

Rooted

and



Moving

Roots provide strength while moving forward. It is important occasionally to glance back at the past, get a realistic understanding of the present; draw lessons to shape a better future and move on.

Rooted And Moving

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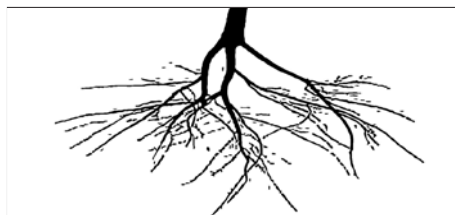
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Written and documented by

Pratima P Mathews



Disclaimer: Opinions expressed in this book are solely the personal views of individual interviewees and do not in any way represent the official stance of the Thailand Center of Excellence for Life Sciences (TCELS).

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FOREWORD

I am proud to present the book, 'Rooted and Moving'. It documents the organizational journey of TCELS, right from its inception all the way to its present days. Serving my second term as the Chairman of TCELS' Board, I realize the importance of analyzing this journey to understand the organization in its totality.

The story of TCELS builds on the narrative of the life sci-

ences industry of Thailand, as seen from the perspective of its different players. In August 2013, TCELS marked the completion of ten years of its inception. In June 2014, it will celebrate its tenth anniversary.

This is an opportune moment for TCELS to look back, introspect and contemplate its future path. The best way to do this is through a joint endeavor of the different people involved in this journey, through all its ups and downs. I appreciate this bold yet modest initiative of TCELS' CEO, Dr. Nares Damrongchai.

'Rooted and Moving' comes across as an exhaustive research exercise that amalgamates the perspectives of all the various stakeholders of TCELS. It presents a comprehensive and balanced view. I commend the efforts of the author, Pratima Mathews.

Thailand's life sciences industry is upbeat about emerging opportunities in the ASEAN region. As the focal point of all life sciences business, research and investment in Thailand, TCELS is ready to make full use of these prospects. 'Rooted and Moving' is a forthright presentation of

TCELS' abilities, shortcomings, aspirations and required improvements.

I hope readers will enjoy the quasi-fictional narration woven into the thorough accounts of TCELS' experiences and emerging observations.

Petipong Pungbun Na Ayudhya
Chairman
TCELS' Board of Directors



ACKNOWLEDGEMENTS

A river is not sure of the windings that lay ahead; it just trusts the unknown and keeps flowing. Petals that open up at the crack of dawn may not know what the day holds; they simply trust the assurance of the sun's rays.

This book can rightly be called a 'labour of trust'. I was gripped by the trust displayed by Dr. Nares Damrongchai when he commissioned me to write this book. I did not trust myself; only the Almighty who directs and controls my life. I am grateful for this trust.

Each of the interviewees trusted me sincerely with their thoughts and opinions. Without naming them individu-

ally, I wish to express my gratitude to each interviewee personally. It was my pleasure and an honor to have such in-depth conversations. I appreciate their candidness. This book is the result of the open sharing of their opinions. I hope that I have been fair in reflecting their views.

The cheerful support which I have received from my colleagues at TCELS has been overwhelming. Mr. Amon, Ms. Benjamas, Ms. Jiraphan, Mr. Mongkolsak, Ms. Palita, Mr. Prathan, Ms. Sukanya, Mr. Supajit, Ms. Suwimon, Ms. Taweeporn, Ms. Warisa and Mr. Wasin have always been there to help and support me. The others may not have been directly involved in this book, but I am always inspired by their infectious smiles.

My thanks to my husband and daughter: my worst critics and best admirers. I am grateful for the help that I have received from Elizabeth and my other friends. I am thankful to my mother for always believing in me and teaching me to lean on God who has brought about this labour of trust.

Pratima P Mathews

- THE ORIGIN -

This section is based on factual information provided by Prof. Dr. Wasun Chantratita who was part of the initial discussions leading to the establishment of the Thailand Center of Excellence for Life Sciences (TCELS). He is Head of Virology and Molecular Biology, Department of Pathology, Ramathibodi Hospital, and also Principal Investigator, Pharmacogenomics - Personalized Medicine Project of TCELS. This section is also based on the experiences of a young entrepreneur associated with TCELS. The name of the entrepreneur and some events in her life have been changed to protect her privacy.



1

Yet Another Day

Sitting idly behind the steering wheel of her car, Mei suddenly realized that she was inattentive to everything around her. She was lost in her thoughts. The traffic had not budged for the last fifteen minutes. It was a daily ordeal which was getting worse by the day. But there was no point complaining. Everyone around her was patiently waiting for the traffic to inch forward. She too sat aimlessly, with a resigned look on her face. It was best not to think about the traffic snarls in Bangkok.

‘Focus on something else’, she said to herself. Not a bad coping mechanism, she thought.

She looked around at the sequence of glowing red tail lights. It was hard to tell if the traffic movement was worse in the morning whilst going to work, or on the way back when returning home. She contorted her face in confusion.

‘Think of something other than the traffic!’ she rebuked herself.

‘It was a long day...,’ she sighed.

‘To be honest, the day is yet to begin,’ her mind chuckled.

Yes, indeed! Both her sons would be waiting excitedly for her.

‘Not a minute of peace with the two boys around’, she yawned.

‘But having them around is a relaxation in itself.’

‘Oh, sure,’ she shrugged her shoulders.

Talking to herself helped her to see things from a different perspective.

‘We want to introduce different perspectives.’ Yes, this is what they said at the Thailand Center of Excellence for Life Sciences (TCELS) today.

Mei had known TCELS for nearly two years. But this was

the first time she was doing an assignment for them. She was part of a team engaged in a feasibility study for one of their projects. Getting work had become very difficult these days. For this assignment she had to go through a lengthy selection process at TCELS. There was a tough competition among the contenders. She was glad that she finally got the work.

This assignment was very important for her, especially in the current financial circumstances. She had to keep the company going, although getting assignments was not easy. Originally it was her brother's company; now she was responsible for it.

Her thoughts raced back to the time when she had first owned the company. Her brain suddenly felt energized. Even in the inertness of the surrounding traffic, she felt a surge of movement.

2 Back in Time

Thailand had enjoyed a compound annual economic growth of 9.6% in the decade from 1986-96.¹ Everything about the economy and business looked quite upbeat. Then, in 1997 Thai economy suffered a sharp downturn. Many believed it was the combined result of currency and financial crises. Unsuccessful defense of the currency and the weak banking system had compounded the problem.

It was a difficult phase for many in the business community. Small businesses found the jolt too heavy to bear. Mei's father, a third generation Chinese immigrant,

¹ The Board of Investment of Thailand (n.d.), *Thailand: Economic Policy Analysis*. Retrieved July 5, 2013, from <http://www.boi.go.th>

went bankrupt. He had a small construction business. The family was not rich but reasonably well off to provide a good education for their two daughters and one son.

Mei was more Thai than Chinese, both in her appearance and language. However, her mannerism and attitude reflected her Chinese inheritance. Entrepreneurship ran in her blood. But the family was intently grooming their only son to take over the family business. Much before the unforeseeable turn of events in the early nineties, he was sent off to Singapore to get a degree in business management.

Their daughters never complained. Actually there was no valid reason for them to object. Mei was studying in one of Thailand's best universities, doing a prestigious course in business studies. She rubbed shoulders with students from some very rich families. It was one of the most glamorous classes at Chulalongkorn University. But Mei found herself out of place.

She disliked her classmates' superficial conversations, mainly about the latest fashions and brands. She did not like their company at all. During free periods she would rather go home than tag along with them to MBK shopping mall.

However, she didn't feel totally comfortable even at home. There was an unspoken sense of disdain in her

mind. Probably her parents never suspected that their ever-smiling, bubbly and chirpy eldest daughter was secretly harboring deep seated resentment and hurt. She had always been the brightest and the most talented of her siblings; always ahead in everything. There wasn't anything in particular that she had been deprived of. But the preferential treatment meted out to her brother was obvious in almost everything. Could that be a reason for her ill-feelings? She was not sure.

It was her mother who had set up the company for her brother. She had completed all the initial legal requirements and set it rolling. 'All you need to do now is to set sail,' she said dotingly to her son.

But there was no wind to propel the boat forward. There was a big slump in the business world. Things were just not going the way they were expected to. 'What can I do in these circumstances?' Mei's brother grumbled.

To run a company, you need to be constantly engaged in activities; have a business plan in place, meet potential clients, target the right audience, engage with your employees and do the mundane jobs of preparing balance sheets, filing tax returns, having timely audits, and much more besides. But this company had almost no activities.

Fortunately, Thailand's economic situation did not remain grim for long. Market confidence soon returned. It was

evident in improving foreign currency exchange rates and declining inflation and interest rates. Indicators of production and demand started leveling off.

In Thailand's first Trade Policy Review since the 1997 financial crash, the World Trade Organization announced in December 1999 that the Thai economy has benefited from major reforms which had led to greater transparency, stronger governance and improved prudential supervision, both in the private sector and in government.² The Business Sentiment Survey initiated by the Bank of Thailand in 1999 generated fairly satisfactory results.³ Consumer confidence also appeared to be returning.

But none of it seemed to motivate Mei's brother. He preferred the certainty and security of being an employee in a company, rather than accept the challenges of being an entrepreneur. He wanted to close the company. But that was easier said than done. He would have to spend around 20 to 25 thousand baht on all the legal procedures involved in the company's closure. Where was the money coming from?

It was the first time that Mei had seen her parents get re-

² World Trade Organization (1999, December 10). *Thailand: December 1999*. Retrieved August 5, 2013, from World Trade Organization: http://www.wto.org/english/tratop_e/tptr_e/tp122_e.htm

³ Siksamat, S. (1999, October 19). *An Experience of Business Sentiment Survey by Bank of Thailand*. Retrieved August 8, 2013, from http://www.bot.or.th/Thai/Economic-Conditions/Thai/Index/DocLib_1/survey_11.pdf

ally mad at her brother. The events of that fateful evening remain etched in her mind. When all the shouting and scolding failed, her mother burst into tears and started pleading with her son.

‘Don’t close the company yet. Give it another chance,’ she sobbed. She couldn’t bear to see all her efforts and hard work go to waste. This company was her long cherished dream for her darling son. But he remained adamant.

It was in one of those melodramatic moments that Mei first revealed her long-cherished ambition. In a matter-of-fact tone, she said to her brother, ‘If I were to set up a company, I would need money. I don’t have it. And you don’t have enough money to close down the company. So why shouldn’t I take over the reins?’

Who could deny it? It was a win-win situation. The entire family came to a unanimous decision.

Mei was delighted. She had never imagined that events would take such a turn. The company just fell into her lap.

But then she faced a real challenge. She needed work to keep the company running. The employees had to be paid on time, no matter what. This was one of the business ethics her parents had always adhered to. To generate some money she needed assignments.

Where would the assignments come from?



3

A Glimpse of the Future

Early years of the new millennium were characterized by the western powers' increasingly controversial debate about Iraq's alleged possession of weapons of mass destruction, while at the same time there was euphoria over the completion of the Human Genome Project.

Mei wasn't really interested. But television in the family's living room kept constantly flashing such stories. Her father, who fell ill after his bankruptcy and business closure, continuously watched news on the TV. It was painful to see her once energetic and enterprising father confined to a room, glued to the television. The constant

noise and mindless repetition of news stories irritated her beyond words.

She found the images of United Nations and International Atomic Energy Agency inspectors scouring the Iraqi desert both appalling and scary. However, she was intrigued by the story of more than 3 billion DNA base pairs in the human genome.

The Human Genome Project was coordinated by the National Institutes of Health and the U.S. Department of Energy, with contributions from universities across the United States and international partners in the United Kingdom, France, Germany, Japan, and China. It allowed researchers to begin to understand the blueprint for building a human being. They were convinced that this knowledge would have a major impact in the fields of medicine, biotechnology, and the life sciences.

Little did Mei realize that these developments were going to influence her life too; not just hers, but of many young professionals - entrepreneurs and researchers alike.

In collaboration with other countries, Thailand set up the Bacterial Genome Project in 1999 and the Rice Genome Project in 2002. In 2002, the National Center for Genetic Engineering and Biotechnology (BIOTEC), Thailand, took

on the Thai SNP Project.⁴ Single nucleotide polymorphisms, frequently called SNPs (pronounced ‘snips’), are the most common type of genetic variations among people. Most commonly, these variations are found in the DNA between genes. They can act as biological markers, helping scientists to locate genes that are associated with diseases. When located within the genes, SNP can be used to estimate the risk of developing certain diseases. It can also predict the response to drug treatment and possible side effects.⁵ The science of using genetic information to predict a patient’s response to a drug is called Pharmacogenomics.

Mei had not studied science at university, but she had always enjoyed inter-disciplinary interactions in her social activities. She was a member of the university society that visited hill-tribes in the north of Thailand. Three times a year they would go camping. They left Morchit bus station on Thursday evening and returned on Tuesday morning.

She enjoyed participating in philosophical discussions. ‘Hey, you are a business faculty student. How do you know so much about other fields?’ her friends used to

⁴ National Center for Genetic Engineering and Biotechnology (BIOTEC), Thailand (2010). *Pan-Asian SNP Consortium*. Retrieved August 6, 2013, from <http://www4a.biotec.or.th/PASNP>

⁵ Genetics Home Reference. Retrieved September 13, 2013, from <http://ghr.nlm.nih.gov/handbook/genomicresearch/snp>

ask. 'I think I am a mermaid,' she would reply, quoting the American author Anais Nin. 'I have no fear of depths but a great fear of shallow living.' She was a voracious reader and would devour almost anything and everything that came her way.

Around the time when the news about DNA sequencing and the Human Genome Project had captivated her attention, she heard about a book entitled 'As the Future Catches You: How Genomics & Other Forces Are Changing Your Life, Work, Health & Wealth', by Juan Enriquez. She read it.

She fell under its spell. She was captivated by the book's dramatic depiction of the genetic, digital, and knowledge revolutions and their unprecedented political, ethical, economic, and financial impacts.

In fact, this book by Harvard Business School scholar Juan Enriquez captured the imagination of many eminent people in Thailand. It was enthusiastically discussed, not just by leaders but by ordinary people too.

By then the Thai economy was truly buoyant. Real GDP growth had surged from 2.2% in 2001 to 7.1% in 2003.⁶ The Royal Thai Government was keen to build on this positive growth by attracting foreign investment, and

⁶ The World Factbook 2009 (2009). *Economy of Thailand*. Retrieved August 6, 2013, from Central Intelligence Agency: <https://www.cia.gov/library/publications/the-world-factbook/index.html>

improving domestic investment and consumption to offset past reliance on exports. The field of life sciences appeared to be a promising area. Year 2003 was declared 'The Biotechnology Year' in Thailand.

The Royal Thai Government announced a series of new policies and initiatives to strengthen the country's life sciences sector. New initiatives included the establishment of the National Biotechnology Committee. It was a policy-level body that would enable the government to have a clearer picture of the country's role in the value chain of biotechnology.

Mr. Suwit Khunkitti, then Deputy Prime Minister, worked alongside distinguished academician, Prof. Dr. Pornchai Matangkasombut, President of Mahidol University, to accomplish the government's mission of promoting Thailand's life sciences sector as a policy priority.

The U.S-Thailand Life Science Task Force was set up under the chairmanship of Deputy Prime Minister Suwit Khunkitti. In its first monthly meeting on May 27, 2003, the U.S-Thailand Life Science Task Force decided to have a professional evaluation of the capacity of Thailand's life sciences in order to look for the best possible avenues of investment and development.

After a competitive bidding process, Hogan & Hartson

L.L.P., a leading international law firm based in Washington, D.C., was selected to conduct a short-term study. The goal of their study was to assess the policy environment of life sciences, to help secure investment in health for economic growth, to enhance worker productivity and help alleviate poverty. These were the key issues as identified by Deputy Prime Minister Suwit Khunkitti in his keynote address at the first annual Asia Pacific Economic Cooperation (APEC) Life Sciences Innovation Forum.⁷

At the first U.S-Thailand Life Science Task Force meeting, it was also decided to establish a center of excellence in life sciences to be the focal point of all research information and business support for life sciences investment in Thailand. The announcement followed within months at the Asia Pacific Economic Cooperation (APEC) Life Sciences Innovation Forum.

In his keynote address at the first annual Asia Pacific Economic Cooperation (APEC) Life Sciences Innovation Forum in Phuket, on August 14, 2003, Mr. Suwit Khunkitti, Deputy Prime Minister of Thailand and Chairman of APEC Life Sciences Innovation Forum, announced the establishment of the Thailand Center of Excellence for

⁷ Keynote Address by His Excellency Mr. Suwit Khunkitti, Deputy Prime Minister of Thailand and Chairman of the Life Sciences Innovation Forum, at the First Annual Meeting of the Life Sciences Innovation Forum (Phuket, August 14, 2003). Retrieved August 6, 2013, from http://www.apecsec.org.sg/apec/news___media/speeches/140803_dpmt_h_lsif.html

Life Sciences (TCELS). He said:

'Yesterday, I had the honor of announcing the establishment of the Thailand Center of Excellence for Life Sciences after my meeting with the US-ASEAN Business Council. The Center will help foster and leverage Thailand's life science and biotechnology research capability and identify and enhance competitive advantages for the Thai life science industries through activities in such areas as research, education, commercialization, technology infrastructure and international outreach. The Center will be administered by the interim board of directors led by myself and comprise experts in related fields.'

4

The Groundwork

In the world of business, time is both a strategy and a weapon. Wasting time can mean losing big opportunities. Thailand was serious about making a mark in the life sciences sector. The government realized that as the country's economy moved forward, one of the central challenges was improving public health whilst ensuring the economic promise of life sciences.

Hogan & Hartson L.L.P. presented their report to the government on September 19, 2003. This report recommended some long and short term goals for generating Thailand's life sciences' roadmap. These included specific suggestions about how to increase the scientific

and information infrastructure and human and physical capital; and create a supportive life sciences climate in terms of regulations, intellectual property, investment environment, healthcare policy and agriculture, industry and energy.

The report also suggested that Thailand should focus on the value chain of life sciences in the areas of:

1. Clinical Trials
2. Diagnostics for infectious and tropical diseases
3. Thailand as the premier medical destination for the region
4. Enhancing existing Thai medical specialties
5. Traditional Thai remedies
6. Development of drugs, vaccines and biotech products for certain diseases, including malaria and dengue fever
7. Agricultural biotechnology:
 - Aquaculture
 - Specialty crops
 - Bio-pharming
 - Bio-industrial
 - Bio-energy
 - Organic food and specialty agriculture.

Thailand was urged to use this report to initiate a process

of national dialogue and national self-assessment. The report stated, 'If Thailand concludes that its Life Science undertakings need more focus and substantially more money, and that its policies should focus more on promoting innovation over generic or commodity products, then we will have added some measure of value to this process of self-examination and renewal. The road of progress towards a knowledge-based economy in which Life Sciences plays a vital role is daunting but worth the effort.'

Thailand was ready to take the leap forward.

5 A New Star on the Horizon

A leap-frog strategy was envisaged for Thailand's life sciences innovation. The newly established Thailand Center of Excellence for Life Sciences (TCELS) was to implement this ambitious strategy.

The Thailand Center of Excellence for Life Sciences, or TCELS, was established by a Royal Decree endorsed on June 18, 2004, under the Office of Knowledge Management and Development (OKMD). TCELS officially began its operations on December 29, 2004.

The Office of Knowledge Management and Development

(OKMD), an umbrella of seven independent organizations, was also established by a Royal Decree issued by the Thai government on June 18, 2004. A public organization, the OKMD was set up under the Prime Minister's Office (PMO) with the vision of developing creative ideas and increasing the knowledge and intellect of Thai society through learning processes.

Together with TCELS, each of the seven specialized organizations under OKMD's wing was a separate entity, with the core objective to trigger new ideas and inspire creativity. The key mission of OKMD was to enable all Thais to achieve equality of access and opportunity that will ensure freedom of learning.⁸

The OKMD at that time was operated by the Bureau of the Budget. This Bureau is a part of the government service. Its status is similar to a department that belongs to the Prime Minister's Office. The Bureau of the Budget is responsible for preparing an annual government statement of expenditure that is presented to the Prime Minister and the cabinet for their approval and submission to parliament.⁹

⁸ The Office of Knowledge Management and Development (2006). *OKMD*. Retrieved August 6, 2013, from OKMD: <http://www.okmd.or.th>

⁹ Bureau of the Budget, Thailand (n.d.). *Bureau of the Budget, Thailand*. Retrieved August 6, 2013, from <http://www.bb.go.th/bbhomeeng/>

6 Beginning of the Journey

Mei, the budding entrepreneur, was aware of these developments taking place in the country. Well, at least on a superficial level and only as much as the newspaper headlines revealed. Since the death of her father, the constant news telecasts in the living room had stopped.

Her company was doing fairly okay. She was quite meticulous and organized in her approach and had an innate knack of connecting with people. She could see opportunities galore in the new economic scenario. Sometimes she wondered if there really was an abundance of business ideas, or it was just her optimism.

She believed that if you ‘keep your face toward the sunshine, shadows will fall behind you’.¹⁰ But this was not sufficient to motivate her friends. Sometimes Mei was ridiculed among friends for her optimism. ‘Come on Mei, face it. It’s just not working and never will. You’re not getting anywhere. Give up!’

But she wouldn’t relent. ‘Who says that?’ She would retort. ‘If you think I’m taking one step backwards after taking one step forwards, it doesn’t mean I’m stuck. I’m just doing a bit of cha-cha, stupid!’

Confidence was another asset that she possessed in abundance; she even amazed herself. Indeed, she had every reason to be confident. She could easily have donned the six thinking hats of Edward de Bono¹¹ and be prepared to learn new things for each of her projects. She would put her heart and soul into each individual assignment.

She wanted to acquire a nuanced understanding of the things that she was working on. She had a deep desire to know everything in detail.

‘But is it really possible to know things? How do we know what we know? Do we not, most of the time, start with our own convictions, mental models, and keep searching

¹⁰ Walt Whitman, 19th century American poet and author.

¹¹ Six Thinking Hats® is a simple, effective parallel thinking process that helps people be more productive, focused, and mindfully involved. More information can be found at http://www.debonogroup.com/six_thinking_hats.php

for evidence to reinforce these certitudes?’ Mei would often ponder.

In the organizational context, knowledge is seen as being constituted recurrently in the ‘ongoing and situated actions of organizational members as they engage in the world’.¹² It is the perspectives of the various stakeholders that add to organizational knowledge.

Mei was also aware that be it in the personal or organizational context, there is always the ‘danger of a single story’.¹³ Very often people run the risk of adopting a single dimensional approach to their understanding and start making knowledge claims. If one ignores the overlapping stories, the mosaic of understanding and knowledge remains incomplete. It can lead to critical misunderstandings.

When Mei was approached by the Thailand Center of Excellence for Life Sciences (TCELS), the newly established life sciences organization in Thailand, to conduct a feasibility study for one of their projects, she wanted to get up close and personal with the organization and its multiple stakeholder groups.

¹² Orlowski, W. J. (1996) Improvising Organizational Transformation over Time: A Situated Change Perspective. *Information Systems Research*, 7(1) pp. 63-92.

¹³ TED talk by Nigerian novelist Chimamanda Adichie. Retrieved August 8, 2013, from http://www.ted.com/talks/chimamanda_adichie_the_danger_of_a_single_story.html

She trusted her observations and sound judgment. But she did not rely entirely on them. She sought the active involvement of other relevant participants. Based on their articulations and narratives she would weave the tapestry.

With this intention Mei scheduled appointments and interviewed people close to TCELS - current and ex-employees, leaders and partners, anyone who could help her understand the organization in the context of Thailand's life sciences industry. She sat with them, reminiscing about the changing sands of time. There were shiny shingles strewn all around, waiting to be discovered.

They engaged in captivating conversations, more absorbing than she had imagined. Emotions and expressions flowed uninhibited. They shared experiences about the organization's initial days, problems that arose along the way, dreams and aspirations, achievements and failures, abilities and weaknesses; explaining everything almost in one breath.

There was a deluge of information. It could easily have been overwhelming, but not for Mei. She gleaned nuggets of information from interviews and piles of notes. Everything appeared chaotic. There had to be some pattern, she mused. But none was apparent.

Mei tried hard to understand. Days went by but everything still looked cluttered and messy. She smiled to herself, ‘What we call chaos is just patterns we haven’t recognized; what we call random is just patterns we can’t decipher’.¹⁴

‘Why look for patterns at all?’ she thought. Instead, she just immersed herself in the pool of information, soaking up each multi-dimensional image that appeared. Animated reflections on the organizational journey soon emerged in front of her eyes. She started getting a clearer understanding of TCELS as an organization and its journey. The following sections are a representation of these conversations and understanding.

¹⁴ Chuck Palahniuk, American novelist and freelance journalist.



- ALONG THE WAY -

1

The Inside Story

This section is based on in-depth interviews with some key founder members of the Thailand Center of Excellence for Life Sciences (TCELS), former employees, current staff and leaders of the organization.



If you ever visit the Thailand Center of Excellence for Life Sciences (TCELS), it is hard not to be touched by the warmth and friendliness of the place. Smiles are not the only measure; they can be found aplenty in Thailand. But the people in this organization exude genuine affability and pleasantness that simply permeate the environment.

TCELS has a fairly young and vibrant team of professionals from diverse fields. There appears to be a healthy balance of experienced personnel and newcomers; their ages range from 25 to over 50 years. On any ordinary day, if you happen to pass through the corridors, it is common to catch the sound of hearty laughter or someone humming

a song. This relaxed atmosphere in no way undermines the professionalism of TCELS' team.

Ms. Sukanya Aonwattana, Assistant Project Manager, Medical Robotics Project, who joined TCELS in 2010, says, 'When I joined I wasn't quite sure what to expect. It was my first job. I have been fortunate to get a supportive and stress-free environment here.' She agrees that the work has increased a lot since then. 'We remain very busy, but still manage to enjoy the work.'

A similar opinion is expressed by Ms. Warisa Iimdgangsanguan, who is fairly new at TCELS. She moved to TCELS in June 2013 from The Brooker Group PLC, a financial consulting and capital management company. Ms. Warisa has also worked with the Stock Exchange of Thailand. 'People here at TCELS are very kind and helpful. Because of their attitude, work becomes satisfying,' she says.

'I am glad that we have managed to build and retain this kind of a work environment,' says Ms. Taweeporn Gedararam, Senior Program Manager, who has been with TCELS almost from the time that it was conceptualized in 2003. Ms. Taweeporn earlier worked for the Thailand Tropical Diseases Research Program.

She remembers nostalgically, 'It reminds me of the time when I first joined TCELS. We were located on the 11th

floor of this same building, College of Management Mahidol University (CMMU) or μ building as it is now called. There were just a few pieces of furniture. And it was a small team, just 12 of us.'

'It has been a long time since then, almost a decade you can say. But it doesn't feel like it. Life with TCELS has been a roller-coaster ride.'

'Well, had it not been so I would have easily got bored!' She adds with her signature smile.

In its brief existence of nine years, the Thailand Center of Excellence for Life Sciences has been through many ups and downs. It was originally established in response to Thailand's aspiration to push for more innovation in the field of life sciences.



Why TCELS?

Thailand has long been engaged in promoting science and technology. There have been many successful research projects and innovations in Thailand. One of the most famous Thai innovations is the invention of an ingenious wastewater aerator, known as the Chaipattana Aerator. The aerator treats waste water by rotating paddles through the water in order to oxygenate it. It is also widely used for adding oxygen to aquaculture breeding pools. Another innovation that greatly benefits agriculture is the Kaset Pattana Rice Thresher, a farm tool that saves both labor and expense in rice harvesting.¹⁵

Thailand boasts prestigious organizations like the National Science and Technology Development Agency (NSTDA), established in 1991. NSTDA is a quasi-government agency which acts as a bridge between the academic research and innovation requirements of industry, with its five subsidiaries, the National Center for Genetic Engineering and Biotechnology (BIOTEC), the National Metal and Material Technology Center (MTEC), the National Electronics and Computer Technology Center (NECTEC), the National Nanotechnology Center (NANOTEC) and the Technology Management Center

¹⁵ The Government Public Relations Department. (n.d.) *Science, Technology and Innovation*. Retrieved September 2, 2013, from <http://thailand.prd.go.th/ebook/inbrief/page.php?cid=10>

(TMC).¹⁶

In 2002, the Ministry of Science and Technology (MOST) established the Thailand Science Park to stimulate and manage the



flow of knowledge and technology amongst universities, Research and Development (R&D) institutions, companies and markets; to facilitate the creation and growth of innovation-based companies through incubation and spin-off processes; and to provide other value-added services together with high quality space and facilities. Located in the suburbs of Bangkok, the Thailand Science Park is the home-base of NSTDA and its research centers along with over 60 corporate tenants.¹⁷

To strengthen the country's capacity to move towards a knowledge-based economy, the National Science Technology and Innovation Policy Office (STI) was established in 2008. It provides support to the government in terms

¹⁶ NSTDA (2011). Retrieved August 9, 2013, from <http://www.nstda.or.th/eng/>

¹⁷ Thailand Science Park. (2005). Retrieved August 9, 2013, from <http://www.sciencepark.or.th/index.php/en/>

of science technology and innovation policy formulation, coordination, and promotion.¹⁸

There are other organizations like the Health Systems Research Institute (HSRI), the National Innovation Agency (NIA), the National Research Council of Thailand (NRCT), the Thailand Research Fund (TRF) and 16 public universities, to name but a few. All are actively engaged in promoting and supporting top class research and innovation in Thailand.

Amidst all these organizations that are progressively enhancing the country's competitiveness, the Thailand Center of Excellence for Life Sciences (TCELS), established in 2004, has its own niche in the area of life sciences, specifically in life sciences for human health.

Talking about the need for establishing TCELS, Prof. Dr. Pornchai Matangkasombut, Founder President of TCELS and current Advisor to TCELS Board, notes that, 'TCELS was set up to play the role of a match maker, to strengthen the connectivity between translational research in life sciences, all the way up to marketing. It had to connect all the different types of actors involved and strengthen the value chain'.

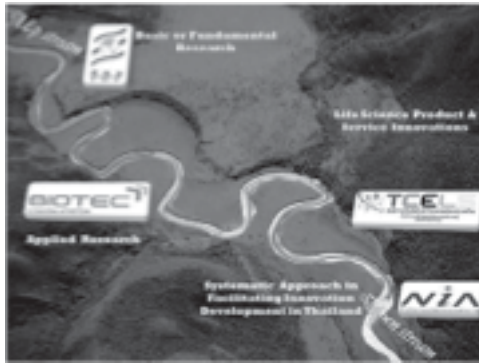
¹⁸ National Science Technology and Innovation Policy Office. (n.d.) Retrieved August 9, 2013, from <http://www.sti.or.th/en/>

Prof. Dr. Pornchai, a leading luminary in the academic and scientific arena, was associated with the establishment and development of many of the above mentioned organizations in Thailand. He is also a former Chairman of TCELS' Board and President of Mahidol University.



TCELS was envisaged as a special organization to enable life sciences researchers to interface with business, points out Prof. Dr. Prasit Palittapongarnpim, former Vice President of TCELS and current Vice President for Research, Mahidol University. 'TCELS had to interact with life sciences companies and businesses, get knowledge about the market and convey it to the researchers.'

The process of moving new technology from the basic research stage to product development is sometimes divided into 'upstream' and 'downstream' phases. Upstream research takes place across the entire life sciences sector, in commercial ventures as well as research institutions. Within the life sciences industry, upstream companies generally focus on conducting further research to add value to technology. The technology is then generally



transferred to companies further downstream to be developed into commercial products.

The value chain in the life sciences industry can be very long. Sometimes it may take up to 5-10 years, or even longer, for the product to reach the market after basic research. If the projects with market potential are not adequately and appropriately supported after the basic research stage, they may end up on the shelf gathering dust.

In Thailand different granting agencies support research at different stages. TCELS has positioned itself to support projects with potential, which have successfully completed the upstream stage of basic research, but still need some hand-holding before reaching the downstream stage of commercialization.

TCELS is an intermediary organization to connect research and innovation, both at domestic and international levels. It ensures the sustainable growth of the life sciences industry in Thailand.

TCELS can be seen as a cheerleader, says Dr. Kitima Yuthavong, present CEO of the Pharmaceutical Research and Manufacturers Association (PReMA) and former Vice President of TCELS. 'TCELS itself is not an athlete, but is there to motivate athletes. Real athletes are the researchers, businesses and companies, both small and big. Sometimes big companies from other industries, like petrochemicals, cement, etc. who have huge amounts of money, may not know much about life sciences. So the role of TCELS is to connect with them, explain things to them and motivate them to invest in life sciences.'

This is fascinating imagery and sums up the role of TCELS quite well. But how mirthful has been the journey of this cheerleader?

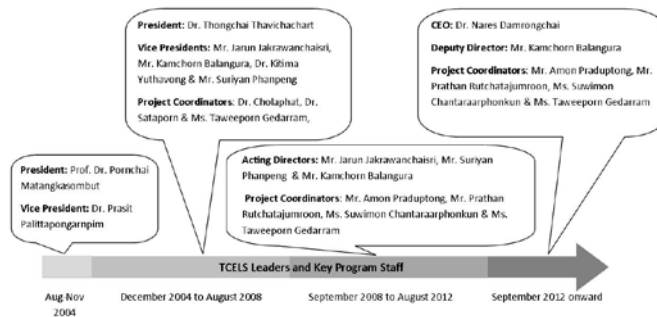
Seriously, aren't most journeys a saga of bitter-sweet memories, full of ups and downs, 'like the flow of a river, carried by the surprises of its own unfolding'¹⁹? The journey of TCELS has been no different.

Initial Years

Professionals who facilitate organizational mapping confess that the initial years are the most crucial in any organizational journey, just like the formative early child-

¹⁹ John O'Donohue, an Irish poet, philosopher and Catholic scholar.

hood stage in human development. Proper direction and guidance at this stage go a long way in contributing to the overall progress and development.



TCELS was fortunate to be led by notable leaders like Prof. Dr. Pornchai Matangkasombut and Prof. Dr. Prasit Palittapongarnpim, President and Vice President respectively for a few crucial initial months. In December 2004, TCELS got its first full time CEO. The designation of CEO or Director was then called the President. Dr. Thongchai Thavichachart, who was earlier Managing Director of the Government Pharmaceutical Organization (GPO), joined TCELS as President.

Dr. Thongchai reminisces, ‘Moving from an organization with over 2000 employees, to TCELS, where initially we



were just two, Taweeporn and I, was like taking over the controls of a small airplane after driving a train for ages. The GPO had different departments, with set procedures and functions; but here we had to find the way ourselves. I cannot say that it was easy, but it was exciting, especially for a person like me who enjoys doing new things.' Currently Dr. Thongchai is an honorary Advisor to the Senate Committee on Science and Technology.

The first business plan of TCELS was drafted by the Thailand Equipment Research in September 2004. It was decided that TCELS will implement its vision, mission and policy objectives through the five pillars of research, education, commercialization, technology infrastructure and international outreach.

TCELS Business Plan

(September 2004)

Vision: TCELS will lead Thailand into becoming a world class provider of innovative life sciences products and services.

Mission: TCELS mission is to foster and leverage Thailand's life sciences research and development capabilities, products, processes, and services in a coordinated and focused manner, with the long term aim of identifying and enhancing competitive advantages for the Thai life sciences, and to generate wealth for Thailand. It will do this via the five pillars of research, education, commercialisation, technology infrastructure and international outreach.

According to this business plan, the following seven technologies, products and services were identified as targets:

- Enabling & Supporting Technologies – R&D Platform
- Pre-Clinical and Clinical Trials
- Pharmaceuticals
- Dietary Supplements & Nutraceuticals (functional food)
- Traditional Thai and Oriental Medicines
- Health Care Services
- Medicinal SPA and natural product treatments.

Soon Dr. Thongchai had his team in place with four vice presidents, Dr. Kitima Yuthavong, Mr. Jarun Jakrawanachaisri, Mr. Kamchorn Balangura and Mr. Suriyan Phanpeng. They also had three project coordinators, Ms. Taweeporn Gedarram, Dr. Cholaphat and Dr. Sataporn; and a four member team for back office support.

Most of the staff, who have been with TCELS since the beginning, fondly remember the close bonding of a small team. There



were lively interactions among the staff; everyone was aware of each other's work. Each morning they would have a staff meeting and discuss the day's work.

Ms. Suwimon Chantaraarphonkun, who joined TCELS in 2005 as Project Manager, shares her thoughts, 'We were a very flat organization, working horizontally. Dr. Thongchai believed in continuously expanding one's knowledge and encouraged us to keep doing new things.'

Three significant projects undertaken by TCELS in the early years were the Pharmacogenomics Project, Animal Breeding Center Project and Human Resource Development



through Doctoral and Post-doctoral Degrees.

'In the initial years, when you talked about TCELS,

all you meant was Pharmacogenomics; the genomics force that can change your life, work, health and wealth,' points out Prof. Dr. Wasun Chantratita, who was part of the initial discus-

sions leading to the establishment of the Thailand Center of Excellence for Life Sciences (TCELS). He is presently the Head of Virology



and Molecular Biology, Department of Pathology, Ramathibodi Hospital, and also the Principal Investigator, Pharmacogenomics - Personalized Medicine Project of TCELS.

This understanding of genomic force, as presented in Juan Enriquez's book, was the prime motivation in establishing TCELS. Subsequently, Pharmacogenomics became just one of the projects of TCELS; many others were added later on.

Research into dengue vaccine, rubber latex and human growth hormone were among the key projects undertaken during the initial years. After the Indian Ocean Tsunami in 2004, which devastated the six southern provinces of Thailand, a Post-Traumatic Stress Disorder (PTSD) project was also included in the Pharmacogenomics program.

(All TCELS' projects from 2004 till 2013 are listed in Appendix 1. A detailed discussion on some of the projects follows in the next sub-section.)

'Whatever we are building on today is the result of some far-sighted decisions taken by the leaders of initial years,' says Ms. Taweeporn. 'Eight years ago, when we started working in this area, there was much skepticism about the Pharmacogenomics Project. Even some medical doctors were not convinced. But our leaders at TCELS understood it well. They knew that if we didn't take the first step, someone else would. They gave TCELS a head start by taking this leap forward.'

'There was also a worry about accountability in spending



the government budget. It had to be spent well. It was after all tax payers' money and we couldn't afford to take any risks. How-

ever we were fortunate that the decision paid off,' Ms. Taweeporn notes with satisfaction.

Today Pharmacogenomics is one of TCELS' best success stories. Currently, a personalized medicine based business model is being designed by TCELS; this can be a spin off from the capabilities and assets of the Pharmacogenomics program and other related programs at Mahidol University.

However, not everything went according to the initial plans. Senior staff members at TCELS frankly admit the organization's disappointments and letdowns. There were political changes in the country. As a result, the OKMD, which comprised seven organizations including TCELS, was placed under tough scrutiny. These organizations were subjected to drastic budget cuts. There were rumors that some of these organizations might even be closed down.

As the African proverb says, when the elephants fight, it's the grass that suffers. In this clash of political titans, the budding life sciences organization became the grass. Due to the political tussles and instability, there were many limitations and missed opportunities.

Challenges and Issues

It is never easy to look back at difficult phases of life. It is easier to wish them away and pretend they never existed. But that would present an unreal and incomplete picture. It takes courage to admit candidly that one has stared problems in the face and turned the challenges into opportunities.

TCELS has done just that.

Taking life sciences research to the industry was a prime objective of TCELS. As a result, TCELS had to ensure that the technology being promoted met the standards set by regulatory bodies such as the Food and Drug Administration (FDA) of Thailand. 'Existing *infrastructure and facilities* at that time were not up to the required standards,' stresses Mr. Kamchorn Balangura, Deputy Director of TCELS. 'They needed improvement and had to be upgraded.'

Strengthening the *value chain in the life sciences* industry, particularly life sciences for health, was another of its objectives. Life sciences involve a high risk venture with a very long life cycle. An extensive investment process is required. But there was no mechanism available to ensure this kind of long term funding.

‘Small businesses don’t have the budget for this. Big conglomerates, which have the money, may not necessarily have the people to provide the translational research,’ explains Dr. Kitima. ‘In Thailand, most funded projects have a duration of two to three years, while the life cycle of biotechnology projects can extend up to 10 years. There was *no venture fund* for this kind of long term financing.’

She further adds, ‘In the field of biotechnology most organizations don’t have the value chain in place. There also needs to be a license agreement between two or more parties – a license from the owner of the first idea to the developer, then one from the developer to the marketer. For this they need the involvement of many patent or license lawyers.’

Without venture capitalists, financiers and *legal experts*, the whole country was lacking in many pieces of the jigsaw puzzle for a viable life sciences industry. TCELS’ challenge was to first put things in place and then connect them together.

TCELS' major *challenges related to the budget*. Going back to the origins, Prof. Dr. Pornchai reveals, 'In fact, one of my conditions to the Prime Minister at the time was that we should be in a position to provide financial support for start-up businesses by establishing a public sector fund that would help to alleviate the risk that the private sector has to take in starting a business for any innovation. To fulfill this mandate of TCELS, we were promised substantial funds at the beginning. We were promised that we would be in a position to establish an endowment fund to the tune of a couple of hundred million US\$. However, due to various factors and political changes, this endowment fund never came about.'

'Legally TCELS was not established as a unit on its own. It was part of six²⁰ other units all lumped together under the OKMD, and that was a mistake.' Prof. Dr. Pornchai explains how TCELS was different from the other units grouped under the OKMD. 'None of the others required investment in risk-taking ventures, like trying out new things'.

²⁰ Initially when OKMD was established in 2004, it comprised seven units. After a re-organization in 2009, it was left with six.

Prime Minister's Office

Office of Knowledge Management and Development (OKMD)

- Centre of Design
- Centre to support gifted people
- TCELS
- National Museum Institute
- Learning Institute
- Moral Centre

There was *no shared understanding*. The orientation of other entities clustered under the OKMD was towards social sciences, whereas TCELS dealt in life sciences. The value chain in the life sciences sector is typically very long. Results are never achieved in a few months' or years' time. Projects need long term budget support, a minimum of five to ten years before anything can be achieved. This made it very difficult for TCELS to explain the projects to the OKMD. It was equally difficult for the OKMD to understand because they had a totally different orientation.

‘How could they understand us?’ asks Dr. Kitima. ‘They were people from the field of arts and social sciences, whereas we were talking about medical science and new technology. Some of these concepts were tough, even for scientists to understand!’



Each proposal had to be approved by the Cabinet. One of the most difficult experiences that Ms. Taweeporn recalls was defending the budget of TCELS in the Budget Bureau.

‘There were endless questions from the Budget Bureau and I had to spend hours explaining things to them,’ remembers Dr. Thongchai. ‘It was not easy.’ These delays made the value chain even longer.

When TCELS was under the OKMD, it was constantly faced with problems of getting its budget approved. Some years, it did not get any budget support at all, explains Mr. Kamchorn. ‘We somehow managed with the money remaining from previous years. Those were difficult times indeed.’

Budget related worries were a constant threat. This also reduced organizational efficiency since some people had

to work on the budget throughout the year. The government system works differently from the private sector.

Mired in the *bureaucratic system*, TCELS found it very difficult to function. Initially, TCELS was expected to be an independent organization. In the words of Prof. Dr. Prasit, ‘We had almost finished writing the constitution for this new organization. But then there were some misunderstandings among politicians and they thought that it would be better for TCELS to be under the OKMD.’



‘It was a major error to put TCELS under the OKMD. The incompatibility in their orientation and the limitations of the bureaucratic system did not allow TCELS to function to its maximum ability.’ With a hint of sadness and frustration in his voice, Prof. Dr. Prasit adds, ‘Most good things in Thailand are sabotaged by the bureaucratic system.’

Another big challenge was promoting *public-private partnerships*, which was a key objective of TCELS. The main difficulty was that these sectors belonged to totally different cultures, explains Prof. Dr. Pornchai. ‘Academia and the researchers, who mostly came from public universities, were interested in scientific questions. They

wanted to find the facts. For them, it didn't matter how long it took. Whereas the private sector wanted to have some sort of 'certainty'; they wanted specific time frames for doing things.' There was a basic incompatibility.

Nonetheless, to add value to their work, both these sectors had to find common grounds for working together. They had to collaborate.

One such opportunity of public-private collaboration presented itself in 2005 when the J. Craig Venter Institute proposed the setting up of a Genomic Institute in Thailand. This was around the time when South East Asia was still reeling under the Avian Influenza, or bird flu, pandemic and scientists were trying to get more information about the disease. But due to bureaucratic problems and regulatory restrictions, this never came to fruition. It was a big opportunity lost.

Until last year in Thailand there were regulations that restricted public-private partnerships (PPP) in terms of investment. The new PPP Bill, which came into effect in March 2013, has made some modifications to the 1992 PPP Act.²¹ This has raised hopes of public-private partnerships in all sectors, including life sciences.

²¹ New PPP bill in Thailand to take effect in March – Skytrain expansion first project (2013, February 13). InfraPPP. Retrieved August 10, 2013, from <http://infrappworld.com/2013/02/new-ppp-bill-in-thailand-to-take-effect-in-march-skytrain-expansion-first-project.html>

Due to the initial limitations of TCELS, in terms of financing and regulations, the *expectations of the private sector* were only met to a limited extent. ‘At first, the private sector had high hopes. But they were disappointed because we couldn’t do much for them at that time,’ remarks Ms. Taweeporn.

‘We had our own limitations. Dr. Thongchai tried very hard to establish companies. He travelled a lot. Unfortunately, because of the budgetary and regulatory constraints, TCELS couldn’t do much in this direction. However, now private sector companies are coming back to us, which is very good,’ adds Ms. Taweeporn.

During the initial years, TCELS also had a problem with acceptance. Dr. Kitima, who has represented TCELS at many meetings, says, ‘People did not understand why we were there and what we were supposed to do. There was a misunderstanding that we were an arm of Mahidol University. Some people did not like this, especially people from other universities. As an organization, it was difficult to make ourselves understood.’

In Thailand, academic affiliation and stature can help in gaining credibility and winning trust. They also facilitate networking and acceptance into the mainstream. Not many in the senior management team of TCELS at that time were from academia. Some speculate that this could be one of the reasons for its isolation.

For nearly four years, TCELS functioned *without a full-time CEO/Director*. During the period from August 2008, when Dr. Thongchai Thavichachart resigned, and September 2012, when Dr. Nares Damrongchai took over as CEO, the organization was managed by Acting Directors. Operations continued without a hitch and it seemed as if TCELS was on ‘auto-pilot mode’.

But in a collectivist culture, where leaders assume paternalistic and fatherly roles²², TCELS was viewed as ‘leaderless’ by other organizations. ‘They used to say – okay, we will wait for your new CEO because Acting Directors may not be able to take lasting decisions on direction and policy. This was the general perception,’ says Ms. Taweeporn.

Organizations are recognized by their leaders. In fact, leader is often the face of the organization. Inter-organizational relationships are, to a large extent, determined by who leads an organization. With the changing leadership, *areas of influence and affiliation* have also changed for TCELS.

Most of the TCELS’ staff agree that during the initial years the organization had very good relations with the BIOTEC. There was collaboration on many projects.

²² Hofstede, G. (1991). *Culture and Organizations: Software of the Mind*. London, England: McGraw-Hill.

Later, TCELS inclined more towards the Ministry of Public Health (MOPH) and the Government Pharmaceutical Organization (GPO). TCELS had good links with Thailand's Food and Drug Association (FDA) at that time. Currently TCELS has very good relations with NSTDA and the Ministry of Science and Technology (MOST).

Ms. Suwimon regards this as beneficial. Because of this network established by TCELS, its area of acceptance has been increasing. 'This is good for the organization,' she says.

Given the extent of setbacks and hurdles, it is no small feat for TCELS to have sailed past them successfully. 'It is in our nature to deal calmly with uncertainties and to adjust,' says Mr. Prathan Rutchatajumroon, Project Manager, who has been with TCELS since 2007. 'We were not greatly affected because our Board of Directors was very powerful. We were protected by them.'

Dr. Kitima also gives credit to the efforts of the Board and especially the Chairman Prof. Dr. Pornchai, 'TCELS fared well because Prof. Dr. Pornchai was very influential in terms of networking.'

When circumstances become tough, there are just two options available: either accept the conditions as they exist, or accept the responsibility for changing them. TCELS chose the latter.

Becoming an Independent Organization

Organizations and their associations have long been viewed as systems or groups. Interestingly, they can also be viewed as living organisms. This conceptualization is particularly useful when trying to understand their culture and well-being.

Fernando Tarnogol, a psychologist and author, has an interesting analogy, 'Every person in an organization, and every organization in an association, functions as a cell. Cells must work in unison with other cells and organs in order not to be rejected by the organization's immune system. The problem is that not every person is 'genetically' compatible with the organism. It has to adapt.' He adds further, 'In some cases this adaptation is just not possible'.²³

Under the OKMD, TCELS was experiencing a similar incompatibility and inappropriateness, given its special technical and multidisciplinary focus. On November 30, 2010, the cabinet approved a proposal submitted by the Office of Public Sector Development Commission to

²³ Tarnogol, F. (2011, August 31). *Thinking Organizations as Living Organisms*. Retrieved August 6, 2013, from FT Careers: <http://fernandotarnogol.com/career-tips/thinking-organisations-as-living-organisms/>

elevate TCELS to an independent organization under the Ministry of Science and Technology to enable TCELS to operate with greater flexibility.

Due to changes in government and political instability, it took a long time for TCELS to come out of the OKMD's umbrella. This change was certainly expected to provide greater flexibility and enhance effectiveness and efficiency in its operations. But was this move the panacea for all the complexities?

There are varying opinions.

TCELS is now under the auspices of the Ministry of Science and Technology (MOST). 'If you are with one ministry, it limits your interactions with the other ministries,' says Prof. Dr. Pornchai. Given the unique and special nature of TCELS' work, it needs to link up with people in different ministries. TCELS has to relate to the ministries of health, finance, education, commerce, industry and maybe even agriculture.

'If you are with one ministry, other ministries think that you are not related to them. I have always insisted that TCELS should report to the Prime Minister's Office. But when we finally came out of the OKMD in 2010, the Prime Minister at that time was not very enthusiastic about TCELS. The only sponsor we had at that time was

the Ministry of Science and Technology,' notes Prof. Dr. Pornchai.

Dr. Kitima and Dr. Thongchai also agree on the need for TCELS to be actively involved with other ministries, particularly the Ministry of Commerce for patent and intellectual property issues.

However, given the present status of TCELS, in terms of its structural placement, Dr. Kitima thinks that it is better for TCELS to be under the auspices of the Ministry of Science and Technology. It encourages the attitude of being innovators.

Elaborating her point further, she says, 'Unfortunately, in Thailand we do not reward innovation sufficiently. There may be journal publications and promotions in the university for academics. But for innovators it is not easy to get patents. We are not very strong in the area of intellectual property protection.'

'For many Thai people the word 'patent' bears a negative connotation. We have a mental attitude of being 'users' and not 'innovators'. From the perspective of users, if a commodity or service is patented, you have to pay more for it. And we don't want to pay more for anything. Sadly, this is society's attitude,' Dr. Kitima laments. 'The Ministry of Public Health is more inclined towards being

the user. Therefore I think that if TCELS has to be with any ministry, it is better for it to be with the Ministry of Science and Technology.’

Most staff members think that the Ministry of Science and Technology understands TCELS better. There is general optimism about TCELS becoming an independent organization.

Our Strengths

Neither hurdles stopped Team TCELS in its tracks, nor limitations held them back. They continued walking down the road because they believed that good things were just round the corner. It is true that when the going gets tough, the tough get going. But what was it that gave them the strength?

The mantra was perhaps, take everything in one’s stride – one step at a time.

If Thailand’s life sciences industry was to make big



strides, it needed a pathway. The existing one seemed to be dotted with potholes. At least this was the situation when TCELS started on its journey. The infrastructure for pre-clinical and clinical trials was either non-existent or needed upgrading. Without getting disheartened, TCELS began attending to the infrastructural needs.

‘We ourselves started building a highway for the life sciences industry of Thailand. We knew that it would help us later in our journey,’ says Mr. Kamchorn. *‘Well, we were not alone in these efforts, but TCELS certainly acted as the catalyst for upgrading standards in Thailand’s life sciences industry,’* he adds with characteristic modesty.

‘In retrospect, we may not have fully succeeded in accomplishing the things that we had set out to do initially, like setting up companies, establishing venture capital and building public-private partnerships, but along the way we managed to add the facilities that will be required later to achieve our initial agenda,’ Ms. Taweeporn says with a gleam of satisfaction in her eyes.

‘We are like pathfinders,’ says Mr. Amon Praduptong, Project Manager, who has been with TCELS since 2007. Most businesses in Thailand do not have the chain of drug development in place. They may have the technology but not the adequate knowledge about registering with the FDA, and other things. TCELS helps them navigate their

way through *the legal and procedural processes*. TCELS also provides related information for *commercialization and intellectual property protection*.



T C E L S ' *unique presence* in supporting the players in the field of life sciences

for health is one of its big strengths. Much support is required in this area because the value chain is extensive. Long term financial investment is needed. Document requirements are also huge. TCELS has the ability to provide *holistic support*, which is a rare attribute.

Most of the TCELS' research partners are academics. Sometimes it is not easy for them to manage these long-term, investment-intensive life sciences projects with their nuanced complexities. 'We don't just give budget support; we work with our partners and help them in managing the projects,' says Mr. Amon.

TCELS does not see itself as an ordinary granting agency. 'We use grants as one of the tools for attaining the *sustainable growth* of Thailand's life sciences industry,' says Dr. Nares Damrongchai, current CEO of TCELS.

Dr. Nares was earlier Director of Policy Research and Management at the National Science Technology and Innovation Policy Office (STI), Thailand.



TCELS supports research into products and services with a high market value. The *linkage of R&D between government and private sector* provided by TCELS is also a strong point. Currently all the funding for research comes from the government. TCELS is trying to bring in investment from the private sector for the development stage, explains Mr. Kamchorn. TCELS promotes both the private and public sector to raise its stakes in the life sciences industry.

Mr. Prathan thinks, 'Our *network is an asset*, both locally and internationally.' Throughout its journey, TCELS has been participating in many local and international conferences and exhibitions. In 2006, TCELS sent its representatives to conferences and on study trips to Canada, China, Hong Kong, Singapore and the US.

TCELS has been participating in the annual BIO International Convention every year since 2006 (with the exception of 2009). Organized by the Biotechnology Industry Organization in the US, the BIO International Convention

is the biotechnology sector's largest event, attracting participants from all over the world.

This participation has not only helped TCELS gain in terms of building networks; it has also honed the TCELS team's *planning and organizing skills*. Earlier, TCELS used to join others as a partner in Thailand's pavilion at the BIO International Convention. In recent years, it has emerged as a lead organizer of the Thailand pavilion. In Chicago, 2013, TCELS was the main sponsor of the Thailand pavilion, along with the Thailand Board of Investment (BOI), NANOTEC and others.

In 2007, TCELS also participated in Euro BIO at Lille, France. In the Asia-Pacific region, TCELS has participated annually in BIO Korea since 2009 and in BIO Japan since 2012.



TCELS also co-organized BIO Asia held in Bangkok in November 2008. On its home turf, TCELS has taken part in many exhibitions and fairs at educational institutions, ministries and other associations like 'Money Expo'.



In May 2008, to mark its third anniversary, the TCELS Day was organized. The theme of the event was 'Life Sciences: Life Quality', disseminating knowledge and understanding of life sciences for health.



'TCELS Day was the first event that I organized here,' remembers Mr. Prathan. It attracted an enthusiastic response, not only

from academics and invited guests, but also from investors and the general public interested in life sciences. Ms. Suwimon considers it as a significant event imprinted on her memory. 'We all worked together. There was wonderful staff cooperation.'

In July 2013, TCELS, on behalf of the Ministry of Science and Technology and six other co-hosts, organized the first ASEAN Life Sciences Conference and Exhibition. The theme of this event was 'The Future of Life Sciences is Here'. It attracted over 1000 government representatives, industry experts, scientists, academicians and private sector representatives from more than 10 countries. ASEAN Life Sciences Conference and Exhibition opened avenues for new business opportunities and partnerships in the field of life sciences among ASEAN nations, ahead of the formation of ASEAN Economic Community (AEC) in 2015.



Ms. Warisa, a new member of staff at TCELS, says, 'I was lucky to be there during the ASEAN Life Sciences Conference and Exhibition. It was a good learning experience with people from different countries.'

Team spirit among the staff is another strength of TCELS, which is reinforced by means of such events.

Much valued in a high context culture²⁴ such as that of Thailand, are co-operation and a relationship-oriented work environment.



Amicability characterizes working relationships at TCELS. Seniors and more experienced staff are always ready to help and encourage newcomers.

‘When I was new at TCELS, my boss Pee Addie helped and taught me many things,’ recalls Ms. Sukanya. Ms. Taweeporn is known by her nickname Pee Addie, or elder sister Addie. Everyone in TCELS is affectionately addressed as ‘Pee’ or ‘Nong’ followed by their nickname, a Thai tradition of addressing older and younger people respectively.

²⁴ High context culture and the contrasting low context culture are terms presented by the anthropologist Edward T. Hall in his 1976 book *Beyond Culture*. More information can be obtained from <http://faculty.pcc.edu/~mmcdowel/eng240fall03/eng240highlowcontext.pdf>

Similar views are echoed by Ms. Warisa who says, ‘Coming from the private sector, sometimes I find the procedures very different and difficult. But the supervisors have always been there to help and support me.’

Staff members are often connected by affectionate bonds that extend far beyond working hours and formal settings. ‘We go to movies, hold dinners and visit temples at weekends. Sometimes we also travel to other provinces,’ says Mr. Amon.



Within the office premise too there are avenues for relaxation. There is a Fitness Room with tread mill and other equipment. It’s an interesting place for an early start to the day. Mr. Amon, who exercises there regularly, shares an insider’s tip, ‘You can enjoy good views from the 21st floor

while burning calories!’

Ms. Suwimon describes the organizational development events that TCELS used to hold once every two months. ‘We would invite a speaker to the seminar and the staff used to travel to places like Pattaya, Chiang Mai, and elsewhere. We still have them, but they are less frequent.’

‘We’re like a family; we can shout at each other and then forget it the next moment,’ adds Mr. Prathan with a hearty laugh.

It was perhaps in response to the concern for relational dynamics in a high context culture and the growing number of staff that Dr. Nares decided to have staff meetings once a month instead of every morning. Now they have more frequent meetings for individual departments and teams. ‘I prefer spending more time in deeper and detailed interactions with each team on specific issues. There are improvements that we need to discuss and I do not want to point out their shortcomings in front of the other teams. Some may find it hurtful,’ he explains.

Many regard the TCELS’ ability to *make grants* as one of its big strengths. Dr. Kitima says that if TCELS doesn’t have sufficient money to make grants it will be unable to support Thailand’s life sciences industry. Similar views are expressed by Dr. Thongchai.



Prof. Dr. Prasit says, 'TCELS has been very fortunate in receiving a considerable budget this year. It should make good use of its *management strength* and create some new opportunities for the life sciences industry along the way.'

TCELS has been providing *learning opportunities* for all those who are associated with it. This was unequivocally stated by many. ‘There have always been opportunities for hands on experience in TCELS, and nothing can teach you better than that,’ says Ms. Taweeporn, who has



attended many international training programs and study tours while working at TCELS.

Dr. Kitima says, ‘What I enjoyed the most at TCELS was that there was so much to learn. I got to know and have met many people.’

With all the varied strengths and opportunities of TCELS, it is worthwhile looking at the contributions it has made over the course of its existence.

Our Contributions

In 2004, when TCELS started functioning, the situation of Thailand’s life sciences industry appeared quite grim. There were many gaps and missing links in the value chain.

‘We had to *improve standards and develop the infrastructure*,’ says Mr. Kamchorn. ‘We played an important role in establishing and improving pre-clinical trial facilities for the production of pharmaceutical products, food supplements, vaccines and cosmetics in Thailand.’

The Health Products Safety Testing Center is an example of this. This toxicology testing laboratory complies with international toxicology standards for pharmacopeias and other products registered by the Organization for Economic Co-operation and Development (OECD) Good Laboratory Practice (GLP), such as vaccines, herbal medicines, cosmetics and household chemicals. Testing for GLP compliance pertaining to immunogenicity, potency and the efficiency of vaccines and drugs helps the clients in reducing non-tariff barriers for international trade.

In collaboration with Mahidol University, an *Animal Breeding Center* was upgraded to international testing standards in 2005-06. This was a crucial step towards



the advancement of pre-clinical research in the entire chain of health products. This center now meets the standards of the Association for As-

assessment and Accreditation of Laboratory Animal Care (AAALAC).

TCELS has also helped in upgrading a Laboratory *Animal Monitoring Center* that guarantees quality control for laboratory animal production in Thailand and ensures full compliance with international standards ISO/IEC 17025. It increases the capacity and quality of breeding and testing units throughout the country and provides consultancy services to other laboratories in the region.

TCELS has initiated a project to set up an *OECD GLP Accreditation Unit* in Thailand for medical laboratories and public health. This project supports the training of experts and encourages domestic laboratories to register for OECD GLP Certification. It also encourages the coordination of national and international organizations to apply for membership of the OECD GLP international certifying organization. These organizations are also motivated to participate in activities and events as per the requirements of the OECD GLP Technical Working Group. Establishment of this OECD GLP Accreditation Unit will bring Thailand another step closer to becoming an OECD country by the year 2015.

In the area of *clinical research* too TCELS has made its contributions, explains Mr. Kamchorn. TCELS coordinated the efforts of the Clinical Research Collaboration



Network to develop the Clinical Research Center of Maharajit Chiang Mai Hospital as the *Site Management Unit*. This unit complies with international standards and acts as a one-stop service provider for clinical research.

TCELS has also helped in scaling up the capacity of *Clinical Data Management Center* - Thammasat University (CDMC-TU). It has contributed in developing skills, knowledge and ability of personnel in the field of clinical research information management.

TCELS has initiated Multi-Center Institutional Review Boards (IRBs) in most medical schools and research centers and has upgraded the Clinical Research Site to standardize and streamline all clinical research and trials. TCELS also supports the *Medical Research Network* (MedResNet) in managing the Thai Clinical Trial Registry (TCTR) system.

Companies who wish to register clinical trials in the TCTR system are obliged to disclose details of the 20 mandatory items of the WHO International Clinical Trials Registry Platform (WHO-ICTRP) dataset. The TCTR aims

to be a research database for clinical research in Thailand.

Establishing the *Joint Research Ethical Committee* is another feather in TCELS' cap. Dr. Thongchai recalls, 'My friend from Yale University came with a huge project for the Multi-Center Clinical Trial. After spending three years in a vain attempt to get the ethical committees' approval, he returned home disappointed. Nothing could be done. University ethical committees normally take a long time with their own procedures.'

This inspired TCELS to set up the Joint Research Ethical Committee (JREC) in 2006. Research Ethics Committees of 24 organizations, units and institutions in Thailand are part of this joint endeavor. It raises Thailand's standard of ethical considerations in human research to the international level, making it prompt and effective.

Mr. Kamchorn points out that TCELS is currently trying to get a *Contract Research Organization* (CRO) in Thailand.

To help patients awaiting a bone marrow transplant receive stem cell treatment, TCELS is working with the Thai Red Cross Society and relevant hospitals to establish a *National Stem Cell Collection Center*. Data from this research will also be used to develop future stem cell projects. Currently there is a center for the storage of cord blood for patients requiring a bone marrow transplant.

‘The *drug development cycle*,’ says Ms. Suwimon, ‘has improved significantly. Infrastructure has been developed and standards for protocol guidelines established.’

Founder President of TCELS, Prof. Dr. Pornchai too expresses satisfaction, ‘We can already see an *improvement in the life sciences value chain*. It was very sporadic and fractured initially. But now the scenario is better.’

Bringing together different players in the life sciences sector and facilitating mechanisms have also been contributions of TCELS. ‘Establishment of ThaiBio is another step in a positive direction,’ adds Prof. Dr. Pornchai.



The *Thai Association for Biotech Industries* (ThaiBio) is a partnership initiative established in 2010. It groups seven companies (Betagro Science Center Co. Ltd., BioNet Asia Co. Ltd., Keen Co. Ltd., Pico (Thailand) Public Co. Ltd., Plantheon Co. Ltd., PTT Public Co. Ltd., and The Siam Cement Public Co. Ltd.). Prof. Dr. Pornchai and Prof. Amaret Bhumiratna, Board Member of TCELS and current Director of the Royal Golden Jubilee Ph.D Program, Thailand Research Fund (TRF), envisioned ThaiBio as a community for encouraging biotechnology related industrial devel-

opment in Thailand. ThaiBio also supports and promotes biotechnology R&D for the overall development of the country in the five areas of food, agriculture, industry, medication and energy and environment.

Currently TCELS and ThaiBio interrelate in the *Asia Bio Business Partnering* (ABBP). ABBP Conference was started in Japan in 2007 with life sciences experts and representatives of private sector companies from China, Indonesia, Japan, Korea and Thailand. The event continues on a yearly basis and more participants join every year.

The ABBP started at the BIOTEC and later TCELS got associated with it. At the recently

concluded ASEAN Life Sciences Conference and Exhibition in July 2013, the eighth Asia Bio Business Partnering was a key event, providing great opportunities of business matching, partnering and exhibition.



Despite the initial difficulties and limitations faced by TCELS, it continued to support companies in technology transfer, helped them obtain licenses for



the establishment of factories, and provided the required legal advice. It pushed forward the establishment of 12 companies, foundations and associations to carry out life sciences work.

These include: Glovax (Thailand), BioLaunch (Thailand), Phankal Co. Ltd., the International Business Development Co. Ltd., Heart Genetics Co. Ltd., Pharma Resources Asia. Co. Ltd., MTI Co. Ltd., International Drug Development (IDD) Co. Ltd, the Alzheimer Foundation of Thailand, the Committee for Ethics in Human Research Foundation, Thammasat and WHO-TDR Clinical Coordination Training Centre and the Thai Association for Biotech Industries.

Most of the TCELS supported projects are a reflection of the *collaborative efforts* of domestic and international players. Pharmacogenomics, Dengue Vaccine and Human Growth Hormone Projects are a few such examples, among many.

Through its Rubber Latex Project TCELS has successfully demonstrated its ability to *bridge research and industrial sectors*. In this project, researchers from the Prince of Songkla University, Hat Yai, discovered four biochemical products from natural rubber latex. One of these products, Hb extract, is used to develop the skin whitening

product. It has already been granted *patent* rights in two countries. The process for patenting it in other countries is now underway.

‘By providing avenues for our partners to gain knowledge, technology and training, we have developed *human resources*,’ says Mr. Suriyan, who was earlier the Vice President and Acting Director and is now the Advisor to TCELS. TCELS staff members regularly attend many training programs, conferences and study tours.



Through its program on *Human Resource Development on Doctoral and Post-doctoral Degree*, TCELS has provided mechanisms for doctoral degree graduates to receive post-doctoral training in their respective fields. This includes practical training in research and development by working on problems that are critical to the development of the country and can demonstrate results in a short period of time.

TCELS has initiated a *Mini-MBA in Life Science Management* in association with Kasetsart University. This short term course is especially designed for researchers, scientists and people in life sciences industries who

already have the basic knowledge, skills and experience. The objective is to give them further professional training in the management and business aspects of life sciences, such as marketing and brand development. A Mini-MBA I, conducted in 2006, had 33 candidates; a Mini-MBA II will be conducted from September to November 2013 with 40 candidates.

In September 2013, TCELS also organized a *Technology and Intellectual Property Management Training* in collaboration with a consultancy company, SkyQuest. Through this two-day course, about 70 participants were equipped in topics related to advancing IP practices, IP monetization and commercialization, technology evaluation and IP management in R&D partnerships and collaborations.

As the prime knowledge management hub for all life sciences related information in Thailand, one of TCELS' more recent contributions has been the establishment of *Thailand Life Sciences Business Forum*. Initiated in November 2012, this forum meets every month to discuss the latest

developments, trends, new technologies and services in the field of life sciences. Relevant issues are discussed in an informal atmosphere



and business collaborations are formulated. Synergy generated through information sharing and brainstorming results in fresh thinking and new directions.

The forum discusses issues like medical devices business, stem cell therapy, marine biodiversity and medicine, Thailand-Korea collaboration on life sciences development, the future of industrial medical robotics and government measures for the promotion of life sciences industry in the context of the Thailand Board of Investment's new investment policy for sustainable development. A recent forum co-hosted by the German-Thai Chamber of Commerce discussed Thailand-Germany business opportunities. Through this forum TCELS seeks to ensure the growth and perpetual development of Thailand's life sciences industry. It also helps members to establish a strong foothold and expand their business through strategic collaborations.

In 2013, in an effort to disseminate information and connect various players in the field of life sciences, TCELS prepared and launched the first version of the *Directory of Life Science Companies in Thailand*. It is hoped to serve as an easily accessible information database.



Leveraging the power of information to integrate the life sciences community and enhance business performance, TCELS also initiated a *Hotline Center* in August 2013. In order to reinforce its commitment to connect the different players and provide a comprehensive database of knowledge and information about the life sciences industry, TCELS has brought together the Office of Industrial Economics, the Ministry of Industry, the Federation of Thai Industries, and the Thai Medical Device Technology Industry Association (THAIMED).

As the focal point of Thailand's life sciences industry, TCELS continues to play the lead role in mobilizing experts to join *APEC Life Sciences Innovation Forum (LSIF)*. The



LSIF brings together scientific, health, trade, economic and financial considerations to address the challenges of infectious and chronic diseases and aging populations. TCELS has prepared a variety of proposals for support from the APEC LSIF.

Some of the contributions are less tangible than others. Sometimes organizations themselves may lose sight of

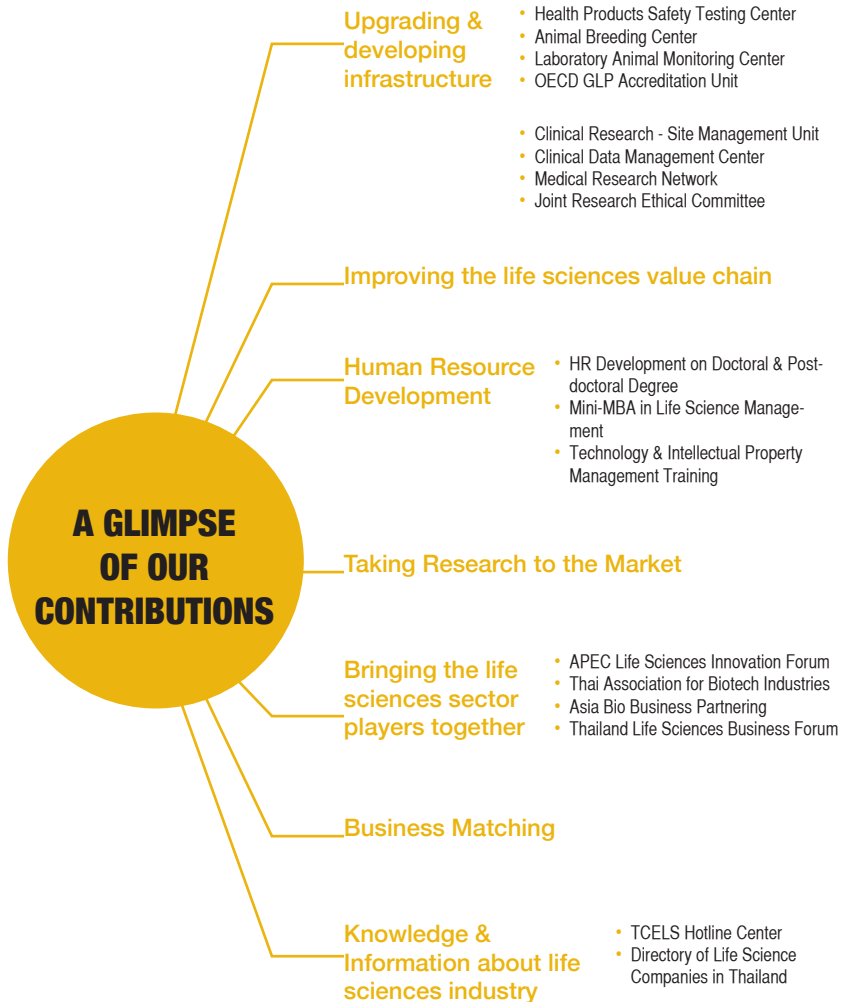
the *intangible contributions*, unless explicitly specified. One of TCELS' intangible contributions is the introduction of a *new work culture in public organizations*. Mr. Amon explains, 'Usually when an organization supports a project, it only supports the budget. But in the case of TCELS, we don't just give money, but also work together with them. We assist them in dealing with any issues that may arise. This is a new work culture. It's not there in most other public organizations in Thailand.'

Another such contribution is the role played by TCELS in encouraging Thailand's universities to set up a *Trade Licensing Office (TLO)* for handling their intellectual property (IP) issues. TCELS invited university representatives and explained to them the benefits of having a TLO. Dr. Kitima says, 'If universities don't have a TLO they cannot commercialize their innovation and products.'

'From TCELS when we visited Harvard Business School in 2005, we talked to their TLO. From there we learned how they help researchers handle their license agreements and spin off companies from the university,' explains Dr. Kitima.

Looking at the entire situation in a realistic manner, Ms. Taweeporn says that if the initial eight years of TCELS are seen as its first phase, it could be said that TCELS used this period to prepare the ground to achieve its original

goals. 'Now, in the second phase, under the competent leadership of Dr. Nares, we can actually achieve them.'



It is true that life doesn't consist in holding good cards, but playing those you hold well.²⁵ TCELS appears to have played its hand fairly well and continues to do so.

Areas of Improvement

Tom Peters, the author of 'In Search of Excellence', has written: Excellent firms don't believe in excellence - only in constant improvement and constant change.

TCELS' insiders may well understand that improvement always begins with 'I'. Therefore, the first thoughts that arise in discussions mostly identify areas of organizational self-improvement.

TCELS is in the process of acquiring a *new organizational structure*²⁶ which 'tries to *eliminate hierarchy* as far as possible,' says Dr. Nares. 'If we are not careful, our behavior may become bureaucratic. We don't want that to happen. We need to retain our spirit of friendliness and cooperation.'

There will be almost triple the number of staff in TCELS'

²⁵ 19th-century American humorist Henry Wheeler Shaw, who wrote under the pen-name of Josh Billings.

²⁶ Please refer to Appendix 2 for more information on the new organizational structure of TCELS.

proposed new organizational structure. This will fulfill the need for an *increased workforce*. This requirement was expressed by many interviewees, including Mr. Kamchorn and Prof. Dr. Prasit.

It is not only about numbers, says Prof. Dr. Pornchai, 'We need many more people with *domain expertise*.' Similar views are expressed by Mr. Suriyan, who says that there is a necessity to increase the competence of staff by training existing staff and hiring proficient people. 'I want to bring the staff up to international standards,' adds Dr. Nares. 'As an organization we also need to upgrade our standards.' He points to the need to get an ISO certification for TCELS' office.

Communication is another crucial area in which TCELS can improve, contemplates Mr. Suriyan. He says, 'We need to increase communication with our partners.' Dr. Nares underscores this point by saying, 'TCELS is in the business of providing services. When we talk about being an intermediary, it means that we have to connect with people, talk to them, care for their needs and give them customer satisfaction.'

Dr. Nares also realizes the importance of communicating with employees and not just with the partners. Before implementing the new structure, Dr. Nares spent nearly two months talking to the staff on an individual basis,

engaging in one-on-one discussions of about 15 to 20 minutes with each person. 'I have been trying to understand their concerns and thoughts. Their views are being taken onboard.'

'*Coopetitiveness*' is another attribute that Dr. Kitima suggests TCELS should embrace at the higher echelons. Coopetitiveness is a blend of cooperation and competitiveness. 'An organization depends on the vision provided by the Board of Directors,' she says. 'It's good to have an attitude of public-private cooperation at that level, involving people who can encourage cooperation and competitiveness among countries.'

TCELS needs to improve in the area of *commercialization*. Dr. Thongchai says, 'During the initial years we undertook some activities in the area of education, like training researchers on issues related to patents and a Mini-MBA course. But the process of commercialization was difficult. We could not do much. For that we need some support from the Ministry of Commerce.' Expert guidance in the area of marketing and brand development may also be required.

Speaking in his distinctive forthright style, Prof. Dr. Pornchai says, 'One of the areas of improvement is that TCELS should be in a *better negotiating position with politicians*. We need people in leadership who can argue

with the politicians and not just agree to whatever they say.’ Considering the power-distance dimension²⁷ of Thailand’s culture, he adds, ‘It may not be easy. But we still need to try.’

The four value chains assigned to TCELS this year by the Ministry of Science and Technology are medical robotics; drugs that include biopharmaceuticals, vaccines, cosmetics, stem cell and gene therapy; medical devices along with personalized medicine; and medicopolis, which includes medical services.

Considering the future potential of working in these areas, Prof. Dr. Prasit says that it will be extremely beneficial for TCELS to concentrate on them. However, in line with Prof. Dr. Pornchai’s comments, he observes that sometimes budget allocations are influenced by political preferences, which may not be a good thing. TCELS’ program staff point out that due to budget fluctuations in the past, projects have suffered discontinuity of funds. With the new shift in budget focus, some ongoing projects face the threat of being scaled down.

‘If Thailand gets a more *advanced budgeting system*, the situation could improve.’ Prof. Dr. Prasit underlines that the current budgeting system was set up 75 years

²⁷ Power Distance by Geert Hofstede: ‘This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally.’ Retrieved August 14, 2013, from <http://geert-hofstede.com/dimensions.html>

ago. The last law regarding national budget allocation was passed some 51 years ago. 'Now it's high time that Thailand upgrades and improves its budgeting system,' he says.

At the macro level, *attitudinal improvements* are suggested by different interviewees for different stakeholder groups. They include researchers' flexibility and willingness to listen and view things differently; openness from politicians to pay attention and take note of things; and the private sector's willingness to share losses in partnerships.

Prof. Dr. Prasit also indicates that Thailand's *education system* needs to encourage more thinking skills in students. The system must work towards cultivating in children an intrinsic inquisitiveness and interest in science and technology. Stressing the long term benefits, he says, 'The education system is responsible for the caliber of the new generation. If we want Thailand's research curve to rise, we have to address and improve the education system.'

Areas of Improvement

- Eliminate Hierarchy
- Increase Workforce
- Domain Expertise
- Coopetiveness
- Commercialization
- Communication
- Being More Vocal
- Advanced Budgeting System
- Attitudinal Improvements
- Thai Education System

Future Opportunities

Based on the insights gained from an exhaustive exercise of introspection, what are the opportunities that TCELS sees ahead?

‘With the insightful vision of its Chairman, Mr. Petipong Pungbun Na Ayudhya, and the competent leadership of its CEO, Dr. Nares, TCELS *seems to be moving in the right direction*,’ says Prof. Dr. Pornchai. TCELS also has political support, appropriate funding and good people. Prof. Dr. Prasit shares a similar optimism. ‘Now TCELS should get down to creating new companies and carrying out collaborative partnerships,’ Prof. Dr. Pornchai adds.

Ms. Taweeporn seems excited that *private sector companies* are coming back to TCELS. ‘Last year, we built as many networks with the private sector as we did during

the initial seven year period. You could say that our network with the private sector has increased sevenfold.'

'We need to *win their trust*.' Dr. Nares indicates his priority. 'Not just the private sector, but all our stakeholders, including our peers like the NSTDA and the STI. We need to be humble.'

Dr. Nares seems to have adopted a *mid-way approach* of encouraging *locally available research* and also attracting *international innovation and investment*. Explaining his strategy for tapping domestic research, he says, 'In our newly initiated Scanning and Browsing Project we look at Thailand's top 10 burdens of diseases. These results are published once every five years. Then we browse and scan who is doing research in those top areas of need. This is how we intend to help the domestic R&D grow, spin-off and find investors. We want them to grow out of the lab and into the market.'

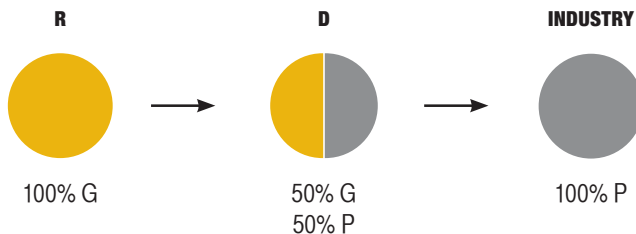
'But we cannot rely totally on home grown innovation,' he says in a matter-of-fact manner. 'We also need to bring in research innovations and investment from outside. There is much life sciences innovation and investment available abroad which Thailand can make use of.'

To stimulate and encourage public-private *partnerships* TCELS needs to work towards simplifying procedures and expediting processes, explains Mr. Amon. 'In private-

private partnerships, we can be a buffer and confidante.’ TCELS needs to help in building *business clusters*, says Dr. Kitima.

Currently Thailand’s *national budget for R&D* is very small as compared to its GDP. Dr. Kitima points out that it is less than 0.5% of GDP, perhaps around 0.3%. There are efforts to raise it to at least 2% of GDP.

Mr. Kamchorn reveals that, ‘TCELS intends to strengthen the linkage between government and private sector in the field of R&D. Currently, the entire amount of the research budget comes from the government. Once the technology is transferred from the area of research to development, we try to encourage the private sector to step in and share at least 50% of the development budget. After that, when it is at the industry stage, we want the private sector to take over 100% of the costs. If we can get this system to work, it will be good for the country. This is the way it works in many other countries.’



R = Research; D = Development; G = Government; P = Private Sector

This year TCELS has been fortunate to get a good budget. But there can be no certainty for the ensuing years. ‘With this kind of instability and uncertainty we cannot do big things. So we need funds that we can manage ourselves,’ says Dr. Nares. ‘We have a proposal which first needs to be approved by the Science and Technology Minister who will then present it to the cabinet.’ He also shares about two of TCELS’ forthcoming projects: Medicopolis and the Central Facility for the Production of Natural Products.

Explaining more about TCELS’ areas of work, Ms. Taweeporn shares about the four *core projects*²⁸ of TCELS that are in line with its mission. These are projects on drugs and wellness, natural products and cosmetics, medical devices and health services. Then there are three *special projects*²⁹, in accordance with the policy of the Ministry of Science and Technology (MOST). These are projects on cell and gene therapy, medical robotics and Advanced Dental Technology Center (ADTEC).

²⁸ Please refer to Appendix 3 for more information on the core projects of TCELS.

²⁹ Please refer to Appendix 4 for more information on the special projects of TCELS.



- Drugs & Wellness
- Natural Products & Cosmetics
- Medical Devices
- Health Services



- Cell & Gene Therapy
- Medical Robotics
- ADTEC

‘It will be beneficial for TCELS to establish an *international advisory committee* and add a global perspective to its work,’ suggests Dr. Kitima.

Dr. Nares emphasizes the need for his staff to be well equipped and prepared to make good use of upcoming opportunities. ‘We need to inculcate more professionalism and have some guidelines for standard operating procedures.’

He wants his staff to be realistically prepared for the impending independent assessment of TCELS that will take place in a couple of years’ time. ‘We need to prove through our performance and achievements that TCELS is worth investing in; otherwise the government will abandon it.’

Dr. Prasit hits the nail on the head when he says, ‘Now is the time for TCELS to show results.’

•————•

‘What a start,’ Mei thought to herself.

‘Wait a moment! What do I actually mean by that?’ She wasn’t quite sure what emotional tone would best fit this phrase.

‘Is it an expression of desperation? Just look at the number of difficulties that TCELS has had to endure.’

‘Or is it a joyful exclamation? After all, TCELS has withstood everything and still managed to contribute to Thailand’s life sciences industry.’

‘Perhaps a sigh of relief will be more suitable. The worst seems to be behind it. TCELS can now look forward to the forthcoming opportunities.’

Hmm, perhaps a concoction of all these emotions, Mei smiled amusingly.

One thing she was sure about, however, was that the predicament in which an organization may find itself initially is by no means an indication of its future.

TCELS certainly had a trouble-ridden start. There were many limitations and pitfalls along the way. But it continued on its chosen path, even if it meant taking small steps, or even a detour along the unpaved pathway. It never stopped contributing to the life sciences industry.

‘Once again, Mama was right! She always said that perseverance pays. It really does.’ Mei could see it in the footprints of TCELS.

Contributions are not measured in size, big or small. They are gauged by the impact they make, the satisfaction they generate and the self-belief they produce.

‘How does one calculate that?’

For once, the businesswoman refrained from using numbers.

Mei knew that it wasn’t an attempt to measure the contributions of TCELS to anything. It was just an exercise in stock taking, because tracking small achievements engenders bigger ones. ‘It’s true that at one point TCELS couldn’t do big things due to its limitations. However, it continued doing smaller ones in a big way.’ Perhaps it is a modest acknowledgement of that. Now, with these experiences TCELS seems

well equipped for the future ahead.

‘Alright, but this is just TCELS’ side of the story,’ Mei reflected. She wanted to get the views of other stakeholders too.

‘The life sciences research community first,’ she thought. Mei met researchers associated with TCELS. ‘What kind of work does TCELS support,’ she wanted to know. ‘What are the research community’s views on TCELS and Thailand’s life sciences industry?’

Mei’s observations have been summarized in the next section. It provides a glimpse into some of the projects that TCELS has been supporting over the years.

2

Ubuntu: Teamwork and Collaboration

This section is based on in-depth interviews conducted with a few of Thailand's leading scientists who are the Principal Investigators in some of the research projects supported by the Thailand Center of Excellence for Life Sciences (TCELS).

Ubuntu is an African philosophy of teamwork and collaboration. Reflecting interconnectedness and interdependence, it can be interpreted as 'I am what I am because of who we all are'.³⁰ In one of his writings, Archbishop Desmond Tutu explains this variedly understood ethical ideal of Ubuntu as being open and available to others, affirming others, not feeling threatened that others are able and good, based on a proper self-assurance that comes from knowing that each individual belongs to a greater whole and is diminished when others are humiliated or diminished.³¹

³⁰ From a definition offered by Leymah Gbowee, Liberian peace activist and joint winner of 2011 Nobel Peace Prize. Retrieved August 16, 2013, from http://www.uleth.ca/edu/currlab/handoutsnew/circles/Circles_and_Cycles/Ubuntu.html

³¹ Tutu, Desmond (1999). *No Future Without Forgiveness*. Image. ISBN 0-385-49690-7.



Tranquil and enchanting. These are the first thoughts that come to mind as one enters the campus of King Mongkut's University of Technology Thonburi (KMUTT). It is located in the mesmerizingly serene and lush green

surroundings, about 25 kilometers away from downtown Bangkok. This year KMUTT has joined the echelons of the world's top 400 universities, listed in the Times Higher Education World University Rankings. Chulalongkorn University and Mahidol University have featured in this list before.³²

As one proceeds towards the laboratories, the sunlit beauty of colorful, emerald green tropical vegetation is soon left behind. All that remains is the eerie silence of long corridors, the cold and characteristic smell of chemicals, and an occasional sight of lab-coat clad scientists staring intently at huge machines. One is left feeling desolate and disconnected. However, this could be any laboratory, anywhere in the world.

But as one talks to the researchers, a whole new picture emerges. Their narrations weave an intricate mosaic of a community, portraying interconnectedness and interdependence. It is a clear reflection of Ubuntu, the African philosophy, which, in one of its interpretations, means 'I am what I am because of who we all are'.

Moments of success, failure, discovery, frustration and jubilation – all emerge from strong interrelatedness and interdependence, for better or for worse. It is a com-

³² The World University Rankings. Retrieved August 17, 2013, from <http://www.timeshighereducation.co.uk/world-university-rankings/2012-13/world-ranking/range/351-400>

munity of players. Each is because of the other. None can act in isolation.

A selection of four TCELS supported research projects discussed here presents a vivid picture of teamwork and collaboration.

About the Projects

Human Growth Hormone Project: The Human Growth Hormone Project which is currently in progress at the GMP pilot plant facility located at King Mongkut's University of Technology Thonburi (KMUTT), has its origins at the BIOTEC where scientists were making *Pichia pastoris* to produce growth hormone on a laboratory scale.

Human Growth Hormone is a hormone which promotes growth and the process of metabolism in the human body. This hormone has long been produced in other countries, using the technology of recombinant DNA. It is used to cure patients who lack the human growth hormone, especially children who have growth deficiency, and patients who are of short stature because of disease. It has also been used for kidney and AIDS patients. The human growth hormone can help increase muscles and augment strength for improved immunity.

Thailand has yet to produce therapeutic protein on an industrial scale. Consequently, this protein has to be imported at great expense every year. Thus, its availability is limited and its cost prohibitive. If it can be produced locally, the cost will come down and it can be made available for wider use among Thai people with growth related deficiencies.

Considering these benefits, in the year 2005, TCELS and the Government Pharmaceutical Organization (GPO) decided to support Assoc. Prof. Dr. Jittiwat Suprasongsin from the Faculty of Medicine of Ramathibodi Hospital and a research team from King Mongkut's University of Technology Thonburi (KMUTT) to carry out this development project at the Research and Development Institute of the GPO. They built on knowledge generated from previous work on this project at the BIOTEC. Assist. Prof. Dr. Anan Thongta joined the project with Assoc. Prof. Dr. Jittiwat Suprasongsin when animal tests were being conducted at the GPO.

From 2005 to 2006, Assist. Prof. Dr. Anan Thongta went to the US under the Human Resource Development on Doctoral and Post-doctoral Degree Scholarship Project of TCELS. Equipped with new ideas, he combined his knowledge of chemical engineering and biotechnology to re-engineer and clone yeast to make the growth hormone product.



Meanwhile, the government funded a pilot GMP facility at KMUTT and TCELS agreed to support the next step of this human growth hormone project. Since 2011, the project has moved to KMUTT in order to develop a pilot production process and generate a human growth hormone product for animal experimentation (pre-clinical test) and tests on humans (clinical trial). This GMP pilot plant can be used to develop many other products too. However, growth hormone will be the first one to be generated at this plant.

Currently, the project is in the final stages of production before the start of pre-clinical tests. After clinical trials, the product will be sent for registration at the Thai Food and Drug Administration. Procedures will then have to be worked out for drug development from this product.

As of now, it is envisaged that the human growth hormone product will be used for treating dwarfism. However, Assist. Prof. Dr. Anan Thongta says that if its usage can be extended to the field of cosmetics and for body building purposes, it will have an even bigger market potential in future.

Pharmacogenomics Project: Pharmacogenomics Project at Ramathibodi Hospital, Mahidol University, is headed by Prof. Dr. Wasun Chantratita, Head of Virology and Molecular Biology, Department of Pathology, Ramathibodi Hospital. In the year 2002, the BIOTEC was pursuing a genomic study called the Thai SNP Project. In 2004, when Thailand turned its attention to capturing the genomic force, the Pharmacogenomics Project of Prof. Dr. Wasun Chantratita and his team moved to center stage. It has since been making great strides with the support of TCELS, Mahidol University, the Ministry of Public Health and the Riken Institute of Tokyo University, Japan.

Pharmacogenomics is a study of human genetics in relation to individuals' different responses to drugs. This helps in prescribing personalized medicine and reducing allergies and side effects due to use of the wrong medicine. Pharmacogenomics is a powerful tool for drug selection for individual patients so as to reduce

the chance of unwanted side effects and the failure of treatment. A reduction in drug side effects can also bring down the cost of treatment. This is particularly beneficial for developing countries with limited resources like Thailand.

In December 2004, when the six southern provinces of Thailand were badly affected by the Indian Ocean Tsunami, TCELS undertook a pilot project on Post-Traumatic Stress Disorder (PTSD) under the Pharmacogenomics Project. Together with Chulalongkorn University and the Rajanukul Institute, this project was undertaken to identify genetic and environmental factors related to PTSD and other mental illnesses. A PTSD Genomics Center was established at the Rajanukul Institute for Research and Social Education on PTSD.

Under the Pharmacogenomics project, research is also being carried out on the five key diseases that threaten the health of Thais: thalassemia, diseases of the cardiovascular system, AIDS, leukemia in children and dihydropyrimidine dehydrogenase disease (DPD).

Among the top 10 drugs responsible for causing adverse drug reactions (ADRs) in the Thai population, Prof. Dr. Wasun and his team have found many predictive genomic markers for eight drugs that can be used to screen out those with a high risk of severe ADR. Pharmacogenomics

can provide doctors with information to tailor treatments to each individual, rendering low-cost, off-patent drugs almost as effective as modern medicines but with fewer side effects.

These consist of a group of anticonvulsant drugs (Carbamazepine, Phenobarbital, and Phenytoin), the drug treatment for Gout (Allopurinol), and the group of national first-line antiretroviral drugs (Nevirapine, Efavirenz, Abacavir and Stavudine). Each drug group can be simultaneously screened for ADR, using the world's first assay researched and developed by the team at a cost of only 1,000 baht per assay sample. The team presented this discovery and the application of hospital laboratory services at the ASEAN Life Sciences Conference and Exhibition in July 2013.

The pharmacogenomics program has yielded tangible products, including genetic test kits for AIDS, cardiovascular diseases, and PTSD. The project has been approved to receive a patent for the process that identifies a correlation between a person's genetics and their allergy to the drugs Nevirapine and Stavudine, commonly known as d4T-based drugs



for AIDS treatment. In collaboration with the Ministry of Public Health (MOPH) and the Riken Institute of Tokyo University, there is now an established unit for Pharmacogenomics and Bioinformatics and a laboratory for genetic analysis that meets the ISO 15189: 2007 standard. From this partnership with the Riken Institute, Thai scientists also equipped themselves with effective communication skills for awareness building.

Currently, the pharmacogenomics program is focusing on RICP (rare/genetic diseases; infectious diseases; cancers; and Pharmacogenomics), whereby the whole genome is sequenced and then analyzed by a panel of experts. They examine the rare/genetic diseases, like autism which run genetically; infectious diseases, such as HIV; cancers that are treatable if the genome sequence is known; and all of this is done through Pharmacogenomics.

Building on the success of this pharmacogenomics program, TCELS is currently developing a personalized medicine based business model that can be a spin off from the capabilities and assets of this project. Prof. Dr. Wasun Chantaratita says that Thailand is now moving closer to what Juan Enriquez predicted in his book, 'As The Future Catches You: How Genomics & Other Forces Are Changing Your Life, Work, Health & Wealth'.

Dengue Vaccine Project: In Thailand, the viruses that cause dengue illness infect tens of thousands of people every year. In addition to being life-threatening, dengue is also a burden on the economy. It is estimated that the government spends at least 2.5 billion baht per year on the cost of patient care and about 500 million baht per year on the annual mosquito larvae abatement campaigns.

Thai researchers have long been trying to develop a vaccine for the four serotypes of dengue fever. Starting in 1980, Assoc. Prof. Dr. Sutee Yoksan and his team's longstanding efforts led to the world's first tetravalent dengue vaccine in 2000. Early-stage clinical trials have been conducted along with Sanofi Pasteur, the vaccines division of Sanofi-aventis Group, a leading global pharmaceutical company.

In partnership with Mahidol University and the Department of Disease Control, Ministry of Public Health, the TCELS is supporting an initiative headed by Assoc. Prof. Dr. Sutee Yoksan, Director of Mahidol University's Center for Vaccine Development (CVD).



After years of relentless work, Assoc. Prof. Dr. Sutee Yoksan and his team produced a live attenuated tetravalent dengue vaccine for the four serotypes of dengue virus in 2009. Many rounds of peer review were successfully conducted by the WHO-SEARO (World Health Organization – South East Asia Regional Office). Assoc. Prof. Dr. Sutee Yoksan and his team have also received permission from the US FDA to conduct trials on American volunteers. This is the first time in history that a vaccine produced in a developing country like Thailand will be tested in a developed country.

The Dengue Vaccine Project is progressing steadily towards the manufacturing stage. In the next few years Thais can expect to have access to a dengue fever

vaccine invented and manufactured by local scientists, adopting internationally approved certification standards. This will be the result of a collaborative partnership between Mahidol University, TCELS, the Department of Disease Control, MOPH, the World Health Organization (WHO), the Chemo-Sero-Therapeutic Research Institute (KAKETSUKEN), Japan, and the Serum Institute of India (SII).



Assoc. Prof. Dr. Sutee Yoksan compares his team's comprehensive research and invention to the roots of a huge banyan tree that penetrate deep down and spread in all directions, gaining experience and disseminating knowledge.

Rubber Latex Project: Thailand leads the world in natural rubber production. A team of researchers from the Prince of Songkla University, Hat Yai Campus, led by Prof. Dr. Rapephan Wititsuwannakul, have developed four biochemical products from natural rubber latex.

In 2006, with support from TCELS, they succeeded in developing commercially viable skin whitening cream from Hb extract, an active ingredient contained in natural rubber latex. This skin whitening cream was introduced onto the market on TCELS Day in 2008. It marked the success of Prof. Dr. Rapephan's research team and also showcased TCELS' success in transferring research to the industrial sector. Clinical trials for this project were

conducted in collaboration with Naresuan University.

At a commercial level, this cream was first sold at the 2008 Bio Asia Conference



in Bangkok. It has already been patented in two countries and is generating revenue. The process for patenting it in other countries is underway.

In response to the huge market demand, the university is now trying to use its business incubator to register the product with the Thai Food and Drug Administration.

Further research is underway to develop products from natural rubber latex which can help reduce skin aging, skin tanning as well as enhance cancer treatment and help cure fungal infections of the mouth.

At the recently concluded 2013 ASEAN Life Sciences Conference and Exhibition, the second product of this project, the anti-aging Hb serum, was introduced. It was enthusiastically received. Prof. Dr. Rapephan Wititsuwannakul says that the rubber tree continues to be a benevolent angel, always standing by their side.

Experiences with TCELS

Most of the lead researchers of the projects under discussion here have been associated with TCELS from its early years. They have been an integral part of the organization throughout all its ups and downs. Reminiscing about this period, they presented a frank account of their experiences.

A common observation was that the *granting procedures at TCELS are less complicated and easier*, as compared to some other granting agencies in Thailand. ‘The document requirements at TCELS are less cumbersome,’ observes Assoc. Prof. Dr. Sutee Yoksan.

Prof. Dr. Rapephan Wititsuwannakul says, ‘I have been working without any difficulty with TCELS because it *respects my work* and does not ask unnecessary questions.’ She thinks that not having too many academics at the decision-making level perhaps makes it easier. Herself an academic and a senior research scholar of the Thailand Research Fund (TRF), Prof. Dr. Rapephan adds with a smile, ‘Sometimes it can be difficult to work with academics. They keep going into minute details.’

Prof. Dr. Wasun Chantratita points out that TCELS has a *market oriented approach* which is different from most other granting agencies in Thailand. Whereas other such organizations are more focused on academic pub-



lications, TCELS looks at the marketability of the results in the life sciences industry. ‘You have to show that you can commercialize the results and people will use your product, which is not easy.’

Prof. Dr. Rapephan thinks that no other granting organization in Thailand helps researchers with the *commercialization of products* to the extent that TCELS does. 'TCELS dared to dream big about the commercialization of skin whitening cream from rubber latex extract. It turned out to be an outstanding achievement, not only for our team, but also for TCELS.'

The *introduction to the market* which TCELS provided was indeed more important than its monetary support for the Rubber Latex Project, feels Prof. Dr. Rapephan. 'It gave us all basic guidance on the *marketing process*.' As an academic, marketing was the most difficult part for Prof. Dr. Rapephan. But TCELS supported her throughout the process and she learnt a lot about promoting the product in the media.

At the 2013 BIO International Convention in Chicago in April, TCELS shared about Prof. Dr. Rapephan's project with Johnson & Johnson. Later, at the ASEAN Life Sciences Conference and Exhibition in July 2013, the company's representative met Prof. Dr. Rapephan. 'If we can enter into the global cosmetics market, it will be immensely beneficial for the Thai economy,' she says.

Once TCELS is convinced about the market value of a project, it goes to great lengths in providing support. TCELS well *understands that life sciences projects can*

have a lengthy life cycle and therefore displays great patience. As with the case of Human Growth Hormone Project, Assist. Prof. Dr. Anan Thongta says, 'Other agencies will perhaps not see this project in the way TCELS does. We started this project almost from scratch. We got the strain from the BIOTEC and then made it on a large scale here. We had to re-engineer and clone the yeast to make the product. It is a very complex and time-consuming process. But TCELS has been patient all through the process. They understand the difficulties.'

Currently, the human growth hormone product for pre-clinical trial is being developed. Then, in consultation with the Thai FDA, a product for clinical trials in humans will be developed. Since it is happening for the first time in Thailand, procedures and rules have yet to be clearly articulated in some cases.

TCELS understands the limitations of Thailand's evolving life sciences industry. It can see the need for long term and capital intensive support. In the case of the Pharmacogenomics Project, Prof. Dr. Wasun explains that TCELS well understood the project's special needs and supported the discovery phase, which it normally doesn't. TCELS realizes the importance of taking risks. 'If you don't take any risks, you won't get anywhere,' he says.



In the case of the Dengue Vaccine Project, the committee comprising the MOPH, Mahidol University and TCELS, realized that the production of a live attenuated tetravalent dengue vaccine had not been moving ahead in Thailand since 2009, due to the country's own limitations. In 2011, the committee decided to collaborate with KAKETSUKEN, Japan, and the Serum Institute of India (SII) to bring the vaccine up to manufacturing level. According to their agreement, KAKETSUKEN will manufacture it for markets in the US, Europe and other high income countries like Taiwan, Korea, Australia and New Zealand, whereas SII will do so in India and other developing countries. This awakens new hopes that the extraordinary scientific success of this pioneering Dengue Vaccine

Project will no longer be plagued by long administrative delays.

The *intervention of an intermediary organization*, like TCELS, is of utmost importance when it comes to coordinating the industry's different actors. Assist. Prof. Dr. Anan says, 'It is not just about having the knowledge; we need to coordinate with others in the field. One university cannot do it alone. We need the cooperation and coordination of several actors at different stages, like the FDA, the GPO, the private sector, etc. We need TCELS to bring them together for interfacing.'

TCELS needs to take a proactive leadership role in ensuring that the situation is cohesive for all to work well together, suggests Assoc. Prof. Dr. Sutee. 'The problem is that there are too many players in the field and very little coordination among them.'

Consequently, TCELS needs to work closely with all the different players. *Frequent communication* is required, emphasizes Assoc. Prof. Dr. Sutee. 'To be successful, it's very important to talk often and have regular follow-ups through internet and telephone, both at the policy and staff level.'

Unsteady budget support from TCELS is a major problem faced by most researchers. 'When the grant is just for a

year, it's a big challenge to keep the production going and retain our trained technicians,' says Prof. Dr. Rapephan. 'The speed of budget allocation is also very slow,' she adds. Assist. Prof. Dr. Anan agrees but explains that it is not easy for TCELS to get its own budget from the government.

Frequent *change of leadership* at TCELS in the past has caused some uncertainty. However now, with Dr. Nares as the new CEO, things look more promising. 'He is from the genomic generation, and is a good public speaker,' says Prof. Dr. Wasun. 'Dr. Nares is fluent in both English and Japanese, which is very good for our project since many of our collaborators are from Japan,' he adds.

An Outlook for Progress

The lead researchers of these key TCELS projects provided their critical observations of the life sciences research situation in Thailand and suggested how the scenario could be improved.

Discussing the paradoxes of the funding situation in Thailand's life sciences industry, Prof. Dr. Rapephan says, 'Most granting organizations and agencies are ready to provide support after the researchers have already established their work. However, researchers need maximum

support when they are young and are just starting their research.’ She feels that she has been fortunate to have the right connections, but not all researchers are so lucky. *Young and talented researchers* need encouragement and support.

Assist. Prof. Dr. Anan remembers the time when he was new and not so well connected. No one heeded his suggestions that Thailand should scale up its work on the Growth Hormone Project. Now he makes a conscious effort to include new and upcoming researchers in his team, who may not be well known but have good ideas.

Administrative delays and political tussles can be very dispiriting for young scientists, fears Assoc. Prof. Dr. Sutee.

Prof. Dr. Wasun urges people *not to mix politics and science* and to *rise above the political divisions* to ensure the country’s scientific advancement. Assoc. Prof. Dr. Sutee calls on high level decision makers to keep an *open mind* and *listen to* different viewpoints.

‘We need to share experiences and *work together in a collective way*. When people work together, everybody gains. If we join hands with others, we learn. The wider the network, the more knowledge we gain,’ says Assoc. Prof. Dr. Sutee. He compares Thailand’s life sciences industry

to a symphony orchestra. ‘We have to realize that none of us can work alone, nor control everything.’

Assoc. Prof. Dr. Sutee encourages Thailand’s leaders to take a cue from the eagle-eyed leaders of other countries who immediately jump at opportunities. ‘If we don’t *act in a timely manner*, Thailand will keep losing opportunities,’ he says. According to the latest developments, live attenuated tetravalent dengue vaccine appears to have enormous potential. If Thailand were to take advantage of this fact, it could be a world leader in the case of live attenuated tetravalent dengue vaccine.

Prof. Dr. Rapephan feels that there is a need to *attract young students* to the field of sciences. A serious political will is required to encourage students to study science. ‘Earlier, Prince of Songkla University, Hat Yai, used to get good students from all over the country. But now, with the escalating violence in the southern provinces, not many students are keen to study there.’

‘Thailand has many *agricultural products*. If we can *add commercial value* to them, it will greatly benefit the country’s economy,’ suggests Prof. Dr. Rapephan. ‘For that we need to coordinate with the private sector. Only an organization like TCELS can bring researchers and the private sector together.’

Almost all the interviewees are convinced that the country holds immense potential. But they underscore the urgency of addressing the above mentioned issues to ensure real progress.



Mei wasn't quite prepared for such in-depth information. If she had found the perseverance of TCELS inspirational, the determination and persistence of some of the scientists she had spoken to almost left her speechless.

'Can I ever sustain this kind of endurance and steadfastness throughout my life,' she wondered. For once she felt her enthusiasm pale in comparison. Mei was in awe.

She had never delved so deep into the intricacies of interconnectedness and interdependence. 'How true,' she muttered to herself. 'I am what I am because of who we all are.'

'Strange that I'd never explored this dimension of existence,' she noted. None of us is in isolation; we are all related. Profound indeed!

Moreover, Mei had never before become so close and personal with the scientific community. Being an entrepreneur, she

had always imagined herself to be on the other side of the table. Some of the opinions and perspectives she'd heard were an eye opener. She had never looked at things from that angle.

'How differently we view and process things,' she thought.

'How would people from my own community, the business sector, look at these things,' she wondered.

Next she attempted to garner the viewpoints of TCELS' other stakeholder groups: private sector companies, both domestic and international, entrepreneurs, business consultants and independent researchers. Their explicit and implicit perspectives are presented in the next section. They add yet another valuable dimension to an understanding of Thailand's life sciences scenario.



3

Views from the Other Side

This section is based on in-depth interviews conducted with a few representatives of private sector companies, both domestic and international, entrepreneurs, business consultants and independent researchers associated with the Thailand Center of Excellence for Life Sciences (TCELS).

Views from different angles provide a diverse perspective. It is only by taking these multiple perspectives into account that the quest for knowledge can be fruitfully achieved. Every individual and organization creates its own reality through the holistic assimilation of these diverse opinions and insights.

Often reality does not lie in what is revealed, but what cannot be revealed. To understand it is therefore important, as Khalil Gibran³³ writes, to listen not to what people say, but rather what they do not say.

That's a debatable point. But there are certain things that cannot be disputed. The power of commerce and technology to transform lives is one of them. Most governments across the globe have realized the growing importance of collaborating with the private sector and working towards shared goals. In Thailand too, the private sector is playing an increasingly important role in the field of life sciences. Its views and impressions are of great significance.

Current Scenario

In 2012, Prof. Walter Gunzburg and Dr. Brian Salmons of

³³ 19th century Lebanese born American philosophical essayist, novelist and poet.

Austrianova came to Thailand looking for a second location for their company in South East Asia after Singapore. They were pleasantly surprised to find a more advanced biotechnology infrastructure in Thailand than they had expected after viewing web-based information.

Austrianova has developed the Cell-in-a-Box™ technology, which is a means to protect, isolate, store and transport living cells. The proprietary technology can be used for a variety of purposes. In healthcare, it facilitates the safe implantation of cells, holding them isolated from the immune system and allowing long term production of therapeutic molecules in patients. They are now looking to expand into Thailand to set up a more streamlined GMP manufacturing facility, using a barrier isolator system.



Until they actually came to Thailand, they had no idea what was going on in the country in the area of stem cell research, because the *postings on internet* were *not easily accessible*. Information regarding procedures for setting up a company in Thailand was not very clear either. ‘Most of the websites we looked at were in Thai. If they were in

English, the quality and standard of the content was not very professional. They did not contain information on things that businesses want to know,' says Prof. Walter Gunzburg, Executive Chairman of Austrianova. There is certainly a problem with access to information.

'On arriving here, we realized that there is a disconnect between what Thailand actually has and what the outside world thinks it has. When we were shown around the GMP facilities, we were utterly amazed. There are huge, state-of-the-art GMP facilities. They don't even have some of these facilities in Singapore.' It seems as if Thailand is *underselling* itself, adds Prof. Walter.

Reminiscing about the scenario in Thailand around seven years ago, Ms. Mattana Pipitnowrat, a local business consultant, says, 'When we were working on a project that time, the infrastructure was not very adequate. For some of the tests, we had to send our material to Singapore. Most of the facilities here, like the animal testing laboratories, were of lower standard.' TCELS and other organizations have done a great deal of work in upgrading standards and developing life sciences related infrastructure, she says.



The team from Austrianova was glad to note that there is *much basic research available* in Thailand. 'As a commercial company, we are also interested in basic research to develop the technology further,' says Prof. Walter.

However, the Assistant Managing Director of a large pharmaceutical company in Thailand points out on conditions of anonymity that much of the research produced in the country *cannot be commercialized*. It ends up on the shelf because it is not focused on the needs and interests of users.

A newly initiated government plan calls on university professors and graduate students to coordinate with the private sector to try to understand market needs and demands before launching a research project. However this plan has yet to be appropriately implemented. Last year, this pharmaceutical company, whose representative spoke to TCELS, was contacted by five professors from different universities in the span of one week. The company was given just three days to list its priorities and needs. It was too short notice. Had the procedure not been so rushed, this leading pharmaceutical company could have suggested something worthwhile which might have led to some useful innovations and ultimately had a positive impact on the country's economy, their representative says.

Ms. Mattana Pipitnowrat, who became associated with TCELS about seven years ago, feels that of late there has been a shift in the focus of Thai researchers. These days they seem to be considering market needs and demands. 'Sometimes I think that we have been *late in shifting our focus to the market*. But at least it is happening now. It is a positive development.'

At one of the tracks on Medical Robotics at the ASEAN Life Sciences Conference and Exhibition in July 2013, it was acknowledged over and over again



that Thailand has world-class research and *brilliant scientists*. But their work needs to be adequately teamed up with entrepreneurs and launched onto the market. Mr. Chalermopol Punnotok, CEO of CT Asia Robotic Co. Ltd, says, 'We need to *bring these strengths together* and build *business clusters*.'

CT Asia is a successful private robotics company which has spent more than five years developing robots. Next year, the company plans to launch the third-generation Dinsow Robot which will be 1.2 meters in height. CT Asia's production base in Bangkok has the capacity to

make 50 robots a year.

Thailand seems to have enough critical mass in terms of innovation, but there seems to be a lack of business professionals for its implementation. ‘We need more *technopreneurs*,’ says Mr. Chalernpol, ‘who can understand the technology and have entrepreneurial skills.’

Looking at the situation from close quarters, a representative of a private company, which has long been associated with TCELS, points out that they are on their own when it comes to looking for researchers in Thailand. There is *no database of researchers* or centralized information available about their work. ‘We have to keep going from exhibition to exhibition and explore the field for ourselves.’

Elaborating on the difficulties that companies face, this private sector representative says, ‘In many of the cases, *the researchers are not aware of the rules and regulations set by the Thai FDA*. Sometimes they do not even pay attention to the basic requirements, like proving the statistical significance. They do research in their own style. Later on, when they sell their product or technology to us, it is very difficult for us to get it registered with the Thai FDA. The Thai FDA has many requirements like the efficacy test, toxicity test, raw material specification, test method, compliance with the ACTD, etc. If we cannot

register the product, we cannot sell it. Thus a company like ours has to bear any losses.' It is easier in the case of cosmetic products, but for pharmaceuticals, health supplements, diagnostics, etc. rules are very stringent. Therefore it is absolutely essential for the researchers to know the rules and regulations of the Thai FDA and adhere to them.

Currently in Thailand, there are many public agencies that do research, like universities and other firms. But each one of them works in a vertical direction. There is no horizontal relationship between them and there is no center to connect them all. When private companies contact these research agencies, any contract format poses a serious problem. There are *no standard contract formats*. 'We have to spend a lot of time in reading each contract individually, very carefully and in great detail,' explains the representative of a private sector company.

Another problem is that there are *no standard rates for the royalty fees* of researchers and research firms. Each has their own rate, varying from 1% to 10%. Negotiating the royalty fee is another nuisance faced by private companies.

Ms. Mattana Pipitnowrat says, 'For the last 10 years I have observed that in the business matching process the issue of price causes the most problems. Researchers always

want a higher price. They think that their product is perfect. But the companies think that it needs additional improvisation. So they want it at a lower price.’ However, it is not just about pricing issues. She also points at the various other risks involved in business matching, both systematic and unsystematic.



Similar views are expressed by Dr. Chanchai Chutsirimongkol, an independent researcher and entrepreneur. His company Photo Bio Care Co. Ltd. (Thailand) has developed products

using bio-plasma technology, which can be used for cosmetic and medical purposes. He is looking for a trustworthy collaborator who will make good use of this technology, whilst protecting his intellectual property rights. He says that even if he doesn't get much profit in terms of money, he will be happy if this technology is used for the benefit of humankind.

This concern about intellectual property (IP) rights opens up a Pandora's box of *IP related issues*. The private sector representative from a partner company of TCELS says, 'As an industry leader who is keen on investing in innova-

tion, our problems are compounded.’ She explains that when her company does the technology transfers from universities and research firms, it is at the R&D level. The innovation is developed further at their in-house R&D facility, from pilot product to the production level.

However, the company gets the patent rights for a limited period of five years. Out of this, it spends at least one year with Thai FDA’s registration procedures. In the case of pharmaceuticals, it can take around two years. Thus it is left with very limited time for commercial activity. The second firm that acquires the rights from this company stands to gain the maximum advantage.

‘As the *market leader*, we pay the registration fees. We spend the money to introduce and promote the product. After all this, we benefit for just about two years. Then the IP rights revert to the original owner and the next company to be granted the IP rights. They benefit from all the additions that we’ve made to the technology, plus the market awareness that we’ve generated.’ She complains.

As the industry leader in the area of medical robotics, Mr. Chalernpol also seems to be experiencing problems. His company is faced with the challenge of *keeping the cost of production low*. Demographic factors show a promising market when it comes to producing robots for nursing assistance for the elderly. There is a sharp rise in the aging

population in countries like Thailand and Japan. But, at present, the demand for robots is only just emerging; it is still at the nascent stage. Based on economy of scale, it is difficult to bring the cost down.

Another problem is the technology itself. In the field of robotics, the *technology is changing very fast*. A significant question is where to draw the line in terms of R&D. Industry leaders are faced with the task of first understanding the needs of the target market and then putting the appropriate technology together.

Then there is the big challenge of *proving the value of the technology* to target consumers. It is not easy when one is dealing with the elderly people. They are generally wedded to age-old perceptions and lifestyles. There is always the danger that they may refuse to accept the technology. Another risk is the threat of faster and cheaper productions from a neighboring country such as China.

As one of the first overseas entrants in Thailand in the field of stem cell technology, Austrianova has its own share of problems. It is exploring grounds for this technology in Thailand. Prof. Walter says, 'It is very difficult for us to understand what is happening in the field of stem cells here. Currently there seem to be *no structures and frameworks available* in this area. We need clarity. It is important for us to move forward quickly in a very

structured way. Therefore we think it is important to involve the relevant stakeholders in forming the required frameworks. But it is hard to find the relevant people who can give us the right information.'

Thailand's life sciences industry is strong in a few areas like agriculture related microbiology. But the human biotechnology sector is fairly young and still emerging. Medical robotics is also an upcoming area. This makes it crucial for companies and different stakeholders to come together, network and collaborate with each other for mutual benefit and growth.

Thailand Life Sciences Business Forum, set up by Dr. Nares in 2012, is a promising initiative to help meet this need. Dinner meetings are organized every month to discuss the latest developments, trends, new technologies and services in the field of life sciences. It is an ideal forum for businesses focused on life sciences to enhance their visibility and create new partnerships. Relevant issues are discussed in an informal and relaxed atmosphere. There is information sharing and brainstorming.

Most of the interviewees expressed a common concern about the *attitude of Thai consumers towards the usage of local products*. 'Generally, Thai people are not loyal towards Thai products,' says Ms. Mattana. 'They prefer products from Korea, Indonesia, Malaysia and Western

countries.’

In the area of robotics, Mr. Chalernpol is particularly concerned about brand perception. ‘When consumers buy something like a robot, they want it from a technologically advanced or developed country.’ Therefore it is important to take into account consumer perceptions. CT Asia has had experiences with branding before and they want to be very careful when creating a brand image.

Challenges in the Present Scenario



Time constraint is another common concern shared by almost all the interviewees. Strategic moves and timely progress are of great significance for any business establishment. Almost all the interviewees say that getting prompt and well-timed support is almost as important

as the support itself, particularly when fast changing technology is involved.

Discussion on the current scenario of Thailand's life sciences industry thus presents a realistic image of a variety of observations. There are inadequacies, shortcomings and ambiguities; yet there are also clear opportunities and prospects. The challenge facing the players is to match their aspirations with the available opportunities to shape a promising future.

Opportunities and Aspirations

The availability of a *local market* with a 65 million strong population is Thailand's obvious advantage. With the onset of the ASEAN Economic Community (AEC) in 2015, Thailand will be the *regional hub for a market* population of over 600 million. This is a promising scenario for any business sector, particularly so for Thailand's growing life sciences industry.

Thailand's Ministry of Science and Technology (MOST) is making *concerted efforts* to promote the country's life sciences industry. For the current year 2013, it has announced four value chains exclusively in the area of human life sciences.

A paradigm shift is envisaged in the ASEAN Plan of Action for Science and Technology 2016-20.⁵⁴ Thailand's strategic location, excellent infrastructure, plentiful supply of skilled technicians and attractive investment incentives present an attractive scenario for investors and entrepreneurs. The Thailand Board of Investment offers a wide range of fiscal and non-tax incentives for biotech investments.⁵⁵ Tax-based incentives include exemption or reduction of import duties on equipment and raw materials, and corporate income tax exemptions and reductions. Non-tax incentives include permission to bring in foreign workers, own land and take or remit foreign currency abroad. Additionally, foreign businesses are entitled to 100% ownership.

The number of private biotechnology companies in Thailand has increased at an average annual rate of 11 percent in the past decade and a half. The business consulting company Tectura has projected that Thailand will be the eighth largest pharmaceutical market in the Asia-Pacific region by 2016.⁵⁶

Thailand is also a notable destination for *medical tourism*, boasting many world-class, competitively priced medical

⁵⁴ The Future of ASEAN Science, Technology and Innovation. Retrieved August 23, 2013, from <http://www.aseansti.net/index.php>

⁵⁵ For more information, please refer to www.boi.or.th

⁵⁶ For more information, please refer to www.tectura.com

facilities. According to data published by Renub Research in 2012, four out of ten medical tourist arrivals in Asia come to Thailand.³⁷ Mr. Chalermopol sees this as a big opportunity. He says, 'We can use this as a springboard for medical robotics. If we can orchestrate the strengths of other countries in this region, the AEC can be the *hub of medical robotics for the world*.' Prof. Walter also thinks that if Thailand can build on the strength of its medical tourism, biotechnology for human health can emerge as a significant sector in the country.

Strategic positioning is very important to realize these aspirations, thinks Mr. Chalermopol. Sometimes companies have to find their way through cumbersome procedural requirements. 'We try to position ourselves in the sector of home ap-



pliances and not medical devices. This positioning helps us with the regulations. We still do rigorous tests with senior citizens. But in terms of procedural requirements things become a little easier,' he says.

If *technology is carefully selected* according to the socio-economic context, there is more chance of success, thinks Dr. Chanchai. Adopting a pragmatic approach, he says, 'If

³⁷ For more information, please refer to www.renub.com

the technology is not very sophisticated, like the bio-plasma technology used for our products, it can be easily generated in ASEAN countries. Thailand could be the first to

Bioplasma Cellmodulation System



pioneer it. We could later collaborate with other Asian countries like China, Korea, and Japan and in the future perhaps with countries like Germany, America, Russia and France too.'

In areas where currently there are certain gaps and ambiguities, entrepreneurs and business professionals are ready to step in collectively to build systems and structures. For example, Prof. Walter of Austrianova says about stem cells, 'Companies like ours with experience of other countries could discuss with and help regulators to build some sort of framework. I think this would also help other companies who come later.'

Mr. Chalermopol has similar views about Thailand's emerging medical robotics industry. He emphasizes the need to build business clusters by bringing different companies together, each with their own branding and specialization, which could complement one another. He says, 'Currently my company, CT Asia Robotics, is the

only player in the field of medical robotics in Thailand. With our experience, we could offer advice to newcomers. Together with organizations like TCELS, we could be a mentor in this specific field’.

Almost all the interviewees realize that the best way to seize the available opportunities is to encourage collaboration between experts in the fields of science and the business world. They unanimously agree on the need to join hands and work in mutually fruitful partnerships.

Expectations from TCELS

In Thailand’s life sciences scenario, where most players seem to be working vertically, TCELS is working horizontally, coordinating different players, says a private company representative. ‘Not only is it bringing these various players together, TCELS is also a *strong intermediary* between the SMEs and the government,’ she says.

Ms. Mattana, who has been observing TCELS for nearly seven years, believes that TCELS has moved from just funding projects to giving them more *business support*. ‘They do business matching and business consulting. TCELS also meets researchers in other countries and connects with them. Locally, they provide knowledge about business models and establishments.’

She makes no bones about the gap between researchers and the private sector when she says, 'The problem here is that experts don't talk to each other. Researchers have expertise in their own fields. They know all about their technology and products, but they have no idea about how the market works. The business sector knows all about market dynamics, but they don't know how to work with the scientific community. Both these sectors need a *coordinator to facilitate* things between them.'

Private sector companies of both domestic and overseas partnerships need an intermediary like TCELS. 'We require TCELS to do the *integration and collaboration*. We expect support in terms of *networking and funding*,' says Mr. Chalernpol.

Independent researchers like Dr. Chanchai expect TCELS to *match their technology with potential business investors*. 'TCELS can be a link between researchers like us who have the technology and the investors who have the money. TCELS can match us with investors who are looking for energy saving and environment friendly technology like ours. If TCELS is involved we can be sure that our rights will be protected,' says Dr. Chanchai.

'We are a small company. We don't have the means to fight big investors if our intellectual property rights were to be infringed.' But he is concerned that time is running

out. In a fast paced world there is no time to lose. ‘Technologies move very fast. If we don’t get support quickly enough, our technology could soon be outdated,’ he fears.

A large Thai pharmaceutical company, whose representative was interviewed, says that initially when their company was engaged in a technology transfer at a Bangkok hospital, in order to scale up the technology to commercial level, all they expected was TCELS’ *acknowledgement* of their company. ‘We requested TCELS that when we launch our product they should please help us with things like government policy, etc.’ It was a new diagnostic kit, an innovation in the whole of Asia.

Dr. Chanchai is also expecting a similar kind of endorsement of his company’s technology from TCELS, and introduction to an investor.

There is a need for an *updated database of domestic researchers and research facilities* in Thailand. Ms. Mattana says, ‘We have many resources in Thailand, but when someone is searching for something in particular, they just don’t know where to look. There is no updated list of available resources and facilities. Sometimes the information available is outdated.’

The private sector representative has very specific suggestions for TCELS. ‘TCELS could help connect us with

universities and research firms. It means the organization should compile a database with information under three important headings: first, the researchers' background and area of specialization; second, their publications; and third, the products, services or raw materials the researchers expect to develop on a R&D scale.'

TCELS has introduced this private sector representative's company to some overseas researchers. But the company had to scout about on its own to find local researchers. If TCELS could produce this kind of database, it would be an excellent source of information.

This private sector representative had earlier described the difficulties that private companies face in registering some researchers' technology and products with the Thai FDA, because of procedural non-compliance. In view of these problems, she expresses the need to get some help from professionals equipped with IP and law related expertise. She suggests that before companies go in for commercialization, they should have their *documents checked by a panel of experts*, something like quality control. Then the companies would be confident about proceeding further. The 'Technology and Intellectual Property Management Training' conducted by TCELS in September 2013 has equipped about 70 participants with IP related skills and expertise.

Private sector companies also face problems coordinating with researchers, because there are no *standard contract formats* and no *standard rates for royalty fees*. ‘Some of these things may be beyond the purview of TCELS and may require the intervention of other relevant authorities,’ says the private sector representative. However, the private sector would like TCELS to promote these two important issues and address them in whatever way possible.

This pharmaceutical company representative also underlines, ‘We need a *strong and determined intermediary agency* that can be fair and take into account the interests of both researchers and private sector companies. The agency has to help us find a middle way, a meeting ground. I know that it’s a very complicated job. Many government agencies have to be consulted on the rules and regulations for IP management.’

She also suggests TCELS should study *models of technology transfer* in other countries. Her company, being one of the market leaders, does not get sufficient time for commercial activity after going through the cumbersome procedure of technology registration and financing its launch on the market. She suggests, ‘It will be good if an intermediary firm like TCELS could study some other countries or firms where substantial technology transfers

are taking place, say, for example the US or Japan, and then set a standard for Thailand which is fair to all interests.’

Private sector companies greatly welcome the *Thailand Life Sciences Business Forum* initiated by TCELS to bring together the various players to discuss relevant issues. However, they would appreciate spending *more time* at these meetings. Some private sector representatives suggest the forum meeting should start earlier in the afternoon. ‘We could devote the afternoon session to business discussions followed by dinner. This would give us time to get to know each other better. Then we could enhance our interaction by having more thorough discussions.’

Acknowledging that TCELS is doing a difficult job working horizontally among the various players in the field of life sciences, this private sector representative adds, ‘It is not easy to bring the different actors together and get them to cooperate with each other in a horizontal manner. For so long they have been working in a vertical manner and usually don’t extend a hand of cooperation. Consequently TCELS needs to have a clear policy, strategy and action plan on how to coordinate and get the desired results.’

‘TCELS could interface with similar organizations in other countries, which are the lead coordinators of life sciences

in their respective countries. They could select some *best practices* for Thailand to adopt and develop a strategy and action plan accordingly,' she suggests.

Sometimes private companies feel that *TCELS is not aware of their problems*. 'I think it is because there is no platform or forum where these problems can be shared,' says the private sector representative. She adds, 'Even if we have a platform or forum, some companies may not be willing to share their problems openly. So perhaps TCELS will have to talk privately and individually to companies about their problems.'

Most of the private sector companies which have a *relationship of trust with TCELS* will have no difficulty frankly stating their problems. If they are convinced that TCELS will keep the information confidential, it should be easy for them to open up. 'In the world of business we are all competing among ourselves. We may not share things with each other. But we can see that TCELS is making its best efforts as an intermediary. If TCELS is aware of the issues on which the private sector needs help, I think it could act more expediently.' Assistant Managing Director of TCELS' partner company informs.

'TCELS is doing a good job by *listening*,' says Mr. Chalerm-pol. 'Listening to the needs of the entrepreneurs is very important. Situational dynamics in the field of medical

robotics is changing very fast. We entrepreneurs are at the forefront by taking R&D to the market. We face many problems in the process. TCELS has a good network and budget. If they can listen and take note of our views and perspective, we can succeed together.'

'To build this industry, one company is not enough. We need to create *business clusters*. TCELS can help us in that.' Mr. Chalernpol adds.

As a newcomer in Thailand's life sciences industry, Austrianova expects help from TCELS in *identifying the relevant stakeholders*. 'However, we are working under certain time constraints. There are customers waiting for us internationally. We only have a limited amount of time to find the answers,' says Prof. Walter.

It may appear that this stakeholder group has many expectations from TCELS, but they clearly realize the organization's *constraints and limitations* and prefer to adopt a realistic approach. Mr. Chalernpol is just being practical when he says, 'TCELS is still under government control. If there are any political changes, TCELS may be affected. Therefore we have to have balanced expectations.'

'TCELS has to work according to the priorities set by the Ministry of Science and Technology. Its budget depends

on this focus. For the current year its focus is on medical robotics and stem cells. So this year again there seems to be no hope for us,' says Dr. Chanchai.

'If TCELS gets an appropriate and timely budget, it can do much better. It has the potential,' observes the private sector representative. 'Currently TCELS' budget situation seems to be good. But in the past it has had difficulties with funding. There were project delays because of budget uncertainties, points out Ms. Mattana.

'If there is an *inter-agency collaboration* between projects, we can optimize money and time,' says Ms. Mattana. But she is fully aware of the organization's limitations with its already overburdened workforce. 'TCELS will need a full-time person to oversee the collaboration of inter-organizational work.'

According to this group of stakeholders, genuine effort is one of TCELS' strongpoints. Focus and determination are its other big assets. 'We can see that TCELS is trying very hard to make things work,' is the common observation. But there are certain issues that are beyond the scope of TCELS. These are the policy related matters. Government intervention at higher levels is required, says the private sector representative.

Overall Anticipation

As regards the overall life sciences industry and the areas in which higher level government intervention is required, the private company representative underscores the importance of having a *national focus on the life sciences industry*. Using the example of South Korea, she explains that the country's government focuses specifically on biotechnology and supports the SMEs directly. In her interactions with some scientists from South Korea, she was informed that research starts right from generating the raw materials. With this kind of concerted national focus and direct support from the government, South Korea's biotechnology industry has progressed really well. 'They are far ahead of us in Thailand,' she says.

As regards the current situation of pharmaceuticals industry, this private sector representative points out that Thailand purchases its raw materials from China and India. There are very few scientists in Thailand who can develop the raw materials locally. 'This way half the cost of the finished product goes out of the country. If this situation continues, Thailand can never be self-sufficient. If Thailand wants to be the leader, we have to start *developing the raw materials locally*. With some support from the government, both private companies and the universities should endeavor to do this.'

Thailand enjoys the coveted position of being the *hub of medical tourism* in the ASEAN region. The challenge is to maintain this leadership and to exploit its benefits to develop other related industries like medical robotics and medical biotechnology. Mr. Chalermopol and Prof. Walter can see great potential in maximizing the benefits of Thailand's reputation for medical tourism if the opportunities are appropriately utilized without delay.

The swiftness of government policies, decisions and funding is an important factor emphasized by almost all the interviewees. A frequent comment is, 'If you are working with technology, you have to move really fast. If you don't, the technology will become obsolete.'

Another common observation is the need to create a preference for *Thai products* among local consumers. Thailand has a good herbal industry, notes the private company representative. 'If Thailand could select an indigenous herb, the way South Korea has promoted Ginseng, it would give a real boost to the local herbal industry.'

Ms. Mattana realizes that Thai people prefer products from Korea, Indonesia, Malaysia and Western countries. 'The only way to promote local products among Thais is to provide quality products at lower price,' she says. 'Countries like China and Malaysia have production at

economies of scale and can therefore keep costs lower than ours. We already have a lot of demand in the market, but we need to generate awareness and a preference for Thai products and services. Around 15 to 20 years ago, a former governor of Bangkok, Khun Jamlongsimuang, initiated a campaign to promote local products among Thais. Nothing of that sort is happening now. The government should try to create awareness in the country about the need to use Thai products. Only then would we be able to produce larger quantities, improve quality and sell local products at lower prices.'

As expressed in an earlier section of this book by another group of interviewees, Thailand's education policy should *encourage students to take up science and technology*. 'Students these days prefer to focus on movies and arts. They think that science is difficult. This is not a good sign for the future,' fears the private sector representative. 'If this continues, Thailand could soon have a shortage of good scientists. Media, along with the government, has to work at changing this perception.'

Pinpointing the difficulties faced by young entrepreneurs, Mr. Chalernpol recounts that the governments of many countries support and *absorb the risks faced by new companies*. 'Here in Thailand we need more support to lower the risks undertaken by startup companies.' The

Ministry of Science and Technology cannot do it alone. The Ministry of Commerce too has to step in and support us, he says.

Representatives of Austrianova feel that it is important for Thailand to *identify the areas that need improvement*. Thailand has much to offer in terms of life sciences, but the information needs to be well disseminated to potential overseas investors through English language websites. Having documents and procedures in dual languages, both English and Thai, would be a step towards internationalization. Proactively it would be helpful to develop frameworks and structures in areas where regulations still need clarification.

‘Our company has a novel disruptive technology,’ says Prof. Walter. To harness such technologies, companies need support in terms of physical resources. He suggests a partnership in which bio-entrepreneur laboratories are set up at the Thailand Science Park and offered at normal rents. ‘This way the companies wouldn’t have to invest a lot of money in infrastructure and could get off to a flying start. Companies would in turn agree to cooperate and partner with the local universities, other companies and researchers.’ These kinds of partnerships wouldn’t cost much and would be in the interests of all.

Underscoring the importance of *mutual support*, Prof.

Walter says, 'We smaller companies, which are trying to develop biotechnology, and smaller countries like Thailand, which are trying to build their life sciences industry, can help each other.'

This stakeholder group realizes that its aspirations and expectations are considerable. But the presence of TCELS is comforting. 'With TCELS, we feel that we have a friend who understands our language and is on the same wavelength. This is very important and tremendously valuable for us.' These words of Prof. Walter effectively sum up the confidence and satisfaction of the private sector.



Even though TCELS calls them ‘Views from the Other Side’, for Mei they appeared to be views from her side of the fence. As an entrepreneur herself, she had presumed that this stakeholder group would reflect her own views. In other words, there wouldn’t be anything new.

She was wrong. Not everything was prior knowledge for her. She hadn’t looked at things in the same way as they were discussed by some interviewees. ‘Sometimes you need to see your own backyard with a different set of eyes,’ she mused.

She was impressed by the well-articulated and clearly defined expectations of this stakeholder group. Mei was once again reminded of her mother’s words: ‘You need to say exactly what you want in order to get what you actually desire.’

The private sector representatives explicitly stated their expectations of both TCELS and higher authorities. ‘This

makes it easier for the ones taking action,' thought Mei. Now they have a clearly worded checklist for the areas of improvement, if they really want to do something about it.

'I see no reason why they wouldn't,' Mei countered. After all, the private sector is a vital link in the entire life sciences cycle. Things would be incomplete without them. Mei recapitulated the concepts of interconnectedness and interdependence.

Through all these narratives it was crystal clear to Mei that until a few years ago TCELS' journey had been far from smooth sailing. There were tough times; scorching sun and strong winds. But TCELS did not waver. When the gusts of wind were ferocious, it chose to build windmills instead of walls.

'This is how TCELS emerged a survivor,' agreed Mei. And better still, it continues to march on with renewed vigor.

'I'm happy I took up this assignment.' Mei felt happy about her association with TCELS. She had always believed in the power of positive thinking. Now, in the story of TCELS, it was right before her eyes – the magic of optimism. This was what she had always been looking for.

'I want to hold on to this charm forever!' Mei sat mesmerized.

- REFLECTIONS -

Mei had seen how organizations originate and set out on their journeys. There is a quest for identity, tasks to be performed, and targets to be met. Through all of this, wittingly or unwittingly, organizational traits are outlined, qualities determined and personalities shaped.

Each journey is different from the other, not just because no two paths are identical, but because each traveler is unique. Failures, successes, achievements, setbacks, all appear intermittently along the way. None is there to stay. Each has its influence. But only the recipient can decide the extent of their sway.

The process of self-discovery can be painful. But only through knowing oneself can one be truly aware. Mei had seen it in the case of TCELS. What she had expected to be a regular data-gathering exercise, turned out to be an amazing process of introspection for the organization.

Any organization that hasn't seen itself through the various perspectives of its stakeholders perhaps doesn't know itself well enough.

After this taste of self-awareness, can one stop? Hardly! There's much to be done. Looking back is the key to moving forward. An occasional glance in the rear view mirror is alright. But moving forward is the ultimate goal. Rooted and moving: rooted in the reality of the past and moving with a vision of the future.

'TCELS can use these reflections to navigate the steps it now needs to take,' Mei thought. No matter how small, steps taken in the right direction can make all the difference. Like an unknown saying goes, 'Tiptoe if you must, but take the step!'

Reflections that emerged have been divided into two parts: Key Observations and Future Vision.

Quite a few observations crystallized from the discussions with various groups of stakeholders. They are discussed in the following sub-section. Some of them are applicable to Thailand's entire life sciences industry, whereas others relate specifically to TCELS.

1

Key Observations

TCELS: The essential bridge

Choppy seas and fierce winds are no reasons for a ship to change course. For TCELS the road has been rugged and the journey rough, yet it has been moving forward with determination to achieve its purpose.

To ensure the sustainable growth of Thailand's life sciences industry and make Thailand a world class center for innovation and investment in life sciences, TCELS must continue to take the translational research to the market. Through all the conversations, this appears to be the most important role expected of TCELS: to provide the

vital link of commercialization to knowledge generated through research.

This is in line with one of TCELS' core objectives. As Prof. Dr. Pornchai, one of the founders of TCELS says, 'TCELS was established to play the role of match maker and strengthen the connectivity between research and the market.'

A key expectation of researchers is that the knowledge generated in their laboratories should have a practical use. If a product or service can be commercialized by market value additions, it can become an asset for the country's economy. TCELS has successfully achieved this. The skin whitening cream from natural rubber latex and the genetic test kit for AIDS patients are a few examples of its success. Researchers want TCELS to keep providing them with this kind of support.

Marketing may not be the biggest strength of most researchers, but the commercialization of their innovations is certainly their dream. It can be achieved if TCELS puts them in touch with the right market players.

The private sector too looks up to TCELS to play the role of an intermediary, be it for an interface with government agencies, regulators or researchers. This sector can see that TCELS is trying its best to bring together the

different players in the life sciences industry. It expects TCELS to continue doing so, because it is what is needed the most.

Trust: The core asset

Expectations may not always be easy to meet. The situational dynamics are sometimes difficult to manage. The perpetual tussle between the scientific and business worlds was anticipated by the founders of TCELS. Prof. Dr. Pornchai explains, ‘The two communities have a totally different culture.’

This tension is evident in one of the writings of David Stuart Maclean: ‘Science is a journey but commerce turns it into a destination. Science works by making mistakes and building off those mistakes and new discoveries. Commerce hates mistakes; mistakes involve liability.’⁵⁸

True. So how does one create a meeting ground for such polarized parties? Dr. Nares, the current CEO of TCELS, gets to the heart of the matter. He views trust as the core asset.

If TCELS is trying to team up these different players, trust is indeed the foundation stone. Successful teamwork is

⁵⁸ David Stuart Maclean is an American writer who was named the 2011 Best Emerging Writer in Non-Fiction by the PEN American Center.

built on the basis of trust. It is perhaps the most important element of any business relationship, any relationship for that matter. Trust at every level - between TCELS and its partners; the private sector and government; and researchers and the private sector.

Initially, some of the private sector's expectations were not fully met when TCELS was unable to achieve much in terms of setting up companies and providing the necessary level of business support. However, all the concerned parties fully understand the limitations and constraints TCELS was experiencing at that time.

Things are changing. Last year alone TCELS achieved a seven-fold expansion of its network with the private sector, according to Ms. Taweeporn. This is an upbeat signal.

The level of trust invested by the private sector in TCELS is clearly reflected by the Assistant Managing Director of a large Thai pharmaceutical company. She says that in the world of business, companies may not divulge things openly with each other because they are in constant competition, but they trust TCELS so they can easily share their problems. 'We are aware that TCELS is putting in its best efforts as an intermediary,' she says.

Similar sentiments resonate with the research community. Dr. Chanchai, an independent researcher, believes

that if TCELS is involved in the business matching of his technology then his rights will be safeguarded.

This puts a heavy burden on the shoulders of TCELS. It needs to keep building on the trust it earned in the past and keep winning the trust of new partners.

Steady budget support

For expectations to be met and projects to succeed, TCELS needs financial resources. Steady budget support is one of the key requirements. TCELS' grant making ability is viewed as one of its big strengths, along with others.

Most of the current and ex-employees of TCELS admitted that TCELS' uncertain financial support under the OKMD was one of the worst drawbacks.

Projects too suffered because of this. Mr. Amon identifies supportive government policy and long term budget support as the most essential factors ensuring the success of life sciences projects, along with proper coordination. The value chain of life sciences projects is already very long. Budget delays make it even longer, says Dr. Thongchai. 'Only in the case of short term projects, like the PTSD project, for which we already had a budget, could

we manage things in time,' he reveals.

However, the worst seems to be over for TCELS in terms of its financial woes. This year TCELS has been granted good budget support from the Ministry of Science and Technology.

But TCELS realizes that there can be no certainty for future years. Dr. Nares thinks it is important for TCELS to have its own funds so it can manage by itself. There are a few upcoming TCELS projects that may hold the solution. Besides, TCELS has been assigned four value chains by the Ministry of Science and Technology, as mentioned in an earlier section.

Now the challenge facing TCELS is to make good use of the opportunities and deliver the results.

People with domain expertise

To ensure results, along with political support and proper funding, TCELS needs people with domain expertise. This is a view shared by almost all the interviewed current and former leaders of TCELS. People with domain specific knowledge have wide and extensive knowledge; they possess in-depth expertise on the subject matter, as well as the ability to combine knowledge from different fields

in innovative ways.

Most of the stakeholder groups observed that TCELS' workforce is insufficient and the current staff have had to work extremely hard to cope with the increased workload. However, the recently implemented new organizational structure, will lead to a threefold increase in staff numbers. This will bring some respite.

As noted by Mr. Suriyan, 'There is certainly a need to increase the competence of our people by training existing staff and hiring proficient people.' 'I want to bring the staff up to international standards,' adds Dr. Nares.

A private sector representative told TCELS that there was a need for more support from experts on Thai FDA rules, IP related concerns and other legal issues. She wasn't sure whether TCELS could meet this need. But if TCELS had more experts in these specific areas this would certainly help.

A competent workforce is the core of any successful organization. Dr. Nares seems fully aware of this. Therefore he emphasizes the need to inculcate more professionalism in his staff. He wants them to be well equipped and prepared to make good use of upcoming opportunities.

Communication: An area of improvement

It is important for TCELS to seize all future opportunities, initiate new projects and effectively implement them. It is equally important for it to take stock of the situation and be aware of the areas where it needs improvement.

A large cross-section of the interviewees identified communication as one of the areas where TCELS needs to improve. Communication figures high up on the list of ten critical success factors for effective project implementation.³⁹ Communication is not only essential within project teams, but between teams and the rest of the organization, as well as with clients. It includes not only feedback mechanisms, but also the exchange of information about project goals, changes in policies and procedures, status reports, etc.

Communication is a crucial area in which TCELS can improve, points out Mr. Suriyan. He says, ‘We need to increase communication with our partners.’

Partners too express the need for frequent communication. ‘To attain success, it’s very important to talk frequently and have regular follow-up conversations

³⁹ Pinto, J. K. & Slevin, D. P. (2008). Critical Success Factors in Effective Project Implementation. Project Management Handbook. Retrieved August 28, 2013, from [http://gspa.grade.nida.ac.th/pdf/PA%20780%20\(Pakorn\)/8.Critical%20Success%20Factors%20in%20Effective%20Project%20Implementati.pdf](http://gspa.grade.nida.ac.th/pdf/PA%20780%20(Pakorn)/8.Critical%20Success%20Factors%20in%20Effective%20Project%20Implementati.pdf)

through internet and telephone, both at the policy and staff level,' emphasizes Assoc. Prof. Dr. Sutee. Working with partners from around the globe, Assoc. Prof. Dr. Sutee is greatly impressed by the seamless flow of information and regular interactions of these teams, despite being separated by distance and time zones. However, communication with local partners like TCELS is sometimes not so prompt, he observes.

The same point was made by a representative of a private company, who expresses the need for TCELS to talk individually to private sector firms to find out about their problems. In short, there is a need for frequent communication.

Connecting with the clients is the key, as Dr. Nares says. 'We are an intermediary organization. It means that we have to connect with people, talk to them, care for their needs and ensure customer satisfaction.'

Taking a cue from the suggestions made by Prof. Walter about improving website content and overall access to information, TCELS needs to work on digital communications. Recently, at the ninth Thailand Life Sciences Business Forum meeting in August 2013, TCELS launched its Hotline Center to help integrate and connect the life sciences community.

TCELS seems aware of the importance of communications and appears to be taking steps in the right direction. Communication, however, is an ongoing process. For the continued health and growth of its partnerships, TCELS therefore needs to be proactively engaged in effective communication.

Importance of listening in upward communication

In a high context culture, such as that of Thailand, downward and horizontal communications are not difficult to achieve, but upward communication is rarely successful.

Downward communication flows from upper management down to employees of lower rank. Horizontal communication flows across the organization, between employees at the same level in the organization.

Unraveling cultural differences in styles of communication, anthropologists Edward T. Hall and Geert Hofstede have shown that collectivistic cultures, such as that of Thailand, usually adopt high context communication styles. Less is spelled out explicitly and much more is implicit or communicated in indirect ways.

High power-distance is another cultural dimension at

work. Power-distance expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. In Thailand the hierarchical divisions are hard to overlook.

This makes upward communication really difficult. Upward communication is initiated by those at the lower levels of the organization. However, it can be successful only if those at higher levels are willing to allow the communication to be effective, be it in the organizational or the wider societal context.

Listening is of fundamental importance for effective communication. This is an ability much needed by leaders in the higher echelons of power; say Prof. Dr. Pornchai and Assoc. Prof. Dr. Sutee.

Prof. Dr. Pornchai acknowledges that in Thailand's cultural context it is not easy for many to speak their minds in front of politicians and others in power. 'Not everyone is as outspoken as me,' he confesses. But it is important for people to speak up and those in authority to listen.

Assoc. Prof. Dr. Sutee urges the decision-makers at high levels to have an open mind and listen to all different viewpoints. Later, they can take decisions according to their judgment. But listening to diverse perspectives is essential, he says.

An important message indeed – if leaders out there are listening!

Significance of timely action

Listening alone is insufficient. It has to be accompanied by timely action. The importance of timely action was brought up over and over again by many interviewees: researchers, entrepreneurs and private sector representatives alike.

Thailand has lost many opportunities because of bureaucratic delays, says Prof. Dr. Prasit. Emphasizing the importance of prompt action, Assoc. Prof. Dr. Sutee gives the example of leaders in some other countries. ‘They have sharp eyes and jump at opportunities immediately. If we don’t act in a timely manner, Thailand will keep losing opportunities,’ he says.

Prompt action is of utmost significance when technology is involved. In a fast paced environment where technology changes very fast, there is no time to wait and watch. Dr. Chanchai, Ms. Mattana, Mr. Chalernpol and Prof. Walter express similar concerns.

Not doing anything on time often becomes its undoing. If budgets are delayed, approvals are postponed, policies

are not implemented on time, and information is not provided promptly, it can lead to serious problems.

At the organizational level, Dr. Nares seems to have taken this to heart. He highlights the importance of encouraging professionalism and eliminating hierarchy. He says that TCELS needs to work in such a way that it can keep pace with all concerned: the private sector, the Ministry of Science and Technology, other colleagues in the life sciences industry and overseas partners.

Need for collective effort

Keeping pace with all concerned and encouraging collective effort is a good strategy for progress. Many interviewees pointed to the need for collective effort, be it inter-ministerial, inter-organizational or inter-sectoral.

The need for working together with different ministries is highlighted by most of the TCELS leaders and also entrepreneurs. Explaining the multi-disciplinary nature of TCELS, Prof. Dr. Pornchai says that besides working with the Ministry of Science and Technology, TCELS also needs to collaborate with the Ministries of Commerce and of Finance, particularly on issues of trade licensing and patents. Since TCELS is working with different universities, it needs to interface with the Ministry of Education.

Work on life sciences for human health has a direct connection with the Ministry of Public Health. There is also a correlation with the Ministry of Food.

Not just with different ministries, TCELS needs to collaborate with different life science organizations and granting agencies as well. Most of the TCELS supported projects have extensive inter-organizational collaboration. Ms. Mattana says that if the inter-agency collaboration on projects is done well, this can optimize the utilization of money and time.

There is also a need to harness the science and business sectors. None can do without the other. Dr. Chanchai, an independent researcher, and Mr. Chalermopol, an entrepreneur, both draw attention to this fact.

The formation of the Thai Association for Biotech Industries (ThaiBio), in which TCELS along with others has played a role, is one such example of collective effort. ThaiBio is a partnership initiative established in 2010, grouping seven companies.

More recently, TCELS has enhanced the life sciences database of its Hotline Center, by bringing together information from relevant ministries and organizations.

Integrated efforts at all levels are required in the entire life sciences industry if innovations are to be successfully

turned into assets. Assoc. Prof. Dr. Sutee, who has been working on the development of a dengue vaccine for almost four decades, emphasizes the need to join hands and share experiences. 'It's important to work together in harmony,' he says.

Coordinated action for success

Henry Ford, the American industrialist and founder of the Ford Motor Company, once said, 'Coming together is a beginning; keeping together is progress; working together is success.' Collective effort is certainly needed, but it has to be transformed into coordinated action for sustainable growth.

There is a fine distinction between collective effort and coordinated action. Astute leadership skills are essential to convert collective effort into coordinated action. This is the type of leadership role that most stakeholder groups expect from TCELS.

Continuing his emphasis on coordinated action, Assoc. Prof. Dr. Sutee urges TCELS to take up an active leadership role.

Representatives from the private sector express their satisfaction that TCELS is trying its best to work horizontally

among the various players in the life sciences industry. They are confident about TCELS' ability to encourage coordinated action in Thailand's life sciences industry.

Dr. Chanchai underscores his point with the example of a laser beam used in his company's bio-plasma technology. 'Just as the coherent, monochromatic and collimated beam of light can penetrate any surface and bring about the desired results, so also if we combine the energy from all the different sources we can create an unparalleled force. With this we can bring about a change in the life sciences industry of Thailand.'

Much confidence is expressed in the current leadership of TCELS to initiate such coordinated action. Describing Dr. Nares as a competent and skillful leader, Prof. Dr. Pornchai says, 'He has a good understanding of things and is taking the right steps.'

These comments provide assurance for the present and much hope for the future.

But how does TCELS envisage its future? Current leaders of TCELS talked about its future vision. Their insights provide a well-defined map for the organization to navigate efficiently through the coming years.

2

Future Vision

With the widening scope of the life sciences industry, TCELS' ambitions for the future are high indeed. Within two years, in 2015, the ASEAN Economic Community (AEC) will be in place, generating unprecedented opportunities for Thailand. TCELS, which is working towards excellence in the life sciences industry, focusing particularly on human health, is all set to build further on Thailand's current strong points and capture the emerging opportunities offered by the AEC.

No organization can function effectively without a sufficient number of competent staff. Leaders of TCELS well understand this fact. Recently, the organization made a

structural change. New people with specific expertise are being added to the team. With this additional workforce, TCELS will be equipped to take up larger challenges.

TCELS will continue its efforts to network effectively with various organizations and agencies, both in the public and private sector, for the stimulation of Thailand's life sciences industry. For the recently inaugurated TCELS Hotline Center, a comprehensive database of knowledge and information about life sciences industry has been prepared by gathering information from the Office of Industrial Economics, the Ministry of Industry; the Federation of Thai Industries; and the Thai Medical Device Technology Industry Association (THAIMED).

In future, TCELS also plans to have joint collaborations with the National Research Council of Thailand (NRCT), the Thailand Research Fund (TRF) and various Thai universities.

As an enabling organization, TCELS wants to upgrade further the Pharmacogenomics, Human Growth Hormone and Rubber Latex Projects as centers of excellence in their respective fields. Once these projects have been sufficiently empowered, they can aim to become centers of excellence in their own right. Similarly, at some point in the future, TCELS' Special Projects will also be ready for a spin-off.

The four value chains assigned to TCELS this year by the Ministry of Science and Technology are medical robotics; drugs which include biopharmaceuticals, vaccines, cosmetics, stem cell and gene therapy; medical devices along with personalized medicine; and medicopolis, which includes medical services. TCELS is ready with a five-year roadmap to proceed in these areas. TCELS also has two large upcoming projects on Medicopolis and the Central Facility for the Production of Natural Products.

Thailand is positioned as the hub of medical tourism in the world, as discussed in an earlier section. If TCELS can continue to capture the openings presented by this status, it can achieve much in all the above mentioned areas.

TCELS also expects to utilize efficiently the forthcoming market opportunities with the onset of AEC. The market population will shoot up from 65 million in the country to around 600 million in the region. Prospects are huge and TCELS is preparing itself in all earnestness to make the most of them.

Amidst all this, TCELS won't overlook the need to retain a realistic and humble approach, as Dr. Nares mentions. They wish to remain rooted, yet keep moving forward.



Rooted and moving.

The imagery transported Mei back to her childhood days. Their family's favorite holiday destination: the mangrove forests in Chonburi province. Who would have imagined that one day it would turn into an ecotourism destination?

Those were some of the best Sunday afternoons she had spent with her father. Sitting idly in a slow moving boat; snaking through the mangroves. Her little eyes would intently watch the water lapping around the exposed roots. She found them really intriguing.

'Are these really roots, Baba?'

'Yes.'

'Are they moving?'

'Yes darling.' Her father was a man of few words.

'Why do they need to move if they are roots? I mean, how can they move?' Mei had the biology lesson in mind which told her that roots had to be fixed at one place.



‘By moving they can handle the rise and fall of the tide. They won’t get flooded.’

On that sultry, ordinary afternoon, in the most unimpressive and simple manner, her father had given her one of the most profound lessons.

Stay rooted. But keep moving.

Suddenly it all started making sense.

TCELS didn’t get swamped by the tides because it was rooted and moving. It will certainly keep going places if it continues the same approach.

- Epilogue -

It had been a long day for Mei. The evening was even longer. Traffic on the way back had tested her patience to the hilt. She felt totally exhausted. She hadn't enough energy left for any further trials. Or so she thought.

But she was wrong. There was strong rivalry between the boys; both vying for their mom's attention. Her husband wasn't far behind. All the three were contending to get noticed.

This was a test she really enjoyed. What could be nicer than being the center of attention, with three boys chasing after her!

'A day that ends with these three around is a day well spent.' She smiled with satisfaction.

Soon it was bedtime for the boys. Today it was her turn to put them to sleep. Her husband chose to hang around while she

read a bedtime story to the boys. They huddled together as Mei read aloud the Fable of the Porcupine:⁴⁰

“It was the coldest winter ever...

Many animals died because of the cold.

The poor little porcupines, realizing the dire situation they were in, decided to group together. This way, they covered themselves; but, the quills of each one wounded their closest companions, even though they gave off heat to each other that would save them all.

After a while, they decided to distance themselves one from another and soon they began to die...alone ...and frozen.

Even though they are little animals, they had to make a life or death choice... either accept the quills of their companions or disappear from the earth!

Wisely, they decided to go back to being together; this way they learned to live with the little wounds that were caused by the close relationship with their companions, but the most important part of it was that the heat that came from the others allowed all to survive.

Therefore, the best relationships are not those that bring together perfect people, but when each individual learns to live with the imperfections of others...”

⁴⁰ Paulo Coelho, a Brazilian lyricist and novelist. Retrieved August 31, 2013, from <http://paulocoelhoblog.com/2010/12/08/the-porcupines-and-solidarity>

The boys were fast asleep.

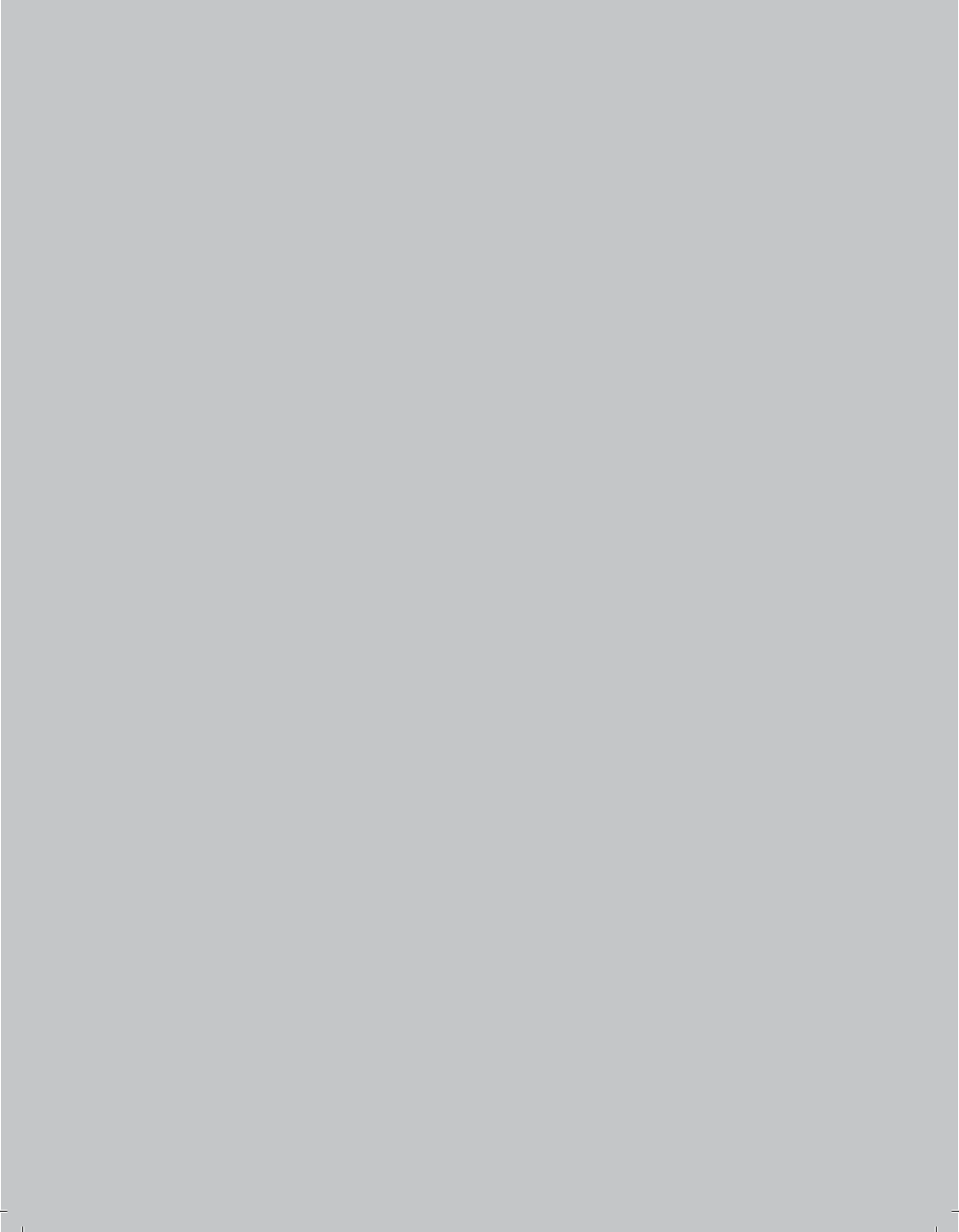
As Mei turned off the lights and tiptoed out, she thought, ‘I hope the different players in Thailand’s life sciences industry are paying heed.’ It is better to stay connected to each other, even if proximity causes minor discomfort. This is the only way for the entire life sciences industry to prosper. TCELS can help in keeping them together.

List of Abbreviations

AAALAC	– Association for Assessment and Accreditation of Laboratory Animal Care
ABBP	– Asia Bio Business Partnering
ACTD	– ASEAN Common Technical Dossier
ADR	– Adverse Drug Reaction
ADTEC	– Advanced Dental Technology Center
AEC	– ASEAN Economic Community
AIDS	– Acquired Immunodeficiency Syndrome
APEC	– Asia-Pacific Economic Cooperation
ASEAN	– Association of South East Asian Nations
BIOTEC	– National Center for Genetic Engineering and Biotechnology
BOI	– Board of Investment
CDMC-TU	– Clinical Data Management Center - Thammasat University
CRO	– Contract Research Organization
CVD	– Center for Vaccine Development
FDA	– Food and Drug Administration
GDP	– Gross Domestic Product
GLP	– Good Laboratory Practice
GMP	– Good Manufacturing Practice
GPO	– Government Pharmaceutical Organization
HSRI	– Health Systems Research Institute

IP	– Intellectual Property
IRB	– Institutional Review Board
JREC	– Joint Research Ethical Committee
KMUTT	– King Mongkut’s University of Technology Thonburi
LSIF	– Life Sciences Innovation Forum
MedResNet	– Medical Research Network
MOPH	– Ministry of Public Health
MOST	– Ministry of Science and Technology
NIA	– National Innovation Agency
NRCT	– National Research Council of Thailand
NSTDA	– National Science and Technology Development Agency
OECD	– Organization for Economic Co-operation and Development
OKMD	– Office of Knowledge Management and Development
PPP	– Public Private Partnership
PTSD	– Post-Traumatic Stress Disorder
R&D	– Research and Development
SII	– Serum Institute of India
SME	– Small and Medium Enterprise
SNP	– Single Nucleotide Polymorphism
TCELS	– Thailand Center of Excellence for Life Sciences
TCTR	– Thai Clinical Trial Registry

- ThaiBio – Thai Association for Biotech Industries
- TLO – Trade Licensing Office
- TRF – Thailand Research Fund
- WHO – World Health Organization
- WHO SEARO – World Health Organization South East
 Asia Regional Office



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- Accreditation Unit – 92
- Advanced Dental Technology Center (ADTEC) – 112
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- Animal Monitoring Center – 92, 103
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- APEC Life Sciences Innovation Forum – 101, 103
- ASEAN Economic Community (AEC) – 85, 158
- ASEAN Life Sciences Conference and Exhibition – 85, 96, 127, 132,
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B

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- BIO Asia – 84
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- BOI / Board of Investment – 83
- Bone marrow transplant – 94
- Brand development – 99, 106
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C

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Environment / Environmental – 50,51,86,96,163

Ethics / Ethical – 94,97,103

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F

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152,154,157,165

Framework – 155,156,161,174

Friendly / Friendliness – 50,104,163

G

GDP/ Gross Domestic Product – 111

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GLP/ Good Laboratory Practice – 91,92,103

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Good Laboratory Practice – 91

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Skin Whitening Cream – 131,134

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Appendix 1

List of TCELS' Projects from 2004 to 2013

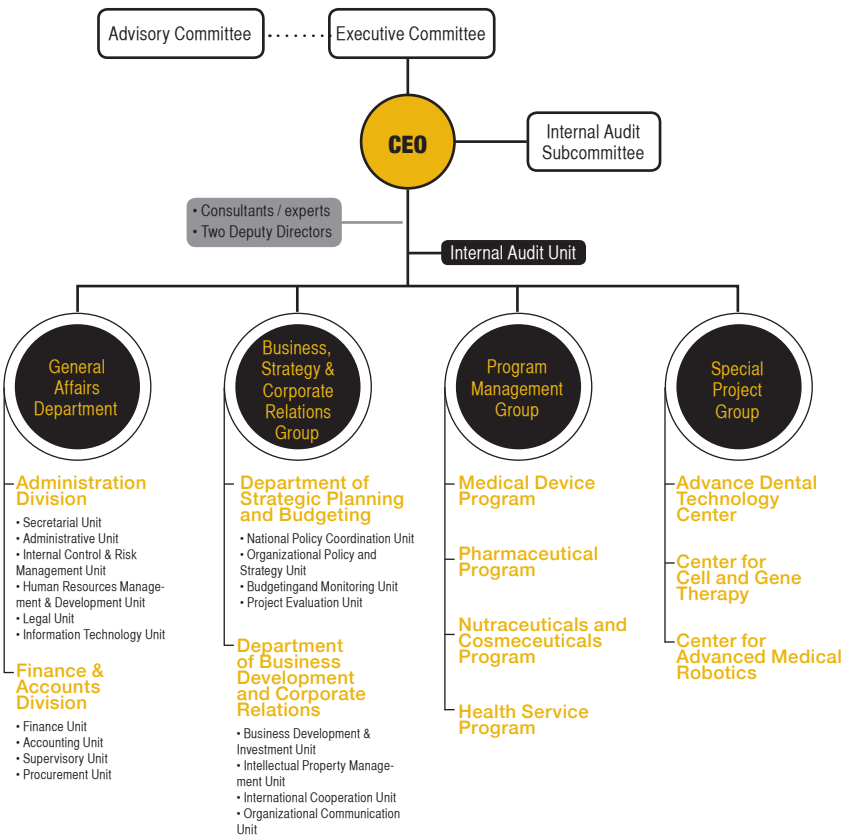
No. Project Name

1. Post-Traumatic Stress Disorder
2. Pharmacogenomics
3. Animal Breeding Center
4. Toxicology Testing Lab
5. OECD GLP Accreditation Body
6. Rubber Latex
7. Human Resource Development on Doctoral & Post-doctoral Degree
8. APEC Life Sciences Innovation Forum
9. Stem Cells
10. Dengue Vaccine
11. Clinical Research Center
12. Climatotherapy

13. Life Sciences Cluster (Spa, Medical Devices)
14. New Generic Drugs
15. Clinical Trial Registry
16. BIO International
17. Drug Delivery System
18. Medicopolis
19. Growth Hormone
20. Advanced Medical Robotics Project
21. Cells therapy and Gene Therapy
22. Bio Plasma
23. Intellectual property Management
24. Workshops and trainings on GLP, GCP, GMP/PICS
25. South East Asian Pharmacogenomics Network
Conference
26. Pharmacogenomics Workshop

Appendix 2

Organizational Structure of TCELS, 2013



Appendix 3

Core Projects of TCELS

The below mentioned four core projects of TCELS are primarily guided by the organization's mission. TCELS has a long term approach towards these projects.

1. Drugs and Wellness

TCELS encourages the discovery of new drugs and the development of new generic drugs. Along with the Faculty of Pharmaceuticals, Chulalongkorn University, TCELS will be supporting four new generic drugs this year. Growth Hormone project of TCELS, in partnership with KMUTT, is in the pilot plant stage. It is soon expected to move to the stage of pre-clinical trials. *(For more information on TCELS' Growth Hormone project, please see pages 122 to 125).*

TCELS is also supporting the Drugs Discovery Project related to cancer, in partnership with the Prince of Songkla University, Hat Yai. Quebracchitol, a biochemical product obtained from the natural rubber latex serum, is a compound being studied for the treatment of cancer and diseases related to fungal infections of the mouth. This project is still in its initial stages. TCELS is also supporting the discovery and development of dengue vaccine, along with the Center for Vaccine Development, Mahidol University. The Dengue Vaccine Project has reached the pilot plant stage and will soon require a quality control laboratory. *(For more information on TCELS' Dengue Vaccine Project, please see pages 129 to 131).*

2. Natural Products and Cosmetics

2.1 Skin Whitening Cream

With the support of TCELS, a team of researchers from the Prince of Songkla University, Hat Yai, have developed a product for skin whitening from active ingredients contained in rubber latex. Thailand leads the world in natural rubber production. This project is going to provide an excellent mechanism to create additional value for

Thai economy in the long run. The team of researchers discovered four biochemical products from natural rubber latex. One of these products, Hb extract, is used to develop a skin whitening cream. It has already been patented in two countries and is generating revenue. Process for patenting it in other countries is underway. Because of its herbal properties, this skin whitening product is gaining popularity.

2.2 Thai Traditional Medicine / Herbal Products

In collaboration with Naresuan University, TCELS is supporting the clinical research for traditional Thai medicine and herbal products. A feasibility study on the GMP pilot plant for herbal products has already been done.

3. Medical Devices

Following the industrial development guidelines of Thailand, TCELS launched a plan to develop medical device cluster in 2009. In collaboration with the Engineering Faculty of Mahidol University, feasibility study was conducted and a roadmap was designed for the establish-

ment of this medical device cluster.

This roadmap includes the development of medical devices in three areas: medical devices for the market, software-dependent medical devices and medical devices that use advanced technologies.

Major components of the roadmap for Medical Device Cluster project are as follows:

- A globally strong and competitive medical devices industry will be developed in Thailand.
- There are greater opportunities for those medical equipment and devices that are useful for the general public.
- A promotion board will be established for developing a network and promoting cooperation among medical industry representatives and their associations, organizations and businesses.
- A unit comprising representatives from agencies will be set-up for data collection and coordination with all the parties. It will also generate proposals for amended or new regulations, support personnel and research developments, certification of medical instruments, promote medical equipment markets in Thailand and abroad, and establish a standards'

laboratory.

As a follow-up to this roadmap, in 2011 a committee for industrial development of medical equipment was established by the Ministry of Industry. This committee will provide policy, strategy and planning for the development of medical equipment and related industries. Currently, a memorandum of cooperation exists between 11 related agencies to advance the strategic development of medical equipment.

Medical Device Cluster is an ongoing project of TCELS.

4. Health Services

4.1 Personalized Medicine

(For information about TCELS' Pharmacogenomics program, please see pages 125 to 128).

4.2 Medicopolis

Medicopolis: Land of Innovative Health Services

TCELS has initiated this ambitious project to transform

Thailand into a medicopolis – the medical hub of ASEAN region. In Thailand, healthcare and medical facilities are of international standards. Medical tourism has become a prevalent business model and has given new wings to Thai economy. These developments have brought about a surge in the number of hospitals vying for local and international accreditations and certifications. Many hospitals have obtained the US standard accreditation from the Joint Commission International Accreditation (JCIA) and gained the status of international hospitals.

Along with the modern medical infrastructure and facilities, Thai traditional medicines and therapies are also world renowned. Medicopolis project of TCELS will support the research and development of products and services related to these systems and will promote Thailand as the medical center of the ASEAN region.

As part of the Medicopolis project, TCELS has the following three objectives:

- Transforming the research in medical products and services to innovations for attracting investors, consumers and tourists,
- Making Thailand the center of medical and wellbeing tourism, and
- Adapting the health products and services to the

specific needs of particular target groups.

Medicopolis project has three main target groups. Platinum Medicopolis service caters to the needs of aging population. Superstar Medicopolis service includes beauty products and treatments for men and women. Wellness Medicopolis service is for general health needs, including fitness, weight loss, spa treatment, Thai massage, herbal food supplements, anti-aging products, etc.

Thus, Medicopolis project will develop innovative health products and services. It is distinctively designed to suit the individual requirements of each target group.

Appendix 4

Special Projects of TCELS

The below mentioned three special projects of TCELS are primarily guided by the policy of the Ministry of Science and Technology.

1. Cell and Gene Therapy

TCELS has been involved in cell and gene therapy projects since 2007. To help patients awaiting a bone marrow transplant receive stem cell treatment, TCELS has been working with the Thai Red Cross Society and relevant hospitals towards establishing a national stem cell collection center. Data from this research will also be used to develop future stem cell projects. Currently there is a national center for storage of cord blood for patients requiring a bone marrow transplant that meets international standards.

As announced by the Ministry of Science and Technology in line with the country strategy, in 2013, a Cell and Gene Therapy Center will be established within TCELS. Developing infrastructure for cell and gene therapies will be the main activity of this center. A GLP laboratory will also be established to develop technologies to cure thalassemia and leukemia patients. Along with this, another laboratory will be established for developing safe and high quality GMP products for therapeutic use and research.

The project on cell and gene therapy will continue until 2017.

2. Medical Robotics

TCELS has established a Center for Advanced Medical Robotics which is at the forefront of robotics network in Thailand. This center will support over 11 different models of robots. Infrastructure and facility development will be completed by 2015 and five models will be ready by 2017.

Center for Advanced Medical Robotics focuses on international and regional investors and users. The changing face of Thailand's semi hi-tech industries motivates the advanced medical robotics project to broaden its

research base to include biotechnology, nanotechnology, telemedicine and information technology themes. Center for Advanced Medical Robotics has envisaged various programs of evolution, integration and collaboration. TCELS plans to lay special emphasis on developing a prototype of robot that can diagnose cancer. This will be done with the help of Thailand Nanotechnology Center.

Two major private sector companies working alongside TCELS in the area of medical robotics are CT Asia and MedicoRobotics Co. Ltd. CT Asia is a successful private robotics company which has been developing robots for more than five years. It plans to launch the third-generation Dinsow next year which will be 1.2 meters in height. CT Asia's production base in Bangkok has the capacity to make 50 robots a year. MedicoRobotics Co. Ltd. is an emerging name in the field of research and development of robots for medical purposes. It also develops robots for industrial and agricultural applications.

3. Advanced Dental Technology Center (ADTEC)

Advanced Dental Technology Center (ADTEC) was initiated in 2012. Projects of ADTEC include design and development of dental implant and materials for improving

the quality of patients' lives. Some of these projects are:

- Design, development and manufacturing of dental implants.
- Design and development of craniofacial implants for facial prostheses.
- Design and development of mini-implant for orthodontic.
- Design and development of mini plates and screws for craniomaxillofacial surgery.
- Design and development of bone plates and screws for small animals.

ADTEC's mission is to design and develop medical devices according to the international standard of ISO 13485, and to license them to manufacturers. Manufacturers can then produce and distribute the medical devices to the users. ADTEC has successfully implemented the case of dental implant.

ADTEC is undertaking the design and development of craniofacial implant, using the same technology as dental implant, for a special target group of people who have lost facial organs in unfortunate circumstances like wars, accidents or diseases. Along with suffering physical trauma, these people are faced with social discrimina-

tion which negatively impacts their self-confidence and limits their opportunities in life. ADTEC beckons a ray of hope through mini-implant. Its application is for beauty dentistry, used for providing orthodontic treatment and achieving the desired tooth movement. Eventually it improves facial aesthetics.

Another special project of ADTEC is the development of mini screws and plates for holding the fracture in the jaw and facial bones. Objectives of this project are:

- To design and develop a prototype of mini plates and screws for face and jaw bones as per ISO 13485.
- To transfer the prototype of mini plates and screws for face and jaw bones for commercial production through ISO 13485 certified manufacturer.

ADTEC also has a project of bone plates and screws for small animals, using the same technology as mini plates and screws for face and jaw bones. It is expected to reduce the cost of import material for animal hospitals and enhance the knowledge base of veterinary sciences in Thailand.

Thus ADTEC, with all its design and development projects, is set to benefit and further enrich dentistry in Thailand, both for humans and animals.



About the Author

Pratima P Mathews is a Communications Consultant based in Bangkok. For the last 20 years she has been working with various international development organizations, UN agencies and private companies on multifarious issues. Pratima is a receiver-oriented strategic communicator with excellent interpersonal skills. She holds master's degrees in Physics and Communications. She has lived in India and Sri Lanka and is now based in Thailand with her family. She can be contacted at pratimamathews@hotmail.com







