



ETAT Business Plan and Exploitation Strategy

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ETAT: Education & Training for Automation 4.0 in Thailand

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Table of Contents

1	Introduction and aim	3
2	Executive Summary.....	3
3	Exploitation Strategy.....	4
3.1	Needs Analysis and NRGs Survey.....	4
3.2	Cooperation with EEC Automation Park and PhoenixContact Thailand.....	5
3.3	Business Model Canvas.....	5
4	Business Model Canvas.....	6
5	Business Plan.....	9
5.1	Overview	9
5.2	Value Stack.....	9
5.3	Structure and Collaboration.....	10
5.4	Financial Plan Model.....	11
5.5	Offered Training Courses	12
6	Future Joint Activities	13
7	Appendices.....	14
7.1	Appendix I	14



1 Introduction and aim

The ETAT project aims to create exemplary Education & Training Centers in the field of engineering education at participating EEC universities that are able to support as education hubs in the EEC region for industry-related education and training for engineers and young specialists. The following objectives are to be achieved with it:

- Modernization of Higher Education in Thailand based on the experience of European countries;
- Increase the employment rate of university graduates and implement the concept of Life-Long learning with the help of special training modules in the field of industrial automation;
- Development of partnerships with enterprises;
- Improve the quality and relevance of Higher Education in Thailand in the field of industrial automation;
- Establishment of 6 certified ETAT Training Centers at partner universities, which will be equipped with 24 special training places (respectively 4 ETAT Smart Labs per Thai university)
- Establishment of a platform for distance learning and cooperation between the partners for providing E-Learning & Cloud-based learning courses and for exchange of didactical documents and information.

ETAT Training Centers will be provided with teaching materials and certificated courses for different target groups (students, employees, post-graduates, trainees) as well as with the Thai trainers trained by EU university partners during the ETAT project.

In this report, the strategy to exploit the developed outcomes of the ETAT project. More precisely it will focus on the training modules elaborated with the European university ETAT partners. The Thai ETAT university partners will use these didactic modules for lecture and practice purposes as well as the hands-on trainings for industrial partners and other stakeholders.

In order to cover specific needs within different interesting groups, a particular exploitation plan has been discussed and developed. Different National Resonance Groups (NRGs) have been asked for the inputs and requirements. The specific needs extracted and analyzed from the survey have been published in the “NATIONAL RESONANCE GROUP SURVEY RESULTS” (<https://etat.informatics.buu.ac.th/index.php/need-analysis/>). The laid business plan is meant to fulfill the training requirements of the educational as well as industrial institutions.

2 Executive Summary

This ETAT Business Plan and Exploitation Strategy is developed under the working group of European and Thai ETAT members. Based on the need analysis and the NRG survey, this business plan is meant to serve all of the target groups’ needs.

This business plan is based on the Business Model Canvas. The value propositions are first developed. These value propositions are the key activities that we will follow to accomplish our plan. Moreover, we connect the hands-on training services from different ETAT training centers altogether, so that we can share the training information and data. Furthermore, the collaboration with the EEC Automation park and PhoenixContact will help us to certify and promote our trainings to be accredited by the industry.

3 Exploitation Strategy

The 6 ETAT training centers at Thai universities act as a training center and a hub for training and knowledge exchanging between trainers and trainees. Furthermore, they have functionalities as a matching maker between the industries and universities for consulting or solving specific problems. So, the missions of the ETAT training centers are:

1. Updating curricula and being a resource for training and learning for educational institutions.
2. Organizing workshops and training for Industrial 4.0 and Automation technology.
3. Consulting and solving specific problems as an R&D center.
4. Tech matching between university/industry or industry/industry cooperation.

The exploitation strategy is set up as follows:

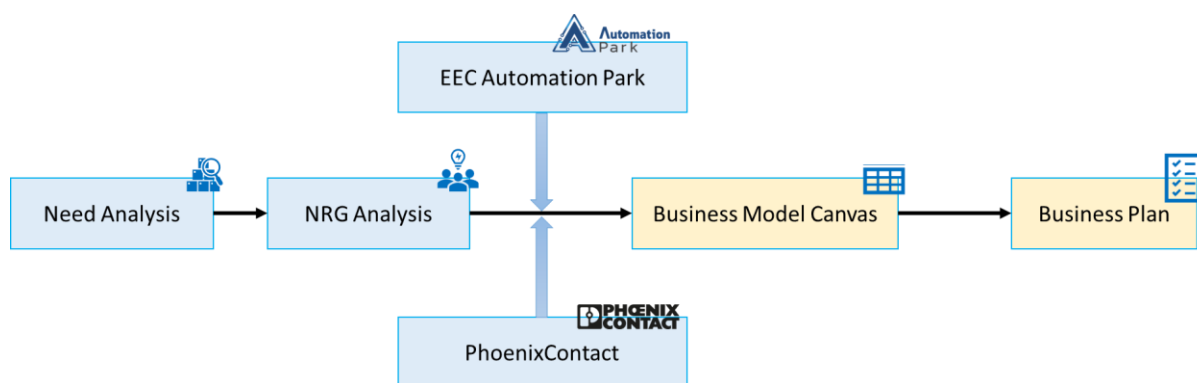


Figure 1 Exploitation strategy flow.

As shown in figure 1, the exploitation strategy begins at the very beginning of this project. We conducted the Need Analysis for the first try of analyzing the requirements of our target groups, including university students (engineering and information technology), university lecturers, and industrial professionals whose work is related to automation technology. With the results, we then created the so-called didactic modules covering the needs of this knowledge. For utilizing these didactic modules, we then had to do our business plan. So, the NRG survey was conducted with specific questions related to training and workshops. With the information, we embraced our key partners to be in our plan. As a tool for business planning, we used the Business Model Canvas. And then we laid out the Business Plan for our ETAT project.

3.1 Needs Analysis and NRGs Survey

This can be considered as the first stage of content creation for the ETAT project. The needs and requirements of the three target groups have been surveyed and analyzed. The results of the needs analysis led us to construct the so-called didactic modules, which can be seen as key topics that can be combined for a subject or workshop. Examples are PLCnext basic programming, IEC 61131-3 programming, Python programming, network and communication, OPC UA, Data Analysis, etc. Thai universities can use these topics for updating their existing courses or even creating a new course depending on what their needs are.

The NRGs survey has been done and analysis for getting better point of view how our target groups would like to be trained. In other words, we would like to construct our services to suit the needs of



our potential customers. Within this survey, we have questions like which topics they want to update, how they want to participate (online/offline), which days do they prefer to participate in the workshops, which time, how much they want to pay, etc. These questions help us to get the overview of the needs of our target groups.

3.2 Cooperation with EEC Automation Park and PhoenixContact Thailand

Most of the ETAT training centers specialize in the teaching and learning within their universities. Some of them might have a stronger relationship to the industry. To archive the same level for every Thai partners, we then had to embrace 2 organizations to be our key partners first, namely the EEC Automation Park and the PhoenixContact Thailand. The EEC Automation Park is responsible for education and training related to automation technology in the Eastern part of Thailand. It is also responsible for workforce development in terms of reskill/upskill training for the industry. So, it is a hub for automation technology workshops as well as the management department of the EEC office. Moreover, the EEC Automation Park records the certificate number trained at the EEC Automation Park and also its partner. We believe that the certification accredited by the EEC Automation Park will gain more acceptance from the industry.

In the same manner, the cooperation with PhoenixContact Thailand will help us achieve the goals that have been set. The PhoenixContact Thailand is one of the leading automation manufacturing companies that has a subsidiary in Thailand. With this cooperation we can be sure that the newest automation technology will be transferred and embraced.

3.3 Business Model Canvas

In this project, we considered using the Business Model Canvas, which is one of the most popular strategic management tools for starting up a business. This tool has a template that one can fill out the necessary information in case to plan a business. The topics include:

1. Value Propositions
2. Customer Relationships
3. Customer Segments
4. Key Partners
5. Key Activities
6. Key Resources
7. Channels
8. Cost Structure
9. Revenue Streams



4 Business Model Canvas

In the ETAT project we used the Business Model Canvas for doing business plan and exploitation strategy. The canvas was discussed and constructed within a group of both European and Thai partners. The input data was the results of the Needs Analysis and the NRGs Survey Analysis obtained from the previous studies. The revised version of our Business Model Canvas is shown in the figure 2 below.

ETAT The Business Model Canvas				
				Date: 10.05.2023
				04.08.2023
Key Partners	Key activities	Value Propositions	Customer Relationships	Customer Segments
EEC Automation Park	Certified PLCnext Training	Upskilling of Engineers with Automation 4.0 (important topics in the NRG survey)	Personal Trainer/Course Trainer	Niche Market: Industry with Automation 4.0-like technology
Chamber of Commerce and Board of Trade of Thailand (Chon Buri)	Automation Training for individual solution	Process Data Acquisition and Analytics with advanced techniques	Self-learning/E-learning	Different universities or from another higher and vocational educational institutions
Phoenix Contact (Thailand)	Problem solving and consulting	Individual solutions for getting the job done quicker and smarter	Nation resonance group communities	Thai partners' customer segments
MARA	Overview/information training for interested SMEs or individuals	Data Visualization on Cloud	EEC Cluster communities (e.g. Health, Manufacturing, Digital, etc.) and for funding submission	PhoenixContact (Thailand)'s customers
Head of Vocational Schools/Universities	Promotion/Demonstration for Thai Industries/SMEs or Raising Awareness of new technology	Consults and applied research and development for the companies	Customer acquisition marketing and customer retention	
ASEAN Chamber of Commerce	Organizing Internation Automation 4.0 research and educational projects e.g. Thal-EU projects / coordinator	Information events and workshops relating industry 4.0		
ASEAN University Association	Job market for automation experts (maybe job annoucement on our website/job matching events/head hunting, etc.)	Platform that provides annual events, information, white papers, research results, ads, etc.		
Thai-German Institute (TGI)		Integrated and sharing platform for Data Student competition/Hackathon for Industry 4.0		
	Key Resources		Channels	
	ETAT Training Centers at 6 Universities ESL Equipment and individual components Trainers (PLCnext-certified)		Personal Connections/Networks Line Chat Groups/Social Media/Facebook ETAT Websites/Faculty/EEC Automation Park Printed Documents (e.g. Study Book, Magazine)	
	Didactic Modules (learning documents concerning Automation 4.0 and data analytics) and Study		Exhibitions/Conferences/Events Emails Video conferences/Webinars	
Cost Structure			Revenue Streams	
Trainers' Honorarium Course Organization (Food and Drinks/Documents/Certificates/Printing Materials/USB Sticks) Training room/Equipment rental cost Marketing cost Server/Domain name cost Teaching Assistant/Admin personnel cost Admin Fee from University (10 - 15%)			Course Registration Fee Individual Consults Research and Solution Approach Grants from organizations Sponsoring from companies Registration fee from events/exhibitions/seminars/workshops/etc.	

Figure 2 The ETAT Business Model Canvas

In details, the ETAT Business Model Canvas can be described as follows:

1. Value Propositions

- Upskilling of Engineers with Automation 4.0 (important topics in the NRG survey)
- Process Data Acquisition and Analytics with advanced techniques
- Individual solutions for getting the job done quicker and smarter
- Data Visualization on Cloud
- Consults and applied research and development for the companies
- Information events and workshops relating industry 4.0
- Platform that provides annual events, information, white papers, research results, ads, etc.
- Integrated and sharing platform for Data Visualization
- Student competition/Hackathon for Industry 4.0

2. Customer Relationships

- Personal Trainer/Course Trainer
- Self-learning/E-learning
- Nation resonance group communities



- EEC Cluster communities (e.g. Health, Manufacturing, Digital, etc.) and for funding submission
- Customer acquisition marketing and customer retention

3. Customer Segments

- University Students (as a part of the university courses)
- Niche Market: Industry with Automation 4.0-like technology
- Different universities or from another higher and vocational educational institutions
- Thai partners' customer segments
- PhoenixContact (Thailand)'s customers

4. Key Partners

- EEC Automation Park
- Chamber of Commerce and Board of Trade of Thailand (Chon Buri)
- Phoenix Contact (Thailand)
- MARA (Manufacturing Automation and Robotics Academy)
- Head of Vocational Schools/Universities
- ASEAN Chamber of Commerce
- ASEAN University Association
- Thai-German Institute (TGI)
- Companies in general

5. Key activities

- Certified PLCnext Training
- Automation Training for individual solution
- Problem solving and consulting
- Overview/information training for interested SMEs or individuals
- Promotion/Demonstration for Thai industries/SMEs or Raising Awareness of new technology
- Organizing international Automation 4.0 research and educational projects e.g. Thai-EU projects/coordinator
- Job market for automation experts (maybe job announcement on our website/job matching events/head hunting, etc.)

6. Key Resources

- ETAT Training Centers at 6 Universities
- ESL Equipment and individual components
- Trainers (PLCnext-certified)
- Didactic Modules (learning documents concerning Automation 4.0 and data analytics) and Study Book

7. Channels

- Personal Connections/Networks
- Line Chat Groups/Social Media/Facebook
- ETAT Websites/Faculty/University/EEC Automation Park Websites
- Printed Documents (e.g. Study Book, Magazine)



- Exhibitions/Conferences/Events
- Emails
- Video conferences/Webinars

8. Cost Structure

- Trainers' Honorarium
- Course Organization (Food and Drinks/Documents/Certificates/Printing Materials/USB Sticks)
- Training room/Equipment rental cost
- Marketing cost
- Server/Domain name cost
- Teaching Assistant/Admin personnel cost
- Admin Fee from University (10 - 15%)

9. Revenue Streams

- Course Registration Fee
- Individual Consults
- Research and Solution Approach
- Grants from organizations
- Sponsoring from companies
- Registration fee from events/exhibitions/seminars/workshops/etc.



5 Business Plan

5.1 Overview

Based on our Value Proposition on the ETAT Business Model Canvas, we considered different services and tasks for serving individual stakeholders' needs. The following table depicts the planned activities and tasks that will be done within our business plan.

Table 1 Planned activities/services according to the Value Propositions

No.	Planned Activities/Services	Tasks
1	ETAT Certified Training and Workshop	Upskilling of Engineers with Automation 4.0
2	Short Courses	Process Data Acquisition and Analytics with advanced techniques
3	Research and Development	Individual solutions for getting the job done quicker and smarter
4	Platform	Data Visualization on Cloud
5	Research and Development	Consults and applied research and development for the companies
6	Events	Information events and workshops relating industry 4.0
7	Platform	Platform that provides annual events, information, white papers, research results, ads, etc.
8	Platform	Integrated and sharing platform for Data Visualization
9	Events	Student competition/Hackathon for Industry 4.0

The key planned activities and services are ETAT Certified Training and Workshop, Short courses, and Research and Development. These activities will be carried out at all of the 6 ETAT Training Center at each university. The Platform service will be done at the BUU ETAT Training Center due to the server arrangement and IT service infrastructure that has been set up during the ETAT project, including ETAT website and visualization dashboard. The Events service will be an occasional program that should be planned among the Thai partners for organizing such an event annually. This also can be seen as a marketing strategy as well.

5.2 Value Stack

Each ETAT Thai partner specializes in different automation fields that actually somehow related. The value stack shows the possible relationships between Thai partners' training centers. The figure 3 depicts the value stack of the ETAT training centers in Thailand.

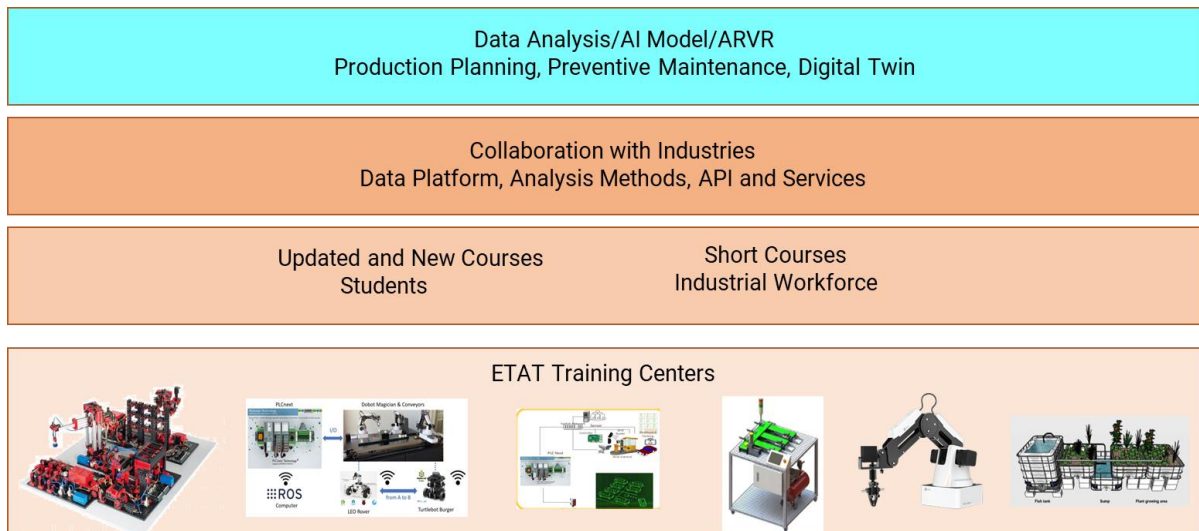


Figure 3 ETAT Business Value Stack

From the figure 3, the value stack begins with each ETAT Thai partner created its own teaching materials and documents based on the ETAT didactic modules. These materials can be used in official subjects for updating or creating new courses in a study programme. Furthermore, the short courses for industrial workforce training can also benefit from these teaching materials.

In case of collaboration, a common data platform is to be established. This platform should bring all of the acquired data together for analysis or visualization purposes. Furthermore, the collected data can be used in various Data Model for different purposes such as manufacturing prediction, preventive maintenance, plant management, etc. An individual user can access this platform via a secured API and services.

At the top level of this value stack is the applications of individual users. One can create applications such as Augmented Reality (AR) or Virtual Reality (VR) using the data from the platform. Furthermore, some specific Artificial Intelligence Models can be used to suit the needs of individual companies. The application can be developed according to Research and Development strategy mentioned above.

5.3 Structure and Collaboration

The Thai ETAT partners are equipped with the PLCnext ETAT Smart Lab training facilities (ESL), which have been developed in the previous tasks within the ETAT project. Moreover, the partner-specific component was also developed and tested for individual purposes, namely, BUU – Smart Factory 4.0, RMUTTO – Robotics, RRU – Smart Agriculture, KU – Process Data Analysis, KMUTNB – IIoT and Railway Transportation, and KMITL – Smart City and Smart Home (Table 2 below). By the end of the ETAT Project lifetime, the Thai partners own the ESL as training facilities, partner-specific component, the developed training materials and the know-how of PLCnext and automation technology.

In a Research and Development task, a consultant (System Integrator: SI) could act as a matchmaker between the industry and the universities – between the demand and the supply. The SI as a facilitator builds the bridge between the demand and the supply. Moreover, the SI has the possibilities to create demands for training and to service potential customers' side. On the universities' side the SI will



provide advice to the ETAT Partner universities about the needs of the potential industry client that the trainings and services could get adjusted accordingly.

The training itself will be offered in the respective ETAT Partner university. Jointly, the ETAT Partner universities and the SI should develop a marketing and promotion strategy in order to wrap the training modules and services into marketable services/products according to expertise of each university. Table 2 depicts the Thai partners, their offered basic and advanced topics, and the specific components they owned.

Table 2 Thai Partners’ Training Programs

Partner	Basic Topics	Advanced Topics	Specific Components
BUU	Basic PLC	HMI, SCADA, AR/VR	Smart Factory 4.0
RMTTO	Basic PLC	HMI, SCADA	Robotics
RRU		IIoT	Smart Agriculture
KU		AI, Big Data	Process Data Analysis
KMUTNB	Basic PLC	HMI, SCADA	IIoT and Transportation (Railway)
KMITL		AI, Big Data	Smart City and Smart Home

5.4 Financial Plan Model

The ETAT Training Centers at the mentioned 6 universities should be initialized as an “**Academic Services Unit**” at a university. Later, they can be incubated and transformed into a Business Unit at a university, depending on how each university operates. In this part, a financial plan model is presented as shown in Figure 4.

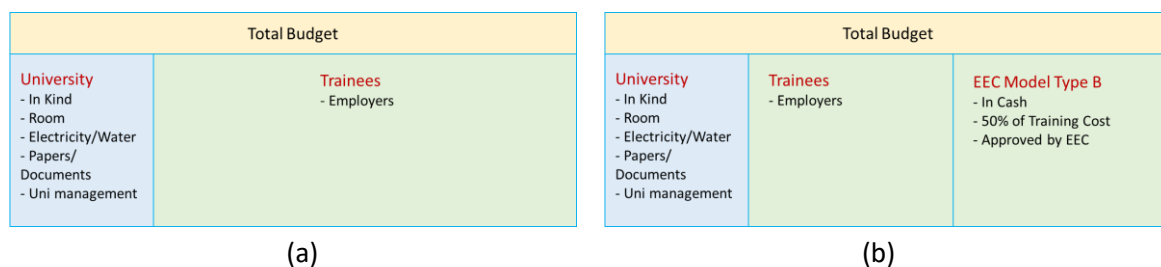


Figure 4 Financial Plan Model (a) without EEC, (b) with EEC

In the financial plan model, 2 different strategies can be described as follows:

1. **(a) Academic Services Unit:** The university can provide the “In Kind” supports in terms of facilities such as training rooms, electricity and water, papers and documents, and part of personnel for university management process. This can be up to 20 – 30 % of the total budget.
2. **(b) EEC Model Type B:** The training courses can be applied for the support of the EEC Office under the program called EEC Model Type B. In this case, the courses have to fulfill the EEC’s requirements and be approved. After the approval, the courses can be offered with the cost reduction of 50% of original cost.



The main budget comes from training costs, which can be divided into 2 cases as follows:

- 1 The trainees pay the total cost for training (without EEC). In this case, the trainees or their employers will pay the total cost for training.
- 2 Training with EEC Model Type B (with EEC). In this case, the training courses must be approved by the EEC office, and then a company can send its employees to be trained at one of the ETAT Training Centers. They will get 50% of the training cost subsidized from the EEC.

5.5 Offered Training Courses

Each Thai university offers training courses related to Industry 4.0 and Automation according to their expertise as follows:

Table 4 Offered Training Courses.

#	Institute	Course
1	BUU	PLCnext Technology Introduction and Implications
2	BUU	PLCnext Basic Programming
3	BUU	PLCnext Advanced Programming on Smart Factory 4.0
4	BUU	PLCnext HMI Programming
5	RRU	Basic IoT and PLC for Smart Farm
6	RRU	IoT for Smart Farm
7	RRU	PLC for Smart Farm
8	RMUTTO	Basic of Industrial Robotics Control
9	RMUTTO	Advance of Industrial Robotics Control
10	RMUTTO	Machine vision
11	KMITL	Basic IoT and PLC
12	KMITL	IoT and application
13	KMITL	Cloud Technology
14	KMUTNB	PLCnext PLC Programming
15	KMUTNB	PLCnext HMI Programming
16	KMUTNB	PLCnext SCADA/Networks Programming
17	KMUTNB	Industrial IoT with PLCnext Technology
18	KMUTNB	ROS Basic Programming
19	KU	PLCnext Basic Programming
20	KU	Data Analysis for industry
21	KU	Big Data and Cloud Technology
22	KU	ETL process on industrial case study



6 Future Joint Activities

Joint activities refer to activities where the ETAT European and the Thai partners could continue their work. Beside the training and teaching in hands-on workshops, the collaborative R&Ds are also in the center point of interest. Following activities are interesting to join:

International Academic Conferences:

- The 7th International Conference on Information Technology (InCIT2023)
 - Submission Date: July 30, 2023
- The 15th International Conference on Knowledge and Smart Technology (KST2024)
 - Submission Date: TBA
- The 21st International Conference on Smart Technologies & Education
 - Submission Date: TBA

Technology and Automation Events:

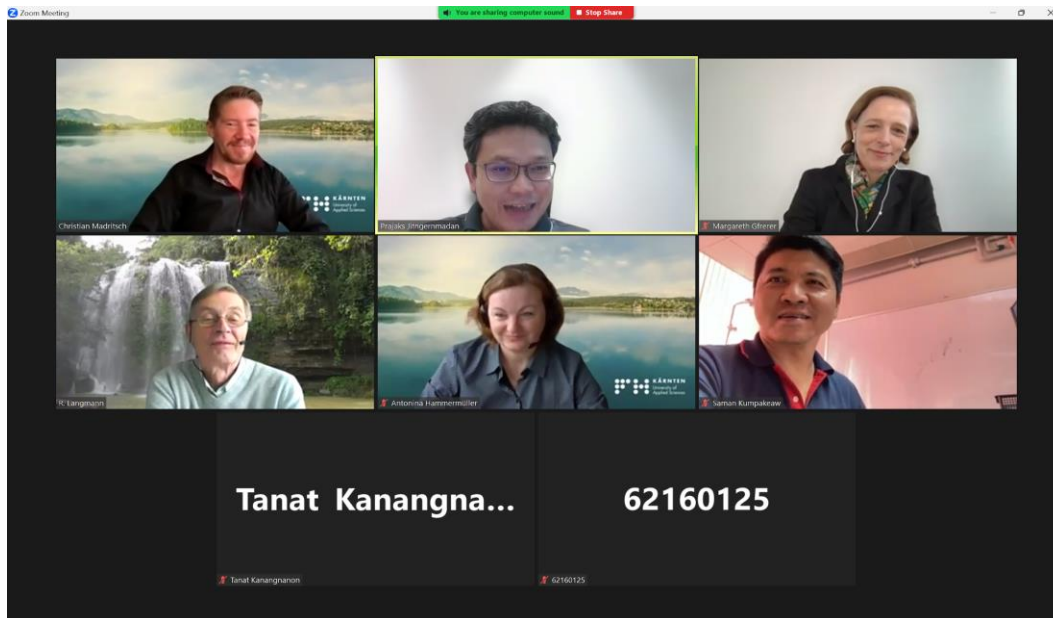
- BUU TechTalk 2024
 - Date: TBA
- PLCnet Training Workshop 2024 @BUU
 - Date: TBA



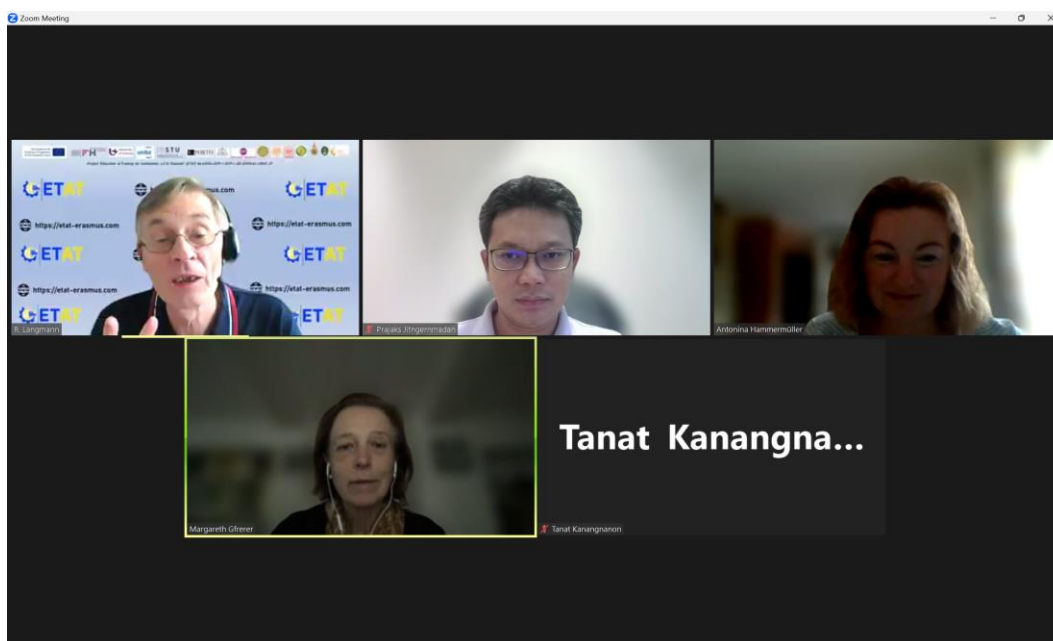
7 Appendices

7.1 Appendix I

Business Model Canvas Discussion Group: 10.05.2023



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2nd Revision on 13.10.2023

