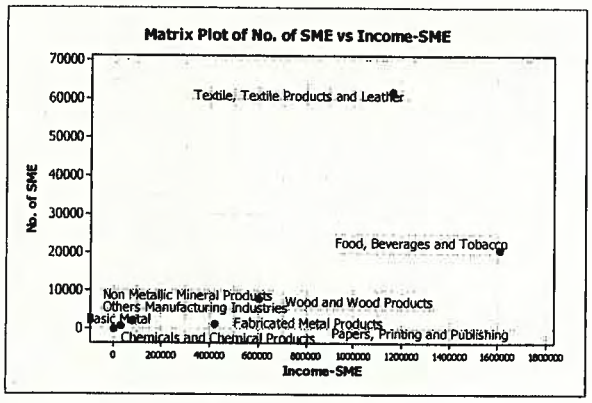
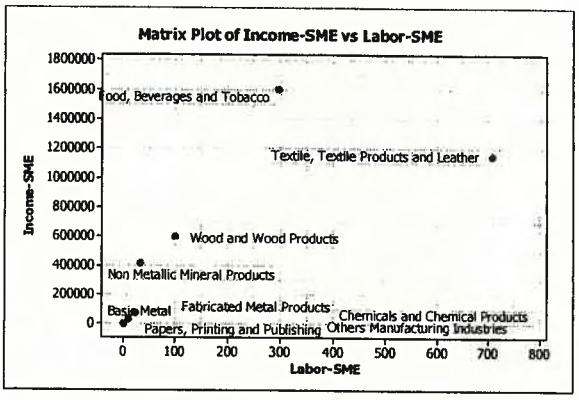




The major labor absorbing industry in East Nusa Tenggara was textile, textile products and leather industry, which absorbed 707 labors. Consequently, this most labor absorbing industry came from SMEs.

Poor soil fertility and condition with thin topsoil layer has made most of the East Nusa Tenggara not suitable for agriculture based industry. To some extent, fertile soil of Timor islands is located at SoE (Southern Central region of Timor or namely Timor Tengah Selatan). Various agricultural products such as orange, paddy, vegetables, etc. are suitable for this area. The consultant team visited the area and had a meeting with the chief of regency (Bupati). Based on the information from the chief of the regency, the Bupati declared that the regency has allocated and reserved a block area of 200,000 ha for bio-diesel fuel from Jarak plant and another 60,000 ha for cassava plantation. The expected outcome of the Bupati is that the consultant team can introduce this prospective investment to foreign investors on any profitable joint venture/ cooperation scheme.

Chapter 3 REVIEW ON LINKAGE PROGRAMS OF UNIVERSITY AND LOCAL GOVERNMENT

OVERVIEW: THE DECENTRALIZATION AND LOCALIZED ROLE OF UNIVERSITY

From its independence in 1945 until the Asia economic crisis in 1997, Indonesia had had one of the most centralized governments in ASEAN countries, with only 14% total public expenditure under local authority. Local revenues generated only 4% of total expenditure, which means local governments were highly dependent on budget transfer from the central government. This condition is not exceptional to the management of university where all state university is highly dependent on transfer of budget from the Department of Higher Education.

When decentralization took place in the year 2001, this centralized budget structure remained unchanged, however, there is on going new reform where state owned universities will be privatized by establishing "corporation type of management". This means that the university should have their own means and ways to create source of funding in addition to subsidized funds provided by central government. Now it is common understanding that prominent state university like UI, IPB, ITB, UGM, will become pioneers for privatization which requires 40% of budget generated from their own activities and 60% subsidized from central government. In the long run, this 40% ratio is expected to increase.

Under the above mentioned circumstances, it is urgently needed for universities to become so called "Research Center University". It means R&D (for technological generating activities) has

become strategically important for not only to increase quality of university but also to generate new source of revenues. Up to present, it is widely accepted that most influential invention of new technology is still in the hands of universities. Therefore, some incentive system on the innovation and invention will be needed by strongly protecting them under "intellectual patent right". In other words, while university keep working with R&D activities all experts who are working for generating or upgrading old technology should organized by university and protected by government in the reasonable financial incentive system of any intellectual property rights found.

After two national decentralization laws were issued January 2001, No.22, 1999 the government has changed the law to No.32, 2004 and No.25, 1999 to No.33, 2004 were implemented. The central government has effectively transferred the responsibility of development to the hand of local government: Cities, Regencies and Provinces. In line with this situation universities also have experienced the transition from tight centralized management to decentralized management. The problem, however, lies in the inadequate adjustment of strategic change from heavy dependency on subsidies into self dependency on generating revenue. Also there are no effective strategies on the side of universities how to contribute their resources for local economic development. Furthermore, so far it has not been established a sustainable financial linkage between universities, local governments and industrial communities.

Based on the interviews in the target regions, most of local government officials confirmed that universities do have vision, mission and programs for achieving socio-economic development in the region. In the process of implementing program, however, local governments sporadically a developed a rather wide ranges of joint programs with universities in a variety different fields and sectors from health services, agriculture development, environment preservation, poverty reduction, SME and industrial development. Yet, both local governments and universities do not have long terms strategies and such linkage programs are very often unsustainable in term of budget. Therefore, University's linkages programs have been up to present still weak. However, if one inspect the data assembled in following Table 2.4, there are surplus human resources, experiences and even to same extent funding availability and R&D can be mobilized by Engineering Faculty that could be directed and a used to support local economic development.

In Indonesia between the period of 1950s and 1990s there was a rapid increase in the number of engineering faculty. As early as year 1946 (one year after independence), university of Gadjah Mada established a formal faculty of engineering followed by UNHAS, UNDANA, UNAND, UNRAM, and UNM. The age of these universities are usually reflected the potentialities, experience, number of study programs and quality of teaching staff. There are two way of looking or analyzing universities linkage programs in terms of : (1) its strength to make linkages with industrial community for local economic development and (2) the need for strengthening of weak universities.

As it is shown in *Table 3.1*, the engineering faculty of UGM, Yogyakarta have variety of disciplines, which is followed by UNHAS. After decades since establishment, the engineering faculties in the target universities have made a significant improvement in (1) attracting more students, (2) developing a variety of engineering study programs, (3) producing a qualified of teaching staff and (4) developing graduate programs, which offer master and PhD degree at UGM and UNAND. Since graduate students have various compulsory program such as writing thesis (for master degree) or dissertation (PhD) and field studies of extension work called "Kuliah Kerja Nyata" (KKN), they can be integrated into each linkage program in the form of application and technological generating activities.

Table 3.1
Some Indicators of Faculty of Enginering in Six Different Location

	UGM	UNAND	UNRAM	UNM	UNDANA	UNHAS
Year of Faculty Establishment	1946	1985	1993	1997	1982	1960
No. of Teaching Staff	411	145	136	147	70	261
- S1	91	29	17	83	33	127
- S2	204	97	114	59	35	104
- S3	116	119	5	5	2	30
No. of Students	7,539	2,322	1,565	1,692	478	4,148
Availability of Discipline						
- Mechanical Engineering	Yes	Yes	Yes	Yes	Yes	Yes
- Civil Engineering	Yes	Yes	Yes	Yes	Yes	Yes
- Electrical Engineering	Yes	Yes	Yes	Yes	Yes	Yes
- Industrial Engineering	No	Yes	No	No	No	Yes
- Environmental Engineering	No	Yes	No	No	No	No
- Architecture Engineering	Yes	No	No	No	No	Yes
- Physical Engineering	Yes	No	No	No	No	No
- Chemical Engineering	Yes	No	No	No	No	No
- Geological Engineering	Yes	No	No	No	No	Yes
- Nuclear Engineering	No	No	No	No	No	No
- Geodecical Engineering	Yes	No	No	No	No	No
- Electronic Engineering	No	No	No	Yes	No	No
- Naval Engineering	No	No	No	No	No	No
- Automotive Engineering	No	No	No	Yes	No	No
- Urban and Regional Planning	No	No	No	No	No	No

Source: Target Universities' Website

The linkage program of universities with local industrial community could essentially be found in the following three functions that can be connected with universities resource potentialities: (1) Developing new industrial products through research and development, (2) Providing education; and (3) Extending new technology and innovation to local communities. Yet, based on information and data collected from six target universities, linkages programs have not been well developed because there is still huge gap between university's capacity and the needs of industrial community (mainly SMEs).

The following sections elaborate fact findings on the linkage programs supported by engineering faculty and local government as well as local SMEs conditions and expectation to the linkage programs.

3.1. GADJAH MADA UNIVERSITY

3.1.1. Overview of the Engineering Faculty

The Engineering Faculty of Gadjah Mada University has a vision to create high quality graduate that hold good moral attitudes, religious and high responsibility to increase community welfare of Indonesia in special and humanity in general, and has a high academic competency and professionalism to apply and develop science, technology, and art.

To fulfill the vision, the Engineering Faculty of UGM has missions to:

- Develop and deliver science, technology and art, and also targeting its uses for improving quality of community life and national tradition enrichment.
- Support community development as an independent moral agent.
- Reach high competitive advantages through applying management resources professionally.
- Support fair and prosperous democratic community development.

- Increase continuous quality in global competency and collaboration.

The Engineering Faculty of UGM has 8 departments that offering 11 disciplinary studies of Architecture Engineering, Physical Engineering, Electrical Engineering, Geodesy-Geometrics Engineering, Geology Engineering, Industrial Engineering, Chemistry Engineering, Mechanical Engineering, Nuclear Engineering, Civil Engineering, and Rural and Urban Planning. The faculty offers study program from post graduate degree, graduate degree, under graduate degree and also extension.

Table 3.1.1.
Number of Staff and Students
in Faculty of Engineering of Gadjah Mada University

No.	Field Study / Level of Education	Total Staff	Total Student
A.	Staff		
1.	Architecture Engineering	46	490
	- S3	19	
	- S2	22	
	- S1	5	
2.	Electro Engineering	56	751
	- S3	6	
	- S2	21	
	- S1	29	
3.	Physics Engineering	33	444
	- S3	5	
	- S2	24	
	- S1	4	
4.	Geodesi Engineering	34	466
	- S3	3	
	- S2	25	
	- S1	6	
5.	Geology Engineering	37	479
	- S3	6	
	- S2	23	
	- S1	8	
6.	Chemistry Engineering	41	727
	- S3	20	
	- S2	11	
	- S1	10	
7.	Mechanical Engineering	55	729
	- S3	19	
	- S2	31	
	- S1	5	
8.	Civil Engineering	58	695
	- S3	35	
	- S2	16	
	- S1	7	
9.	Diploma	51	2758
	- S3	3	
	- S2	31	
	- S1	17	
B.	Supporting Staff	421	

The Engineering Faculty of UGM is the largest among 18 faculties there with averages each year student's number of 13,000. Until December 2004, the number of fulltime teaching staffs is 411 persons, of which 116 teaching staff holding PhD degrees, 204 teaching staff with Master degrees, and 91 teaching staff with undergraduate degrees. Now, 44 staff is still pursuing Master degree and 55 staffs with Doctorate degree. Since its establishment, Engineering Faculty of UGM has produced 21.500 graduates. For supporting its academic activities, Engineering Faculty of UGM has 421 administrative staff, that consists of 22 staff with graduate degree, 40 staff with bachelor degree, 351 staff with senior high school graduate (SMA) degree and the rest are junior high school (SMP) degree(See Table 3.1.1).

Besides the teaching and administrative staff, Engineering Faculty of UGM has physical facilities as follows:

- Buildings of 60.241 square meter that consist of administrative buildings, laboratory rooms, teaching rooms, library and conference rooms.
- The Engineering Faculty of UGM's Library building is constructed of three levels with total space of 529 meter square and hold 10.849 books titles (total of 25.304 books) with 1.876 title (3.816 exp.) in Bahasa Indonesia and the rest is in English or other languages. The library also equipped with computer-based networking (LAN-based).
- Internet facility (FASNET), with 40 computers, and high quality of supporting a staffs. Fasnet also has many activities on community training that related to Information Technology (IT), for students and academics community.
- Geothermal Research Center, as a joint activity between Engineering Faculty of UGM and PERTAMINA, for conducting analysis on different thermal moving in Geothermal System.
- Technical Sea-shore Laboratory, a joint activity between Engineering Faculty of UGM and BPPT, that study the mechanism to minimize the destructive force of approaching waves on sea-shore, etc.
- Prof Soeroso Notohadiprawiro Geology Field Station in Desa Beluk, Klaten. A joint project with PERTAMINA that can be used for any research activities concerning Earth Science.
- Moslem's Prayer Building (Mushola) that build of two stores with effective space of 454 m^2.

3.1.2. Linkage Program of the Local Government

The Government of Yogyakarta puts its developing program for SMEs under the Office of INDAGKOPTAMBEN (Industry, Trade, Cooperative, Mining and Energy) that has mission to be an accelerator for developing industrial, trade, cooperative, mining and energy sectors become strong for facing global competition. According to this vision, the INDAGKOPTAMBEN has mission to:

1. Increase the working performance of government officials in providing services to community.
2. Support local development growth through maximizing INDAGKOPTAMBEN potential.
3. Increase community involvement in INDAGKOPTAMBEN to global market competition.

According to those visions and missions, in 2004 strategic planning there are 4 main activities had been done, such as:

1. Developing Jogja Trading House (JTH) that was supposed to increase SMEs development and trading activities on industrial goods. At least, there are two main objectives of JTH: extension and commercial. Through commercial activities the JTH was being expected to help SMEs promoting and selling their products to regional, national or even international market. Through JTH, the SMEs products were expected to be known regionally, nationally or globally. The JTH is also supposed to accompany SMEs in its development process.
2. Develop Jogja Regional Development (JRD) project, in association with World Bank in industrial sector and multi-sector development.
3. Providing rolling working capital scheme for SMEs and industrial sector.
4. Setting up a Digital Government Service (DGS) that is collaboration between Local Government and Microsoft, where the Small and Medium Business Services Centre will help SME digitally.

Formerly the development of SMEs was supposed to be conducted under the Department of Cooperative and SMEs, however almost all technical departments have a SME development program. Beside the Department of Cooperative and SMEs, some department that has SME development program is the Department of Industry and Trade, Department of Finance,

Department of Agriculture and so on. Although there were many department support SMEs development, the activities were quite focused.

Table 3.1.2.
The Local Government Involvement in Industrial Development
(2004 – 2005)

Code	Activity	Number of Collaboration with EF of Gadjah Mada University		Total
		Yes	No	
TSU	Training Start Up	0	10	10
TUG	Technological Upgrading	0	3	3
IPR	Patent (IPR) and Standardization Support	0	8	8
PEX	Promotion/ Exhibition	0	3	3
SAC	Supporting Activities	0	5	5

Table 3.1.3.
Type of Training Start Up
by Local Government in Industrial Development

No	Type of activity related to SMEs development	Scope of activity	Collaboration with	Source of financial	Total funding (Rp million)	Range of Time
1	Management Training on Export-Import	7 person, 20 SMEs		APBD	16,3	2004/ 2005
2	Forum on Small Credit for SMEs	30 person, 200 Bank and 30 BUMN	BUMN	APBD	86,3	2004/ 2005
3	Training on Accessing Small-scale Credit	27 person, 250 SMEs		APBD	62,4	2004/ 2005
4	Training on Clean Production	25 person and 40 companies	-	APBD	20,3	2004/ 2005
5	Training on Natural Dyeing Use	20 person	Serat Alam Small Enterprise	APBD	14,3	2004/ 2005
6	Training on Aromatix Candle Production	20 person	-	APBD	31,3	2004/ 2005
7	Training on Leather Produtcs Design	25 person	-	APBD	22,8	2004/ 2005
8	Training on Woodworking Produtcs Design	25 person	-	APBD	23,3	2004/ 2005
9	Training on Increasing Handicraft Products	25 person	BPBK	APBD	16,7	2004/ 2005
10	Training on Stoneworking Produtcs Design	20 person	-	APBD	22,2	2004/ 2005

Since the implementation of regional autonomy, the Government of Jogja was streamlining its department structures and office. The Department of Industry, Trade, Cooperative, Mining and Energy were restructured and rejoined to be a Department of INDAGKOPTAMBEN. It was really a big effort to be questioned, the development program for SMEs than became unfocused because many different programs for each former department were joined together.

Concerning the collaboration with the university, there was no strong initiative from the local government to work together with the university. Every development activities were conducted under their own effort as a part of routine activities and duties. Although some joint activities between local government and universities had been done, there were done with personal in university as resource person.

Moreover, because of Government Regulation prohibits lecturer of state university to work as consultant to local government's project that will be funded through regional budget (APBD), the involvement of university's activities in local government projects were decreased. ON the other hand, the local government stated that the initiative to set-up a collaboration activity, especially on SMEs development, must come first from the university, because they don't know what the potentiality of university actually have to support SMEs development.

Table 3.1.4.
Technological Upgrading Activities to SMEs by LG

No	Type of activity related to SMEs development	Scope of activity	Collaboration with	Source of financial	Total funding (Rp million)	Range of Time
1	Machinery Workshop for UPTD BTTG staffs	2 person	BTTG	APBD	12	2004/ 2005
2	Woodworking Workshop for UPTD BTTG staffs	1 person	BTTG	APBD	1	2004/ 2005
3	Survey on the Possibility of Applying Solar-cell Technology for SME	12 person		APBD	37,9	2004/ 2005

Table 3.1.5.
Type of Patent and Standardization Support by Local Government in Industrial Development

No.	Type of Patent (IPR) and Standardization Support in Industrial Development	Scope of Activities	Collaboration with	Source of Financial	Total fund (Rp million)	Time
1	Batik Design Development	9 person	-	APBD	17,8	2004/ 2005
2	Wood Products Design Development	9 person	-	APBD	16,5	2004/ 2005
3	Silver Products Design Development	6 person	-	APBD	18,1	2004/ 2005
4	Quality Products Design Development	9 person	-	APBD	24,9	2004/ 2005
5	Quality Assurance Implementation for SME	5 person, 5 companies	-	APBD	23,8	2004/ 2005
6	Ecollabeling for Wood Products	6 person, 20 companies	-	APBD	10,8	2004/ 2005
7	Training on IPR	8 person, 20 SMEs	-	APBD	12,4	2004/ 2005
8	Training on Trade Mark	9 person, 20 SMEs	-	APBD	13,2	2004/ 2005

Table 3.1.6.
Promotion and Exhibition Activities to SMEs by LG

No	Type of activity related to SMEs development	Scope of activity	Collaboration with	Source of financial	Total funding (Rp million)	Range of Time
1	Domestic Promotion (12 events)	348 person	-	APBD	406,7	2004/ 2005
2	Foreign Promotion (4 events)	15 person	-	APBD	482,8	2004/ 2005
3	Export Products Promotion	11 person	-	APBD	107,9	2004/ 2005

Tabel 3.1.7.
Supporting Activities to SMEs by LG

No	Type of activity related to SMEs development	Scope of activity	Collaboration with	Source of financial	Total funding (Rp million)	Range of Time
1	Domestic Trade Policy	10 SMEs	-	APBD	10,4	2004/ 2005
2	Indentifacion of raw and intermediate materials needs for industry	7 person, 5 commodities and 9 provinces	BTTG	APBD	41,7	2004/ 2005
3	Research on Batik of Jogjakarta	5 person	-	APBD	11,4	2004/ 2005
4	Socialization the importance of SP-IRT	6 person and 20 SMEs	-	APBD	5,4	2004/ 2005
5	Business Consultation	9 person	BPBJ	APBD	10,6	2004/ 2005

The government of Yogyakarta supports SMEs mostly for increasing management skill, production techniques, and marketing. However, their supports usually were intended to SMEs that relatively well manage and have potentiality to growth. The really weak and small SMEs were beyond the government's support.

Although the government officials always said that there was a strong need to build up such linkages activities between University, LG and SMEs, such activities were not exist. So far, the assistance activities from LG to SMEs were quite effective for improving SMEs production and quality. However, most of LG support activities were performed indirectly through exhibition. On the other hand, most of SMEs expected that every support, either from LG or University, was on financial aid. Although, there is a certain amount of financial aid managed by Lembaga Pembinaan Terpadu (LPT) from Dinas Industri dan Koperasi, but because of most SMEs does not have good managerial skill, the financial assistance can't be used optimally.

For linkages activities with University, the main problems were on coordination matters. Sometimes the LG quite bureaucratic to perform such coordination matters so the program was too late to perform. On the other hand, the University also thinks their position was higher than LG and SMEs, so they just waiting for LG and SMEs to come to them.

3.1.3. Linkage Program Carried Out by Engineering Faculty

As an university, the engineering faculty of UGM is also mandated to implement Three Mandate of Higher Education (Tri Dharma Perguruan Tinggi) namely teaching, research and community services. All activities must be conducted under the frame of this mandate. So, even without any interventions from outside, the University must perform community service, either from their teaching staffs or students. The Engineering Faculty of GMU allocates about 10 percent of its total budget for this activity.

For teaching staffs, the community services activity was conducted especially as an obligation to Tri Dharma of University but also to collect "credit point" for supporting their academic carrier. They can perform these activities along with faculty agenda or by their own initiative. For students, this community service mandate will be conducted through Kuliah Kerja Nyata (KKN) program. These activities actually open many possibilities to be accomplished with industrial community, Local Government and SMEs, or even straight to rural community. However, the

contact between University and Local Government was only for releasing permission for performing the activities.

In university level, there is a SMEs development center, which is called a Small and Medium Enterprises Development Center (SMEDC). Periodically the SMEDC conducting open discussion with SMEs, especially with SMEs they supported. However, SMEDC almost passive, they only wait for SMEs or Local Government come to them and asks for help.

The main problem for performing linkages activities between University, LG and SMEs is lack of communication. University has no initiative to perform such activities, while the LG quite difficult to perform such independent activities because of its rigidity structure, and the SMEs himself does not know where to go. So the main problem actually is just a communication barrier between University, LG and SMEs.

From the other hand, SMEs condition was very diverse. So, it was quite difficult for EF-GMU to set up such activities for SMEs development that covers as many SMEs as possible. Some existing linkages activities were from personal faculty member with large industrial company. Meanwhile, the President Decree Number 80 Year 2003, concerning the Guidelines of Procurement for Government Offices affirms that the lecturer from state university is not allowed to provide consultation service to the regional government using fund from regional budget. Therefore to create better linkage programs, the involvement of university as an institution is needed rather than individual faculty member.

3.1.4. SMEs Performance after Linkage Program

Out of 10 SMEs surveyed, 6 SMEs (or 60 percent) had experienced collaboration activities either from university or local government. Unfortunately, there was no involvement from the engineering faculty of UGM. From those 6 SMEs, 3 SMEs had been trained by SMEDC UGM in areas of management skill and applying IT (internet) for promotion. Two of those six SMEs had been assisted by universities of outside DI Yogyakarta. Mostly SMEs have been supported from local government to join trade exhibition, except one company which has been supported technology development.

Most surveyed SMEs mentioned that the university's support had not produced significant impact for their production development, because most of the supports were just for joining trade exhibition. They said that 5 to 6 SMEs were supported to rent a space in the exhibition by the local government; however the exhibition space were too small. And they also expressed some concern of their design being copied by their competitor. Only two SMEs (20 percent) said that the support had significantly contributed to increase their production: even 100 percent increased.

Table 3.1.8.
SMEs Financial Performance after Linkage Program

No.	Kind of Industry	Value (Rupiah)	
		Medium Industry	Small Industry
1	Silk		
a.	Total Revenue	1,006,250,000	287,500,000
b.	Total Cost	980,000,000	196,000,000
c.	Total Profit	26,250,000	91,500,000
2	Silver		
a.	Total Revenue	2,520,000,000	360,000,000
b.	Total Cost	1,254,990,000	228,180,000
c.	Total Profit	1,265,010,000	131,820,000
3	Glass		
a.	Total Revenue	1,050,000,000	350,000,000
b.	Total Cost	805,000,000	230,000,000
c.	Total Profit	245,000,000	120,000,000
4	Leather Wallet		
a.	Total Revenue	672,000,000	168,000,000
b.	Total Cost	397,520,000	99,380,000
c.	Total Profit	274,480,000	68,620,000
5	Wooden Jewerly Box		
a.	Total Revenue	127,680,000	22,800,000
b.	Total Cost	54,000,000	10,800,000
c.	Total Profit	73,680,000	12,000,000

All of three SMEs that received support from local government and university said that no relations or joint activities were observed between those institutions. The local government and university supported in different areas and different time, which was not coordinated each other. Although they had been supported by universities, like all of other SMEs interviewed, they did not know what kind of activities and capabilities of universities really could be utilized to support SMEs. They did not know where to go and who to ask in universities, when they needed any support for their technical problems.

3.1.5. SME's Need and Expectation to Engineering Faculty in Linkages Program

- Actually there are no linkages or collaborations that exist between Engineering Faculty, local government and SMEs. Although, every party felt that it was very important to develop SMEs.
- If there were some linkages activities, it was mostly between University and SMEs or between local governments with SMEs.
- Community services just are seen as an obligation to raise a certain points in ac only.
- There were some efforts to set up any activities; however the communication scale was very important.

3.1.6. SWOT Analysis of Faculty of Engineering in Linkages Program

Strength:

- There is an obligation for lecturer to perform community service activities as part of their effort to collect "credit point" for raising their position higher.

- Students also are obliged to take Kuliah Kerja Nyata (KKN) program before finishing their study.
- The faculty has certain amount of funding that particularly was allocated for community services activities.
- There are many support, either from university or other institution (such as JICA), for conducting community service activities.
- Some collaboration with big companies has been established.

Weakness:

- Different visions and missions for supporting SMEs development between EF-GMU and local government.
- Vast diversity of SMEs condition and needs.
- SMEs have no initiative to come to university and ask the university to solve their problems.
- The most important need for SMEs usually are funding, but SMEs mostly are not bankable
- Not enough support from local government
- The existing collaboration was only with big companies.

Opportunity:

- There is a strong vision and mission for applying their science and expertise to surrounding community, especially for industrial community, through technology transfer program.
- A raising interest from local government for EF-GMU to conduct community services activities in their area.
- A raising interest on SMEs development.
- There is a KKN program that was conducted with specific theme according to rural people and SMEs needs
- Position of SMEDC that has special concern in SMEs development.

Threat:

- Different communication ability between University, Local Government and SMEs
- Developing SMEs just become a political jargon.

3.2. ENGINEERING FACULTY OF UNAND (UNIVERSITY OF ANDALAS), WEST SUMATRA

3.2.1. Overview of the Engineering Faculty

The Faculty of Engineering of UNAND (Andalas University) was established in May 13, 1985 and has 5 study programs, namely:

a. Mechanical Engineering
b. Civil Engineering
c. Electrical Engineering
d. Industrial Engineering
e. Environmental Engineering

It has a vision to be the quality engineering high education institution with national and international reputation. While its mission are as follows:

a. To conduct the quality of engineering high education in order to generate competitive students in global market
b. To conduct a quality research in the field of engineering that is accepted in the national and international level.

c. To conduct effective public services in the field of engineering.

The Engineering Faculty of UNAND has 145 teaching staffs, 65 supporting staffs and 2,322 S1 degree students in total. The information about number of staff and student in Faculty of Engineering can be seen in the table 3.2.1. below:

Table 3.2.1.
Members of Engineering Faculty of Andalas University

No.	Field Study/Level of Education	Total Staff	Total Student
A.	**Staff Degree**		
1.	**Mechanical Engineering**		
	S1	4	659
	S2	22	-
	S3	7	-
2.	**Civil Engineering**		
	S1	3	764
	S2	35	-
	S3	8	-
3.	**Electrical Engineering**		
	S1	9	357
	S2	16	-
	S3	3	-
4.	**Industrial Engineering**		
	S1	8	325
	S2	12	-
	S3	1	-
5.	**Environmental Engineering**		
	S1	5	217
	S2	12	
	S3	-	
	Total	**145**	**2,322**
B.	**Supporting Staff**		
	Administration	51	-
	Publication and Documentation	2	-
	Housekeeping	7	-
	Technician	1 person/lab	-

3.2.2. Linkages Program of the Local Government

The Industry and Trade Office of West Sumatra Province has a vision to establish a competitive industry and trade sector based on democracy economic and play an important role as the activator of economic development in West Sumatra. While the missions are as follows:

1. The establishment of strong and conducive of business climate
2. Stabilizing and strengthening of SME position in order to be more professional and competitive.
3. To accelerate industry growth through the improvement of market quality and extension.
4. To protect consumers' interests through quality and business order.

Many activities have been conducted by Industry & Trade Office of West Sumatra province, namely: training start up, technological upgrading, patent and standardization support, promotion and exhibition, and some supporting activities (see table 3.2.2). All of these activities were financed by Regional Budget (APBD) and State Budget (APBN).

Table 3.2.2.
Local Government Involvement in Industrial Development (2004- 2005)

Group of Activity	Code	Total Activity
Training Start Up	TSU	11
Technological Upgrading	TUG	8
Patent (IPR) and Standardization Support	IPR	1
Promotion and Exhibition	PEX	6
Supporting Activities	SAC	11

The detail of each group activities mentioned on the table 3.2.2, can be seen on the following table:

Table 3.2.3.
The List of Training Start Up of SMEs
by West Sumatra Industrial and Trade Office

Kinds of Training Start Up Activity	2004-2005	2006	2007	2008
1. Education and training handicraft industry, costume, AMT, GMP implementation and P2WKSS assistance	V	V	V	V
2. Workshop of rattan processing development	V	-	-	-
3. Industrial management training	V	V	V	V
4. Comparative study and partnership with the advance similar industry	V	-	V	-
5. Make a brief guidance book about business management both in production and accounting	V	-	-	-
6. Superior industry assistance	V	V	V	V
7. Small industry assistance in management and accounting field	V	V	V	V
8. SME development	V	V	V	V
9. The assistance on informal sector economy	V	V	V	V
10. The efficiency of SME management	V	V	V	V
11. SME management assistance	V	V	V	V

Table 3.2.4.
The List of Technological Upgrading Activities of SMEs
by West Sumatra Industrial and Trade Office

Kinds of Technological Upgrading	2004-2005	2006	2007	2008
1. Technology development of handicraft and food industry	V	V	V	V
2. Technology Development of snack industry originated from sea basic products	V	V	V	V
3. Implementation of Amdal,UKL dan UPL system	V	V	V	V
4. Optimization of PIP area utilization	V	V	V	V
5. Public utilization through capital participation and loan	V	V	V	V
6. Public economy utilization through capital support	V	V	V	V
7. Coordination of state owned enterprise credit extension	V	V	V	V
8. The expansion of SME access to capital sources	V	V	V	V

Table 3.2.5.
The List of Patent and Standardization Support
by West Sumatra Industrial and Trade Office

Patent (IPR) and Standardization Support	2004-2005	2006	2007	2008
1. Standardization support activities to SMEs continuity	V	V	V	V

Table 3.2.6.
The List of Promotion and Exhibition Activities of SMEs Products

by West Sumatra Industrial and Trade Office

Kinds of Promotion and Exhibition Activity	2004-2005	2006	2007	2008
1. Leaflet production for export products	V	-	-	-
2. Increase cooperation with the investor in developing facilities and infrastructure of trade center	V	V	V	V
3. Supporting and facilitating the establishment of trading house of superior commodity in West Sumatra	V	V	-	-
4. Increase licensing service in Padang	V	V	-	-
5. The availability of formasi Trade Information Conter	V	V	-	-
6. Increase the trade and business contact through the exhibition in other province and abroad	V	V	V	V

Table 3.2.7.
The List of Supporting Activities of SMEs Development
by West Sumatra Industrial and Trade Office

Kinds of Supporting Activity	2004-2005	2006	2007	2008
1. Training to the official as supervisor	V	V	V	V
2. Data collection and mapping of the industry entrepreneurs in Padang	V	V		
3. Make legal products for investment and partnership of small and large enterprise, consumer protection and BPSK	V	V		
4. Make legal products for market retribution	V	V		
5. The development of traditional, modern and special market	V	V	V	V
6. Arrangement of market space, parking area and market supporting facilities	V	V	V	V
7. Research of consumer trade and business environment	V			
8. Development plant of unhandled market	V	V		
9. Increase handicraft trading house	V			
10. Creation of comodity and trading profile of industry and trade data	V			
11. Development of regional investment	V	V	V	V

3.2.3. Linkages Program Carried Out by Engineering Faculty

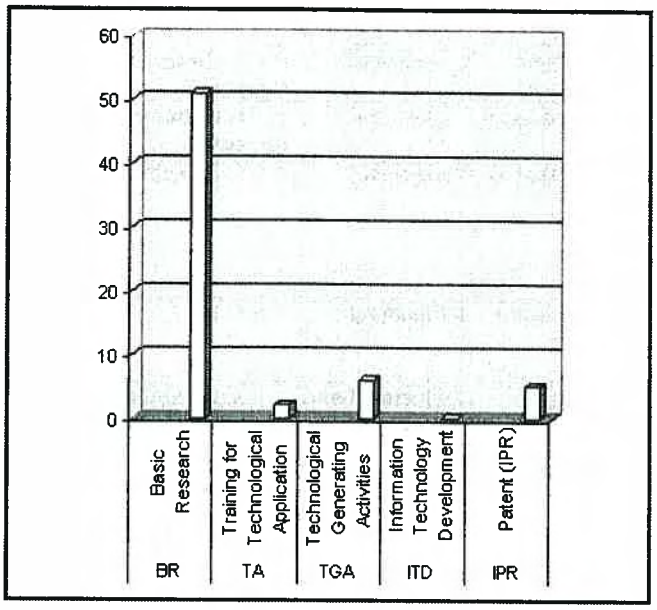
There were about 51 activities conducted by Faculty of Engineering of Andalas University, but only few of them were applied in the field in the form of training for technological application, technological generating activities, patent and standardization support. In period 2004 – 2005, there were only 2 training for technological application, 6 technological generating activities and 5 IPR proposal related to SME development in West Sumatra (see table 3.3.8).

Table 3.3.8.
Recent Extension Work (2004 - 2005)

Group of Activity	Code	Total Activity
Basic Research	BR	51
Training for Technological Application	TA	2
Technological Generating Activities	TGA	7
Information Technology Development	ITD	0
Patent (IPR)	IPR	5

The 2 training for technological application conducted were SME development activities carried out in 2004 and cooperated with Industry and Trade Office, and training of gambier production process cooperated with PT. Semen Padang in1999. 5 proposed patent (IPR) were: Tidal/ wave hidro-pressure electricity generator, Nilam Destillation system, Gambier processing system, High-pressure stove for boiler, dan Wind electricity generator. While the 7 technological

generating activities were the combination of training for technological activities and activities development of 5 proposed patent.



Most of technological generating activities conducted by Faculty of Engineering were in the form of cooperation with some large companies, such as: PT. Semen Padang, PT. Telkom, and others, as it shown in *Table 3.2.9.*

Table 3.2.9.
Experience of Research Collaboration with Industry and Local Authority

No.	Title of Research Collaboration	Department	Collaboration with	Funding		Year
				Source	Amount (Rp)	
1.	Development and application of concrete materials	Civil	PT. Padang Cement	PT. Padang Cement	2,000,000,000	
2.	Surveying	Civil	Local Authority and companies	Local Authority and companies	600,000,000	1995-2003
3.	Concrete consultancy	Civil	Local Authority and companies	Local and companies	600,000,000	1995-2003
4.	Soil consultancy	Civil	Local Authority and companies	Local Authority and companies	600,000,000	1995-2003
5.	Vibrating screen development	Mechanical	PT. Padang Cement	PT. Padang Cement	200,00,000	1995-2003
6.	Cyclone dust separators development	Mechanical	PT. Padang Cement	PT. Padang Cement	200,000,000	1997
7.	Materials handling equipment development	Mechanical	PT. Padang Cement	PT. Padang Cement	100,000,000	1997
8.	Vibrating screen development	Mechanical	PT. Padang Cement	PT. Padang Cement and	20,000,000	1998

				Local Authority		
9.	Cement loader development	Mechanical	PT. Padang Cement	PT. Padang Cement	20,000,000	1999
10.	Conveyor pins development for substitution	Mechanical	PT. Padang Cement	PT. Padang Cement	30,000,000	1999
11.	Bag dust filter development	Mechanical	PT. Padang Cement	PT. Padang Cement	300,000,000	2000
12.	Electrical energy saving	Electrical	PT. Padang Cement	PT. Padang Cement	15,000,000	2000
13.	Development of campus automatic telephone system	Electrical	PT. Telkom	PT. Telkom	400,000,000	2002
14.	Study of neutral grounding resistor	Electrical	PT. PLN	PT. PLN	15,000,000	2002
15.	Geographical information system (GIS)	Electrical and Civil	Local Authority of West Sumatra	Local Authority of West Sumatra	50,000,000	2002
16.	Development of e-Campus	Electrical	PT. Telkom	PT. Telkom	250,000,000	2003
17.	Survey of electrical consumers in West Sumatra	Electrical	PT. PLN	PT. PLN	100,000,000	2003
18.	Mechanical-electrical consultancy for Ketaping Airport	Electrical	Ketaping Airport	Ketaping Airport	20,000,000	2003
19.	Waste water analysis	Environmental	Padang Hospital	Padang Hospital	20,000,000	2003
20.	Development of hydro-mechanical competency training systems	Mechanical	PT. PLN	PT. PLN	10,000,000	2003
21.	Local electrical general planning	Electrical	PT. PLN	PT. PLN	70,000,000	2004
22.	Provincial electrical general planning	Electrical	PT. PLN	PT. PLN	30,000,000	2004
23.	Development of hydro-electrical competency training systems	Electrical	PT. PLN	PT. PLN	5,000,000	2004
24.	Development of hydro-civil training systems	Civil	PT. PLN	PT. PLN	5,000,000	2004
25.	Development of small scale industry in West Sumatra	Industrial	Department of Industrial and Trade	Department of Industrial and Trade	100,000,000	2004
26.	Reorganizing inventory system	Industrial	PT. Padang Cement	PT. Padang Cement	1,000,000,000	2004

The cooperation between Faculty of Engineering and large companies is also in the form of research activities plan until year 2006 as shown in Table 3.2.10.

Table 3.2.10.

Research Planning Collaboration with Industry (2005-2006)

No.	Expecting Research Collaboration	Department	Industry/Local Authority	Range of Time	Total of Funding (Rp)
1.	Asset management improvement	Industrial Management	PT. Padang Cement	2005, 2 year	500,000,000
2.	Electrical	Electrical	PT. PLN	2005, 1 year	100,000,000
3.	Mechanical and electrical	Mechanical, Electrical	PT. PLN	2005, 2 year	200,000,000
4.	Mechanical and electrical	Mechanical, Electrical	PT. PLN, Kassel University-Germany, Unand	2005, 5 year	1,000,000,000
5.	Dust filtering improvement	Mechanical	PT. Padang Cement	2006, 2 year	500,000,000
6.	Mechanical and electrical	Mechanical, Electrical	PT. Padang Cement	2006, 2 year	300,000,000

Collaboration with Major Industries/ Corporations

The engineering faculty of UNAND has been supported financially and technically by PT Semen Padang since its establishment within UNAND. The cooperation has developed significantly. Nowadays, the faculty has become the part of PT Semen Padang's think tank. Training programs, studies and other engineering related studies and projects have been implemented by the faculty for the company. Recently, the faculty is conducting a consulting service on "Inventory control system development as a part of asset management program" for Semen Andalas.

Over the last 5 years, the faculty has been providing training, consulting/ advisory and studies for other institutions, such as PLN (Power Indonesia), PT Telkom, Local Government, and others. The collaboration with major corporations has gained into mutual benefit. The collaboration with PLN has been focusing on trainer exchange and operational support. The faculty provides training programs on knowledge based skill, work attitude/ ethics, and learning/ teaching method. On the other hand, PLN provides trainers on technical skills development.

PT Telkom has lended an STD (Digital Transmission System) which is now intalled in the faculty's telecommunication laboratory (of which is also granted by PT Telkom) in the faculty.

3.2.4. SMEs Performance

Based on the interview with the head and teaching staffs of the Faculty of Engineering of Andalas University, there are 8 SMEs that has been developed and potential for further development, namely: wood and wood products, dried meat, leather, embroidery, metal products, tofu, bakery, and crackers. The performance of these 8 SMEs can be seen on the table 3.2.11 below:

Table 3.3.11.

Comparing SMEs Performance – Small and Medium Scale Industry

No.	Kind of SMEs	Value (Rupiah)	
		Medium Industry	Small Industry
1.	Wood and Wood Products		
a.	Total Revenue	2,400,000,000	99,600,000
b.	Total Cost	1,800,000,000	50,640,000
c.	Total Profit	600,000,000	48,960,000
2.	Dried Meat		
a.	Total Revenue		25,500,000
b.	Total Cost		10,200,000
c.	Total Profit		15,300,000
3.	Leather		
a.	Total Revenue		30,000,000
b.	Total Cost		18,000,000
c.	Total Profit		12,000,000
4.	Embroidery		
a.	Total Revenue		426,000,000
b.	Total Cost		369,120,000
c.	Total Profit		56,880,000
5.	Metal products		
a.	Total Revenue	2,780,000,000	
b.	Total Cost	1,518,050,000	
c.	Total Profit	1,261,950,000	
6.	Tofu		
a.	Total Revenue		259,200,000
b.	Total Cost		162,000,000
c.	Total Profit		97,200,000
7.	Bakery		
a.	Total Revenue	1,260,500,000	
b.	Total Cost	470,500,000	
c.	Total Profit	790,000,000	
8.	Crackers		
a.	Total Revenue		120,000,000
b.	Total Cost		60,000,000
c.	Total Profit		60,000,000

3.2.5. SME's Need and Expectation to engineering faculty in linkage program

Base on interview result, there are some expectation and comments by SMEs on Engineering Faculty of Andalas University, as follows:

- Technology introduced to SMEs by Engineering Faculty does not touch the needs of the SMEs (e.q. Gambier crushing machine instead of boiler)
- No continuation on linkage program carried out by Engineering Faculty.
- The Engineering Faculty or the university has never been interested in helping SME in terms of continuous assistance due to the university/ faculty staffs are accupied on collaboration with big industry/ corporations

3.2.6. SWOT analysis of Engineering Faculty in linkage Program

Strength

1. The availability of technology expert, especially in the field of Mechanical Engineering, Civil Engineering, and Electrical Engineering, Industrial Engineering, Environmental Engineering and supporting staff to conduct SME development activities.
2. The availability of some supporting facilities, such as laboratory of Machinery Construction Engineering, Structure Dynamics, Energy Conversion, Agriculture Machine and Polar Energy, Production Core, Metal, Biophysics, Production System, Work System Plan,

Manufacture Facilities Lay Out, Decision and Information System, Electric Power Distribution System, Measurement, Computer, and others.

3. The teaching staffs and head of Faculty of Engineering have a strong commitment to develop SME in consistent and sustainable way.
4. There are many government institutions involved in SME development activities.

Weakness

1. There is no cooperation between Faculty of Engineering and Industry and Trade Office in conducting SME development activities.
2. Some teaching staffs carried out industry development activities individually instead of on behalf the Faculty of Engineering.
3. There is no complete and sophisticated database about potential SMEs in West Sumatra Province.
4. There is no written short, middle and long term plan of SME development both in Faculty of Engineering and Industry and Trade Office.

Opportunities

1. There is policy stated in State Guideline (GBHN) 1999 – 2004 mentioning that the economic development is based on people economy system, therefore this policy should be implemented by all provinces including West Sumatera.
2. There are some unfinished researches which have not been applied in the field in the form of technological generating activities conducted by Faculty of Engineering. By finishing these researches, there will be some benefits obtained to develop SME in West Sumatera.
3. Most of the SME in West Sumatera implement simple and traditional technology in processing the products, therefore the product quality and design is not competitive. Related to this, there are many activities can be done by Faculty of Engineering of Andalas University to improve this matter.
4. Human resource skill of SME especially in management aspect (production and operational, financial and marketing management) is still limited. Faculty of Engineering has the opportunity to cooperate with the related institution to conduct assistance in management aspect.
5. There is an effort from the head of Faculty of Engineering to accommodate and coordinate research activities and public services into one stop services.
6. There is an effort of Faculty of Engineering to cooperate with the related institution within Local Government of West Sumatera province to conduct SME development activities.
7. The implementation of Regional Autonomy gives more authority to regional government to develop its SME.

Threats

1. In facing globalization era, SMEs are required to have human resource professionalism and the effective, efficient and international standard management.
2. High competition of similar products.
3. There are some international agreement (AFTA, APEC and WTO) that should be implemented soon in multilateral trade.
4. The opportunity of big scale and modern trade business located close to the traditional market.
5. The condition of export market destination is very competitive. Besides that, it is often create some issues which are not related to the business, such as: human rights, environment safe, labor, dumping, subsidize democracy and others.
6. Barrier to domestic security is also one of the constraints for SME development.

3.3. ENGINEERING FACULTY OF UNHAS (UNIVERSITY OF HASANUDDIN), SOUTH SULAWESI

3.3.1. Overview of the Engineering Faculty

The Engineering Faculty of UNHAS (University of Hasanuddin) was founded on September 10, 1960, and the first study programs formed were Department of Civil Engineering, Machinery Engineering and Shipbuilding Engineering. The university's vision is to serve as a center for education, studies, development, sciences application and technology engineering, based on marine and universal cultures. While the mission are as follows: (i) Turn out graduates to be faithful to God and have capability of applying and developing science and technology, and future oriented, (ii) develop science and technology based on marine culture in order to support the process of improving the welfare of the Indonesian people, and (iii) empower people's active participation in the application and development of science and technology in effective and efficient ways. With that vision and mission, it is expected that by the end of the second decade of the 21st century, the Engineering Faculty will be capable to play its role as a center for development of science and technology, based on marine culture.

Table 3.3.1.
Number of Student, Teachers, and Study Program in Faculty of Engineering, Hasanuddin University

No.	Field Study/Level of Education	Total Staff	Total Student
A.	**Staff Degree**		
1.	**Mechanical Engineering**	46	930
	S1	29	930
	S2	14	0
	S3	3	0
2.	**Civil Engineering**	52	831
	S1	25	831
	S2	22	0
	S3	5	0
3.	**Electrical Engineering**	46	667
	S1	22	667
	S2	14	0
	S3	10	0
4.	**Architecture Engineering**	54	708
	S1	22	708
	S2	25	0
	S3	7	0
5.	**Geological Engineering**	26	361
	S1	9	361
	S2	14	0
	S3	3	0
6.	**Naval Engineering**	37	651
	S1	20	651
	S2	15	0
	S3	2	0
	Total	**261**	**4148**
B.	**Supporting Staff**	**92**	
	Administration	61	
	Publication and Documentation	11	
	Housekeeping	12	
	Technician	9	

In terms of the number of students and lecturers, The Engineering Faculty is the UNHAS's largest faculty. It has 6 (six) departments/study programs for S-1 level namely: Civil Engineering, Architecture Engineering, Machinery Engineering, Shipbuilding Engineering, Electrical Engineering, and Geological Engineering. Besides the regular S1 program, these 5 study programs (except Geological Engineering) also have extension program. These six study programs have diploma programs (D1 and D3/D4) and "magisterial" program (S2). For the diploma program of Civil Engineering, the faculty cooperates with the Ministry of Resettlement and Regional Infrastructure Development while the Geological Engineering cooperates with local governments. In addition, the

Faculty has "magisterial" program of Infrastructure Technology which is also cooperated with the Ministry of Resettlement and Regional Infrastructure in South Sulawesi. The Engineering Faculty is supported by 261 lecturers, of whom 127 have S1 degrees with some of them are pursuing S2 degrees; 101 lecturers with Master's Degree (S2) with some of them are continuing their studies for doctoral degrees (S3); and 33 doctorate degree holders. Besides that, it also has 92 supporting staffs.

3.3.2 Linkage Program of the Local Government

The vision of the government of South Sulawesi is "To Make South Sulawesi as one of the most developed regions in Indonesia through local self-reliance approach and based on religious spirit". The mission to be implemented by South Sulawesi includes regional economic development by positioning itself as a center of services for eastern Indonesia in the fields of education, trade, finance, and science and technology. Also, South Sulawesi Province tries to promote business atmosphere that supports economic development activities.

In order to develop small and medium enterprises, the Local Government has established SME and Cooperative Office and Industry and Trade Office.

The SME and Cooperative Office has a mission: To establish the self-reliant SME and cooperatives as strong economic agents that support South Sulawesi's economy. Support to SME is given through business facilities, promotional and marketing activities assistance, and also by promoting the development of SME through cooperation with universities. Several activities carried out for SME development include those shown by the following table.

Table 3.3.2.
Recent Government Involvement in Industrial Development

Group of Activity	Code	Total Activities
Training Start Up	TSU	8
Technological Upgrading	TUG	3
Patent (IPR) and Standardization Support	IPR	-
Promotion/ Exhibition	PEX	5
Supporting Activities	SAC	2

Table 3.3.3.
Type of Training Start Up
by Local Government in Industrial Development

No.	Type of Training Start Up in Industrial Development	Scope of Activities	Collaboration with	Source of Financial	Total fund (Rp million)	Time
1.	Finance and accountancy training	166 SMEs in 10 municipalities	Intekbis UNHAS	State Budget	n.a.	2004/ 2005
2.	Business partnership through BDS	56 Business Development Services (BDS)	BDS Association	State Budget	n.a.	2004/ 2005
3.	SME centers developments	70 SME center in 25 municipalities	-	State Budget	n.a.	2004/ 2005
4.	Training for the use of technology and establishment of industrial incubator		Handayani School of Economics	State Budget and Regional Budget	n.a.	2004/ 2005

Table 3.3.4.

Type of Technological Upgrading
by Local Government in Industrial Development

No.	Type of Technological Upgrading in Industrial Development	Scope of Activities	Collaboration with	Source of Financial	Total fund (Rp million)	Time
1.	Incubator and technology to improve production capacity	30 SMEs in 6 municipalities	Intekbis UNHAS	State budget	n.a.	2004
2.	Incubator and technology workshop	28 SMEs in 6 municipalities	Intekbis UNHAS	State budget	n.a.	2004
3.	Incubator and technology workshop	35 SMEs in 6 municipalities	Intekbis UNHAS	State budget	n.a.	2004
4.	Incubator and technology workshop	25 SMEs in 6 municipalities	Intekbis UNHAS	State budget	n.a.	2004
5.	Disbursed fund for the trade sector.	2 business groups in once city	Business Incubator UNM	State budget	n.a.	2004
6.	Disbursed fund for the Small and Medium Industry.	125 IKM at 23 regencies or municipalities	-	State budget	n.a.	2004
7.	Technical support for packaging quality of IKM product		Intekbis Unhas	State budget	n.a.	2004
8.	Development of industry in cocoa processing		JICA	State budget	n.a.	2004

Table 3.3.5.
Type of Patent and Standardization Support
by Local Government in Industrial Development

No.	Type of Patent (IPR) and Standardization Support in Industrial Development	Scope of Activities	Collaboration with	Source of Financial	Total fund (Rp million)	Time
1.	Facilitate trademark registering	South Sulawesi	IPR Center UNHAS	Regional Budget	-	2004
2.	Consultancy service and use of brand and design	South Sulawesi	IPR Center UNHAS	Regional Budget	-	2004

Table 3.3.6.
Type of Promotion/Exhibition
by Local Government in Industrial Development

No.	Type of Promotion/exhibition in Industrial Development	Scope of Activities	Collaboration with	Source of Financial	Total fund (Rp million)	Time
1.	International Exhibition	Selected SMEs	NAFED	Regional Budget and State Budget	n.a.	2004/ 2005
2.	National Exhibition at PRJ and SMESCO	30 SMEs in 6 districts	NAFED	Regional Budget	n.a.	2004/ 2005
3.	Promotional support with international exhibition	Selected IKM	-	Regional Budget	n.a.	2004/ 2005
4.	Promotional support through exhibition in provincial and national level.	Selected IKM	Provincial Secretariate	State Budget	n.a.	2004/ 2005

Table 3.3.7.

Type of Supporting Activities by Local Government in Industrial Development

No.	Type of Supporting Activities in Industrial Development	Scope of Activities	Collaboration with	Source of Financial	Total fund (Rp million)	Time
1.	Incubator evaluation Minister of Co-ops	1 unit garage incubator	Business Incubator of UNM	State Budget	n.a.	2004/ 2005
2.	SME Regulation Bill	South Sulawesi Province	Provincial Secretariate	State Budget	n.a.	2004/ 2005
3.	Feasibility study for development of regional distribution	Makassar for all regions	LPPM UNHAS	Regional Budget	n.a.	2004/ 2005
4.	Planning and industrial engineering in agriculture	All regions in South Sulawesi	German Government	State Budget	n.a.	2004/ 2005

SME development is carried out through the business incubator program and facilitation by BDS aiming to several aspects like technology improvement on production and the products, the improvement of production quality, the development of marketing networks. These activities are linked to SME development programs carried out by state enterprises through PUKK Program.

Cooperation between Hasanuddin University and the SME and Cooperative Office is materialized mainly through workshops and business incubator programs for potential SME by using state budget funds. Workshops and business development are held for selected SME from several regencies. They are selected through recruitment processes. These activities are held in three phases in order to select SME participants from all regencies/cities, in accordance with their reliable commodities. Business development involves the Technology and Business Incubator of Hasanuddin's LPPM. The SME and Cooperative Office provides funding from state budget for the business incubator program. After the program starts, it monitors the progress of the program implementation and prepares the SME to be involved in SME-BUMN partnership programs.

The Industry and Trade Office has not yet developed formal cooperation with institutions at Hasanuddin for the development of SME. So far, cooperation has been carried out on an individual basis and has involved the university lecturers as consultant who introduces the utilization of applied technologies.

3.3.3. The Linkage Program Carried Out by Engineering Faculty

3.3.3.1. Engineering Faculty with Local Government

The government's cooperation with Hasanuddin University was carried out on several forms. ***First***, the regional governments' requests the university, especially the Architecture and Civil Engineering department, to design their regional spatial plans and engineering for the physical development. This cooperation was mostly in the form of recruiting lecturers from Department of Civil or Architecture Engineering to be acting as experts/consultants for local governments in designing regional spatial plans.

Second, the placement of experts/advisors in the regencies/cities was aiming to support local development plans, such as: the designing of regional development plans, improvement of physical/civil infrastructure in the regions, development of alternative energies for areas in need, utilization of maritime resources, and others.

These activities were also informal. Normally, the formal cooperation was developed when the third parties involved, such as the cooperation between cement producer, PT. Semen Tonasa and Maros Regency Government in material testing.

Third, the researches financed by the Directorate General of Higher Learning Education were carried out in the regions, use regional resources, and the result is utilized by the regions. The researches were mainly in the form of applied researches that turn out to be applied technologies and/or effective – efficient ("tepat guna") technology. Such researches are normally carried out by individual lecturers in order to increase their credit points for the purpose of the promotion in the university.

Synergy between the Office for Cooperatives and SME from South Sulawesi Province and Intekbis from Hasanuddin University has been quite successful in developing business incubator programs and in pushing forward the development of entrepreneurship for beginners in different regions/cities. In addition to effectively utilizing programs at the Office of Cooperatives and SME, this cooperation has turned out to be quite effective in making use of the expertise of Hasanuddin's lecturers especially those form the Engineering Faculty in the transferring of science and technology to SME and in pushing forward the development of stasrt-up SME. Through technology and business incubator program, SME can be made aware of their weaknesses in business management and production techniques. This program also promotes involvement of large companies (state firms) in the development of SME in their areas of operation

Fourth, the placement of the lecturers in the local government was mainly aimed at the mapping of regional potential in order to identify the need of regional development plan.

Fifth, the cooperation of diploma education program in certain field. The program that has been carried out was Diploma 1 of Geodesy Engineering. This program was established through cooperation between Hasanuddin's Engineering Faculty and South Sulawesi Provincial Government for the purpose of the utilization of mining potentials in the province.

Sixth, the cooperation of technology and business incubator program for SMEs. This cooperation was carried out between Hasanuddin and SME and Cooperative Office. This cooperation was conducted through Businesses and Technology Incubator Institution, which is part of University's LPPM, instead of the Engineering Faculty. The Business and Technology Incubator Institution has developed significant cooperation with outside parties for the development of SME in South Sulawesi. The Engineering Faculty only provided lecturers for the institute's cooperation programs, who serve as experts for analyzing technical matters and facilitating and supporting the SME.

Table 3.3.8.

Number of Proposal Activities by EF of Hasanuddin University for IPTEK, VOUCHER, ROUTINE, 2004

No.	Activity	Partner	Funding	Budget (Rp million)
I.	**Center for Implementation and Management of "Kuliah Kerja Nyata"**	UNHAS	Routine budget	25
II.	**Institute for Publik Service (LPM)**			
	1. Implementation of LPM Activity	DGHE – MoE	Science and Technology	10
	2. Implementation of LPM Activity	DGHE – MoE		10
	3. Enhancement of SMEs through assisting/work training in order to improving of SME in Agribusiness sector	Regional Office of Cooperative and SME	Business and Technology Incubator	284.86
	4. Implementation of LPM Activity	UNHAS	Routine budget	15
	5. Enterpreunership Study	DGHE-MoE	Enterpreunership Study	15
	6. Utilization of Isolate Bacterial Arellus Kakao and Controlled Fermentation Place for improving of Fermentation Process at SME processing cocoa in Wonomulyo sub district	DGHE - MoE	KKU	17
III.	**Center for Development Management and Policy Studies (PSKMP)**			
	1.Pusbindiklatren Bappenas	BAPPENAS	BAPPENAS	3,666.02
IV.	**Center for Appropriate Technology**			
	1. Life Skill Training of Appropriate , Technology in Makassar City	Regional Office of Ministry of Education (MoE)	LIFE SKILL Project, MoE	100
II. TOTAL				**4,142.88**

The first phase of cooperation in business development and business incubator programs has been completed in three periods of time, starting from 2001/2002. About 25-30 SMEs from 7-8 regencies/cities in South Sulawesi attended programs in each period. Until the three periods, this program has involved more than 100 SME and reached all regencies/cities in South Sulawesi. These activities, which were coordinated by Business and Technology Institution, involved lecturers from the Engineering Faculty as experts to identify problems and to facilitate problems solving and production improvement for SME in the province. Activities were carried out in five phases:

(1) Selection of potential SME from different economic sectors to be put into the incubation.

(2) Workshops for identifying problems and product quality

(3) Visits to locations to analyze and solve problems.

(4) Periodical visits for facilitation and evaluation of results

(5) Passing out by facilitating the cooperation with state owned enterprise (BUMN) through PUKK Program.

3.3.3.2. Universities and Small and Medium Enterprises (SME).

Hasanuddin's cooperation with SME was carried out in two forms namely: (1) SME development program through workshops and business incubator; (2) The utilization of technology developed by the university for SME. The SME development program through workshops and business incubator was in the form of cooperation between the government (SME and Cooperative

Office) and Business and Technology Incubator Institution of Hasanuddin's LPPM as consultant and program implementing body. Meanwhile, the utilization of technology was in the form of direct cooperation between the government and the Engineering Faculty (as an institution or as individual lecturers).

Several forms of "Tepat-Guna Technology" development that can be used by SME/community:

- *Undersea lamps for fishermen*
- *Power generators for non-machine weaving equipment (ATBM) (Silk)*
- *Furnace for burning earthenware vessels with optimal heat*
- *Cocoa crusher machines*
- *Water turbine for micro-hydro power plant.*

Utilization of technology developed by the Engineering Faculty was part of the efforts to be closer with the local communities, especially SME. The faculty is expected not only to carry out its education mission but also to develop technologies that can be used by the local people. This effort can be implemented since the Engineering Faculty has lecturers who can develop appropriate technology and has related laboratory facilities and workshops. Besides that, as an institution, LPPM also has a Center for Appropriate Technology Development (PPTG) that involves Engineering Faculty lecturers. Moreover, the faculty has a mission of serving as a center for technology studies in eastern Indonesia.

Table 3.3.9.
Research Activities Related to SME Development by Engineering Faculty of Hasanuddin University

No	Research Activity	Cooperation with	Year
1.	Pioneer business of breeding chicken through Cooperative with revolving system	Provincial Government – Office of Cooperative and SME, South Sulawesi	2004
2.	Application of Computer Program for Accountancy in finance management in Loan-Deposit Cooperative/Unit in South Sulawesi	Provincial Government – Office of Cooperative and SME, South Sulawesi	2004
3.	Study on profit sharing system in partnership pattern on poultry business in Gowa District	Provincial Government – Office of Cooperative and SME, South Sulawesi	2005

New development technologies introduced to the local people and SME is not only through PTTG, but through the Engineering Faculty itself. However, PTTG and the faculty support to each other in applying new technologies for SME/local community. PTTG utilizes and markets its developed technologies to the Engineering Faculty, which then to be disseminated to the local community. On the other hand, the Engineering Faculty also promotes new technologies it has developed to PTTG so that the local people and SME can make use of them. These two institutions are targeted the local community as the technology users.

Table 3.3.10.

The Activity of Public Service by Teaching Staff of ENGINEERING FACULTY of Hasanuddin University at 2004

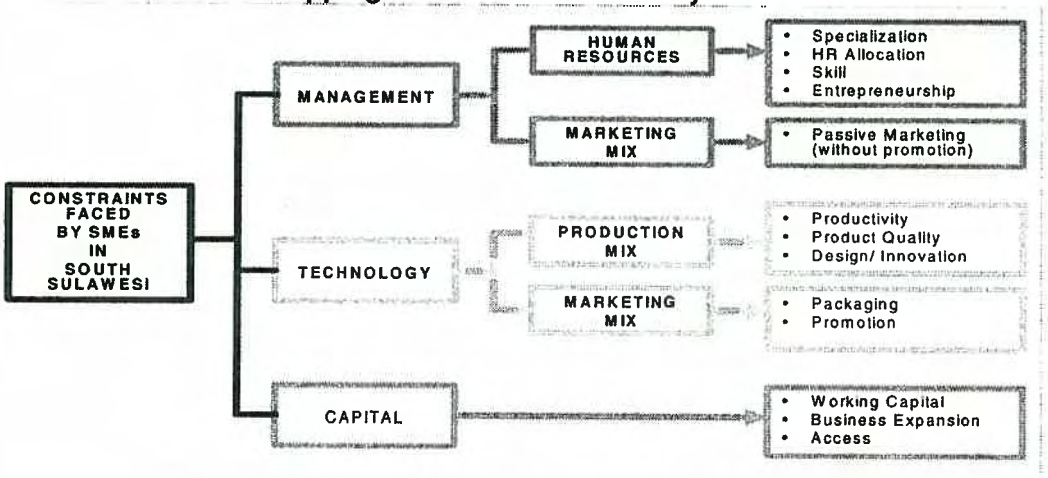
No	Department	Title of Activity
1	Mechanical	1. Identification of Space and Work Station of an unqualified Video Display Terminal (VDT) and extension of avoid of Repetitive Strain Injuries (RSI) in Hasanuddin University 2. Skill Improving of utilization of AutoCAD software in design of machinery element 3. Skill Improving in Cost production budgeting with computerization
2.	Civil	4. Designing of mapping of city road network mapping base of Geographic Information System (GIS) in Sinjai District 5. Designing of software for mapping of transportation performance base of Geographic Information System (GIS) in Makassar city
3.	Electric and Electronics	6. Extension of the safety use of electrical energy in Totoli village Majene District, West Sulawesi 7. Educational Extension on response and strategy to take a higher education in engineering faculty, Hasanuddin University 8. Image of State Electric Cooperation PLN) in community
4.	Architecture	
5.	Geology	9. Designing of Separator Magnetic instrument for reducing Fe^{+} content in soil in order to improving quality of pottery in SME UD Sandy Jaya Takalar District
6.	Shipping and Marine	10. Extension of Determination of sandeq propeller
TOTAL		**10 Activities**

3.3.4. SMEs Performance after Linkage Program

3.3.4.1. SME Conditions

SME in south Sulawesi are mostly involved in three main sectors namely processing industry, trade and services. However, many SME use simple technology and management systems. SME in the industrial sector are mostly based on natural resources, which use simple processing methods. They are labor intensive industries, and are developed with small initial capital and use low-class technologies. SME in the trade sector are mostly from the retail sector with low turnover. Meanwhile, few SME in the services sector are high technology-based, except SME providing information technology services.

Mapping of Constraints faced by SME



SME in South Sulawesi need improvement, especially in the management and technology aspects. Their weaknesses in the management aspect are in the arrangement and allocation of their workers. For example, they have not implemented good systems of work division and specialization, and they do not have a plan to increase the workers' skills to boost the productivity. They are satisfied with the existing skills of their workers. On the marketing side, weaknesses are in the absence of clear marketing concepts. They remain passive in promoting their products and keep relying on the local market.

The most fundamental weakness is their incapability of mastering and utilizing of new technologies in doing business. They still use simple technologies and remain incapable to absorb new technologies including efficient and effective technologies (Teknologi Tepat-Guna), which are low-cost and are much needed by SME. Such technologies can boost the production, improve product quality in accordance with current market demands, develop designs, and improve products. Production of stagnant items, the absence of design development and product innovation, have made it difficult for their products to penetrate markets. In connection with market expansion, SME also need technology development in products packaging and in creation of simple leaflets for promotions, which can support their market expansion.

Only few SMEs have been involved in improvement programs carried out by related institutions at provincial/regency/city levels, especially in SME development incubator programs. Meanwhile, local universities, so far have never carried out assistance programs for SME because most the university program depend on the programs planned by local governments. As a result, only few SME had the opportunities to get management assistance, technical consultation, and production technology assistance, the facilitation to capital access and marketing from the university.

3.3.4.2. SME Performance

SME involved in business incubator programs have some improvement on their performance. From the aspect of business management, the improvements were included the allocation of workers and the division of labor in production system, financial management, and the drafting of business plans. SME were able to increase productivity of their workers and improve the quality of their products (in cashew nut processing business). In addition, SME can manage their finances for further business development (a portion of profits were allocated for business development). SME became more enthusiastic in managing and developing their businesses for instance by .expanding marketing networks for their products.

SME received several orders for furniture from the SME and cooperative Office and Hasanuddin University, following the development of cooperation between the three parties. Meanwhile, SME processing cashew nut succeeded to develop marketing networks with large stores after their products became even more popular. Thanks to their quality

Table 3.3.11.
Comparing SMEs with Linkage Program and Without Linkage Program

No.	Kind of SMEs	Value (Rupiah)	
		With Linkage Program	Wihout Linkage Program
1.	**Cashew Nut**		
a.	Total Revenue	58,540,000	40,400,000
b.	Total Cost	30,400,000	24,400,000
c.	Total Profit	28,140,000	16,000,000
2.	**Tailorman**		
a.	Total Revenue	1,286,000,000	864,000,000
b.	Total Cost	969,600,000	648,600,000
c.	Total Profit	316,400,000	215,400,000
3.	**Wooden Furniture-1**		
a.	Total Revenue	168,800,000	144,000,000
b.	Total Cost	106,800,000	92,400,000
c.	Total Profit	62,000,000	51,600,000
4.	**Wooden Furniture-2**		
a.	Total Revenue	240,000,000	108,000,000
b.	Total Cost	185,000,000	83,000,000
c.	Total Profit	55,000,000	25,000,000

The guidance on product quality and production techniques has made SME recognize the weaknesses of their products. These weaknesses were the focus of improvement facilitated by Hasanuddin University. The increasing in turn over experienced by the SME which have been involved in the business incubator were roughly around 55 %.

SME's cooperation with Hasanuddin University through business incubator program also can provide opportunities for them to enlarge their marketing networks with their own endeavors, since their products have become more popular, and also through cooperation between Hasanuddin University and the SME and Cooperative Office.

3.3.5. SMEs Need and Expectation to Engineering Faculty in Linkage Program

Some expectations of SMEs to the engineering faculty of Hasanuddin University on linkage program are:

- So far, the Engineering Faculty's assistance is limited to managerial support. Meanwhile, SME need more training on simple and better production technology.
- Besides the applied technology to be introduced by the engineering faculty, SMEs also request investment and working capital support.
- The Financial support from PUKK Program (SMEs development fund from SOEs, and big corporations) is expected to be realized
- The produce of SMEs is marketed locally/ regionally – needs support in market expansion.

3.3.6. SWOT Analysis of Engineering Faculty in Linkage Program

Strength

- Hasanuddin University's Engineering Faculty has lecturers with the capability of technological development including the efficient-effective ("Tepat-Guna") technology.
- The activities of Engineering Faculty focus on marine and mining sectors. It can support the development of technology for fish catching and the utilization of marine and coastal resources which suitable with Regional condition.

- The Engineering Faculty also has laboratory facilities and workshops that support the technology development.

Weakness

- Technology development heavily depends on outside funding sources like the university's partners (local governments and private companies), and competitive grant funds.
- As a result, in certain matters, research and technology development activities are not focused to technology application, but to researchers'/lecturers' efforts of promotion in their career.

Opportunity

- Opportunity of cooperation with Regional Governments and large private companies was so great since Hasanuddin's Engineering Faculty is still the largest faculty and its facilities are the most complete in that province.
- Some regional governments and private corporations in South Sulawesi have allocated special funds for SME development programs, and carry out their programs of providing experts and consultants from Hasanuddin's Engineering Faculty.

Threat

- Research and technology development that has not been well organized would cause research activities and technology development programs follow their own ways without clear direction.
- The activities are carried out only to meet the demand of working partners, and are not in line with university's mission in developing SME.
- Only individual lecturers involved get the benefits of research and technology development programs, while available facilities are very much under utilized to the contribution of SME development.

Resume of the Form of Linkage between Hasanuddin University and Regional Governments/Private Companies

- Cooperation with PT. INCO for apprenticeships of lecturers and students at Nikel INCO's mining sites.
- Cooperation with PT. PLN of Region VIII Sulselra for apprenticeships of researcher lecturers and students
- Cooperation with PT. Telkom for:
  - *Apprenticeship and research for students and lecturers*
  - *Implementation of D3 education program*
  - *Development of education activities*
- Cooperation for the introduction and development of HaKI in the regions with the Office of Industry and Trade facilitating the registration of Trademark.
- Cooperation with Bantaeng Regency Government for the production and supplying of high quality seedlings of potatoes through networking techniques.
- Cooperation with South Sulawesi Province's Office of Food Crop Farming for controlling withering and bleeding diseases on banana trees, using environmentally friendly methods
- Cooperation with Regional Governments for:
  - *Design regional spatial plans and civil construction plans (civil engineering and architecture fields)*
  - *Make inventory of the regions' natural resources (geology and marine fields)*
  - *Draft regions' budget plans*
- Cooperation for business incubator program with the Office of Cooperatives and SME from south Sulawesi:
  - *Three-year period implemented (2001-2004)*
  - *25-30 SME from several regencies until all regencies/cities are covered*
  - *Workshop for identifying problems by involving competen experts from Hasanuddin University, which is followed by trainings and facilitation for SME (management and technology)*
  - *Facilitation of SME for taking part in PUKK BUMN Program*
  - Cooperation with state enterprises as consultant for PUKK funding program for SME (angkasa Pura, Jamsostek, Pelindo etc)
  - Development of "Tepat-Guna" Tgechnology for fishery SME:
    @ Undersea lamps for fishermen
    @ Power generators for non-machine weaving equipment (ATBM), Silk.
    @ Furnace for burning earthenware vessels with optimal heat
    @ Cocoa breaking machines
    @ Water turbine for micro hydro power plants

3.4. ENGINEERING FACULTY OF UNM (STATE UNIVERSITY OF MAKASSAR), SOUTH SULAWESI

3.4.1. Overview of the Engineering Faculty