

## **Road to Internationalization of Faculty of Engineering Chulalongkorn University**

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### **A b s t r a c t**

The author described the internationalization process of the Faculty and the past performance based on the policy of the Faculty of Engineering, Chulalongkorn University especially on the d international collaborations, research project and curriculum development. Furthermore, the strategic directions were systematically planned by using balance scorecards technique for the future to strengthen the internationalization process of the Faculty from various aspects, i.e., educational and research process, capacity building of the Faculty, quality assurance and program accreditation. The future results on this internationalization policy are expected to grow with regular review on action plans with target setting to match w i t h r e s o u r c e s a c q u i r e d .

**Key words:** internationalization, education, strategic planning, balance scorecards

### **1. I n t r o d u c t i o n**

The Faculty of Engineering, Chulalongkorn University was first established by King Vajirardh on June 1, 1913 as the Engineering School of King Chulalongkorn's Civil Service College. Later the Civil Service College, the Medical and Ministry of Education were merged by a royal decree into Chulalongkorn University. The school then became the Faculty of Engineering and officially granted a Bachelor of Engineering in 1935. The Master of Engineering's degree in Civil, Mechanical, and Electrical Engineering started offering in 1941. Up to now, the Faculty had been enrolled with international cooperation, i.e., SEATO Graduate School of Engineering during 1959-1971, Colombo Plan with several experts from the United Kingdom in 1964, French Government in setup a semiconductor device research laboratory, JICA in setup the CAD/CAM laboratory. The Faculty has been actively offered engineering education to the Thai Community for more than 90 years. With the wave of globalization and corporatization of the university, the Faculty had moved towards regional hub for the international engineering education via being a secretariat for ASEAN University Network and setting up the International Engineering School.

The paper described how the Faculty developed the research and curriculum to match with international level during this past ten years. Many tasks had been implemented and achievements are highly recognized. To foster the internationalization in the near future, strategic planning with balance scorecard techniques were employed to make a systematic plan with clearer directions, targets and action plan. Better achievements are expected to be born with the collaboration from regional countries and international institutes.

## **2. U n i v e r s i t y   a n d   F a c u l t y   P o l i c y**

During this past ten years, the University had indicated the internationalization Policy via more support on academic exchange among institutes and international conference presentations. However, in the last five year of the university development plan, the graduate capability to work with knowledge and skill up to international standards were emphasized. In order to implement such policy, QA mechanism were employed to set a management system with input (instructor, student, and curriculum), process (teaching and evaluation methods) and output control. International Programs were also encouraged under the collaboration and assistance from leading universities and international funding agencies with the aim to be one of the leading universities in the region.

The Faculty, under the University Policy, had set the supportive schemes on curriculum development towards international accreditation, foster more paper presentations in the international conference and subscription in the peer reviewed journals. The Faculty adopted QA system and passed the national accreditation after four years of implementation in the year 2003. In the year 2001, the Faculty had been assigned to work as a secretariat for ASEAN University Network (AUN/SEED Net) under TJTTP-JBIC program. Besides, the Faculty established the International School of Engineering (ISE) to actively response to the needs for international engineering education of both bilingual and international programs in t h e   y e a r   2   0   0   3 .

## **3. A   c   h   i   e   v   e   m   e   n   t   s**

As for background information, the Faculty now has 310 staff with 68 percent of PhD owned and 30 percent with Professor and Associate Professorship (Table 1). Most of the Faculty members graduated from prominent and diversified universities from USA, UK, Japan (see Table 2). At present, the Faculty has 45 programs with 6 international programs, i.e., two in bachelor level (Nano, Automobile engineering), three in master level (Civil, Manufacturing, Petroleum) and one in PhD level (Civil) (see Table 3). The total student number is 4476 with 2790, 1562, 121 students in bachelor, master and PhD level respectively (see Table 4). It is noticed that number of PhD students grew considerably in the last three y e a r s .

With the ISE setup, the number of foreign students especially from neighboring countries shared about 25 percent of PhD students in the Faculty (see Table 5) and more frequent foreign scholars visiting the Faculty to make lectures or academic discussions which enable more international atmosphere in the Faculty. Some students were even encouraged to make a short research in the foreign collaborating institutes (see Table 6).

The research achievements also maintain high active roles especially in the graduate level which can be seen from research fund, number and papers (see Table 7). It is noticed that international joint research could also be established from the year 2003 and seemed to g r o w   g r a d u a l l y   b y   t i m e .

The internationalization of the Faculty had gradually moved from the international participation to the internal international activity unit within the Faculty which is the big step o f   c h a n g e .

## **4. S t r a t e g i c   P l a n n i n g   t o w a r d s   i n t e r n a t i o n a l i z a t i o n**

Under the globalization and corporatization atmospheres among Thai universities, each education unit needs to carefully consider their positioning and use all their strengths to induce supporting resources from various parts especially with the private sectors. With the

aim to be a leading engineering faculty in the region, the development plan had to be strategically and systematically planned. With the adaptation of balanced scorecard concept, the strategic mapping was developed into four aspects, i.e., stakeholders, process, learning and growth, resources (see Figure 1). Besides, the measures and target of each strategic objectives were also considered and set (as Table 8) to make sure that action plans, to be considered and decided, go align with overall plan and meet the objectives. Regular review on action plans was done to adjust actions with the resources input.

The strategic plan started with building up additional resources mechanism via research funding and academic services. The additional resources can induce better management infrastructure and render the development of research and academic (both in and ex-curriculum) contents. As the results, higher qualified graduate and research works towards international standards can be achieved.

Each elements of strategic plan are debated among managements to set indicators and appropriate strategies are then set to meet the indicators. The strategies are also deployed into each or joint functions (see sample in Table 8). The important part of planning is to review the plan at least once a year to modify the more appropriate strategies to match with actual resources acquired.

Under this strategic planning, the aim of international recognized engineering institute can be pushed forward with systematical monitor and more achievements on graduate and research works in the international level can be expected, though, collaboration among institutes in the region and backup from international agencies are inevitable, e.g., credit transfer system, curriculum joint accreditation, university research and teaching network.

## 5. C o n c l u s i o n s

Based on the University and the Faculty policy on internationalization, the Faculty had expanded her international activities from the promotion of international conference attendance, paper publication to the development of international courses and international joint research with comparatively successful achievements. With the emerge of globalization and corporatization, the Faculty had introduced more systematic strategic planning by utilizing balanced scorecards techniques to set development plan. The plan comprised with linked elements and targets to be achieved in the next five years. It is hoped that under the strategic plan, better advancement on academic and research towards international recognized level of the Faculty can be expected under the collaboration among institutes in the region and with international agencies.

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## 7. A c k n o w l e d g e m e n t

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## 8. Author's biography

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**Table 1** Proportion of Faculty staff by position and degree  
( b a s e d o n S e p 2 0 0 3 d a t a )

<b>Position/Degree</b>	<b>N u m b e r</b>			<b>P e r c e n t a g e</b>		
P r o f e s s o r	1	4		5		
Associate Professor	7	6	2		5	
Assistant Professor	8	4	2		7	
I n s t r u c t o r	1	3	6	4		3
P h D	2	1	1	6		8
M a s t e r	9		7	3	1	. 9 9
B a c h e l o r		2		.	0	1
<b>T o t a l</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>

**Table 2** Proportion of Faculty staff by highest degree graduated country  
( b a s e d o n J u n e 2 0 0 3 d a t a )

<b>Graduated country</b>	<b>N u m b e r</b>			<b>P e r c e n t a g e</b>		
USA & Canada	1	2	3	4	0	. 7
AIT/Chula/local	6		6	2	1	. 9
U K	4		4	1	4	. 6
J a p a n	3		7	1	2	. 3
F r a n c e	2		1	1	0	. 4 7
G e r m a n y		4		.	0	1
A u s t r a l i a		4		.	0	1
N e t h e r l a n d s		3		.	0	1
<b>T o t a l</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>

**Table 3** Engineering/Science Programs in the Faculty

<b>Programs</b>	<b>Bachelor</b>	<b>Higher Diploma</b>	<b>Master</b>	<b>PhD</b>
Number	13+(2)	1	12+4+(3)	9+(1)

R e m a r k s ( x ) : I n t e r n a t i o n a l P r o g r a m

**Table 4** Number of total student number in each program

<b>Program</b>	<b>2 0 0 1</b>	<b>2 0 0 2</b>	<b>2 0 0 3</b>
B a c h e l o r	2 7 0 4	2 7 6 4	2 7 9 0
Higher Diploma	4	3	3
M a s t e r	1 4 6 7	1 5 6 8	1 5 6 2
P h D	9	7	1 0 8 1 2 1
<b>T o t a l</b>	<b>4 2 7 2</b>	<b>4 4 4 3</b>	<b>4 4 7 6</b>

**Table 5** Number of foreign students in the Faculty in the year 2003

<b>Country</b>	<b>Master</b>	<b>PhD</b>	<b>Total</b>
I n d o n e s i a	2	9	11
V i e t n a m	1	8	9
L a o s	-	6	6
B u r m a	1	3	4
C a m b o d i a	1	2	3
P h i l i p p i n e s	-	1	1
J a p a n	-	1	1
<b>T o t a l</b>	<b>5</b>	<b>30</b>	<b>35</b>

**Table 6** International academic exchange activities in the Faculty

<b>Type</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
Visiting Scholars	49 + (29)	94 + (26)	48 + (26)
Dispatching Scholars Inter. Conference	(13)	(3)	6 + (11)
Presentations	60	68	65
Student Dispatching	11	15	5

Remarks (xx) : collaboration under TJTTP-JBIC Program

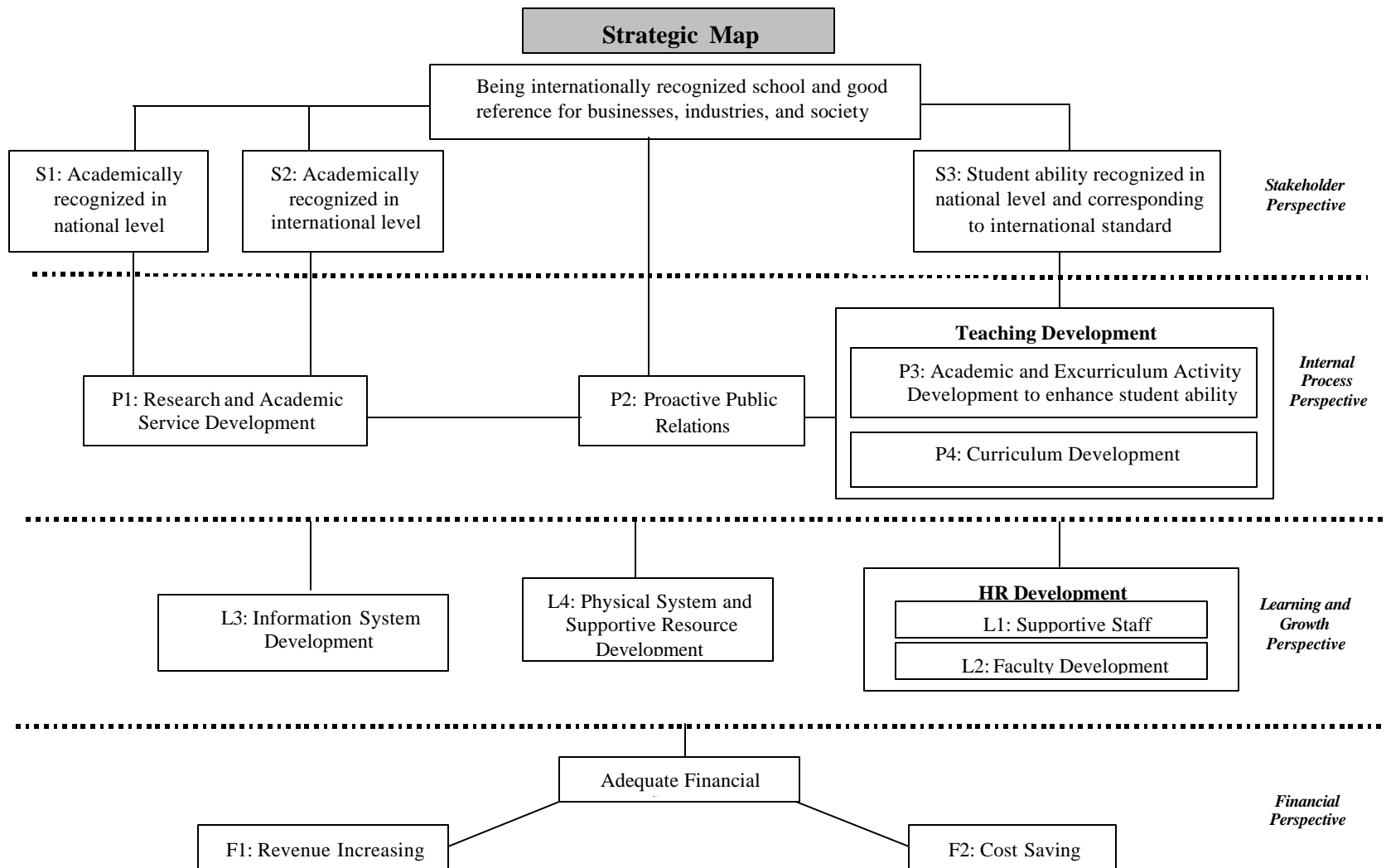
**Table 7** Research Performance of the Faculty

<b>T y p e</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
Research Fund (M B)	75.3	101.6	89.1
Research projects (no.)	50	51	72
Research papers (no.)	341	384	354
Research Award (no.)	8	9	18
Inter. Joint Research Projects (no.)	na	na	17

R e m a r k s : 1 U S \$ = 4 0 B

**T a b l e 8 S a m p l e o f S t r a t e g i c P l a n n i n g T a b l e**

Aspect	Strategic Goal	Indicators	Strategies	Administration	Planning & Development	Research	Academic	Student	Quality Assurance	Information	Department
S2	2. Academically recognized at international level	1. Numbers of research published in international journals 2. Numbers of research referred / cited in international level 3. Numbers of research presents in international conference 4. Number of new / in progress / completed research projects 5. Number of Patentable Research 6. Number of academic collaboration activity in international level 7. Number of clients in academical service	Explained in Strategy 4.2 and 4.4			O					O
P1	4. Research and Academic Service Development	1. Number of project acquires 2. Project value 3. Client satisfaction	4.2 Research in international level								
			4.2.2 Support Research Grants			O					O
			4.2.3 support motivating rewards for publishing			O					O
			4.4 Academic Service in international level								
P4	7. Curriculum Development	1. Review term 2. International recognition 3. International accreditation	4.4.1 Create Collaboration with international academic services			O					O
			7.1 Strengthen International School of Engineering				O				O
			7.2 Revise and create flexible Curriculum for undergraduate and graduate study to change and develop interdisciplinary programs				O	O			O



**Figure 1** Strategic Map of Faculty Development Plan