The Engineering Faculty of UNM (State University of Makassar) was established in 1997 in line with the change of name of IKIP Makassar into State University Makassar. This means that the first engineering faculty (established in 1965) in the university was dedicated to produce teachers in engineering, rather than engineers. Started in 1997, the role of the faculty has changed conversely.

The vision of the Engineering Faculty off UNM is to become the center of education, research and technology advancement whereas education and entrepreneurship are the main objective. With this vision the engineering faculty of UNM brings its mission to produce professionals who have the integrity and high intellectuality to technological advancement, by developing and performing teaching and research activities and providing technology based consultation services which is supported with sound academic climate and culture.

Based on the engineering faculty administration office record, the faculty has 166 lecturers/ teachers serving for six faculties in 2005. The engineering faculty of UNM has 91 under graduate teachers (some of them are studying for master degree/ S2), 69 master degree holder teachers and 6 doctors/ professors. The faculty is supported by 50 administrative, financial and laboratory staffs.

The engineering faculty of UNM has five study programs which are delivered through 16 formal and vocational classes. The study programs are Electrical Engineering, Electronics Engineering, Automotive Engineering, and Civil Engineering. For each study program the university has facilitated the faculty with laboratories for technological engineering, electronics and civil engineering. The study program of civil engineering is the biggest faculty in the engineering faculty of UNM due to its number of students and lecturers.

Table 3.4.1.
Number of Student, Teachers, and Study Program
In Faculty of Engineering, State of Makassar University

No.	Field Study/Level of Education	Total Staff	Total Student
A.	**Staff Degree**		
1.	**Mechanical Engineering**	34	326
	S1	22	326
	S2	12	0
	S3	-	0
2.	**Civil Engineering**	43	380
	S1	23	380
	S2	19	0
	S3	1	0
3.	**Electrical Engineering**	25	434
	S1	18	434
	S2	6	0
	S3	1	0
4.	**Electronic Engineering**	23	285
	S1	9	285
	S2	13	0
	S3	1	0
5.	**Automotive Engineering**	22	267
	S1	11	267
	S2	9	0
	S3	2	0
	Total	**166**	**1951**
B.	**Supporting Staff**	**40**	

The university and the engineering faculty of UNM have engaged and performed quite extensive extension works either with/ to local government or SMEs. These activities are

administered and organized under an institution named as Institution for Community Development and Research (LPPM). There has been also strong personal involvement of teachers to the community development/ research activities. A number of cooperation has been performed with the regional government and technical institution office in one project based office i.e. the SIBERMAS program. The SIBERMAS Program is developed to carry out incubator programs and SME foster program under and umbrella program of Regional Science and Technology (IPTEKDA).

3.4.2. Linkage Program of the Local Government

See Chapter 3.3.2 (Faculty of Engineering of Hasanuddin University)

SIBERMAS program was implemented under the cooperation of the Barru Regency. The regency of Barru, is the place where the university can implement a scientific base entrepreneurships program which concluding the improvement of the productive activity of the people. The activities are focused on enhancing the live of coastal people, motivate them and stem more added value and pioneering early childhood education program. A number of productive activities and people empowerment have been prevailed through this program.

3.4.3. Linkage Program Carried Out by Engineering Faculty

3.4.3.1 University/Engineering Faculty with Local Government

A remarkable progress of a linkage programs between the university and the local government should be recorded. A formal cooperation between UNM and local government focusing to the development of SMEs in Tofu industry were made under an umbrella of a regional program named "People Empowerment Synergy Program" (SIBERMAS). There are three mode of service being carried out, such as creating an incubator program, training program to SMEs and foster program. Aside from the formal cooperation, the lectures also perform as consultants and experts in the program. However, there has been no cooperation that is directly involving the Engineering Faculty of UNM, but the Institution of Community Development and Research. The involvement of the engineering faculty is not direct but only the involvement of the competent lecturers.

The SIBERMAS program was carried out with financial aid from the High Education Directorate General the Ministry of Education after the LPPM UNM won the proposal for the research and community development research. The purpose of this activity is to enable and improve the people's self reliant. The goals were achieved through a number of activities concluding research, local potential product and commodity mapping, training and monitoring and assistance to the further development activity. The first phase of the SIBERMAS was implemented for three years in the Barru Regency and in cooperation with local government. The activities were focused on the development of marine sector and agri-business based on the potential of every region.

The second phase of the program in Polwali Mandar Regency was carried out right after the completion of the first phase. The phase II of SIBERMAS covers 18 types of activities with the additional activity on the machinery and engineering related activity i.e. welding and manufacture of tools and farming machinery. This program was set by taking into account the need and the potentials of the people and expected implemented cooperation with the local government.

The Business Incubator Program was conducted by the LPPM of the State University of Makassar, involved most of the experienced lecturers from Engineering Faculty. The incubator program was implemented when UNM is selected as the most proper university to manage this program (based on the recommendation and approval from Ministry of Education), based on the assessment of its facilities and resources. The university had provided a location for the business incubator activities which was commenced on automotive related activity and cafeteria management with the support of soft loan from BUKOPIN and facilitated by Co-ops Unit and SMEs.

IPTEKDA cooperation vented into a Memorandum of Understanding between the Engineering Faculty of UNM with the Barru Regency Government. The fund is originated from the Lawu Utara Regional Government budget. Through this activities, training and technological program have been suited to the need and local potential. Some of which have been developed are Kapurung (North Luwu's traditional food) and patterned batik of Luwu

In the course of its implementation, the fund aid from BUKOPIN was allocated for the capital expenditure of the SME who will join the SME business incubator program.

The incubator was conducted within the campus area, which nurture the 10 types of business activities. There was also an out-of-campus activity which nurture new-starter SMEs initiated by the alumni of the university The activities have been implemented and proven as a success for house appliance made of chicken feather at the Polewali Mandar Regency and for the work of embroidery at Luwu Utara Regency.

The highlight of the linkage program activity between the Engineering Faculty of UNM with the local government is the training activity and the development of applied technology in cooperation with the Technology Development Agency (BAPTEK) of Luwu Utara Regency under the program of Regional Science and Technology (IPTEKDA). The cooperation with the Luwu Utara Regency Government has been started since 2002 whereas focused on the engineering training and effective applied technology development. This program was expected to support the mission of BAPTEK as the center of effective technology development in South Sulawesi and Eastern Indonesia.

Table 3.4.2.
SIBERMAS and IPTEKS Activity Carried by the Engineering Faculty of UMN with Local Government

Year	Program	Number of Activity	SMEs Target
2001	- IPTEKS	14 activities	
	- Voucher	7 activities	7 Group of SMEs
2002	- IPTEKS	19 activities	
	- IPTEKS outside SIBERMAS	8 activities	
	- Voucher	4 activities	4 Group of SMEs
	- Voucher Luaran Sibermas	3 activities	3 Group of SMEs
2003	- IPTEKS	14 activities	
	- IPTEKS outside SIBermas	11 activities	
	- Voucher	4 activities	4 Group of SMEs
	- Voucher outside Sibermas	3 activities	3 Group of SMEs
2004	- IPTEKS	19 activities	
	- Voucher	4 activities	4 Group of SMEs
2005	- IPTEKS	23 activities	
	- Voucher	5 activities	5 Group of SMEs
	- IPTEKS outside Sibermas	11 activities	
	- Vucer outside Sibermas	3 activities	3 Group of SMEs

Table 3.4.3.
Multi-years Linkage Program Carried Out by the Engineering Faculty of UNM

Year	Program	Number of	Teach. Staff

		activities	
2001	SIBERMAS "community empowerment in Barru District"	1 activity	15 persons
2002	SIBERMAS" community empowerment in Barru District Multi Years Voucher "incubator for 4 SMEs"	1 activity 1 activity	5 persons 3 persons
2003	Sibermas "Industry and Service Business"	1 activity	5 persons
2004	SIBERMAS " community empowerment in Barru District "	1 activity	4 persons
2005	SIBERMAS "community empowerment in Polewali Mandar District	1 activity	4 persons

3.4.3.2. University with SME's

Logically, the support from the Engineering Faculty to the SME is manifested in form of effective applied technology and utilization of the technology for the business activities. However, there has been no specific program from the engineering faculty of UNM used by the SMEs instantly.. The on-going support and cooperation are more in the individual involvement and temporary, through the research activity and community development services of the lecturers or came from part of the outcome of technological exhibition

Some technologies which have been developed and utilized by the SME were machinery to rip off the chicken feather, brick casting machine, drying processing machine for krupuk/ crackers, cashew nuts crusher, pepper peeler technology and coconut grinder and coconut milk digester. In terms of the design, the SME has utilize the furniture designs and cookware designs made of clay. Many of the technology developed are applied technology based which suit for the work in the community. However, the utilization of the technology products is very low due to the limited technology (know how) and in-balanced information dissemination.

Table 3.4.4.
Business Incubator Activity Carried Out
By the Engineering Faculty of State University of Makassar

Year	Activity	Number of Target
2000	Training for Improving Performance of Cooperative	16 Cooperative in SS
2001	Incubator for three group of tenant /SME (INWUB)	3 SMEs
2002	Incubator for three group of tenant /SME (INWUB)	3 SMEs
2003	Incubator for 11 group of tenant /SME (INWUB)	11 SMEs

The only means of technology and know how transfer was only disseminated through exhibition held by the Engineering Faculty or by inviting the SME to the laboratory and garage of the Engineering Faculty. However this opportunity is very rare. Meanwhile, the support from the local government imposing to use more applied technology generated by the engineering faculty is limited to the special program i.e. SIBERMAS and IPTEKDA. However, there has been strong intention of the engineering faculty to manage program i.e. SIBERMAS although the funding form the government has been over.

3.4.4. SME's Performance after Linkage Program

See chapter 3.3.4. (Hasanuddin University)

3.4.5. SME Need and Expectation to Engineering Faculty Role in Linkage Program

See chapter 3.3.5. (Hasanuddin University)

3.4.6. SWOT Analysis of Engineering Faculty in Linkage Program

Strength

- The Engineering Faculty has its human resources and facilities (laboratory and garage/ workshops) which is fairly adequate to support providing technical guidance and management for the SME and private sector.
- Within the SME itself, the technical faculty is relatively the only faculty which has a high relevancy for the technical cooperation with the business sector mainly industry of SME. Therefore the technical guidance cooperation which UNM has made should involve all of the resources with the Engineering Faculty.
- The Engineering Faculty has made a major contribution to the development of SME.

Weakness

- The faculty has difficulties in generating special internal budget for the linkage program activities to the development of SME. The activity conducted is still relying on the fund from the partner agent and third parties.
- The technological development activity and the design development are still limited to the context of research granted from the lecturer whereas no follow up activities has been done. Consequently, the technology produced and designs developed are only the outcome of the research and development merely to improve credit for promotion.
- The result of the research and technological development and design has yet to be disseminated to the public particularly the SME.

Opportunity

The Engineering faculty has informally performed a significant contribution to the development of SMEs. UNM has attained recommendation from the respective institution to implement business incubator program and has business incubator facilities in the campus area of which has a strategic location. The significant experience in linkage program activities has been successfully performed through the program of SIBERMAS and IPTEKDA.

Threat

The dependency on financial support for the program may decline the dedication of the mission and morality of the lecturers/ teacher to be more professionally involved in SME development and assistance. On the other hand, this activity will generate additional income as a benefit for the lecturers. Hence, this may lead the lecturer/ teachers to more "addicted" to get this promising side job rather than carrying out the main task i.e. teaching activities.

Further, the research and technology development are merely considered as activities that can be used for job/ rank promotion.

3.5. ENGINEERING FACULTY OF UNRAM (UNIVERSITY OF MATARAM), WEST NUSA TENGGARA

3.5.1 Overview of the Engineering Faculty

The Faculty of Engineering was established in 1993 and has 3 study programs: (1) Mechanical Engineering; (2) Civil Engineering; (3) Electrical Engineering. It has a vision to be a

competitive education institution in the field of technology in national and regional level in order to implement the three basic university program (known as Three Dharma Perguruan Tinggi) and science & technology skill based on human resources quality and potential area sustainability. While its mission are as follow:

a. To serve public and government based on the needs of the quality human resources in engineering field by implementing the efficient and effective education;
b. To apply science and technology in order to search and utilize potential area through research, study, technology transfer, science skill and escalation of self quality.

The Faculty has 136 teaching staffs, consists of 3.7% are Post Graduate Degree (S3), 83.8% are Graduate Degree (S2), and 12.5% are Undergraduate Degree (S1). It also has 80 supporting staffs. Until now, number of students in Faculty of Engineering are 1,565 which consist of 400 students of Mechanical Engineering study program, 765 students of Civil Engineering and 400 students of Electrical Engineering (see *Table 3.5.1).*

Table 3.5.1.
Number of Staff and Students in
Faculty of Engineering of Nusa Cendana University

No.	Field Study / Level of Education	Total Staff	Total Student
A.	Staff	136 persons	1565 persons
	Mechanical Engineering	37 persons	400 persons
	S1	7 persons	400 persons
	S2	30 persons	-
	S3		
	Civil Engineering	60 persons	765 persons
	S1	3 persons	765 persons
	S2	52 persons	-
	S3	5 persons	
	Electric Engineering	39 persons	400 persons
	S1	7 persons	400 persons
	S2	32 persons	-
	S3		
B.	Supporting Staff		
	Administration	50 persons	
	Publication and documentation	6 persons	
	Housekeeping	16 persons	
	Security	8 persons	

3.5.2. Local Government Support on Linkages Program

Although most provinces in Indonesia have set up the Industry and Trade into different entity after the regional autonomy has been applied, in West Nusa Tenggara, this Industry & Trade is still under one office. The vision of the office is the establishment of strong Industry and Trade based on regional resources in order to increase people welfare in NTB. In line with the vision, the mission of the office is as follow:

a. To establish and develop the industry through optimal management of human and natural resources in order to generate regional superior product which is competitive in local, national, and global level.

b. To increase the marketing of people products both industry and agriculture products.
c. To increase procurement and distribution of basic need and other strategic products.
d. To develop facilities and infrastructure which support industry & trade.

Related to its vision and mission, the Industry & Trade Office has enacted 5 years program with the objective are as follows:

1. The development of industry which create a wide business and job opportunity for the people.
2. To increase trading activities in both domestic and abroad.
3. The availability of basic need and other strategic products in the market with reasonable price and taking the people purchasing power into the consideration.
4. To develop non oil & gas export in the event of increasing foreign exchange revenue to be used for national development.
5. The availability of Technical Service Unit (UPT) in order to support Industry & Trade Development.

Many activities have been done by the Industry & Trade Office. This covers training start up, new technological aid, patent (IPR) and standardization support, promotion and exhibition, and supporting activities. The type of local government activities related to industrial development can be seen in the table below:

Table 3.5.2. Recent Local Government involvement in Industrial Development (2004-2005)

TSU	Training Start Up	8
TUG	Technological Upgrading	3
IPR	Patent (IPR) and Standardization Support	1
PEX	Promotion/ Exhibition	5
SAC	Supporting Activities	2

The detail activities base on group of activity like the *table 3.5.2*, we could be seen in *Table 3.5.3* to *Table 3.5.7*.

Table 3.5.3.
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.	Training on weaving quality & design development in Bima City	Bima City (20 persons)	Balai Besar Tekstil	State Budget	25	2004/ 2005
2.	Training on weaving quality & design development in Sumbawa Regency	Large Sumbawa Regency (20 persons)	Balai Besar Tekstil	State Budget	26	2004/ 2005
3.	Training on weaving quality & design development in Sumbawa Regency	Dompu Regency (20 persons)	Balai Besar Tekstil	State Budget	26	2004/ 2005
4.	Training on weaving quality & design development in West Lombok Regency	West Lombok Regency (20 persons	Balai Besar Tekstil	State Budget	26	2004/ 2005
5.	Training on weaving quality & design development in Central Lombok Regency	Praya (20 person)	Balai Besar Tekstil	State Budget	26	2004/ 2005
6.	Silk Testing, treatment and Care Method	NTB Province (3 persons)	JICA. BBT	State Budget, JICA	-	2004
7.	Natural Silk SME internship in South Sulawesi	6 persons	Disperindag SULSEL	State Budget	30	2005
8.	Technical Training of Natural Color	2 persons	Dit. Sandang. DIT IKM Deperindag	State Budget	-	2004/ 2005

Table 3.5.4.
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.	Realigning dan Restand Machines Aid	3 products	BBT	State Budget	15	2004
2.	ATBM DOGBY Machines Aid	2 products	BBT	State Budget	24	2004
3.	ATBM Machines in Bima Regency	6 products	Biro Cana Deperindag	State Budget	10	2004

Table 3.5.5.
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.	IPR Program	9 Regency/ City	Dit. Paten dan Merk Dep Hukum dan UU	State Budget/Regional Budget	25	2004-2005

Table 3.5.6.
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.	INACRAFT exhibition	4 firms	DIT IKMDIT IKM	State Budget	32	2004/ 2005
2.	ICRA exhibition	4 firms	DIT IKMDIT IKM	State Budget	32	2004/ 2005
3.	TPT exihition	3 firms	DIT PDM	State Budget	32	2004
4.	JABEX exhibition	4 firms	DITPLN	State Budget	35	2005
5.	Pekan Raya Jakarta	5 firms	DIT IKM	State Budget	40	2005

Table 3.5.7.
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.	West Nusatenggara Traditional Woven Clothes Fashion	9 Regency/ City	Dekranasia se NTB	State Budget	117	2003-2005
2.	Batik & Textile Design Competition	3 Regency/ City	Balai Besar Kerajinan dan Batik	State Budget	-	2004-2005

Although The Industry & Trade Office has many activities related to industrial development, the fund allocated to those activities was very limited and the coverage areas of activities were limited to regency and province area.

In order to increase the performance of manufacture industry, especially the performance of SME, the Industry & Trade Office has enacted Industry Development Program for period 2006 – 2007. The programs are as follows:

1.	Training Star Up	16	times
2.	Upgrading old product	150	design
3.	New Technological Application	2	times
4.	Management of Firm	16	times
5.	Information Technology	2	times
6.	Company Profile of Hand Woven Industry	1,500	exemplar
7.	Intellectual Property Right (IPR)	30	design
8.	Promotion/Exhibition	10	times
9.	New Machine Aid	10	units
10.	Special Exhibition	2	times

3.5.3. Linkages Program carried out by Engineering Faculty

During 2004, the teaching staffs of Engineering Faculty have conducted 31 titles of research activities with total fund of Rp 312 million. The research were funded by DIKTI, routine fund, DPP/SPP, basic research. Hibah pekerti, RPKD NTB and S.Q IV JTE. The teaching staffs have also conducted 20 titles of public service activities with total fund Rp 374.55 million. The sources of fund came fom vucer, Iptekda LIPI, DPP/SPP, D2JTE-PLN and self financing.

Related to SME development, there were 11 activities conducted by the Faculty of Engineering during 2003 – 2004. Generally, the related activities were in the form of **training for technological application.** The amount of fund for these activities were about Rp 20 million – Rp 116 million and it took about 2 weeks until 1 year for each training implementation. Most of the training was funded by state budget (APBN) and regional budget (APBD), besides other sources

such as: Ristek and LIPI. Training and supervision were given to superior SME, namely: bamboo industry, pottery, weaving, wood industry, and other industry such as: tobacco, tofu and metal industry. Some activities related to training for technological application can be seen on the table below:

Table 3.5.8.
Type of Training for Technological Application (TA)
by Engineering Faculty of Mataram University

No.	Type of activities/function	Scope of activities	Collaboration with	Source of financial	Total funding (Rp million per year)	Range of time (week/month)
1.	Training on raw material preservation	NTB	Diperindag NTB	Regional Budget	50	2 weeks
2.	Development of pre-construct bamboo house	NTB	YKPR-NTB	Ristek Prida 2003	80	6 months
3.	Training and Supervision of bamboo processing	NTB	Diperindag NTB	APBD 2003	20	2 months
4.	Technology Transfer Activities	NTB	Dikti, UGM &Diperindag NTB	APBN 2004	80	6 months
5.	Supervision on Pottery Industry	NTB	IPTEKDA LIPI and Diperindag NTB	APBN 2003	80	12 months
6.	Supervision on Metal Industry	NTB	RPK Ristek	Ristek RPK 2003	70	12 months
7.	Supervision on Antique Box Industry	NTB	IPTEKDA LIPI and Diperindag NTB	LIPI 2004	116	12 months
8.	Supervision on Wood Industry	NTB	IPTEKDA LIPI and Diperindag NTB	LIPI 2004	140	12 months
9.	Supervision on Tobacco drying up Industry	NTB	RPK Ristek & Disperindag NTB	Ristek 2003	80	12 months
10.	Supervision on Wood Industry through life skill activities	NTB	Cooperative Office and SME and Pusat Pelajar Mandiri	Ristek 2003	50	6 months

All the above activities were started by technological generating activities in the form of tools engineering design with 6 months of average working time

Table 3.5.9.
Type of Technological Generating Activities (TGA)
by Engineering Faculty of Mataram University

No.	Type of activities/function	Scope of activities	Collaboration with	Source of financial	Total funding (Rp million per year)	Range of time (week/month)
1.	Engineering Design of battery with sea tidal power	NTB	Vucer DIKTI	State Budget	10	6 months
2.	The Development of bamboo preserving techniques	NTB	Vucer DIKTI	State Budget	10	6 months
3.	Cidomo Design which environmental friendly	NTB	Vucer DIKTI	State Budget	10	6 months
4.	Engineering Design of Electronic Library	NTB	Vucer DIKTI	State Budget	10	6 months
5.	Engineering Design of measurement system on the characteristic	NTB	Vucer DIKTI	State Budget	10	6 months

	of radio canal propagation					
6.	Prototype Design production of Wind Turbine	NTB	Vucer DIKTI	State Budget	10	6 months
7.	Modification of storage tank for tofu industry waste processing	NTB	Vucer DIKTI	State Budget	10	6 months
8.	Design of floating fish cage (keramba) cultivation tools without rubbing river floor	NTB	RPK- NTB	RPK Ristek	50	6 months
9.	The Production of palm fiber roof tile	NTB	IPTEKDA LIPI	LIPI	10	6 months
10.	The Production of electric carving tools	NTB	Vucer DIKTI	State Budget	10	6 months
11.	The Production of Plastic recycle machine	NTB	Vucer DIKTI	State Budget	10	6 months
12.	Engineering design for fumice crushing tools	NTB	Vucer DIKTI	State Budget	10	6 months
13.	Engineering Design of workshop for tofu production	NTB	Vucer DIKTI	State Budget	10	6 months
14.	The Production of solar fish dryer tools	NTB	Vucer DIKTI	State Budget	10	6 months
15.	Bamboo dryer tools with hybrid power	NTB	Vucer DIKTI	State Budget	10	6 months
16.	The production of fiberglass boat	NTB	Vucer DIKTI	State Budget	10	6 months
17.	Engineering design of Tobacco drying up tools	NTB	Vucer DIKTI	State Budget	10	6 months
18.	The production of wood & bamboo bending tools	NTB	IPTEKDA LIPI	LIPI	10	6 months
19.	The production of mechanic bamboo cutting mahines	NTB	Vucer DIKTI	State Budget	10	6 months
20.	Wood carving and mask drying up tool	NTB	Vucer DIKTI	State Budget	10	6 months
21.	The production of stone crushing machine	NTB	Vucer DIKTI	State Budget	10	6 months

The Faculty of Engineering has also been cooperated with Industry & Trade of NTB Province in conducting internet use training for SME. This activity used Regional Budget of Rp 30 million for 2 weeks training period. The faculty has obtained 5 Intelectual Property Rights and Standardization Support at the National Level as mentioned on the table below:

Table 3.5.10.
Type Patent (IPR) and Standardization Support

by Engineering Faculty of Mataram Unviersity

No.	Type of patent	Number of patent	Area of patent
1.	Simple Patent: bamboo pre-construction wall	S20000006	National
2.	Simple Patent: steigher (brugak) bamboo with knock-down system	S20000233	National
3.	Knock-down bamboo chair	Publication	National
4.	Manual devices for bending wood and bamboo	Publication	National
5.	Knock-down bamboo bed	P24200200859	National

3.5.3.1. Linkages between University and Local Government

Related to the linkages between university and local government through Industry and Trade Office in developing SME in NTB Province, it is said that the related activities are not carried out properly, since there is no mutual understanding between these two institutions. It seems that the Industry & Trade Office did not conduct the whole-hearted cooperation with the university, while the university was not too active in creating the cooperation with the government in developing SME. But, individually, some teaching staffs of Mataram University were quite active to cooperate with the Industry & Trade Office in developing manufacture industry.

3.5.3.2. Linkages between University and SMEs

As it is mentioned before, the Faculty of Engineering of Mataram University has conducted many activities related to SME supervision and development in NTB, such as: new technology application, human resource training & development, product design and other activities related to market extension. The main problem faced by researcher and supervisor in the Faculty of Engineering is lack of fund and supporting tools. Meanwhile, the head of faculty and the teaching staffs show enthusiasms for conducting the activities related to SME development in NTB. This can be seen by the continuation of some SME development activities, such as: the supervision of bamboo, weaving, pottery and wood industry.

3.5.3.3. Linkages between Local Government and SMEs

Similar to Faculty of Engineering, the activities of SME development conducted by Industry & Trade Office were related to new technology application, human resource training & development, product design and other activities related to market extension, therefore, there were overlapping roles due to the lack of coordination between these two institutions.

3.5.4. SMEs Performance with Linkage Program

Many SME have been aggressively developed in NTB and spread out into some regencies/cities such as Mataram, West Lombok Regency, Central Lombok Regency, East Lombok Regency, Sumbawa Regency, Dompu Regency, Bima Regency and Bima City. Some similar industries have formed a certain cluster in rural/district level. With this condition, it is easier to make them involved deeply in any activities related to SME development.

Based on the report of Cooperative and SME Office in NTB, part of the SME products in NTB have penetrated export market. Also, some of the products play an important role as source of income. Type of small and medium industries that have been developed and potential for further development are: bamboo and bamboo products industry, pottery, weaving, rattan, wood and wood products. Out of these industries, weaving and bamboo industries have been developed by Faculty of Engineering of Mataram University.

It is shown that all the industries which implemented the FE's technology consistently have obtained positive benefit on their performance, such as higher revenue. This can be seen on the table below:

Table 3.5.11.
Comparing SMEs with Linkage Program and Without Linkage Program

No.	Kind of SMEs	Value (Rupiah)	
		With Linkage Program	Wihout Linkage Program
1.	**Bamboo**		
a.	Total Revenue	189,400,000	30,540,000
b.	Total Cost	132,400,000	17,040,000
c.	Total Profit	57,000,000	13,500,000
2.	**Pottery**		
a.	Total Revenue	987,000,000	55,500,000
b.	Total Cost	720,235,000	36,700,000
c.	Total Profit	266,765,000	18,800,000
3.	**Weaving**		
a.	Total Revenue	1,179,000,000	982,500,000
b.	Total Cost	561,000,000	510,000,000
c.	Total Profit	618,000,000	472,500,000
4.	**Rattan**		
a.	Total Revenue	583,000,000	466,400,000
b.	Total Cost	378,950,000	344,500,000
c.	Total Profit	204,050,000	121,900,000
5.	**Wood**		
a.	Total Revenue	-	193,525,000
b.	Total Cost	-	146,075,000
c.	Total Profit	-	47,450,000

Bamboo

Related to the development of bamboo industry, the Faculty of Engineering has conducted new technology application assistance in the form of bamboo preserving and bending technology. Out of many bamboo industries participated in the training, only one industry implements continually and consistently the technology transformed by the Faculty of Engineering.

Pottery

Faculty of Engineering has given an aid in the form of clay mixer machine to produce high quality raw material and accelerate the time to mix the clay. The Faculty has also had cooperation with Industry & Trade Office in implementing assistance in human resource development, product design and market expansion through promotion and exhibition. There is one pottery company who has a website for marketing its product on the local, national and international level.

Table 3.5.5 shown that Pottery industry who got assistance from the Faculty and Local Government obtained more economical benefit than other industry without assistance. This

TARUNA bamboo industry, as the only one industry which has used new technology, uses some methods in order to increase product quality and durability, such as:

1. Bamboo soaking method
   To produce the high quality bamboo, it is necessary to soak the bamboo in 1.5 days (for peeled bamboo) and 3 days (for unpeeled bamboo).
2. Gravitation method
   This method use gravitation to eliminate bamboo liquid in order to produce the high quality product. By using this method, it takes about 4 hours for small bamboo (< 4 meters) and 1 day for longer peeled bamboo.
3. Knock down method
   This method is the modification of Boucherie wood preserving method that uses 2 tubes. One tube is used for preserving solution and the other is filled with 4 kg/cm air. The 10% concentrated Borax solution is used for preservation. By using this method, it takes only 9 minutes to produce high quality bamboo, with the durability of 15-25 years. Meanwhile, unpreserved bamboo last for only 5-10 years.

By implementing new technology, TARUNA bamboo industry gains additional benefits, especially the increase of order. Besides that, TARUNA can sell their products with the price 3% - 5% higher than other similar products without preservation. As it is shown in the previous table, the bamboo industry which has implemented preservation technology obtained benefit of more than 300% compared to those without preservation technology.

industry has a good prospect, since this product is well known abroad and the raw material is also abundant.

Weaving

Based on the interview, this industry is a family business which was established in 1971. Weaving products in NTB have been well known in local, regional and international since this place is one of the tourism destinations in Indonesia, therefore there is no problem for marketing the product. Generally, the main problem in this industry is the availability of raw material. Cotton and Silk thread is bought from Surabaya and the price is quite expensive, since it is imported from India, China and Japan. The depreciation of Rupiah currently has an impact on the availability of raw material. The high quality threads become limited in the market.

Similar to bamboo industry, Faculty of Engineering of Mataram University and Industry and Trade Office of NTB Province are interested to develop the weaving industry. But, in practical, there is no cooperation between these two institutions. The activities to develop the weaving industry become overlapped and inefficient. The activities of industry development conducted by Faculty of Engineering and Local Government were emphasized on the improvement of quality and product design and market expansion through some exhibition and fashion contest, but, unfortunately, there is no coordination between them.

The weaving industry who participated in the assistance activities actively obtained about 30% more benefit compared to those who did not. As a result of the assistance activities, the weaving industry can produce higher quality product which is fade proof and more variety and modern product which meet market demand.

Rattan

Some activities conducted by local government in developing rattan industry were as follows: (1) Management training conducted by PT. Pos and Giro related to the improvement of knowledge in bookkeeping and marketing procedure; (2) Training on industrial basic technology conducted by cooperative and SME office of West Lombok regency related to the knowledge and skill improvement; (3) Training on design introduction and production quality improvement conducted by Industry & Trade office related to product design of rattan; (4) Comparative study to the industry center in East Jave, Central Java and West Java, financed by Industry & Trade Office of NTB Province with the objective to improve the perception of rattan industry development.

As it is shown in the table, rattan industry that received assistance from Industry & Trade Office obtained 67% benefit more than those who did not receive assistance. The assistance activities make rattan products has better quality and more attractive product design, therefore price and demand of this product is increase.

Based on the interview, rattan is one of the prospective industries in NTB, since the market is not only locally but it is exported to some Asian countries, US and Europe as well. Raw material is not a constraint in developing rattan industry, since it is available in Lombok, Sumbawa, Jawa and Kalimantan.

Wood and Woods Products

Bima Regency which is located in Sumbawa Island is the center of teak producer in NTB. This teak is the main raw material of furniture industry in this area, but the quality of the product is still not good enough compared to the similar product in other area in NTB. Therefore, the Faculty of Engineering of Mataram University has implemented two phase assistance activities to develop this commodity in Bima Regency financed by IPTEKDA LIPI. The first phase was emphasized on the improvement of technical skill with the objective as follows: (1) To develop SME skill in order to

improve product quality of wood products, such as: furniture, window and door frame, and woodcraft through preserving technology; (2) To improve furniture product quality through the introduction and use of modern equipments; (3) The improvement of SME's employee skill on the production technology, such as: bending process on the wood and utilizing of wood's scrap with glue laminated technique; (4) The development of SME partner' skill in managing more modern business, including the management of human resource, raw material, production equipment and sustainable promotion.

On the Second Phase, there were 5 main activities related to the continuation of the first phase activities, i. e. equipment modernization and other 4 activities, namely: wood bending and laminating technique, wood preservation, finishing technique training, and brochure making and business management training.

3.5.5. SME Need and Expectation to Faculty of Engineering's role in Linkage Program

- The envy amongst the SMEs in bamboo furniture (in Gunung Sari) to the success of a bamboo furniture SME which assisted by Faculty of Engineering. This situation is also found amongst the SME in pottery (in Praya)
- SMEs in tradional weaving in Sukarara has a strong collaboration with Faculty of Engineering and local government in term of design, marketing and promotion.
- SMEs in bamboo furniture require bamboo cultivation technology and seeds due to decreasing bamboo supply.
- There has been no information on patent procurement and assistance to acquire it.

3.5.6. SWOT Analysis of Faculty of Engineering in Linkage Program

Strength

1. The availability of technical expert, especially in the field of Mechanical Engineering, Civil Engineering, Electrical Engineering and some supporting expert to implement SME development activities.
2. The availability of some supporting tools, such as: structure, hydro, transport, geo-technique, telecommunication, basic electricity, control, digital, power, computer, production, metal, measurement, computerized numerical control laboratory.
3. There is a wish and commitment from Faculty of Engineering Head and teaching staffs to develop SME more consistent and sustainable.
4. There is cooperation between Faculty of Engineering and Local Government of Mataram Province through Industry & Trade Office and Cooperative and SME Office.
5. Faculty of Engineering of Mataram University and Industry and Trade Office of Mataram Province has the experience of implementing SME development activities in aspects, namely: training for technological application, technological generating activities, marketing and production management, and training for information technology.
6. There are many kind of industry in NTB Province and they have formed a certain cluster in rural level which is easier to conduct assistance for SME development in this area.
7. Market for SME products in NTB has been developed not only in domestic but international as well. This is mainly because NTB is one of attractive destination for tourism.
8. There many government institutions involved in SME development

Weakness

1. The cooperation between Faculty of Engineering of Mataram University and Local Government in developing SME in NTB is still limited.
2. There is no coordination between Faculty and Local Government in conducting SME development activities.

3. The supporting tools owned by Faculty of Engineering to conduct SME development activities are limited.
4. Lack of initiative to cooperate with related institution in local government.
5. Some teaching staffs have cooperation with related institution individually instead of under the name of faculty.
6. There is no complete and sophisticated database of potential SME.
7. There is no written short term, medium term and long term plan of SME development either on the Faculty of Engineering of Mataram University or the Industry and Trade Office of NTB Province.

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 NTB.
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 NTB.
3. Most of the SME in NTB 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 Mataram 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 an 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 NTB province to conduct SME development activities.
7. The Government policy to concentrate the development in east Indonesia makes the effort to develop NTB more focused.
8. 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.

3.6. ENGINEERING FACULTY OF UNDANA (UNIVERSITY OF NUSA CENDANA), EAST NUSA TENGGARA

3.6.1. Overview of the Engineering Faculty

The Faculty of Engineering of Nusa Cendana University was established in 1991 in the form of technical implementation unit (UPT), and has three departments, namely: Mechanical Engineering, Civil Engineering, and Electrical Engineering. Although it is still in the form of UPT, this unit has implemented the three basic university program in sufficiently way. This is proven by the performance of education, research and teaching activities conducted are as good as other faculties' in Nusa Cendana University.

The vision of UPT is to become the source of technical development in local, regional, national, and international level. Meanwhile, its missions are as follows:

a. To conduct a good education that generates capable human resources.
b. To improve the quality and quantity of education system
c. To increase public services
d. To develop the quality of students' construction
e. To improve cooperation for the purpose of education development
f. To set up new study programs in line with public needs.

The Faculty of Engineering (UPT) has 70 teaching staffs, consists of 2.9% are Post Graduate Degree (S3), 50% are Graduate Degree (S2) and 47.1% are Undergraduate Degree (S1). It also has 44 supporting staff. Until now, this Faculty has 478 students, consists of 148 persons students of Mechanical Engineering Department, 150 students of Civil Engineering Department, and 180 students of Electric Engineering Department (See *Table 3.6.1*).

Table 3.6.1.
Number of Staff and Students
in Faculty of Engineering of Nusa Cendana University

No.	Field Study / Level of Education	Total Staff	Total Student
A.	Staff	70 persons	478 persons
1.	Mechanical Engineering	20 persons	148 persons
	S 1	8 persons	148 persons
	S 2	12 persons	-
	S 3	-	-
2.	Civil Engineering	25 persons	150 persons
	S 1	13 Persons	150 Persons
	S 2	10 Persons	-
	S 3	2 Persons	-
3.	Electric Engineering	25 persons	180 persons
	S 1	12 Persons	180 Persons
	S 2	13 Persons	-
	S 3	-	-
B.	Supporting Staff	44 persons	
1.	Administration	30 persons	
2.	Publication and documentation	10 persons	
3.	Housekeeping	4 persons	

3.6.2. Local Government Support on Linkages Program

In order to develop SME, the local government of NTT is supported by Industry and Trade office and Cooperative & SME Office. Generally, the Industry and Trade Office is the most relevant institution for SME development.

The Local Government of NTT has a vision to create the autonomous, advance and prosperous people in NTT based on Pancasila and UUD 1945. While, the mission are as follows:

a. To improve a total understanding and implementing of precious philosophy of Pancasila in appropriate way, especially in developing mutual respect among different communities, legal supremacy and human right enforcement, good character and discipline, in order to create safety, order, peace in a nation and social life.
b. To create the accountable regional autonomy as a process of democratization and development by building up regional and international cooperation.

There were many related activities conducted by the Industry and Trade Office, namely: training start up, new technological aid, patent (IPR) and standardization support, exhibition and promotion, and some supporting activities. But, unfortunately, all these activities were not well recorded. The result of the interview could only identify the activities conducted instead of the activities coverage, total cost and length of time. Moreover, the Industry and Trade Office do not have a future plan list of SME development activities.

The local government involvement in industrial development can be seen in *Table 3.6.2.* Furthermore, the detail activities can be seen in *Table 3.6.3.* to *Table 3.6.6.*

Table 3.6.2.
The Local Government Involvement in Industrial Development
(2004 – 2005)

Code	Activity	Number of Collaboration with EF of Nusa Cendana University		Total
		Yes	No	
TSU	Training Start Up	-	8	8
TUG	Technological Upgrading	-	3	3
IPR	Patent (IPR) and Standardization Support	-	11	11
PEX	Promotion/ Exhibition	-	8	8
SAC	Supporting Activities	-	5	5

Table 3.6.3.
Type of Training Start Up
by Local Government

No	Type of activity related to SMEs development	Scope of activity	Collaboration with	Source of financial	Total funding (Rp million)	Range of Time
1	AMT-EMD Training	6 regencias of Timor dan Rote Ndao		APBN and APBD	6	2004, 8 days
2	Training of salt cultivation	7 salt farmer Oebelo district		APBN and APBD	6	2004, 7 days
3	Technical training of Bamboo handicraft	10 crafter from Belu, TTU (North Central Timor), Kupang and City Kupang		APBN and APBD	6	2004, 8 days
4	Training of quality improvement of woven	6 regencies and cities (Belu,TTS, TTU, Rote Ndao, municipal/ city of Kupang - 30 person		APBN and APBD	8	2004, 10 days
5	On job training small industry of wax	Surabaya, 2 person		APBN and APBD	9	2004, 12 days
6	Participation on HACCP Training	Jakarta, 1 person		APBN and APBD	6	2004, 7 days
7	Participation on die casting training	Bandung, 3 person		APBN and APBD	10	2004, 13 days

10	GMP training for SMEs of food	Sedaratan Sumba, 20 person		APBN and APBD	6	2004, 8 days
11	GKM training	16 Regency/ City of NTT, 18 person		APBN and APBD	46	2004, 7 hari
12	GKM (Quality control) traning and application	16 Regency/ City of NTT,		APBN and APBD	46	2004, 7 days
13	Mapping/identify of food quality system	Belu, TTU, TTS, Reg./City Kupang		APBN and APBD	46	2004, 7 days
14	Participation on consultation meeting of food quality system	Bandung, 2 person		APBN and APBD	46	2004, 7 days
15	Participation on convention of extension staff /worker	Jakarta, 2 person		APBN and APBD	33	2004, 5 days
16	Patent (IPR) socialization	Di 11 Regency, 30 person		APBN and APBD	20	2004, 3 days
17	GMP application in 3 firms of food SMEs	City Kupang		APBN and APBD	13	2004, 2 days

Table 3.6.4.
Type of Technological Upgrading by Local Government

No	Type of activity related to SMEs development	Scope of activity	Collaboration with	Source of financial	Total funding (Rp million)	Range of Time
1.	Aid of salt production tools	Center Kupang Subdistrict		APBN and APBD		2004
2.	Mobile agriculture mechinery workshop	Ngada District, and Manggarai District		APBN and APBD		2004
					306.04	

Table 3.6.5.
Type of Promotion/Exhibition by Local Government

No.	Type of activity related to SMEs development	Scope of activity	Collaboration with	Source of financial	Total funding (Rp million per year)	Range of Time
1.	Supply of Hardware	Province		APBN and APBD		2004
2.	SMEs Data analyzing, skill improvement of SMEs information system operators	Province		APBN and APBD		2004
3.	Collected and tabulated of SMEs potential data	Province		APBN and APBD		2004
4.	In order to list of 15 commodities	Province		APBN and APBD		2004
5.	Information technology planning of 6 commodities	Province		APBN and APBD		2004
6.	Tabulating and analyzing of main commodity data	Province		APBN and APBD		2004

7.	Collecting, tabulating, and analyzing of SMEs directory	Province		APBN and APBD		2004
8.	Profile planning of export orientation commodities	Province		APBN and APBD		2004
9.	Participation on SMEs promotion/exhibition in level of local, national, and international	Regional and International		APBN and APBD		2004
					347.77	

Tabel 3.6.6.
Type of Supporting Activities by Local Government

No.	Type of activity related to SMEs development	Scope of activity	Collaboration with	Source of financial	Total funding (Rp million)	Range of Time
1.	Socialization of monitoring system to staff of Industrial and Trade Office	Province		APBN and APBD		2004
2.	Participation on program evaluation meeting	National		APBN		2004
3.	Project administration	Province		APBN and APBD		2004
4.	Planning	Province		APBN and APBD		2004
5.	Workshop	Province		APBN and APBD		2004
					270	

3.6.3. Linkages Program Carried Out by Engineering Faculty

The Faculty of Engineering of Nusa Cendana University has been actively involved in SME development, especially in developing weaving industry. SME development activities conducted by the Faculty of Engineering were comprised of new technological application, human resources training and development, and product design. The main problems faced by the Faculty of Engineering related to this matter are lack of fund and limited supporting equipment.

The extension work carried out by Faculty of Engineering of Nusa Cendana University can be seen in Table 7. There were about 70 activities conducted by teaching staff in this faculty that covers: 12 activities of training for technological application, 52 technological generating activities, 4 activities of information technology development, and 2 under process patent (IPR). Out of these activities, there were only 12 activities related to SME development and generally in the form of training for technological application.

Table 7. Recent Extension Work by Engineering Faculty of Nusa Cendana University (1996 - 2005)

BR	Basic Research	0
TA	Training for Technological Application	12
TGA	Technological Generating Activities	52
ITD	Information Technology Development	4
IPR	Patent (IPR)	2

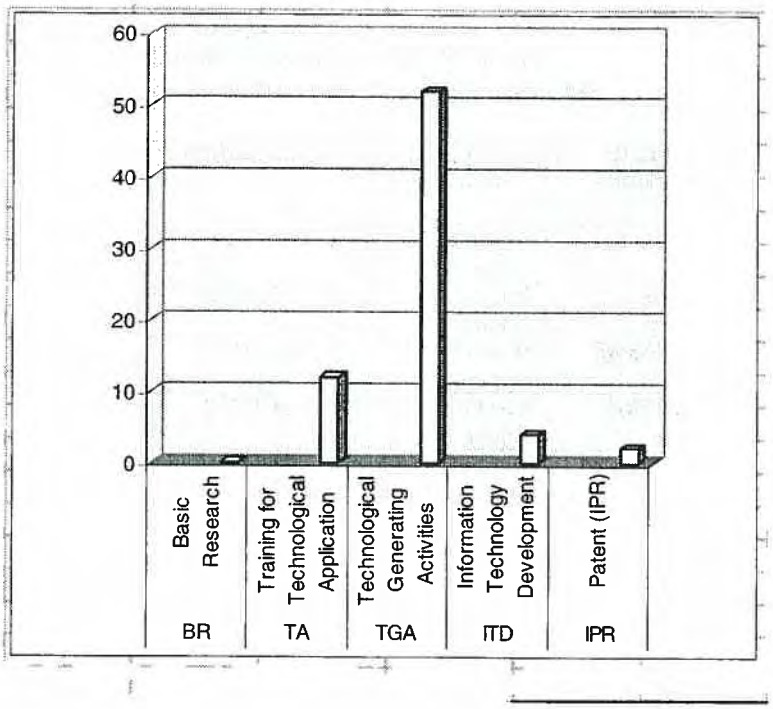

Table 3.6.8.
Type of Training For Technological Application (TA)
by Engineering Faculty of Nusa Cendana University

No	Type of Activities	Scope of Activities	Organization	Source of Fund	Total Funding (Rp/year)	Working time
1	Electronic Skill	Penfui, Kupang	EF UNDANA	DPP UNDANA	1.200.000	2001 2 months
2	Brick Production	Penfui, Kupang	EF UNDANA	ROUTINE	1.200.000	2001 2 months
3.	Handling Trouble shooting	Oesapa, Kupang	EF UNDANA	DPP	1.350.000	2002 2 months
4	Pump maintenance	Oebobo	EF UNDANA	ROUTINE	1.350.000	2002 2 months
5	Computer reparation	Electro Lab, Undana	EF UNDANA	DIKS	1.250.000	2003 2 months
6	Water Tower Installation	Machine Lab. Undana	EF UNDANA	DIKS	1.250.000	2003 2 months
7.	The Operation of Excel & SPSS	Lasiana, Kupang	EF UNDANA	DIKS	2.250.000	2004 2 months
8.	Grounding Installation	Oesapa	EF UNDANA	DIKS	4.350.000	2004 2 months
9.	Concrete with Bamboo design	Lasiana, Kupang	EF UNDANA	IPTEKS DIKTI	5.000.000	2005 4 bulan

10.	Spray Painting	Penfui, Kupang	EF UNDANA	IPTEKS DIKTI	5.000.000	2005 4 bulan
11.	Piping	Liliba, Kupang	EF_UNDANA	KWU DIKTI	15.000.000	2003 8 bulan
12.	Bar welding	Lasiana, Kupang	EF_UNDANA	MKU DIKTI	15.000.000	2004 8 Bulan

Table 3.6.9.
Type of Technological Generating Activities
by Engineering Faculty of Nusa Cendana University

No.	Type of Activities	Scope of Activities	Organization	Source of Fund	Total Funding (Rp/year)	Working Time
1.	Modem work study	Electro Lab Kupang	EF_UNDANA	DPP UNDANA	3.000.000	1996 6 months
2.	Soil water potential	Penfui Kupang	EF_UNDANA	DPP UNDANA	3.000.000	1997 6 months
3.	Piston Design	Machine Lab. Kupang	EF_UNDANA	DPP UNDANA	3.000.000	1997 6 months
4.	Parallel Port Control	Electro Lab. Kupang	EF_UNDANA	DPP UNDANA	3.000.000	1997 6 months
5.	Plating of agriculture equipment	Oesao Kupang	EF_UNDANA	ROUTINE UNDANA	3.000.000	1997
6.	Working safety in Laboratory	Machine Lab. Kupang	EF_UNDANA	DPP UNDANA	3.000.000	1998 6 months
7.	Database planning with MS Access	Electro Lab. Kupang	EF_UNDANA	DPP UNDANA	3.000.000	1998 6 months
8.	Cheap house analysis	Kolhua, Kupang	EF_UNDANA	DPP UNDANA	3.000.000	1998
9.	Irrigation of Kapalangga	Kupang regency	EF_UNDANA	ROUTINE	3.000.000	1999 6 months
10.	Electricity safety system	Osapa Kupang	EF_UNDANA	ROUTINE	3.000.000	1999 6 months
11.	Domestic waste study	Nunbaun Kupang	EF_UNDANA	ROUTINE	3.000.000	2000 6 months
12.	Micro-cell on Com. Cellular	Kodya Kupang	EF_UNDANA	ROUTINE	3.000.000	2000 6 months
13.	Gradation of sand in Takari & Sumili	Takari Kupang Tengah	EF_UNDANA	ROUTINE	3.000.000	2000 6 months
14.	Computer Starting Flow	Electro Lab. Undana	EF_UNDANA	DPP	3.000.000	2000 6 months
15.	Weir flow	Machine Lab Undana	EF_UNDANA	DPP	3.000.000	2000 6 months
16.	HF Communication	Kupang regency	EF_UNDANA	ADB	10.000.000	2000 6 months
17.	Spatial Cognition	Kupang regency	EF_UNDANA	DIKS	7.000.000	2001 6 months
18.	Saklar Elektronik	Electro Lab. Undana	EF_UNDANA	DPP	7.000.000	2001 6 months
19.	TV Trainer	Electro Lab. Undana	EF_UNDANA	ROUTINE	7.000.000	2001 6 months
20.	Handling the corrosion	Machine Lab. Undana	EF_UNDANA	ROUTINE	7.000.000	2001 6 months
21.	Crack durability	Machine Lab. Undana	EF_UNDANA	ROUTINE	7.000.000	2001 6 months

22.	The flexibility of floor tile	Civil Lab. Undana	EF_UNDANA	ROUTINE	7.000.000	2001 6 months
23.	The impact of welding flow	Machine Lab. Undana	EF_UNDANA	DPP	7.000.000	2001 6 months
24.	Welding crack durability	Machine Lab. Undana	EF_UNDANA	PDM	7.000.000	2001 6 months
25.	Spatial comfort	Civil Lab. Undana	EF_UNDANA	DIK	7.000.000	2001 6 months
26.	Mechanic nature of ST 37	Machine Lab. Undana	EF_UNDANA	DIK	7.000.000	2001 6 months
27.	Electricity equipment study	Electro Lab. Undana	EF_UNDANA	DIK	7.000.000	2002 6 months
28	Kupang street services	Kupang	EF_UNDANA	PDM	7.000.000	2002 6 months
29.	Static Lateral burden	Kupang	EF_UNDANA	DIK	7.000.000	2003 6 months
30.	Recycle of used plastic	Machine Lab. Undana	EF_UNDANA	DIK	7.000.000	2003 6 months
31.	Building function	Undana Campus	EF_UNDANA	DIK	7.000.000	2003 6 months
32.	Orifis flow	Machine Lab. Undana	EF_UNDANA	DIK	7.000.000	2004 6 months
33.	Residential area	Fatufeto, Kupang	EF_UNDANA	DIK	7.000.000	2004 6 months
34.	Ground water utilization	Buraen, Kupang Regency	EF_UNDANA	DIK	7.000.000	2004 6 months
35.	Clay stabilization	Bakunase Kupang Regency	EF_UNDANA	DIK	7.000.000	2004 6 months
36.	Stimulated Brillouin Scattering	Electro Lab. Undana	EF_UNDANA	SP4	7.000.000	2004 6 months
37.	Sela Batang performance	Electro Lab. Undana	EF_UNDANA	SP4	7.000.000	2004 6 months
38.	Programe Logic Control	Electro Lab. Undana	EF_UNDANA	SP4	7.000.000	2004 6 months
39.	Electrode Grid	Electro Lab. Undana	EF_UNDANA	SP4	7.000.000	2004 6 months
40.	Wireless Canal	Electro Lab. Undana	EF_UNDANA	SP4	6.000.000	2004 6 months
41.	Carburetor process	Machine Lab. Undana	EF_UNDANA	PDM	6.000.000	2004 6 months
42.	The Swelling clay potential	Baun, Kupang Regency	EF_UNDANA	PDM	6.000.000	2005 6 months
43.	Troll as electric current control	Oesapa, Kupang	EF_UNDANA	ROUTINE	1.800.000	2000 2 months
44.	Non Engine pump	Oesapa Kupang	EF_UNDANA	ROUTINE	1.800.000	2000 2 months
45.	Soyabean ripener with pedal system	Oebufu, Kupang	EF_UNDANA	VUCER DIKTI	10.000.000	2001 6 months
46.	The utilization of coconut shell	Naikoten, Kupang	EF_UNDANA	UNDANA Project	7.000.000	2002 6 months
47.	The electricty soyabean ripener	Oebufu, Kupang	EF_UNDANA	VUCER DIKTI	10.000.000	2003 6 months
48.	Lontar cutting machine	Oebobo, Kupang	EF_UNDANA	VUCER DIKTI	10.000.000	2003 6 months
49.	Rock cutting machine	Penfui, Kupang	EF_UNDANA	VUCER DIKTI	10.000.000	2003 6 months
50.	Coconut	Kelapa Lima,	EF_UNDANA	VUCER	10.000.000	2003

	scrapper with mol motor	Kupang		DIKTI		6 months
51.	Metal stove	Rote, Kupang Regency	EF_UNDANA	VUCER DIKTI	10.000.000	2004 6 months
52.	Quality improvement of traditional weaving products	Ranamese, Oebobo, Airnona Kupang	EF_UNDANA	VUCER MULTI YEARS DIKTI	70.000.000	2005 8 months for 3 years

Table 3.6.10.
Type of Information Technology (IT) development
by Engineering Faculty of Nusa Cendana University

No	Type of IT Development	Scope of Activities	Organization Activities	Source of Financial	Total Funding (Rp/year)	Range of time (month,year)
1	Computerized program	Faculty of Engineering, Kupang	EF_UNDANA	SP4	10.000.000	5 months
2	Local Network Program	Faculty of Engineering, Kupang	EF_UNDANA	SP4	30.000.000	8 months
3	Internet	Faculty of Engineering, Kupang	EF_UNDANA	SP4	30.000.000	8 months
4.	Multimedia	Faculty of Engineering, Kupang	EF_UNDANA	SP4	30.000.000	8 months

Table 3.6.11.
Type of Patent (IPR) and standarization support
by Engineering Faculty of Nusa Cendana University

No.	Type of Patent	Number of Patent	Area Of patent	Total Financial (reward received)
1	Knock-down weaving tools	In process	In process	-
2.	Special designed weaving product (prayer mat with traditional motive)	In process	In process	-

Related to SME development, the Faculty of Engineering of Nusa Cendana University has a plan for the next 5 years, namely:

1. Establishment & development of textile weaving industry
2. Establishment of Kaplan system waterwheel
3. Installation of hydrant pump
4. Formulate IPR for weaving products and tools in NTT
5. Development of tool for peeling the coffee bean skin
6. Design seam-folding knock down system for cloves picking
7. Optimization of fishery tools to increase fish catching in Kupang Ocean.
8. Increase people awareness to mitigate the natural disaster
9. Design the earth quake proof knock down houses with simple local material.

Linkages between University and Local Government

Related to the linkages between Industry and Trade Office and Faculty of Engineering in developing SME in NTB province, it is said that the related activities are not carried out properly. There is no cooperation between these two institutions. The Industry & Trade Office tends to conducts the SME development activities by themselves, while the University were not too active in creating cooperation with Industry & Trade Office.

Furthermore, the Faculty of Engineering of Nusa Cendana University has cooperation with Local Government of South-Central Timor Regency. This regency has financed the development of building and some research activities of Faculty of Engineering. Currently, the regency is financing the development of waterwheel for power plant and the irrigation of public corn field. It has also provided about 60 thousand hectares of field for cassava plant cultivation and research area for other commodities.

3.6.4. SMEs Performance After Linkages Program

The SMEs have been developed aggressively in NTT and many similar industries have formed certain cluster in rural level. With this condition, it is easier to gather the SMEs in development activities.

Based on the interview with the head and teaching staffs of the Faculty of Engineering, there are 5 SMEs that has been developed and potential for further development, namely: weaving, handicraft, pottery, tofu and furniture industry. Out of these 5 industries, weaving industry is the only SME that consistently implement the technology transformed by Faculty of Engineering. The performance of these 5 SMEs can be seen on the table 12 below:

Table 12.
SME Financial Performance after Linkage Program

No.	Kind of SMEs	Value (Rupiah)	
		Medium Industry	Small Industry
1.	**Weaving**		
a.	Total Revenue	1,680,000,000	126,000,000
b.	Total Cost	465,000,000	66,040,000
c.	Total Profit	1,215,000,000	59,960,000
2.	**Handicraft**		
a.	Total Revenue	171,000,000	25,250,000
b.	Total Cost	142,750,000	16,552,000
c.	Total Profit	28,250,000	8,698,000
3.	**Pottery**		
a.	Total Revenue	887,000,000	25,000,000
b.	Total Cost	820,235,000	16,700,000
c.	Total Profit	66,765,000	8,300,000
4.	**Tofu**		
a.	Total Revenue	1,123,200,000	253,500,000
b.	Total Cost	1,060,920,000	200,400,000
c.	Total Profit	62,280,000	53,100,000
5.	**Furniture**		
a.	Total Revenue	-	350,000,000
b.	Total Cost	-	298,000,000
c.	Total Profit	-	52,000,000

3.6.5. SME Need and Expectation to Engineering Faculty in Linkages Program

Base on interview result, there are some expectation and comments by SMEs on Engineering Faculty of Nusa Cendana University, namely:

- SMEs need assistance from Engineering Faculty but they seldom come due to no budget, no equipment/ machinery/ tools or no staffs available
- Lack of support on technical/ capital assistance from local government due to limited budget; however, the local government imposed the use of traditional woven cloth as uniform to be used every Thursday.

- SMEs in traditional woven are supporting the plan of Engineering Faculty (EF) to develop semi-automatic hand woven machine (but according to EF – they do not sufficient fund to do it
- SMEs in marble industry need cutting machine (with blade diameter of 40 inch) but the EF and local government could not provide it.
- The lack of raw material for Cendana Wood to be processed for handicraft and essential oil has made the industry collapsed.

3.6.6. SWOT Analysis of Faculty of Engineering in Linkages Program

Strength

- The availability of technology expert, especially in the field of Mechanical Engineering, Civil Engineering, and Electrical Engineering, and supporting staff to conduct SME development activities.
- The availability of some supporting facilities, such as laboratory of Machinery Engineering, Electrical Engineering and Technology Workshop.
- The teaching staffs and head of Faculty of Engineering has a strong commitment to develop SME in consistent and sustainable way.
- The Faculty of Engineering and Industry and Trade Office have the experience of conducting SME development through many aspects, namely: training for technological application, technological generating activities, marketing and production management, and training for information technology.
- There are many industries in NTT province and they have formed certain cluster in rural level which make easier to conduct assistance for SME development in this area.
- There are many government institutions involved in SME development activities.

Weakness

- There is no cooperation between Faculty of Engineering and Industry and Trade Office in conducting SME development activities.
- The infrastructure and facilities owned by the Faculty of Engineering for supporting SME development are still limited.
- Some teaching staffs carried out industry development activities individually instead of on behalf the Faculty of Engineering.
- There is no complete and sophisticated database about potential SMEs in NTT Province.
- There is no written short, middle and long term plan of SME development both in Faculty of Engineering and Industry and Trade Office.

Opportunities

- 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 NTT.
- 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 NTT.
- Most of the SME in NTT 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 Nusa Cendana University to improve this matter.
- 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.