gives benefit in a unique way between science and business; technology causes costs to rise if care is not taken. When the technology is implemented for human benefit, sometimes there is a need for additional effort in adjustment or changes to prove value to the market. In this connection, there are a few criteria for success, like the benefit value to the society in directly or not if people use that technology, and disadvantages for the community if they do not use that technology. In other words, the value of technology will come out if it gives benefit to the people. In this case the technology can be commercialized by becoming products or services that give additional benefits. This process is usually slow and needs more finances. For the first step of the whole process, we need legal protection for the technology. With HAKI (Indonesian for intellectual property rights).

Hodkinson (1987) defines HAKI (Patent Rights) as:
"Basic rules that are made to give protection for everybody that is doing research and development or doing intellectual creativity, so it can cover their cost efforts and produce benefits from commercialization that already protected legally in one of time."

One kind of important protection in technology commercialization is a patent which is the right to exploit the invention that is growing technically. Patent gives protection to the unique invention (never known by the community before), new invention (never been with existing technology), and those having industrial application ability.

This paper uses a case study methodology to explore current practice of the business incubator in Bandung Institute of Technology.

Business Incubator Center-Bandung Institute of Technology (PIB-ITB)

Business incubator center ITB has been established for almost 2 years, it is one of business incubator in Indonesian universities with the difference, where the business idea is based on new technology and innovative as an entrepreneur characteristic.
The Incubation center at ITB was created to facilitate the process of creating new enterprises with high-tech start up, which has productivity-value to society, especially in relation to its competencies. Internally, creating the innovation of inventions within ITB will continue to improve because of the commercialization activity. PIB-ITB also becomes one of the educational processes at ITB, especially as a visual learning of value added creation, to enhance professionalism, to be committed for creating reliable entrepreneur and motivating business community inside ITB. This incubator has to be able to facilitate a supporting media for community welfare particularly around ITB and Indonesia in general.

Mission

The mission of Business Incubators Center Bandung Institute of technology (PIB-ITB) is to create entrepreneurs and enterprises by providing assistance and facilities services, needed by a potential entrepreneur.

Aims

1. To encourage the process of establishing new enterprises based on various competencies in ITB by providing services and coordinating activities to promote art, science, and technology; including intellectual property rights.

2. To promote favorable environment for technology innovation growth, emergence of new knowledge entrepreneurship to the ITB society.
3. To create institutionalized-networking with industries, private sectors, and entrepreneurs in various competencies in ITB.
4. To promote new invention that will contribute to the growth of ITB and industries.

Roles

According to the mission, roles of ITB Business Incubators Center are:
1. To facilitate the implementation of technology
2. To build innovative and ethical enterprises which contribute to the community
3. To improve expertise and facilities utilization, and to create a synergy among institutions within ITB to supports the two point as above

Nature and Benefits

ITB Business Incubator Center is an open institution for students, employees, alumni and the public. The membership is divided into two groups,namely:
- ❖ Tenants: individuals or institution which have ideas or concepts about a new knowledge-based business
- ❖ Investors: financial institutions, industries, and the public

The management of ITB Business Incubators Center is supported by professional management to arrange its activities and also coordinating individual expertise, laboratories, and centers or institutions in ITB, which have ability to support the incubator's programs and activities.

The benefits of ITB Business Incubators Center activities are:
1. As an interaction platform among researcher and business communities.
2. As a facilitator to identify enterprises with a good prospect of financial condition, and to support Commercial Business Unit (SUK ITB) and national economic growth.

Technopreneur Networking Center Concept

Along with entrepreneurship dissemination effort, the Center also conducts advanced educational processes on business incubator development and technology commercialization process. As "centers of excellence" universities can produce inventors on science and technology who can be bridged by commercialization activity.

These activities will help in transforming the invention into innovation. Therefore, the value creation process is performed. Through this process there are 2 positive impacts that will be created internally or externally in relation to the university itself. First, the internal effect is that educational activities and research no longer become a cost center but can afford the ability for sustaining themselves. Second, externally this technology commercialization, in the end, will lead to social wealth and improvement.

Business incubator establishment will be a medium for research commercialization and creating a new job fields. Technopreneur networking center concept has the means for forming an effort process with additional value, and also the ability to provide a working field and proper mutual cooperation between universities-industry-society-government.

Services

ITB business incubator center will provide quality services that include:

- Office infrastructure for its tenants
- Meeting platform between new entrepreneur and service provider through Business Development Discussion Forum
- Access to the financial institution, networking, and alliance partner
- Assistants and business mentors from various business firms or industries to assist its tenant in technical, management marketing, etc
- Access to laboratories, research centers, and studios in ITB for possible technology utilization, research products, production process, etc
- Business services, such as: company administration, financial and accounting, legal affairs, intellectual property rights, etc
- Access for the financial institution, industries, and the public to the information about potential business in ITB Business Incubator Center developed by its tenants.

How does Business incubation work, we can see from the following figure:

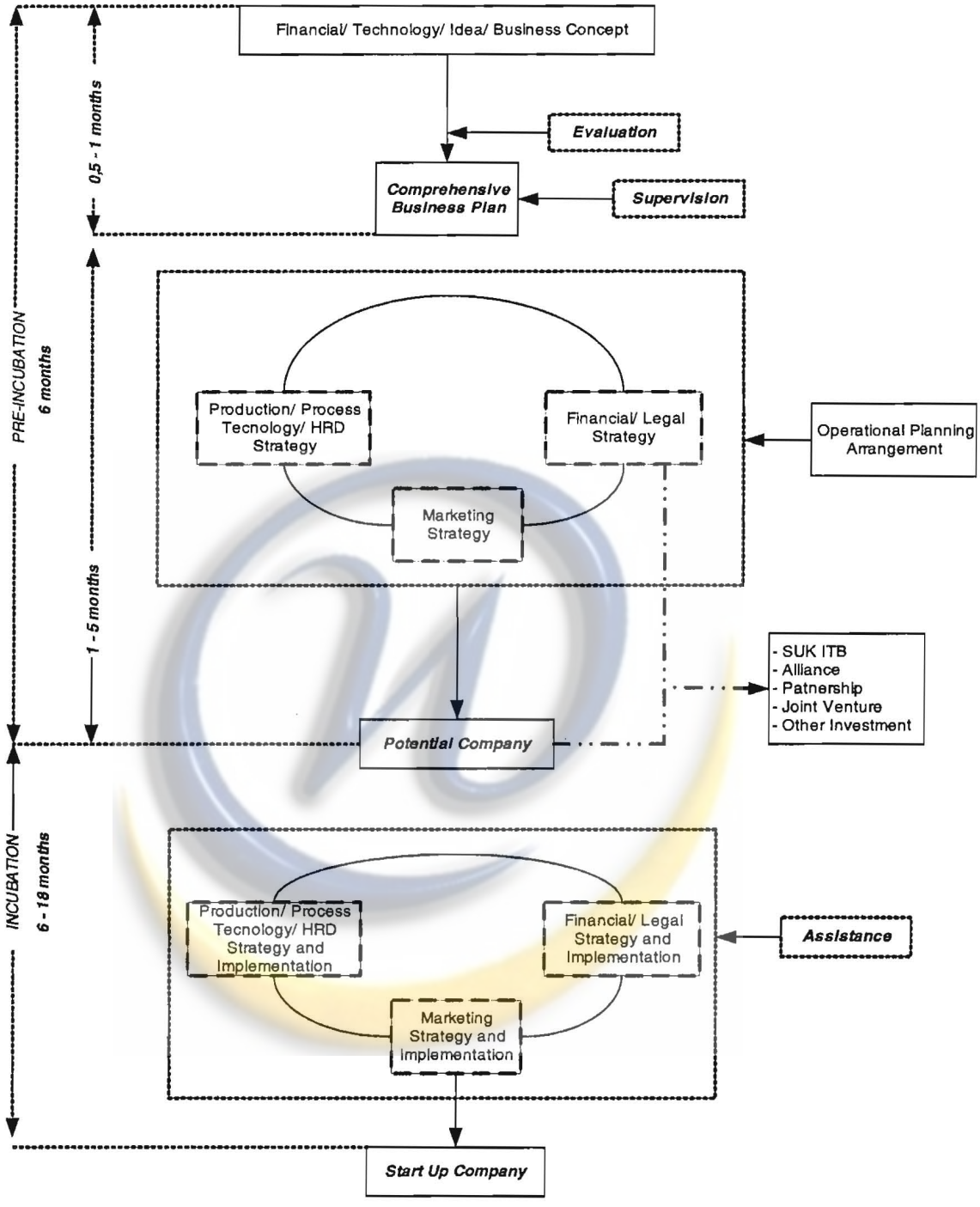

Figure 4.
The Process Diagram of Establishing New Enterprise Business Incubator Bandung Institute of Technology

In the pre-incubation phase PIB-ITB needs to have established for the beginning of a track record client or getting the potential business plan. We can use a five point Likert scale (a non-dimensional scaling method) for assessing the suitability of applicants.
The seven areas measured are listed below.

1. Ability to pay rent
2. Compatibility with incubator objectives.

3. Completion of application package
4. Demonstrated business capability of principals.
5. Projected growth potential.
6. Completion of comprehensive business plan.
7. Potential for royalty or equity income to incubator.

The maximum score for each area is 5, as is the maximum average score. No one scoring less than 3 on the likert scale would be considered suitable.
The incubation's processing time to start up company is about 2 years.

Some of Outputs PIB-ITB

On the earlier stages PIB-ITB produced 8 tenants, some of the outputs are:

- The making of fermentation milk with 3 pro biotic bacteria
- Designing a biogas reactor and its operation in dairy farm are a couple of these innovations. Cipta tani lestari tenant PIB-ITB came up with an idea of 15.000 biogas reactor unit installation for dairy farm in west java during the beginning in 2004

Analysis of Case Study

ITB as an entrepreneurial university has incubators scattered in many departments. Each incubator of department has link to the center business incubator. The business incubator center ITB is based on its competency. Therefore the business incubator can help the tenant not only in management but also in technical or technology transfer. For example, one of the outputs PIB-ITB is designing a biogas reactor. Cipta Tani Lestari consists of the ITB alumni, who came up with an idea of 15.000 biogas reactor unit installation for dairy farm in west Java during the beginning 2004. The innovation process of this idea is that the material is made of plastic. This process is continued for finding the design and precise sizes of the biogas reactor. This technology can reduce the price of biogas reactors. This can become a strategic program that proves biogas alternative energy resource is competitive enough to other resources of energy, and to observe a national scale marketing. It's also a significant evidence of cooperation between private and educational institutions for providing alternative energy resources.
The existence of the Business Incubator in the university will promote the emergence of the entrepreneur spirit in innovation characteristic. In addition, lecturers, students and alumni will also be motivated to develop applied research which is needed by industries and the community. All university entities will be motivated to be creative and innovative; so that whenever they have new business ideas they will be able to implement it by using the business incubator as a medium. The innovative idea and selling value will be supervised by the business incubator. So the business incubator can be an important element in establishing an entrepreneurial university.

Research Findings

- The business incubator is built on the university's competency. To make growth enterprises, the incubation process is not only in management but also in technology transfer.

- There is a lack of awareness about the business incubator center at Bandung Institute of Technology with the result that some sections of the university did not use the business incubator as a medium in developing their innovative ideas.
- PIB-ITB needs a good system to support its tenants.
- Generally, the tenants in PIB-ITB come from ITB alumni and alumni of the other higher education institutions. It means that PIB-ITB as a capable medium creates the entrepreneur from the graduate student or alumni not only looking for a job but also creating new job fields.

Conclusion

The idea of the entrepreneurial university is linked with the ideas of technology transfer-establishing closer links between university research, on the one hand, and industry and commerce, on the other. To make the university entrepreneurially successful requires creation and commitment within its members. Evolutionary entrepreneurs must enter. If universities stick to their traditional role, they will fail in this. Based on the information before, we need a medium such as business incubator as an important element in establishing the entrepreneurial university.

The business incubator will support the entrepreneurial university by:
1. Facilitating the implementation of technology, technology transfer-establishing closer link between university research and industry, and commercialization
2. Building innovative and ethical enterprises which contribute to the community.
3. Improving expertise and facilities utilization and to create a synergy among institutions to support the two points before.

The synergy will result in producing graduates who combine the research spirit of a scientist and the risk taking of an entrepreneur. When students leave the university, they and their teachers believe they have become equipped with the knowledge to pursue a professional career. Everybody who establishes his own firm or business requires qualifications in three dimensions (Gerber: "three-people-in-one"): as a professional/ technician, as a manager, as an entrepreneur.
By means of business incubator, the output of a university is new knowledge embodied in new products, innovation, technology, and organizations by-products.

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