INNOCENS
INNOVATION & ENTREPRENEURSHIP

Co-funded by the Erasmus+ Programme of the European Union

573965-EPP-1-2016-1-SE-EPPKA2-CBHE-JP
Enhancing innovation competences & entrepreneurial skills in engineering education

Innovation and entrepreneurship in higher education

Huaan Fan, Royal Institute of Technology (KTH), Sweden

INNOCENS Final Conference, Nur-Sultan, Kazakhstan. 2019-10-03.

Innovation and global challenges

- Maintain competitiveness in developed countries
- Move on the value chain in emerging economies
- Diversify economy and reduce the dependency on oil and gas
- Create jobs and build welfair for the whole society

Small startups can become tech giants

What is needed to have more innovative tech companies?

Environment

Policy, legal systems, free market economy,

government-university –business partnership

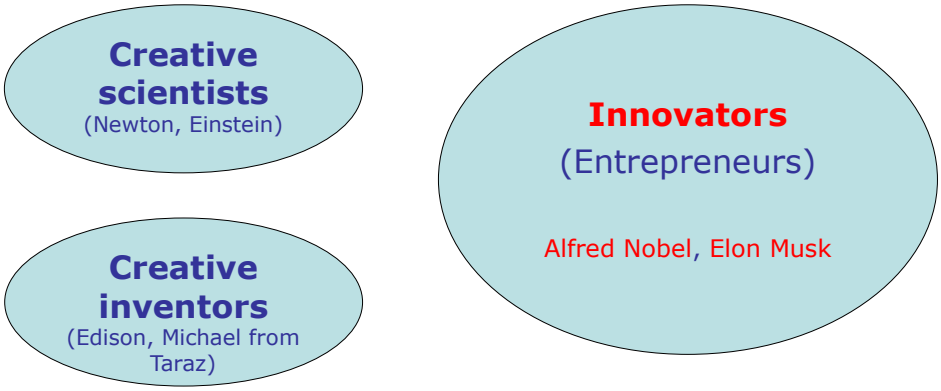
Creativity

New, original, unusual ideas, thinking outside of the box leading to new different approaches

Entrepreneurs

Entrepreneurial mindset, entrepreneurial skills, professional support (incubator, accelerator, venture investors, …)

Creativity, Invention vs Innovation



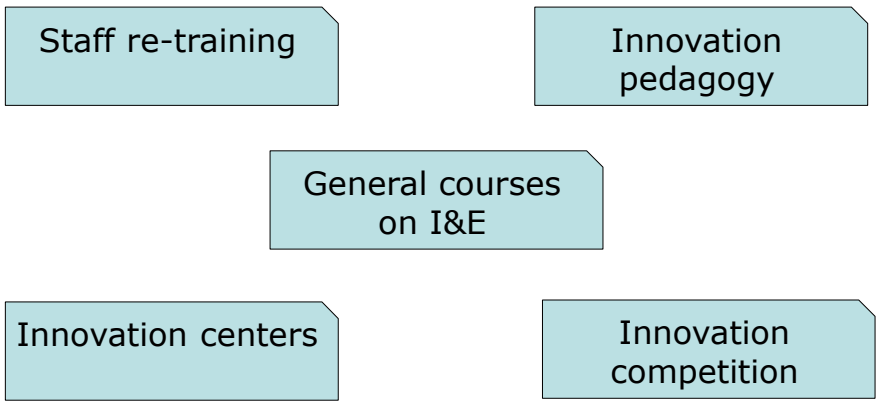
The INNOCENS project

- A capacity building project supported by EU's Erasmus+ Programme
- 19 partners in 7 countries (Sweden, Spain, Finland Armenia, Georgia, Belarus, Kazakhstan &), including 11 universities
- KTH in Sweden as the coordinating institution
- 3-year project (15/10/2016 – 14/10/2019)

11 university partners

- Royal Institute of Technology (KTH), Sweden
- Turku University of Applied Sciences, Finland
- Polytechnical University of Valencia, Spain
- National Univ of Architecture & Construction of Armenia
- National Polytechnical University of Armenia
- Georgian Technical University
- Batumi State University
- Belarusian State University
- Brest State Technical University
- Almaty University of Power Eng. and Telecommunication
- Taraz State University

Main project activities



Study visit and training of trainers

Study visits on European innovation systems (Stockholm, Sweden, June 2017)

Training in entrepreneurship (Valencia, Spain, April 2017)

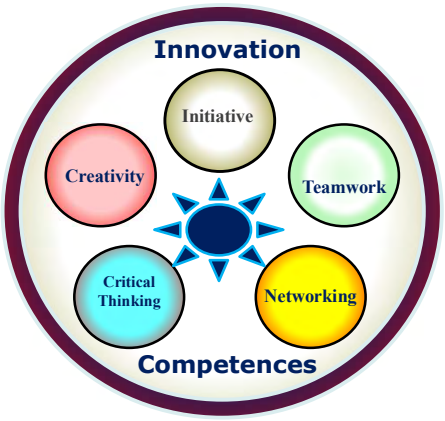
3 workshops on innovation pedagogy

How to define & enhance innovation competences? (Turku, Finland, Sept 2017)

How to assess innovation competences? (Minsk, Belarus, September 2017)

Innovation competences and curricular design (Taraz, Kazakhstan, April 2018)

Innovation competences



© FINCODA UPV-SEE-CSP team (2017). *Innovation Competence Model*

Innovation pedagogy (*innopeda*)

- New philosophy and mindset for higher education
- Flexible, working-life oriented curricula focusing on skills and competences
- Multi-disciplinary learning environment
- Development-oriented assessment
- Entrepreneurial mindset and skill
- Student-centered *active learning*

Tarja Åberg (2019). Innovation pedagogy and innovation competence assessment

Innopeda experiment in active learning

- During 2017-2019, every partner university has tested some of active learning methods:
  - *Co-teaching with business professionals*
  - *Project hatchery*
  - *Innovation camp*
  - *Gamification*
  - *Problem-Based Learning (PBL)*
  - *Flipped class*
  - *Collaborative learning*
  - *Learning by case method*
  - *Learning by teaching*
  - *online learning*
  - *Blended learning ……..*

Innovation competence assessment

- Continuous self-assessment by students
- Web-based (online)
- *FINCODA Innovation Barometer*
  - 34 indicators → 5 basic innovation competences

Educating students in innovation

- All engineering students need basic knowledge in math, physics, chemistry, biology etc
- In modern times, knowledge in IT (programming), law, economics, environment is also important
- In the future, every engineer must have basic knowledge/skills in innovation and entrepreneurship
  - ✓ Understand the importance of an innovation-friendly environment (*national innovation systems*)
  - ✓ Have practical skills in commercialization and business idea development (*entrepreneurship*)

Developped & delivered 2 general courses

Innovation systems

Syllabus / topics

1) Importance of innovation for economic growth and development
2) Innovation indicators, international innovation assessment and ranking
3) National innovation policy
4) Human capital and intellectual property rights
5) Government-university-business partnership
6) Innovation process and innovation management
7) Professional support in innovation and entrepreneurship:
8) Technology-based innovations: biotech, health and clean energy, IT and telecom, ***fintech***
9) Social entrepreneurship to meet new challenges in societies

Entrepreneurship for engineers

Syllabus / topics

1) Business idea generalization
2) Intellectual property strategies
3) Customers and market
4) Team building
5) Finance, venture capital
6) Business plan
7) Internationization
8) Project 1: case study and anaylis
9) Project 2: business plan development

Establishment of innovation centers

- A unit within a partner university with dedicated staff (full time or part time employed)
- Office space
- IT and other office equipment (≈ 159 000€)
- Provide pre-incubator servies to students/teachers
  - ✓ *any student with a new idea can come to the center to get help to: evaluate/validate the idea, search team members or external mentors, find financing, and finally transform the rough idea into a viable business (startup)*

New innovation centers in Kazakhstan

Taraz, March 2, 2018

Almaty, June 6, 2018

Open ceremonies in Armenia & Georgia

Yerevan, June 6, 2018

Tbilisi,
May 25, 2018

Batumi,
May 29, 2018

Two innovation centers in Belarus

Minsk, April 29, 2019

Brest, July 22, 2019

Development of innovation centers

Reach out to the students

seminar, course, training,workshop events, ……

Networking
build local innovation eco -systems (with entrepreneurs, companies,public agencies

Business idea development
Help students transform new ideas into viable business/startup

Innovation competitions

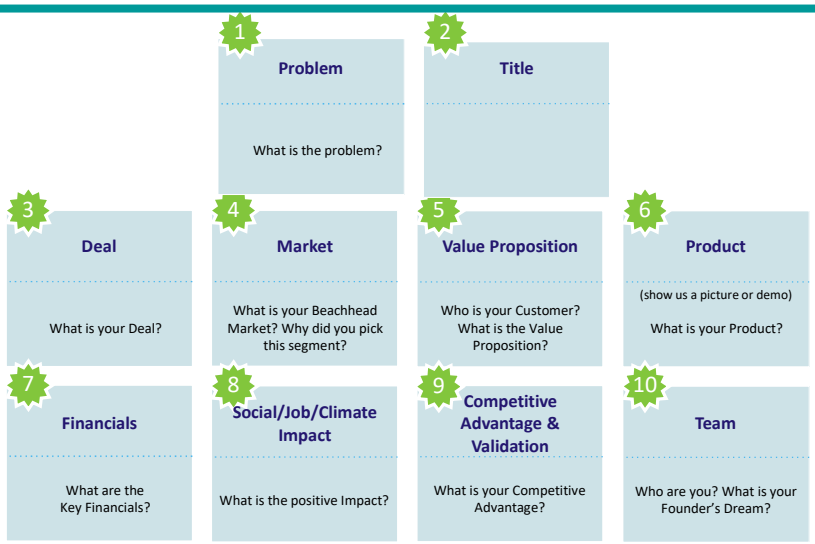
Learn by doing, have fun !

INNOCENS innovation competition

Criteria of business idea competition

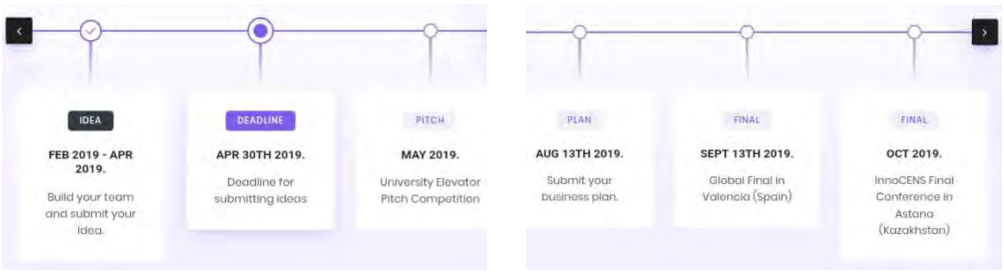
- Novelty of the business idea
- Commercial potential
- Social impact
- Quality of the business plan
- Pitch performance

Common pitch deck



(Israel Griol Barres, 2019)

Competition timeline



(Israel Griol Barres, 2019)

Business ideas from partner university students

	Partner university	No. of ideas
1	National Polytechnic University of Armenia (NPUA)	**44**
2	National University of Architecture and Construction of Armenia (NUACA)	**31**
3	Georgian Technical University (GTU)	**19**
4	Batumi State University (BSU_GE)	**23**
5	Belarusian State University (BSU_BY)	**16**
6	Brest State Technical University (BrSTU)	**14**
7	Almaty University of Power Engineering and Telecommunication (AUPET)	**15**
8	Taraz State University (TarSU), Kazakhstan	**26**
Total number of business ideas submitted to the competition		**188**

Global competition in Valencia 2019-09-13

Global competition in Valencia

Global winner: NPUA Team

Summary of major results

- Re-trained more than 140 staff members via 5 training courses/study visits/workshops
- Introduced innovation pedagogy to enhance students innovation competenecs
- Developped/delivered two general courses on innovation/entrepreneurship to students in selected study programs
- Established 8 innovation centers which are now operational and will be sustained in the future
- Organized innovation competitions with 188 ideas collected, 8 local winners and 1 global winner

Competition timeline

For more info about INNOCENS

Welcome

to the afternoon session !

Co-funded by the Erasmus+ Programme of the European Union

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TURKU UNIVERSITY OF APPLIED SCIENCES

INNOCENS final conference in Nur-Sultan 3. – 4.10.2019

Turku University of Applied Sciences (TUAS), Finland

Tarja Åberg, TUAS, Finland 2019

Co-funded by the Erasmus+ Programme of the European Union

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Innovation pedagogy ?

- **a learning approach** that defines in a new way how knowledge is assimilated, produced and used in a manner that can create sustainable innovations.

Innovation competences?

- such as ***creativity, critical thinking, initiative, teamwork*** **and** ***network abilities*** which enable students to participate in innovation processes in their future jobs so that real innovations are created.

> *" I never teach my pupils, I only attempt to provide the conditions in which they can learn."*
> *- Albert Einstein*

Tarja Åberg, TUAS, Finland 2019

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Why innovation pedagogy?

Why the change is needed from traditional pedagogy to innovation pedagogy?

- We live in a dynamic environment and need to be able to solve wicked problems such as climate change
- The job descriptions of young people can change approx. 25 times during their lifetime.
- About 65% of young people today will work in jobs which do not even exist now.
- The most important competences to success in working life will be skills for life-long learning, ability to recognize and assess own learning and ability to develop it.
- The traditional approaches in HEIs do not provide competences needed in current and future work
- The graduates will be successful in their work and life in general, as well as the organizations, where they work, will be successful.

Tarja Åberg, TUAS, Finland, 2019

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The Corner stones of Innovation pedagogy

- activating learning and teaching methods
- working-life orientation
- innovative RDI operations integrated with studies
- flexible curricula
- multi-disciplinary learning environments
- internationalization
- entrepreneurship
- versatile and development-oriented assessment
- renewing teacher roles

" Learning by doing

together with working life

with supportive university platform

with own active attitude "

Tarja Åberg, TUAS, Finland 2019

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Innovation competences

TUAS participation in research
on innovation competences within EU projects

- Co-funded by LLP
- How to measure innovation competencies
- theoretical background building **INCODE barometer**
- 2011-2013

INCODE

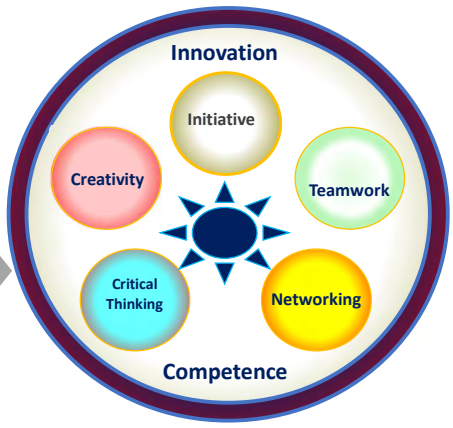
INNOKOMPPI

- Co-funded by ERF
- Validating the tool
- **INNOKOMPPI barometer**
- 2012-2014

- Co-funded by Erasmus KA
- From higher education to the enterprises
- **FINCODA barometer** to be used also in enterprises
- **software application tool for competence assessment**
- 2014-2017

FINCODA

FIVE MAIN INNOVATION COMPETENCES



Tarja Åberg, TUAS, Finland2019

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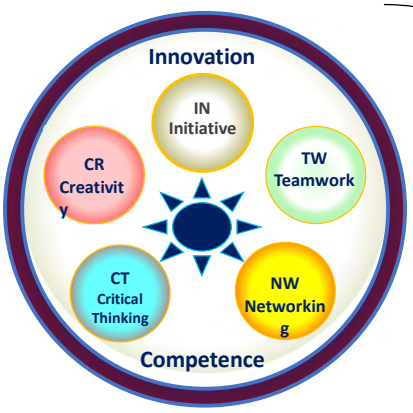
FIVE MAIN INNOVATION COMPETENCES



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Innovation Competence Model

34 INDICATORS OF FIVE MAIN INNOVATION COMPETENCES

Number	Code	Items
1	CR1	Think differently and adopt different perspectives
2	TW1	Be attentive when others are speaking, and respond effectively to others' comments during the conversation
3	CR2	Use intuition and own knowledge to start actions
4	TW2	Invite feedback and comments
5	IN1	Foster improvements in work organization
6	TW3	Obtain constructive comments from colleagues
7	CR3	Find new ways to implement ideas
8	TW4	Identify sources of conflict between oneself and others, or among other people, and to take steps to overcome disharmony
9	IN2	Take an acceptable level of risk to support new ideas
10	IN3	Go beyond expectations in the assignment, task, or job description without being asked
11	NW1	Meet people with different kinds of ideas and perspectives to extend your own knowledge domains
12	IN4	Convince people to support an innovative idea
13	IN5	Systematically introduce new ideas into work practices
14	IN6	Act quickly and energetically
15	CR4	Generate original solutions for problems or to opportunities
16	CT1	Use trial and error for problem solving
17	CT2	Develop and experiment with new ways of problem solving
18	NW2	Acquire, assimilate, transform and exploit external knowledge to establish, manage and learn from informal organisational ties
19	CT3	Challenge the status quo
20	CT4	Face the task from different points of view
21	CR5	Make suggestions to improve current process products or services
22	CR6	Present novel ideas
23	CT5	Forecast impact on users
24	CR7	Show inventiveness in using resources
25	CR8	Search out new working methods, techniques or instruments
26	TW5	Provide constructive feedback, cooperation, coaching or help to team colleagues
27	TW6	Work well with others, understanding their needs and being sympathetic with them
28	NW3	Share timely information with the appropriate stakeholders
29	TW7	Consult about essential changes
30	NW4	Build relationships outside the team/organization
31	CR9	Refine ideas into a useful form
32	NW5	Engage outsiders of the core work group from the beginning
33	CT6	Ask "Why?" and "Why not?" and "What if?" with a purpose
34	NW6	Work in multidisciplinary environments

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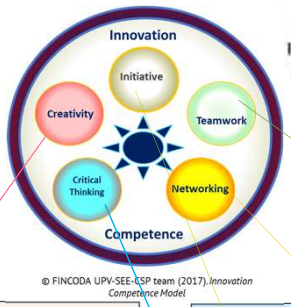

© FINCODA UPV-SEE-ESP team (2017). *Innovation Competence Model*

Innovator has mastery on one or more of the basic innovation competences

Creativity: ability to think beyond existing ideas, rules, patterns or relationships. To generate or adapt meaningful alternatives, ideas, products, methods or services regardless of possible practicality and future added value.

Critical thinking: ability to analyse and evaluate advantages and disadvantages and estimate the risks involved for a purpose.

Teamwork: ability to work effectively with others in a group.

Initiative: ability to influence/make decisions that foster positive changes. To influence creative people and those who have to implement the ideas.

Networking: ability to involve external/outside stakeholders outside the team

(Marin-Garcia et al., 2016.)

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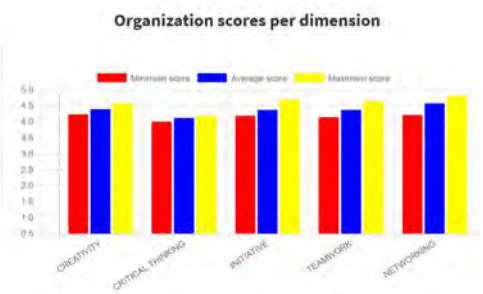
Innovation competence assessment

https://www.fincoda.eu

A tool for universities and other working life organizations for measuring individuals' innovation competencies

Amazing results

Scaled bar charts provide a visual representation of data across dimensions



Awesome design

The columns in the survey report display grouped data and compare across dimensions

"If you want to change student learning, change assessment" (Brown, et al. 1997)

Tarja Åberg, TUAS, Finland2019

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Innovation peadgogy and innovation competence assessment in InnoCens

- Introduction of innovation pedagogy and innovation competence assessment
- Implementation of innovation pedagogy and innovation competence assessment in two of engineering courses

in four partner countries

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What was done in each university:

- implemented some Innopeda methods in two courses
- piloted or introduced Fincoda barometer or the SW tool in some way
- collected feedback of the experiences & reported it
- analysed the feedback and defined the lessons to learn
- positive trust to the future and willingness to continue
- HONESTY IN FEEDBACK!!!

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Special mention for two universites of FOCUSED and INVOLVED work

TarSu: assessing innovation competences:

- Fincoda barometer translated in Armenia
- adapted by INDIGO local soft ware
- assessed group of 20 teachers with deep analysis
- assessed group of 33 master students with deep analysis

AUPET: used project hatchery method:

- with deep analysis of experiences;
  - positive & negative
  - lessons to learn

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What was learned
What next
?

- needs more introduction of Innopeda to the staff
- to define clear expectations for the courses & outcomes to students
- better preparation
- feedback in the end
- better involvement of students

- stuff trainig
  - continue the innopeda competence assessment implementation
    - better preparation
      - more focused content orientation
        - more practicing

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Thank you!

TUAS team from Finland,

” the world`s happies country 2019”

Israel Griol-Barres

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IDEASUPV
tu empresa empieza aquí

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

INNOVATION, ENTREPRENEURSHIP AND BUSINES IDEA DEVELOPEMENT

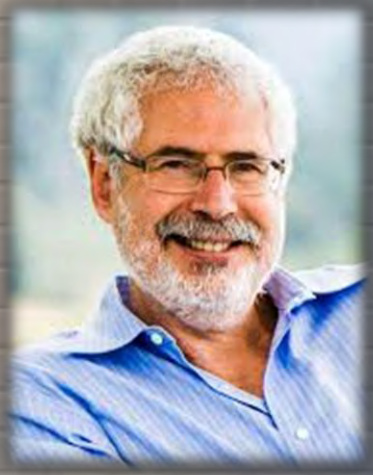
INNOCENS Final Conference
Nur-Sultan – October 3rd 2019


Research is good, but NOT enough.

A startup is not a small company.

So, what's a startup?

A TEMPORARY ORGANIZATION DESIGNED TO SEARCH FOR A REPEATABLE AND SCALABLE BUSINESS MODEL



Steve Blank

"A startup is a human institution designed to create a new product or service under conditions of extreme uncertainty."

Eric Ries

Startup VS Company

A Startup looks for a business model

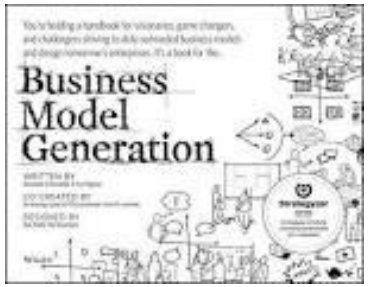
A Company executes a business model

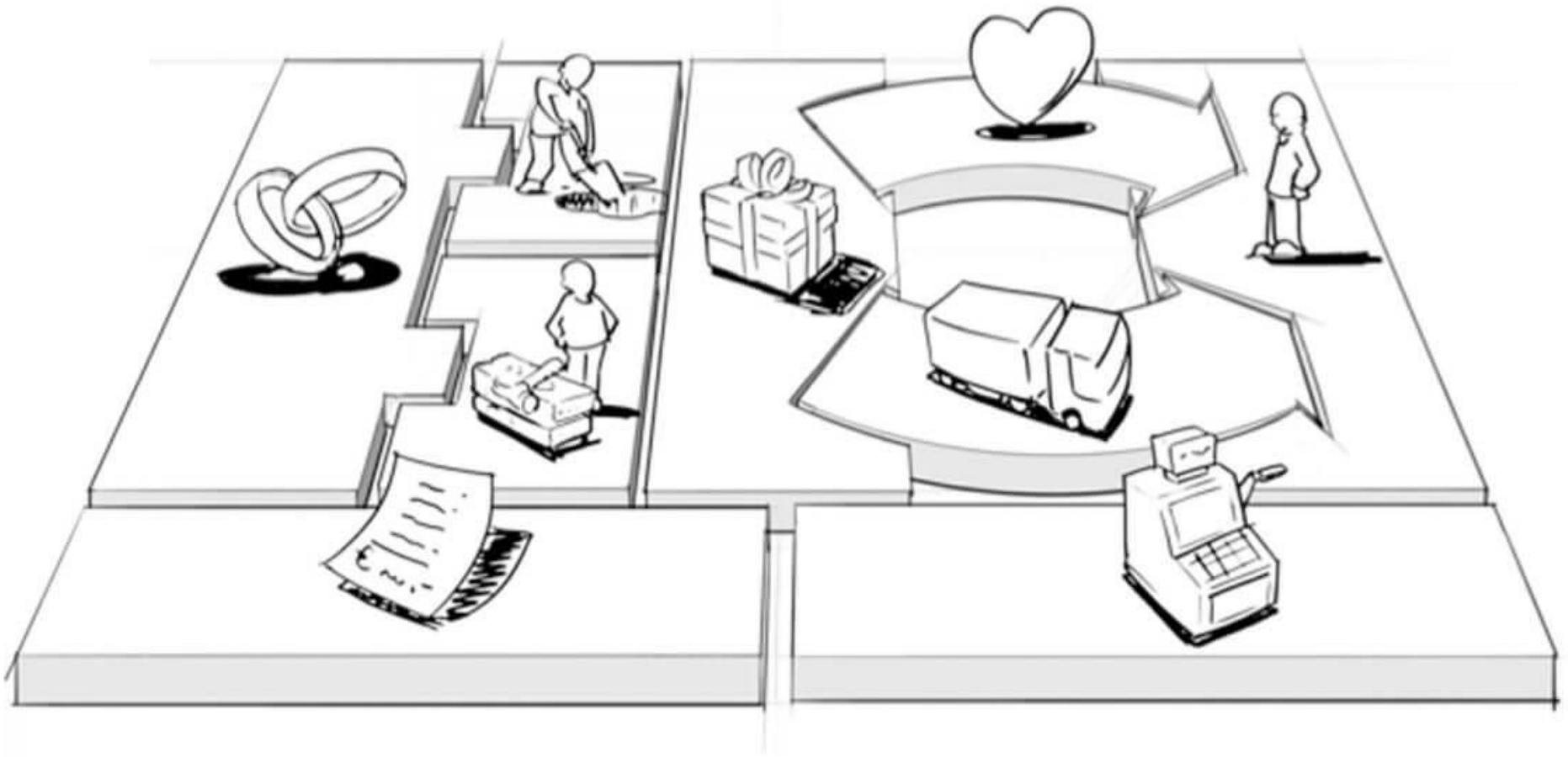

What is the main goal of a startup?


What is the main goal of a startup?
TO STOP BEING A STARTUP…

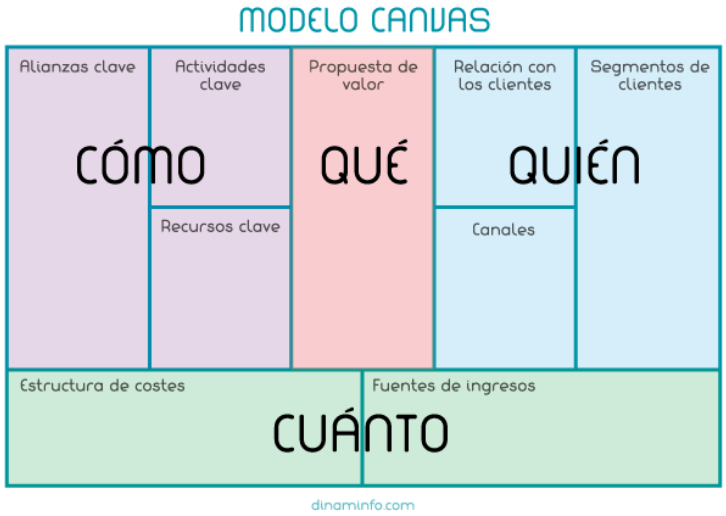
What is the main goal of a startup?

TO STOP BEING A STARTUP…
… AND TO BECOME A SUCCESSFUL COMPANY


Business
Model
Generation



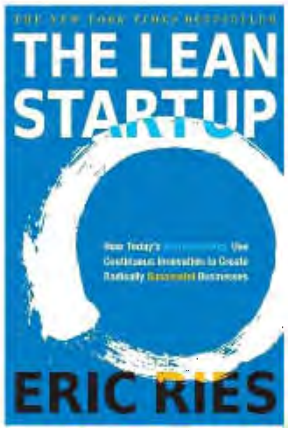
BUSINESS MODEL → VALIDATION → MILESTONES

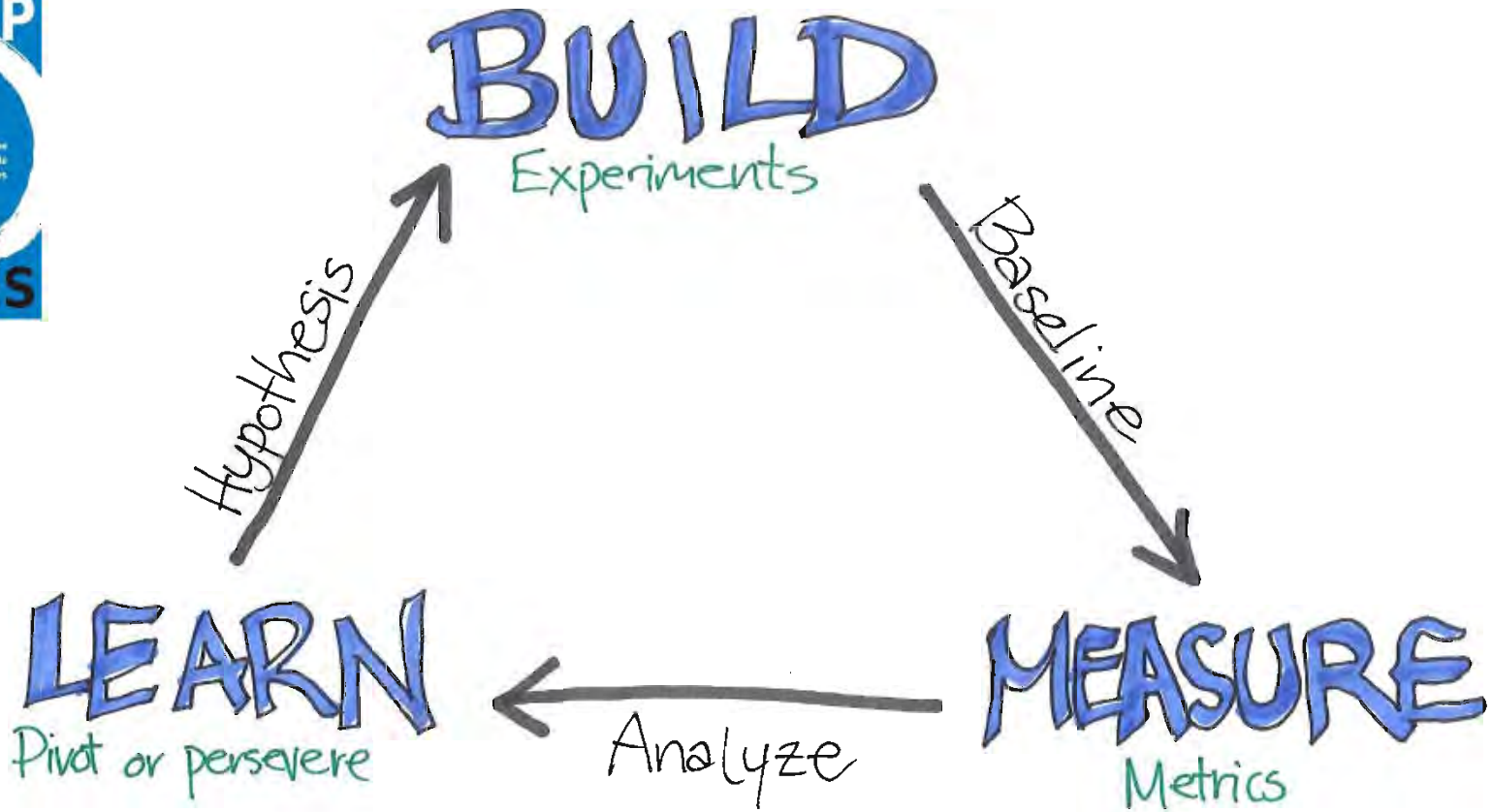


Get Out of the Building

'There are no facts inside your building, so get the heck outside'

\- *Steve Blank*


THE LEAN STARTUP
ERIC RIES


BUILD
Experiments
Baseline
MEASURE
Metrics
Analyze
LEARN
Pivot or persevere
Hypothesis

The Customer Development Model


MOTIVATION
MENTORING
TRAININGS
ACCESS TO FUNDING
INNOCENTRE
LOCAL ENTREPRENEURIAL ECOSYSTEM
PHYSICAL SPACES
TEAM BUILDING
COMPETITIONS

Inspiring everybody in the university

New research results and spinoffs

New startups

Trainings: Learning by doing

Innovation centres of the project

Armenia

National University of Architecture and Construction of Armenia (NUACA),
National Polytechnic University of Armenia (NPUA),

Georgia

Georgian Technical University (GTU),
Batumi Shota Rustaveli State University, (BSU)

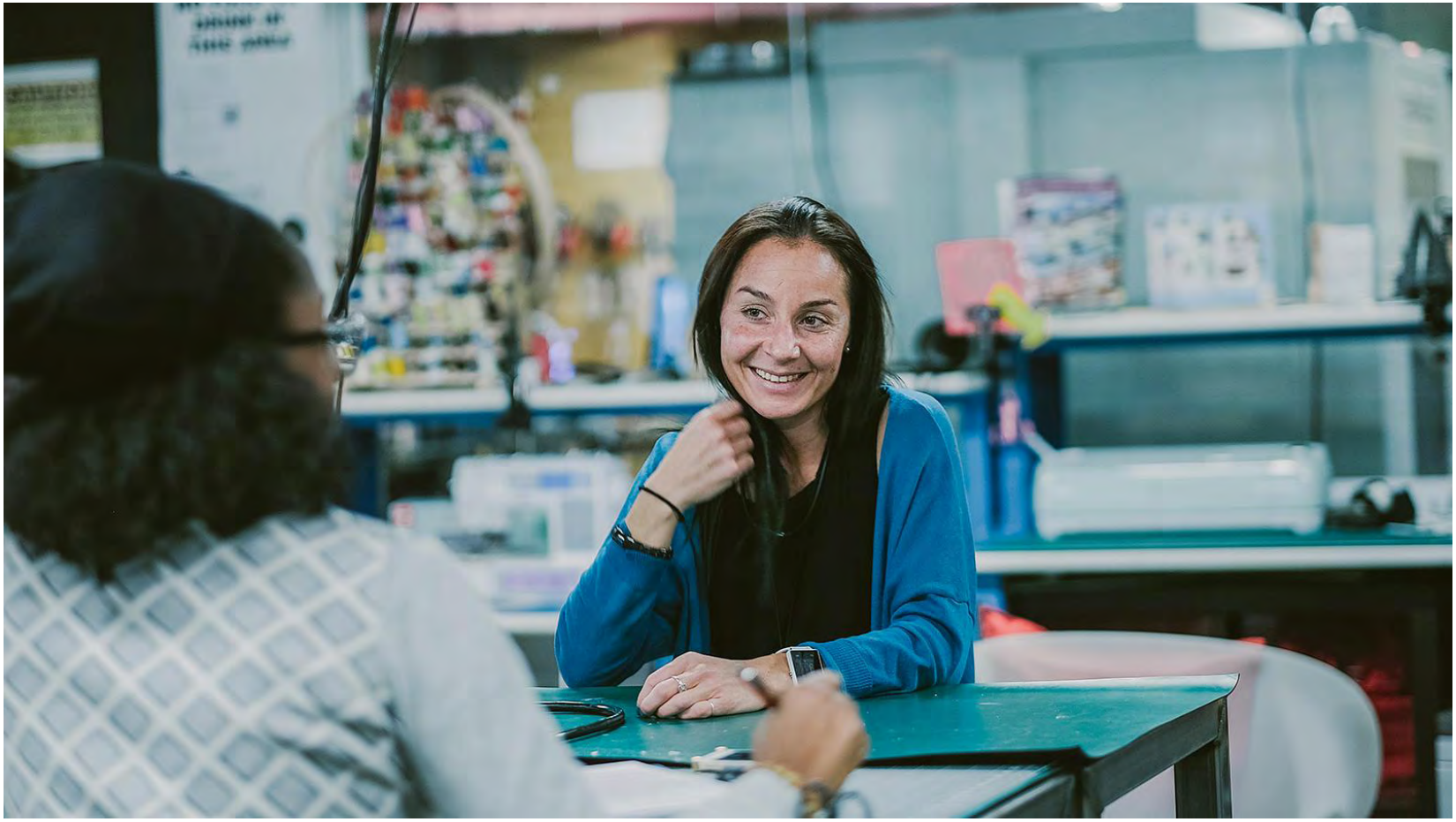
Belarus

Belarusian State University (BSU),
Brest State Technical University (BSTU),

Kazakhstan

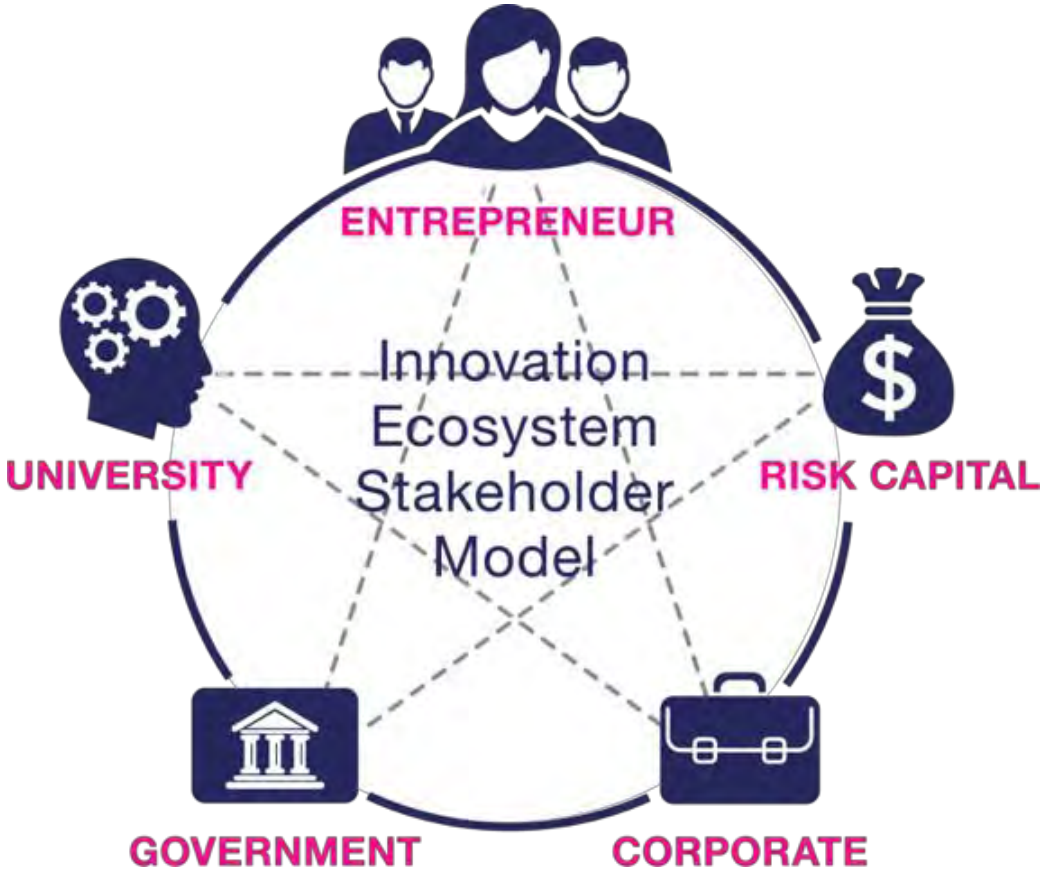
Taraz State University named after M.Dulati, (TarSU)
Almaty University of Power Engineering and Telecommunications (AUPET,)

Mentoring sessions: Face to Face



Local entrepreneurial ecosystem

MIT Model



And much more…

- Access to funding: investors, business angels…
- Physical spaces: Rooms, FabLabs, Coworking spaces, Offices…
- Team building
- Business Idea Competitions

MENTORING

Process:

WHAT TO DO IN A MENTORING MEETING?

Evaluate idea and team.
Evaluate business model.
Create and evaluate a validation plan.
Team building, partner agreements.

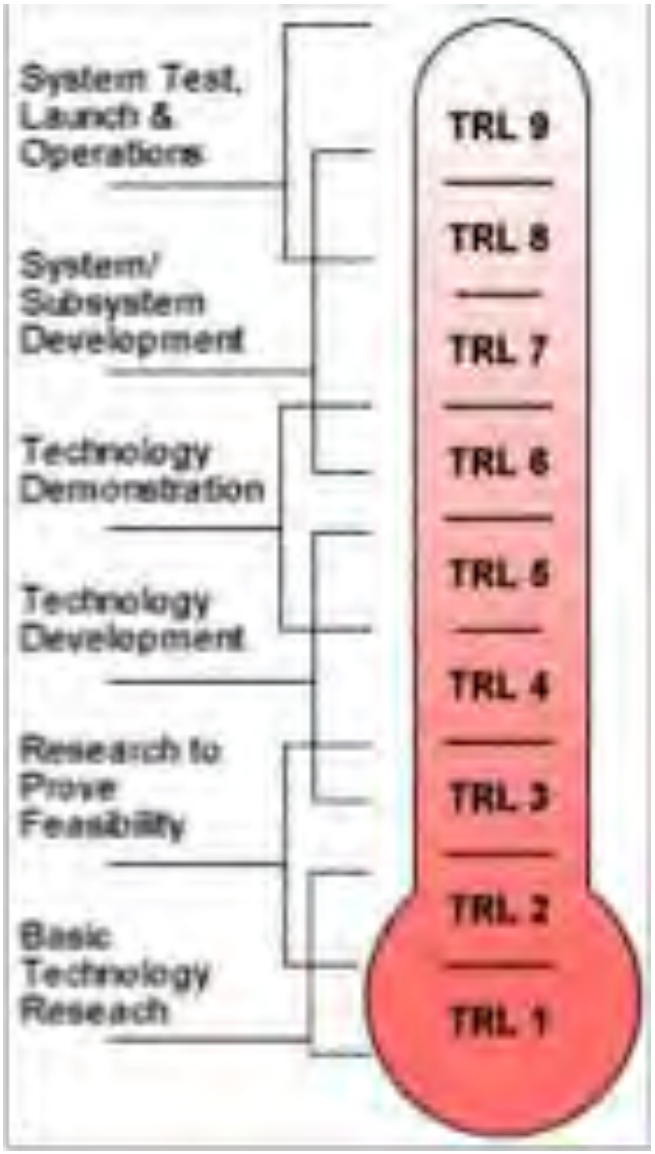
The entrepreneur/startup contacts the mentor every time they want to meet.

All the meetings are scheduled in a CRM.

Evaluation of business ideas

- Commercial potential.
- Innovation / Novelty.
- Social/Job/Climate impact.
- Degree of validation of the idea.
- Strength of the team.
- Quality of the pitch. Communication skills.

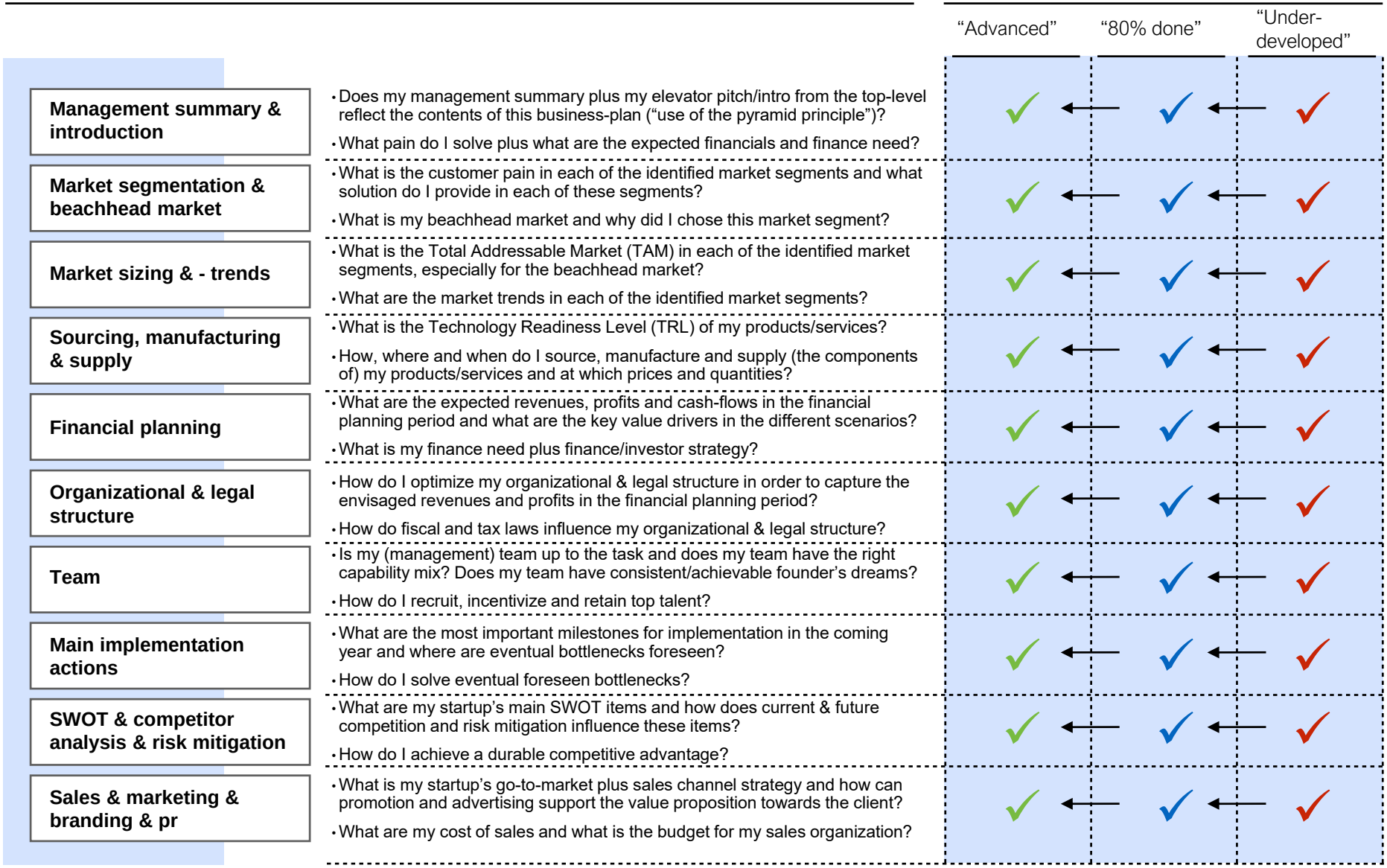
Technology Readiness Level (TRL) of Company X products & services:



Evaluation of the maturity of a startup

Key topics & questions to be addressed for any startup:

Perceived status of this BP:



Source: Company X; Climate-KIC; Start-U-up

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INNOCENS BUSINESS IDEA COMPETITION

INNOCENS COMPETITION

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Do you have a business idea?
Compete for a big impact.

Apply now on
www.innocens.webs.upv.es

INNOCENS Business Idea Competition.

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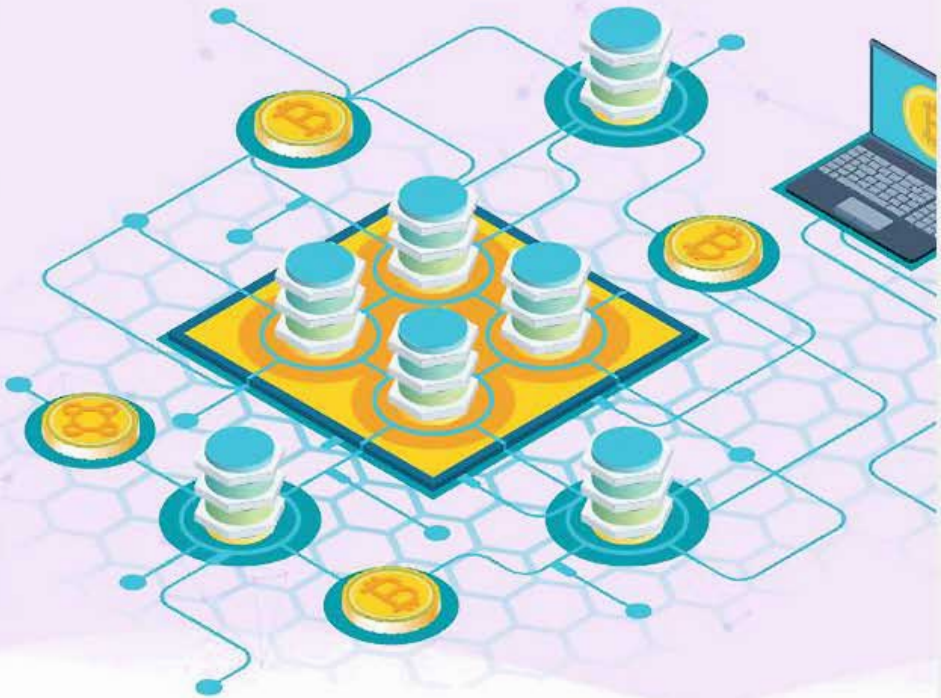
INNOVATION BUSINESS IDEA COMPETITION by InnoCENS

Do you have a business idea?

Compete for a big impact in the InnoCENS Innovation Business Idea Competition 2019.

Call for participation

Download Participation form



Boost your business project

Do you have a business idea? Do you dream of becoming an entrepreneur?
This is a wonderful way to put in practice your entrepreneurial and innovative skills in an international business idea competition.

Don’t miss the opportunity and participate in the competition in your university!

Enter now!

STEP 1: Simple form to apply till April 30th

INNOCENS COMPETITION

STEP 2: Every INNOCENTRE selects TOP10 ideas

Each team sent:

- Business Model Canvas
- 5 minute presentation

- Innocentre provided coaching and training in Elevator Pitch!!!

STEP 3: Local Pitch competition in every university partner – May 2019

INNOCENS COMPETITION

AWARD: 2500€ to attend Global Final

COMMON PITCH DECK

1. **Problem**
   What is the problem?
2. **Title**
3. **Deal**
   What is your Deal?
4. **Market**
   What is your Beachhead Market? Why did you pick this segment?
5. **Value Proposition**
   Who is your Customer? What is the Value Proposition?
6. **Product**
   (show us a picture or demo)
   What is your Product?
7. **Financials**
   What are the Key Financials?
8. **Social/Job/Climate Impact**
   What is the positive Impact?
9. **Competitive Advantage & Validation**
   What is your Competitive Advantage?
10. **Team**
    Who are you? What is your Founder's Dream?

INNOCENS COMPETITION

STEP 4: Business Plan Submission – Aug 13th 2019

INNOCENS COMPETITION

STEP 5: INNOCENS Global Competition

Valencia (Spain) – Sep 13th 2019

INNOCENS COMPETITION

STEP 6: Global champion attend the InnoCENS Final Conference

Nur-Sultan (Kazakhstan) – October 2019


GLOBAL WINNER
INNOVATION BUSINESS IDEA
COMPETITION


.gali .con

IC sustainability plan

- Dedicated university staff
- Strong networking (Business-university-government) – communicating with business community, associations, professional unions, etc – entrepreneurship day, job fair
- Continue work with ongoing and new projects
- Conducting different activities at the university and local levels (competitions, hakathons, startup demodays, camps, trainings, workshops, etc)
- Dissemination of information on activities through all possible channels (mass media, social networks, website, direct contacts etc)

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"NO!
Try not!
DO or DO NOT,
There is no try."

Alexander Osterwalder / Yves Pigneur "Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers (Generación de modelos de negocio)"

Eric Ries "The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses (El método Lean Startup: Cómo crear empresas de éxito utilizando la innovación continua)"

Ash Maurya "Running Lean: Iterate from Plan A to a Plan That Works"

Steven G. Blank / Bob Dorf "The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company (El manual del emprendedor: La guía paso a paso para crear una gran empresa)"

Bill Aulet "**Disciplined Entrepreneurship: 24 Steps to a Successful Startup**"

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Georgian Technical University

"Implementation of Innovation Pedagogy at GTU"

The final project INNOCENS conference

Nur-Sultan, Kazakhstan

October 1-5, 2019

1

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How we understand, what is Innovation pedagogy ?

- A learning approach that defines in a new way how knowledge is assimilated, produced and used in a manner that can create sustainable innovations;

Why the change is needed from traditional pedagogy to innovation pedagogy?

- The traditional approaches in HEIs do not provide enough competences needed in current and future work;

Why innovation pedagogy?

- The graduates will be successful in their work and life in general, as well as the organizations, where they work, will be successful;

How can we do it? Examples:

- "Learning by doing";
- "Together with working life";
- "With supportive university platform";
- "With own active attitude" etc.

2

Some existing pedagogy methods and how we made piloting of selected innovation pedagogy method in GTU?

Innovative Attitudes:
● Existed and ● to be Existed Approaches

Forms and Methods of Achieving the Learning Outcomes:

- ◯ Lecture/Seminar;
- ◯ Guest Lecturer, Co-Teaching;
- ◯ Practical Classes (Team Working, Exercises, Case Study, Presentation);
- ◯ Group work/Discussions, Role Play;
- ◯ Course Work/Project;
- ◯ Assignments by Business Sector;
- ◯ Independent Work (Working on Book, Reading and Comprehension);
- ◯ Reading and Reflection.
- ◯ International Group Work;
- ◯ Profession Excursion;
- ◯ Success Stories;
- ◯ Paid Internship.

- Evaluation
- Assessment: Self-assessment, Teacher Assessment

3

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Piloting of some Innovation Pedagogy method at GTU

What have we done and how?!

Within project InnoCENS activities, based on the project experience, at GTU in 2 Faculties - Faculty of Power Engineering and Telecommunication (course - "Entrepreneurship and Problem Solving") - Faculty of transportation and Mechanical Engineering (course - "Principles of Entrepreneurship") were provided the following innovation pedagogy methods (as pilot project of InnoCENS) during the fall semester of 2018-2019 academic year:

- **Guest Lecturer;**
- **Co-Teaching;**
- **Group work – Final Project;**

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Guest Lecturer

- Guest lecturers at a university are usually up-and-comers, experts or well-known in their field;
- This is a great opportunity for networking opportunities (a guest lecturer may be present during a class or at a special time outside class);
- Beyond professional practices, university might invite a guest speaker to give advice to students on general planning for the future;
- Guest lecturers can open up student's eyes to job prospects they never saw possible before;
- Listening to a guest speaker and participating in ensuing discussions can be an invaluable part of student's university education.

Guest Lecturer at GTU

The representatives from business sector were invited at GTU to deliver the lectures presenting their experiences and best practices and talk about their "success stories":

1. Founder of restaurant chain "Chemo Kargo";
2. Founder of IT company "F1";

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Co-Teaching

Co-teaching is the strategy of having two instructors in the same class to provide extra content, student assistance, and support.

Co-teaching has been proven to help students in at least three big areas:

- Improved teacher-student attention;
- Shared instructor expertise and responsibility;
- Improved student achievement, in general.

Co-Teaching at GTU

Business representatives conducted the lectures together with GTU teacher on appropriate topic which is included in the syllabus "Entrepreneurship for Engineers";

Delivered Topics: 1. "The Role and Importance of Entrepreneurship for the Modern Economy of Georgia";
2. "Entrepreneurship and decision making";

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Group work

What are the benefits of group work?

- Break complex tasks into parts and steps;
- Plan and manage time;
- Refine understanding through discussion and explanation;
- Give and receive feedback on performance;
- Challenge assumptions;
- Develop stronger communication skills.

Group work experience at GTU - Group work project

- Group work project is included in the course - Entrepreneurship for engineers;
- Final Project was implemented within working groups and presented by them at the end of the semester;
- Projects were related to real business cases and had been idea generations as well;
- In the course "Entrepreneurship for engineers" group work project structure contains 12 topics.

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Feedback from Student Experiences

- In general students feedback was positive. It was interesting for them to meet with the business representatives and consider the real stories;
- According to the students feedback, the group work projects were very useful for their communication and group work skills development;
- Taking into account positive feedback, above mentioned innovative methods will be implemented again in the class during upcoming semesters;
- Syllabus "Entrepreneurship for Engineers" is a Bachelor Compulsory Elective course (Optional), thereof students are willing to know more about the courses before the start of the semester.

8

Feedback from Teachers Experiences

- Teachers have mentioned that it was not always easy to attract Businessmen for delivering lectures and be a co-teacher as well as to deliver lectures and share their experiences from both theoretical and practical viewpoints;
- According to teachers feedback, GTU still needs to promote greater awareness on the types and methods of innovative and technology-enhanced T&L methodology and share best practices;
- Teachers feedback pointed out that GTU needs to carry out extensive activities to introduce innovative pedagogy methods to its academic staff

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Appropriate actions carried out for the Innovation Pedagogy implementation at GTU:

- **"Teaching Staff Development Center" (TSDC) was established within the structure of GTU Innovations Center** to support the provision of innovation pedagogy activities at GTU**;**
- In February- March 2019, certified **Teacher Training (TT) courses** on innovative methods of teaching and learning were conducted by Teaching Staff Development Center of GTU Innovations Center;
- All participants successfully completed the course, have been **Certified – 1 ECTS;**

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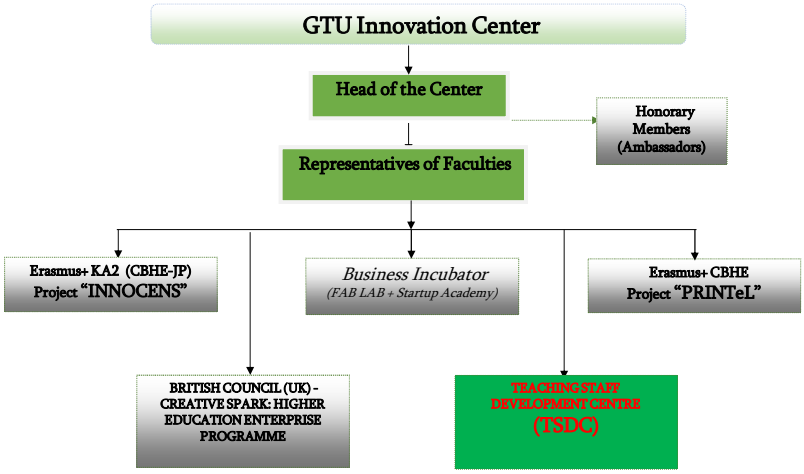

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- **TSDC and 11 internal Trainers (ToT) offer the following Innovation Pedagogy programmes/courses to Academic Staff at GTU:**

  - Active learning, with special focus on technology enhanced collaborative learning;
  - Active learning & ICT-enhanced teaching: m-learning & gamification;
  - Video as a learning tool for teachers & students: Video lecturing & promoting interaction in the classroom;
  - Active learning in the flipped classroom;
  - Hybrid/blended teaching & learning.

  All this TT curses syllabuses are developed;

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Some statistics related to TT participants:

Female: 229 – 68%;

Male: 107 – 32%;

Average age: 45 years old;

Professors – 102 – 30%;

Associated professors – 144 – 44 %;

Assistant professors – 56 – 16%;

Invited Teachers – 14 – 4%;

Others – 20 – 6%;

Total Number of Participants: 336

Average number of participants for each session: 30

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Some important figures:

GTU Staff	Total	Trained	Percent
Academic Personnel	1507	336	22%
Professors	505	102	20%
Associated Professors	533	144	27%
Assistant Professors	190	56	29%
Invited Teachers	279	14	5%

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After the completion of TT course, each participant was asked to evaluate and feedback on conducted TT course **(Evaluation Questionnaire in Google Survey);**

Some examples (comments) from TT Course Evaluation Questionnaire:

- I will use gained knowledge for effective teaching process;
- We will try, if we will have relevant technical support;
- Interesting, important and timely;
- I liked everything, it was new for me and I'll use it in my practice;
- I will add innovative approaches to the learning process;
- I will combine it with traditional methods;
- I will try to use them step-by-step;
- Thank you for interesting training;
- I am highly satisfied by the training…

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Experience & Challenges:

- The number of teaching staff with new pedagogical approaches should be increased;
- Old courses should be redesigned accordingly;
- There is a need of promoting and farther dissemination of the types and methods of innovative pedagogy and sharing of the best practice;
- We can determine the participants' level of interest and involvement in the training process as equal. Herewith women were more dynamic in certain activities, especially in group work;
- The participants made a very clear statement that they would use the new skills and experience to plan and organize lecture/seminars accordingly;
- At the same time, the participants expressed a desire for the future training courses that would be focused on innovation pedagogy, wishing such trainings to be held more frequently and that more their colleagues to be involved in these useful activities.

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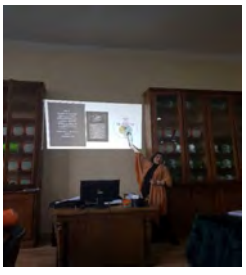
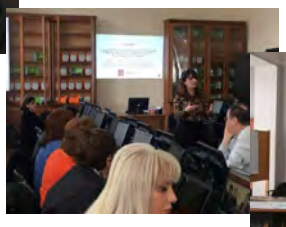
Some Photos








Thank You

CONTACT INFORMATION

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Tel. (+995 32) 236 31 25

Email. Innovations@gtu.ge

1- 5 October, 2019
Nur-Sultan, Kazakhstan

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573965-EPP-1-2016-1-SE-EPPKA2-CBHE-JP Enhancing innovation competences and entrepreneurial skills in engineering education (INNOCENS)

FINAL PROJECT CONFERENCE

INNOVATION AND ENTREPRENEURSHIP IN HIGHER EDUCATION

Innovation competence assessment

Elmira Faizova, M. Kh. Dulaty Taraz State University

Nur Sultan, October, 2019

Funded by the Erasmus+ Programme of the European Union

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Innovation pedagogy workshop

Turku University of Applied Sciences (TUAS), Finland

12-20 September 2017

Innovation pedagogy
Innovation competences assessment
Minsk, Belarus
27November - 02 December, 2018

Funded by the Erasmus+ Programme of the European Union

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Assessment of innovation competences: TarSU case

1 Step. Preparation team of experts for innovation competence assessment. Workshop "Innovative competences: from individual to program" for teachers of TarSU.

2 Step. Preparation of a set of FINCODA Barometer criteria in Kazakh and Russian.

3. Step. Development of special assessment module based on the INDIGO software application.

4. Step. Survey for master students from engineering programs.

5. Step. Survey for staff from different programs. Training on Innovation competence assessment in practice.

6 Step. Creation of a project team for the dissemination of innovative pedagogy and methods for assessing innovative competencies as part of the University Scientific and Methodological Council

7 Step. Inclusion of goals and indicators in the TarSU Development Program for 2019-2022

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INNOCENS INNOVATION & ENTREPRENEURSHIP

1 Step

Preparation team of experts for innovation competence assessment. Workshop "Innovative competences: from individual to program" for teachers of TarSU

*FINCODA - **Framework of Innovation Competencies Development and Assessment***

Standard for assessing innovation and entrepreneurship skills

2 Step. Preparation of a set of FINCODA Barometer criteria in Kazakh and Russian

ИНСТРУМЕНТАРИЙ ПО ОЦЕНКЕ ИННОВАЦИОННЫХ КОМПЕТЕНЦИЙ	
1. Думать по-другому и придерживаться разных точек зрения	(Креативность)
2. Быть внимательным, когда другие говорят, и эффективно реагировать на комментарии других во время разговора	(Работа в команде)
3. Использовать интуицию и свои знания для начала действий	(Креативность)
4. Делать отзывы и комментарии	(Работа в команде)
5. Способствовать улучшению организации работы	(Инициативность)
6. Получать конструктивные комментарии от коллег	(Работа в команде)
7. Находить новые способы реализации идей	(Креативность)
8. Определять источники конфликтов между собой и другими людьми или среди других людей и предпринимать шаги для преодоления дисгармонии	(Работа в команде)
9. Принимать приемлемый уровень риска для поддержки новых идей	(Инициативность)
10. Выходить за рамки ожиданий в задании, задаче или описании задания без запроса	(Инициативность)
11. Знакомиться с людьми с различными идеями и перспективами для расширения своих собственных знаний	(Нетворкинг)
12. Убедить людей поддержать инновационную идею	(Инициативность)
13. Систематически вводить новые идеи в практику работы	(Инициативность)
14. Действовать быстро и энергично	(Инициативность)
15. Вырабатывать оригинальные решения проблем или возможностей	(Креативность)
16. Использовать пробы и ошибки для решения проблем	(Критическое мышление)
17. Разработка и экспериментирование с новыми способами решения проблем	(Критическое мышление)
18. Приобретать, ассимилировать, трансформировать и использовать внешние знания для создания, управления и обучения из неофициальных организаций	(Нетворкинг)
19. Восстановить статус-кво	(Критическое мышление)
20. Смотреть на задачи с разных точек зрения	(Критическое мышление)
21. Вносить предложения по улучшению текущих технологических продуктов или услуг	(Креативность)
22. Генерировать новые идеи	(Креативность)
23. Прогнозировать воздействие на пользователей	(Критическое мышление)
24. Демострировать изобретательность при использовании ресурсов	(Креативность)
25. Осуществлять поиск новых методов работы или инструментов	(Креативность)
26. Обеспечивать конструктивную обратную связь, сотрудничество, коучинг или помощь коллегам команды	(Работа в команде)
27. Хорошо работать с другими, понимая их потребности и сочувствуя им	(Работа в команде)
28. Предоставлять своевременно информацию соответствующим заинтересованным сторонам	(Нетворкинг)
29. Консультироваться о важных изменениях	(Работа в команде)
30. Строить отношения вне команды / организации	(Нетворкинг)
31. Перевоплотить идею в полезной форме	(Креативность)
32. Занимать аутсайдеров основной рабочей группы с самого начала	(Нетворкинг)
33. Спрашивать себя с целью «Почему?» И «Почему нет?» И «Что, если?»	(Критическое мышление)
34. Работа в многопрофильных условиях	(Нетворкинг)

FINCODA Barometer
http://fincoda.dc.turkuamk.fi/

Инструментарий инновационного барометра FINCODA

Креативность (9 тем)

• способность преодолевать (думать за пределами) традиционные идеи, правила, шаблоны или отношения, а также генерировать или адаптировать осмысленные альтернативы, идеи, продукты, методы или услуги независимо от их возможной практичности и будущей дополнительной ценности

Критическое мышление (6 тем)

• способность анализировать и деконструировать проблемы, оценивать преимущества и недостатки, предвидеть, как будут развиваться события, оценить связанные с этим риски

Инициативность (6 тем)

• способность принимать решения или выполнять действия для воплощения идей, способствующих позитивным изменениям, а также для мобилизации и управления творческими людьми и теми, кто должен реализовывать идеи

Командная работа (7 тем)

• способность эффективно работать с другими людьми в группе

Networking (6 тем)

• способность привлекать внешние заинтересованные стороны (вне рабочей группы)

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3. Step
Development of special assessment module based on the INDIGO software application

http://ratertraining.fincoda.eu/fincoda-barometer/

4. Step
Survey for master students from engineering programs

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Assessment implementation
Results of a survey of students
Barometer FINCODA questionnaire

The overall result for all assessment competencies		Percentage of responses by group				
Score	Percentage	Creativity	Critical thinking	Team working	Initiative	Networking
0-2	0	0	0	0	0	0
3	36,84	5,26	0	0	0	0
4	57,89	57,89	89,47	27,78	89,47	73,68
5	5,26	36,84	10,53	72,22	10,53	26,32

The overall result for all assessment competencies		Percentage of responses by group				
Score	Percentage	Creativity	Critical thinking	Team working	Initiative	Networking
0-2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	34,5	42,4	33,3	12,1	24,2	60,6
5	65,5	57,6	66,7	87,9	75,8	39,4

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5 Step. Survey for staff from different programs

Training on Innovation competence assessment in practice

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5 Step

Survey for staff from different programs. Training on Innovation competence assessment in practice

Assessment implementation

Results of a survey of teachers. Barometer FINCODA questionnaire

The overall result for all assessment competencies		Percentage of responses by group				
Score	Before/Current	Creativity	Critical thinking	Team working	Initiative	Networking
0-2	4 / 0,6	3	0	0	1	0
3	25 / 12,8	30	18	11	18	10
4	46 / 34,5	61	27	39	57	51
5	25 / 52	86	75	90	44	59

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6 Step. Creation of a project team for the dissemination of innovative pedagogy and methods for assessing innovative competencies as part of the University Scientific and Methodological Council

7 Step. Inclusion of goals and indicators in the TarSU Development Program for 2019-2022

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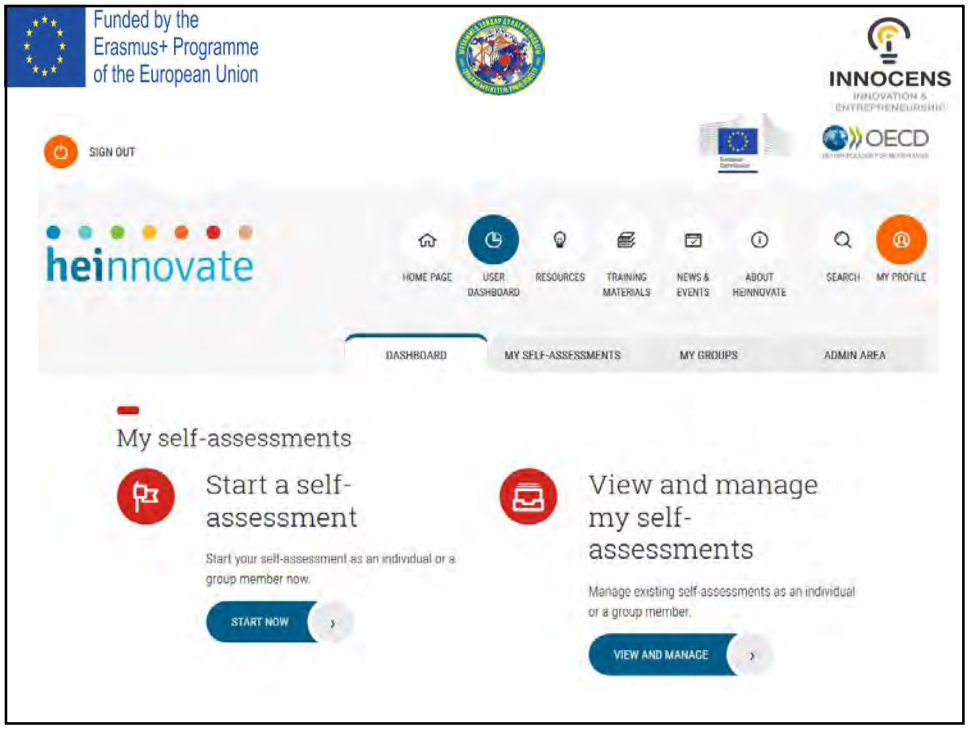
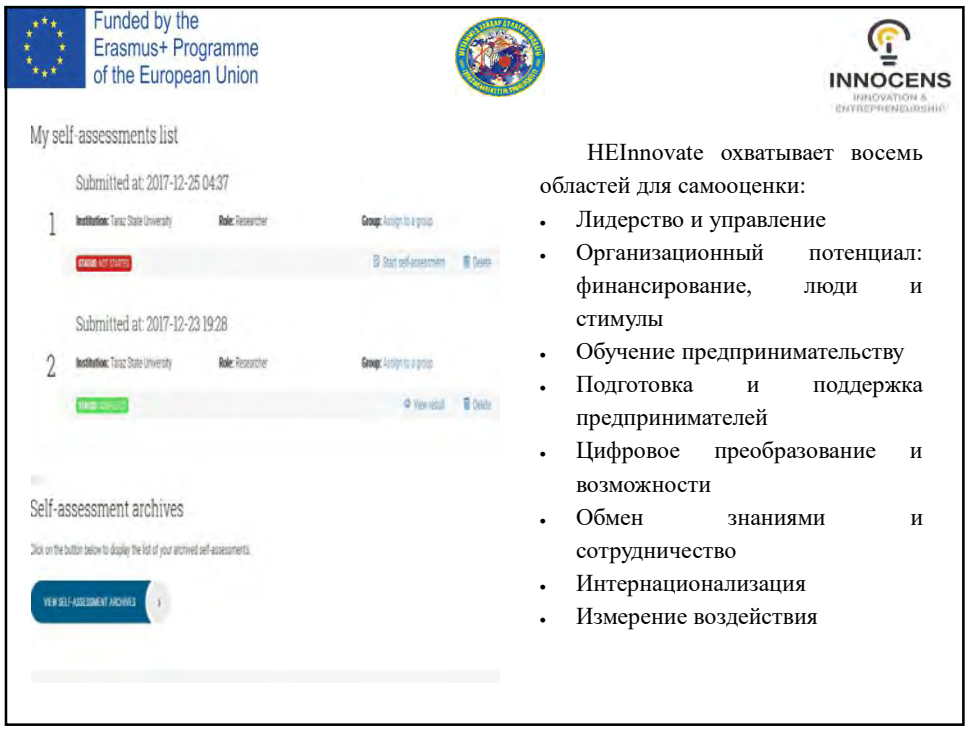
IMatrix

Ability to think creatively, differently and outside of the box					Умение мыслить творчески и нестандартно
Ability to critically evaluate existing solutions, identify needs for improvement and seek new solutions					Способность критически оценивать существующие решения, определять потребности для улучшения и искать новые решения
Ability to integrate knowledge and technologies from multiple technical disciplines or business branches		x			Способность интегрировать знания и технологии из нескольких технических дисциплин или отраслей бизнеса
Ability to take initiatives on interested tasks with devotion and entrepreneurial mindset		x		x	Способность проявлять инициативу по интересующим задачам
Ability to develop teamwork and build collaboration networks					Умение развивать командную работу и создавать сети сотрудничества
Basic knowledge on innovation and entrepreneurship, skills to transform new ideas and scientific results into viable business		x	x	x	Базовые знания в области инноваций и предпринимательства, навыки превращения новых идей и научных результатов в жизнеспособный бизнес
Environmental responsibility, reduce ecological impact of a decision (damage caused to other species, to nature or future generations).		x	x	x	Экологическая ответственность, снижение экологического воздействия
Use learning in a strategic, autonomous and flexible way, throughout life		x	x	x	Стратегии обучения на протяжении всей жизни
Ability to use the modern techniques, skills and updated tools necessary for the practice of the profession		x	x	x	Умение использовать современные методики и инструменты в профессиональной деятельности
Design and evaluate a process effectively until it is finalized in a project		x	x	x	Оценка процесса преподавания до итогового экзамена





HEInnovate охватывает восемь областей для самооценки:

- Лидерство и управление
- Организационный потенциал: финансирование, люди и стимулы
- Обучение предпринимательству
- Подготовка и поддержка предпринимателей
- Цифровое преобразование и возможности
- Обмен знаниями и сотрудничество
- Интернационализация
- Измерение воздействия

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Thank you!

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Final INNOCENS Conference

Introduction of a new courses developed under InnoCENS project:

- *Innovation Systems*
- *Entrepreneurship for Engineers*

Belarusian State University, Minsk
National University of Architecture and Construction, Yerevan

Final Conference of InnoCENS Project, Nur-Sultan, October, 2019

10.12.2020

Why 2 master courses on innovation and entrepreneurship were developed in frame of InnoCENS project?

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Entrepreneurial skills are not taught to students in engineering programs. Consequently, most engineering students in partner countries have limited or no knowledge on how to turn a new idea into a new commercial product or service, how to start a technology-driven company, how to finance a startup, etc. This situation has greatly limited the potential of engineering students to commercialize their knowledge.

How did we start?

One of the main activities of the InnoCENS project was the development of 2 master courses:

- Innovation Systems
- Entrepreneurship for Engineers

The process of the development of 2 master courses was started in Stockholm during the workshop organized by KTH in June 2017, with the participation of representatives of all partner institutions.

We believe that our students will benefit from the 2 master courses on innovation and entrepreneurship which give them useful skills to turn good ideas into successful businesses and start-ups.

How did we start?

1. During the workshop at KTH syllabuses of new master courses in innovation and entrepreneurship were discussed.

2. Responsible persons were appointed for the development of syllabus of each course:
   - Innovation Systems - Amalya Mkhitaryan
   - Entrepreneurship for Engineers - Varazdat Hovhannisyan

3. During a year syllabuses of new master courses were developed based on comments and contributions of all InnoCENS partners and especially of UPV.

4. Each partner university adapted the developed courses in its own environment, taking into account their legislation, internal regulations etc.

5. Each partner piloted the developed courses and based on feedbacks made changes, revisions.

Report on the delivery of two courses:

The Cases of NUACA (Yerevan) and BSU (Minsk)

Innovation systems

National University of Architecture and Construction of Armenia (NUACA)

Varazdat Hovhannisyan

Final Conference of InnoCENS Project, Nur-Sultan, October, 2019

Innovation systems

ECTS credits	4
Learning outcomes	After completing this course, the students should : 1. understand the importance of innovation for socio-economical development 2. be aware of key factors and indicators defining the innovation environment 3. have insight on national innovation policy and improvement needed in order to improve the national innovation environment 4. understand different types of IPR and skills to manage IPR 5. be familiar with different types of commercialization of research and business ideas 6. be able to find suitable professional support in entrepreneurship and business development

Innovation systems

Syllabus

1	Importance of innovation for socioeconomic development - *economical theories on innovation-driven economical growth* - *globalization and knowledge-based digital economy* - *challenges of modern societies and the need for innovation*
2	Innovation indicators and international innovation ranking - *key factors influencing innovation performances* - *innovation indicators used by WIPO, EIS and others* - *international ranking and good practices*
3	National innovation strategy and policy - *business-friendly environment* - *rule by law and good governance* - *innovation-friendly regulations and taxation* - *ICT investment and infrastructure* - *financial support to innovators and entrepreneurs* - *government-university-business partnership for innovation*

Innovation systems

Syllabus

4	Human capital and intellectual property rights - *Importance of IPR for economic growth* - *Types of IP: patents, copyrights, industrial designs, trademarks, etc* - *IPR analysis and strategy*
5	Innovation process and management
6	Professional support in innovation and entrepreneurship - *science (technology) parks, innovation clusters and local ecosystems* - *incubators and accelerators* - *innovation for regional development*
7	Innovation and entrepreneurship in higher education - *curricular development focusing on innovation competences* - *courses on innovation and entrepreneurship* - *commercialization of research results: technology transfer, licensing, spin-offs and startups* - *the role of university innovation offices* - *student entrepreneurship activities*
	Project work including report-writing and seminars

Innovation systems

Recommended Literature

Bessant and Tidd (2015). Innovation and entrepreneurship. John Wiley & Sons; 3rd edition (2015).

Peter Drucker (2015). Innovation and entrepreneurship. HarperCollins (2015).

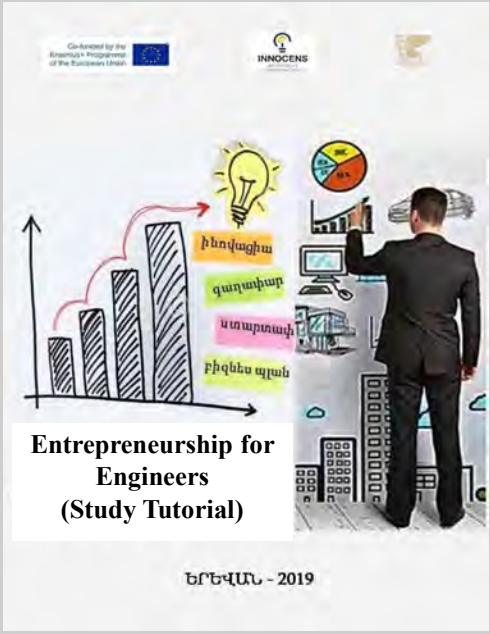
Daria Tataj (2015). Innovation and entrepreneurship, a growth model for Europe beyond the crisis. Tataj Innovation Daria Golebiowska-Tataj (Sept. 2015)

Carayannis, Samara and Bakouros (2014). Innovation and entrepreneurship - Theory, Policy and Practice (Innovation, Technology, and Knowledge Management). Springer (Nov. 2014)

Information on course delivery

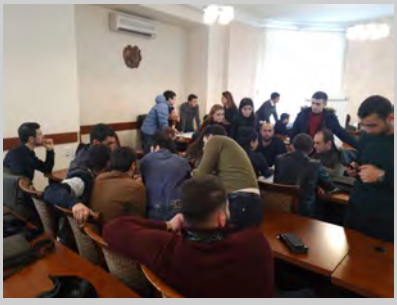
Name of the course	**Innovation systems**
Status of the course	Elective Course
Delivery time (year, semester)	2018/2019, 2-nd semester
Student group (programme name, class)	Civil Engineering
Responsible teachers	Ms. Marine Ghazaryan
Number of students in the course	42 registered / 24 passed
Project topics (if any)	Eco-system for innovations
External lecturers (if any)	Mr. Arevshad Vardanyan (Professor of Moscow State University), Ms. Lusine Korekyan (psychologist, business consultant)
Comments & feedbacks from teachers/students	Lack of Literature in Armenian, Merging of two courses *(Innovation Systems and Entrepreneurship for Engineers)*, Course should be mandatory – not elective

The Developed Study Tutorial by NUACA



Picture from the course





Report on the delivery of two courses:

The Cases of NUACA (Yerevan) and BSU (Minsk)

Entrepreneurship for engineers

Belarusian State University (BSU), Minsk

Sergey Hvesenya

Final Conference of InnoCENS Project, Nur-Sultan, October, 2019

Entrepreneurship for engineers

ECTS credits	2
Learning outcomes	After completing this course, the students should : 1. understand the role of innovation for the economic growth 2. understand the difference between disruptive and incremental innovation 3. apply creative thinking and innovative set of mind 4. protect intellectual rights 5. know the procedures to develop an idea and start up a new technology-based company

Entrepreneurship for engineers

ECTS credits	2
Learning outcomes	After completing this course, the students should : 6. develop the ability to translate a business idea into marketing and financial plans 7. estimate financial costs for implementing the idea 8. understand and systematically explore basic processes in business modeling 9. understand and systematically explore the important elements in managing companies and developing its human resources

Entrepreneurship for engineers

Syllabus

- Introduction to innovation
- Innovation research
- Creative thinking
- Market analysis
- From idea to final product
- IP/certificates, how to apply
- Levels of innovation (country, region, international)
- Product life cycle evaluation
- Business implementation
- Legal issues
- Commercialization (startup, spinoff, grants)

Entrepreneurship for engineers

List of lessons

1	Inspiration and Fundamentals of Entrepreneurship Innovation research - *Introduction to Technology Entrepreneurship and Technology Ventures* - *Attributes and Myths of Technology Entrepreneurs* - *Engineers as Entrepreneurs* - *Mindset of the Entrepreneur and Entrepreneurial Leader* - *Creating and Selling the Entrepreneurial Value Proposition* - *Specifics of business and startups* - *Team Building*
2	International and National legislative basis in the area of entrepreneurship - *Legal Forms of Entrepreneurial Activities* - *Intellectual Property Law Contractual Law* - *Taxes and Taxation* - *Business Ethics And Negotiation*
3	Idea Generation and Feasibility Analysis - *Entrepreneurial Idea Generation and Feasibility Analysis* - *Technology Commercialization Potential* - *Paths and Barriers from Idea to Market* - *Assessing and Presenting the Opportunity* - *Customer development* - *Problem-Solution fit* - *Business model generation* - *Validation plan*

Entrepreneurship for engineers

List of lessons

4	Assignment - Case Study And Analysis - *Students will work on specific business ideas chosen by them (by creating teams among themselves)* - *They should show why they think that their idea will be successful* - *They should compare their idea with already existing businesses* - *They should analyze why particular company /having similar idea like their/ is successful or not successful, etc.*
5	Business Planning and Execution - *Business Structuring, Strategy and Management* - *Business modeling and business planning* - *Financial Analysis and Projections* - *Market and Competitive Analysis* - *Presenting a Clear, Concise, and Compelling Message (Opportunity)* - *Intellectual Property Strategies for Technology Companies* - *Marketing, Sales and Distribution Strategies* - *Investment and Financial Strategies* - *Accessing to funding* - *Venture Growth and Value Harvesting*
6	Project - business plan development - *Finalize the ideas in a Business Plan* - *Articulate the goals of the new venture, develop a plan on how to reach to your customer, how to sell and pitch your offering, and determine the development time and resources needed to establish the company* - *Live presentation of the project in the shape of an elevator pitch*

Entrepreneurship for engineers

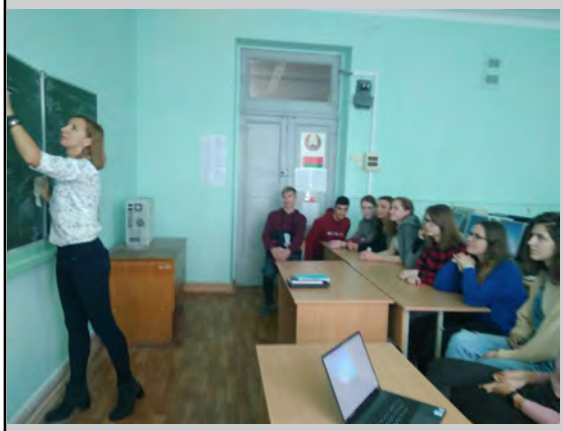
Recommended Literature

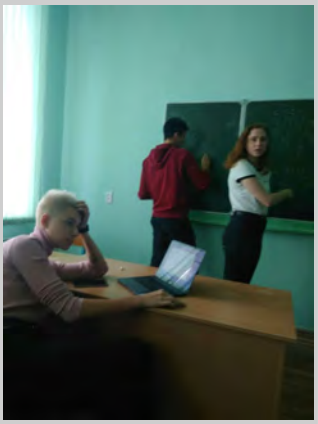
- *"Launching New Ventures: An Entrepreneurial Approach", by Kathleen Allen (Cengage Learning, 2015)*
- *"The Start-Up Owner's Manual", by S. Blank & B. Dork (K&S Ranch Publishers, 2012)*
- *"Innovation & Entrepreneurship, 3rd ed.", J. Bessant & J. Tidd (J. Wiley & Sons, 2015)*
- *"Technology Entrepreneurship", T. Duening, R. Hisrich & M. Lechter (Elsevier, 2015)*
- *"Value Proposition Design", by A. Osterwalder, Y. Pigneur, G. Bernarda, and A. Smith (J.Wiley & Sons, 2014).*
- *"Business Model Generation", by A. Osterwalder & Y. Pigneur (J.Wiley & Sons, 2010)*

Information on course delivery

Name of the course	**Entrepreneurship for engineers**
Status of the course	Elective Course
Delivery time (year, semester)	2018/2019, 2-nd semester
Student group (programme name, class)	Mathematical modeling, mechanics
Responsible teachers	Mr. Dzianis Marmysh
Number of students in the course	22 registered / 15 passed
Topics of suggested projects(if any)	HeadHealth (Blood pressure measurement and forecasting) 3D Scan (Service for recovery 3D image from 2D images) Twin Engine (Digital twin of internal combustion engine) FinAdvice (Financial advisor on-line) CarSale (On-line service for car spare parts wholesales)
External lecturers (if any)	Mr. Aliaxei Vakulchik (entrepreneur, business consultant)
Comments & feedbacks from teachers/students	Useful course for further development and growth of own projects; Necessary more real cases of successful business for engineers; Merging of two courses *(Innovation Systems and Entrepreneurship for Engineers);*

Picture from the course





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INNOCENS INNOVATION & ENTREPRENEURSHIP

"Enhancement of Innovation Competences and Entrepreneurial Skills in Engineering Education"

AUPET Innovation Center

Co-funded by the Erasmus+ Programme of the European Union

Background

- Innovation and education are key drivers of economic development and competitiveness
  - Innovations are identified as a strategically important direction for the economy development and reflected in state strategic development legal documents
  - Activities aimed at the commercialization of university competencies expressed in development and support of university start-up and spin-off companies

INNOCENS INNOVATION & ENTREPRENEURSHIP

Co-funded by the Erasmus+ Programme of the European Union

INNOCENS INNOVATION & ENTREPRENEURSHIP

Development of innovations at the university

Creation of specialized institutions and collaborative support of business community TO REACH and ATTRACT students and academic staff, to support their efforts on development of Business ideas, to educate entrepreneurship basics - how TO TRANSFORM AN IDEA INTO THE BUSINESS

Co-funded by the Erasmus+ Programme of the European Union

INNOCENS INNOVATION & ENTREPRENEURSHIP

"AUPET Innovation"

"AUPET Innovation" center opened on June 6, 2018

- The Center operates in line with the Legislation of RK: The Law of the RK dated July 4, 2018 No. 172-VI "On Amendments and Additions to Some Legislative Acts of the Republic of Kazakhstan on Issues of Education" The Law of the Republic of Kazakhstan dated July 27, 2007 No. 319-III "On Education" (as amended as of April 19, 2019)

- "AUPET Innovation" is established within the scope of the liabilities covered under the EU Erasmus+ grant project "InnoCENS".
- It is fully equipped and has premises for performing appropriate activities. Address: room A410, 126/1 Baitursynuly street, Almaty, Kazakhstan.

"Enhancement of Innovation Competences and Entrepreneurial Skills in Engineering Education"

Co-funded by the Erasmus+ Programme of the European Union

Development of innovations at AUPET

Development an innovation infrastructure:

Innovation center, science and technology parks, incubator, accelerator and other supportive tools

Co-funded by the Erasmus+ Programme of the European Union

Equipment

Co-funded by the Erasmus+ Programme of the European Union

AUPET Innovation Center opened

4

АЛМАТИНСКИЙ УНИВЕРСИТЕТ ЭНЕРГЕТИКИ И СВЯЗИ

«AUPET Innovation»: импульс развитию молодежного предпринимательства

Открытие Инновационного центра «AUPET Innovation» – знаковое событие в истории Алматинского университета энергетики и связи (АУЭС) в период преобразований в научной и инновационной деятельности вуза и первый шаг к трансформации его в исследовательский вуз в соответствии со Стратегией развития страны-2050.

INNOCENS INNOVATION & ENTREPRENEURSHIP

INNOCENS INNOVATION & ENTREPRENEURSHIP

IC Services

Activities

- Lectures, seminars, workshops, meetings with entrepreneurs and investors, Team building activities for startup
- Business idea Competitions

Incubation spaces

Providing assistance in search of funding

Cohesive local **entrepreneurial ecosystem**

Business ideas assessment

through its:

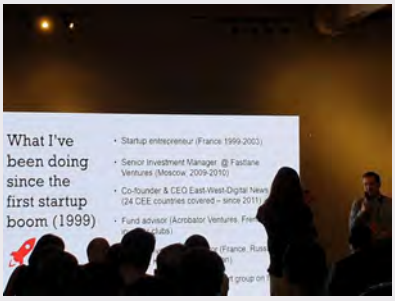
- Commercial potential
- Innovation/Novelty
- Social/Job/Climate impact
- Degree of validation of the idea
- Strength of the team
- Quality of the pitch, communication

Co-funded by the Erasmus+ Programme of the European Union

"Enhancement of Innovation Competences and Entrepreneurial Skills in Engineering Education"

Providing education

- "AUPET Innovation" provides education on start-ups for students through workshops, lectures and talks from local entrepreneurs, training, bootcamps



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Mentoring

- Meetings and lections with "AUPET Innovation" center staff and invited professionals on varied commercialization technologies, strategies planning, marketing technologies, product development, evaluation of idea and the team, business model.

- Talgat Kamarov, Chairman of the Board of Centras Securities
- Askar Aituov – DAR lab Accelerator
- A. Khairova - Smart & KPI
- Saken Zhumashev managing partner, KPMG
- A. Shorman – EY

"Enhancement of Innovation Competences and Entrepreneurial Skills in Engineering Education"

Promoting Entrepreneurial culture

- **Entrepreneurship day at AUPET**
- Inspirational talk by a local entrepreneur.
- Presentation of services offered by the Innocenter
- Expoday - local products by local startups

- Small workshop on lean canvas Tools for a competition.
- Presentation of the local competition

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"Enhancement of Innovation Competences and Entrepreneurial Skills in Engineering Education"

Entrepreneurship Culture

Motivation → Seminars and workshops → Trainings Mentoring → Working space → Motivation

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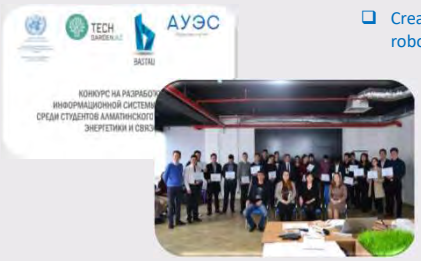
AUPET Innovation activities



- Creation of IT platform for robots with GPS navigation

HARDWARE SOLUTIONS

National Championship in robotics among pupils and students

Science and innovation Competition in the framework of the conference "Science and Innovation for Young Scientists"

- **«Smart house,**
- **«Technology M2M – Smart traffic light»,**
- **«Automatization of sewage water controling system»,**
- **«Fingerprint recognition software development»,**
- **«The use of Unmanned aerial vehicles in agriculture»,**
- **Fire Detection and Fire Extinguishing Robot,**
- **Door lock (door handle) with fingerprint identification.**

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Экомарафон SHELL

Shell

Co-funded by the Erasmus+ Programme of the European Union

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Competitions

"Enhancement of Innovation Competences and Entrepreneurial Skills in Engineering Education"

INNOCENS

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DEMO DAY
19 апреля 2019

АУЭС
Образован в 1975

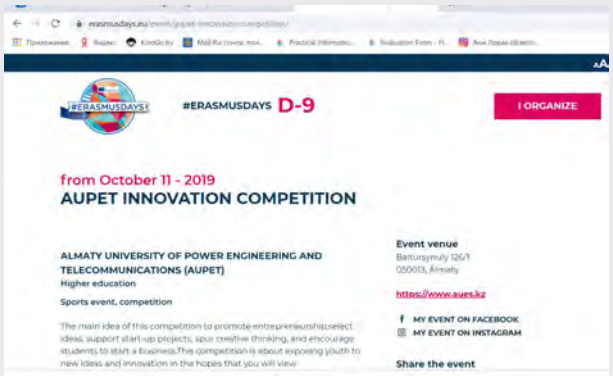
INNOCENS

Co-funded by the Erasmus+ Programme of the European Union

ENTREPRENEURIAL ACTION US

INNOCENS INNOVATION & ENTREPRENEURSHIP

11 октября 2019 #ERASMUS DAYS



APPLE

INNOCENS INNOVATION & ENTREPRENEURSHIP

KUTEL

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Networking

- AUPET signed a partnership agreement with Tech Garden IT Cluster. It is a professional environment for the development of demand driven innovations based on mutually beneficial interaction of business, startups, investors, educational and research institutions
- DarLab – International accelerator of business ideas (CIS countries)
- Organization of events around themes of innovation, entrepreneurship, Environment.
- Mentoring - connecting students and professionnals

Co-funded by the Erasmus+ Programme of the European Union

IC sustainability

- AUPET dedicated staff
- Strong networking: Business-University-Government - business community, associations, professional , state and Venture funds, Vendors
- Dissemination – Logo and branding, website and social media, direct contacts, newsletter, contests
- Activities - trainings, workshops, seminars, mentoring sessions, competitions, Khakathons, Startup demodays, Camps, meetings, Entrepreneur day, Job fair
- Enhancing students innovative competences through Innovative methods of teaching (Innovation Pedagogy)

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Thank you for your attention

"Enhancement of Innovation Competences and Entrepreneurial Skills in Engineering Education"

NPUA Innovation Incubator

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INNOVATION & ENTREPRENEURSHIP

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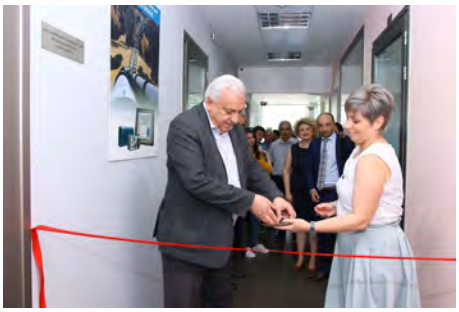
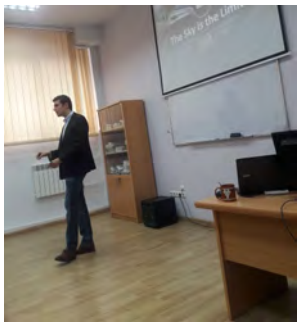


NPUA Innovation Incubator

Why & How

The mission of "NPUA Innovation Incubator" is to support the development of students' startups and implementation of new business ideas by providing incubator-rich business environment, technical knowledge and guidance. The activities of the "NPUA Innovation Incubator" is directed to support the innovative ideas, as well as to promote of university-industry cooperation.

Series of seminars from Industry representatives

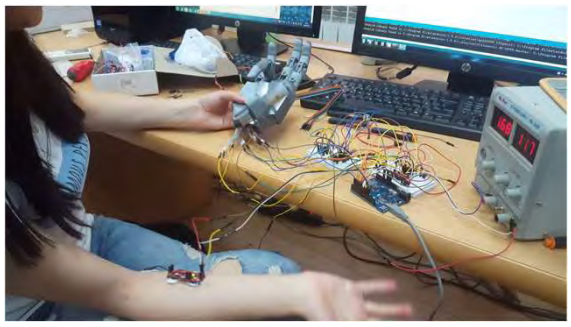


Series of seminars from Industry representatives

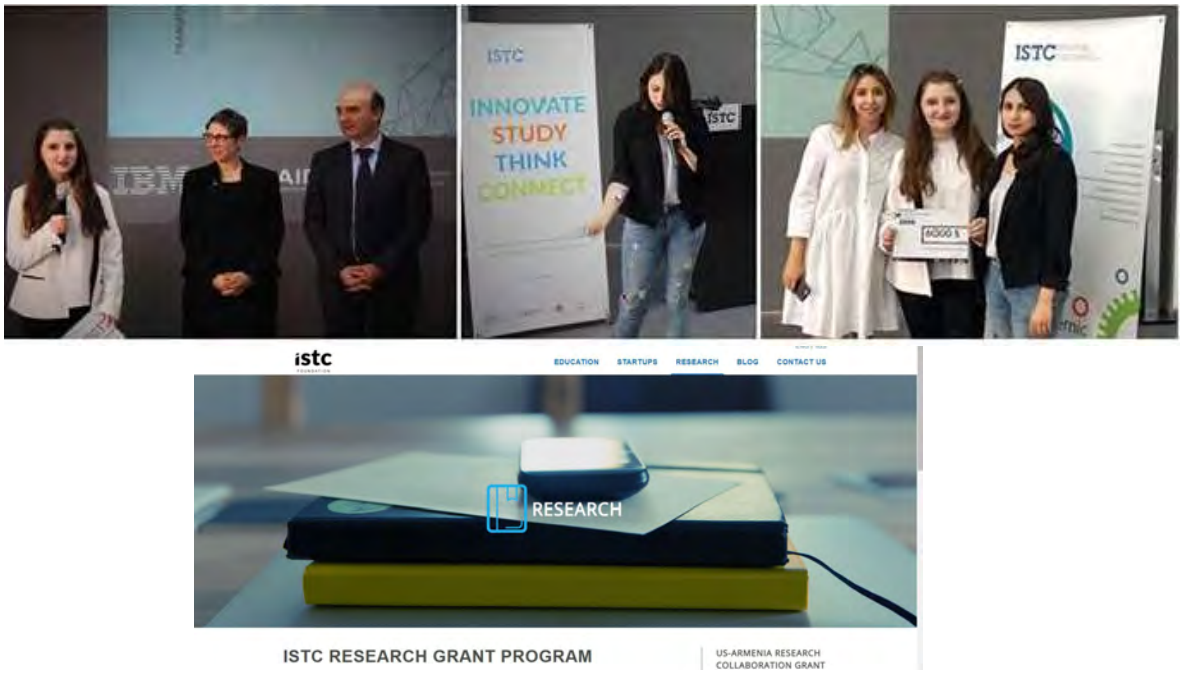
"Do-A-Thon" within "Brain Awareness Week“ framework and within partnership of Medical University

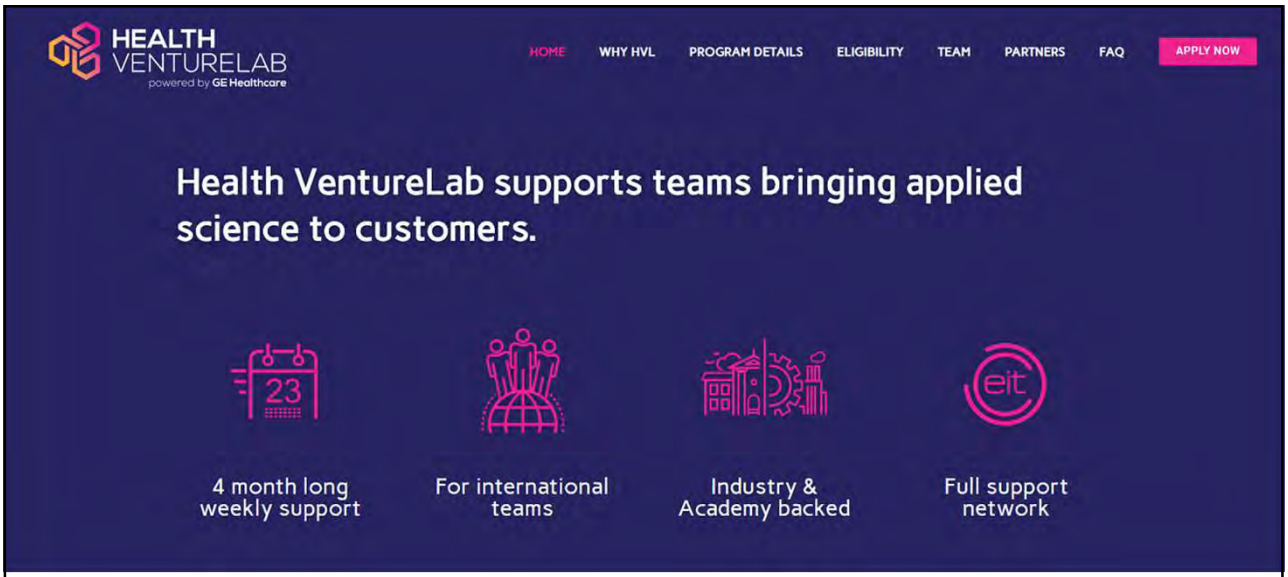
Participation in Engineering Forum-EXPO in Vanadzor

Preparation for ICET 2018 international completion



Armbionics– Bionic hand controlled by electromagnetics signals





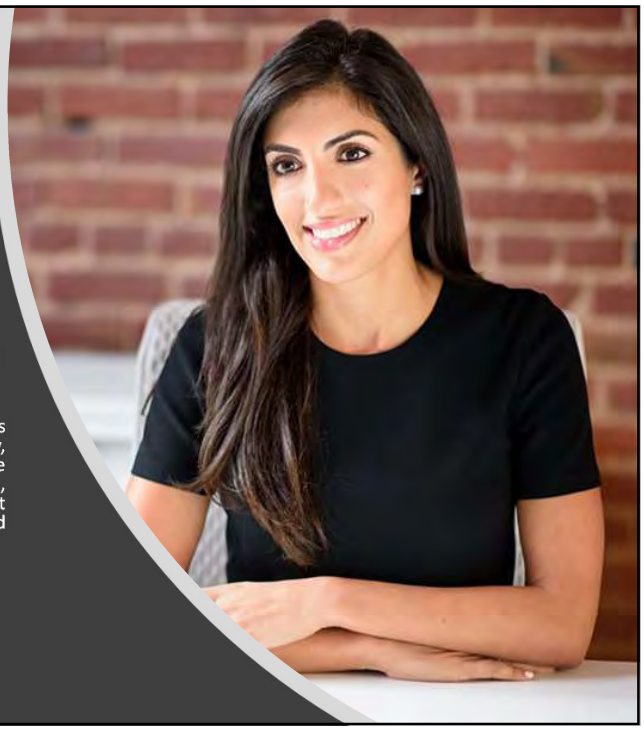
Participation in Competition, Budapest

Co-organizers of Startup boost weekends

Hosted and managed SBW3

Entrepreneurship Day-October 10

Within coorporation with Ministry of Transport, Communications and IT of RA

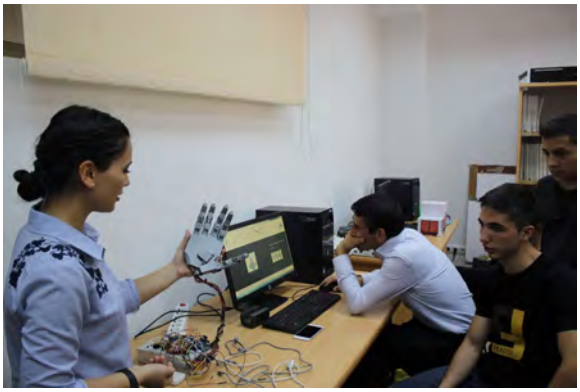


Key Speaker: Nina Achajian

Nina focuses on venture and growth investments in enterprise SaaS and digital health. She is particularly excited about vertical SaaS solutions that replace pen and paper workflows.

Nina joined the team from Cota Capital, where she led investments in Cover, TubiTV, Blueprint Genetics and Mission Bio. Previously, Nina was an FP&A Lead for Google's AdSense team where she managed a multi-billion dollar book of business covering Amazon, IAC, and eBay. Nina started her career as a high yield bond trader at Citigroup. She also is the founder of HIVE Ventures, the first seed fund focusing on Armenian entrepreneurs.

Nina graduated from Harvard University with a B.A. in Government and is a recipient of the Michael C. Rockefeller Scholarship. Nina currently lives in San Francisco and enjoys watching football and Formula 1.



Day 1: Open doors

Day 2 Students' projects EXPO

Day 3 Entrepreneurship day

Day 3-5 Workshops/Masterclasses

Day 3-5 Team work activities

Day 5 Competition

INNOVATION BUSINESS IDEA COMPETITION

Success stories
ENERGY GLOB

GROVF
Database Hardware Acceleration

GROVF WINS THE AWARD OF A FUNDINC
HORIZON 2020

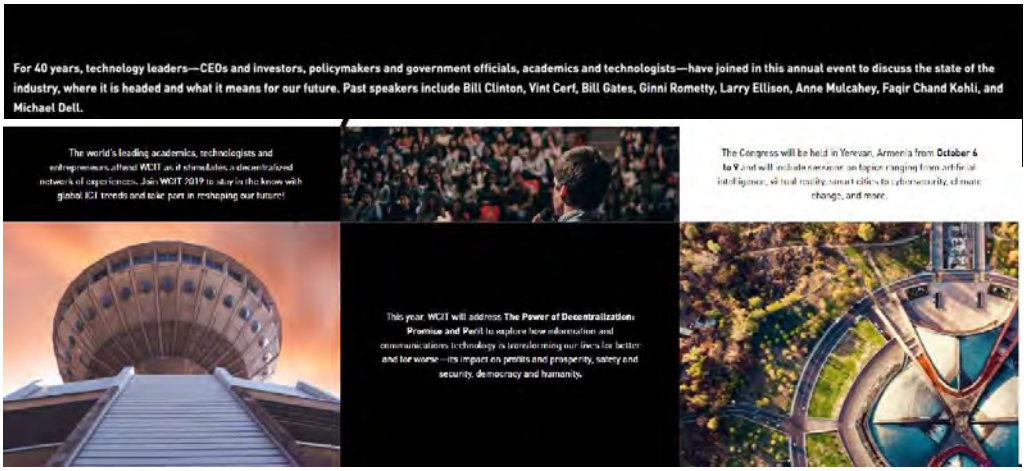
European
Commission

Success stories
GROVF

Eurasian Patent Universiada "A look into the future"

Winner of Business Idea Competition of InnoCENS project

Participation at WCIT 2019



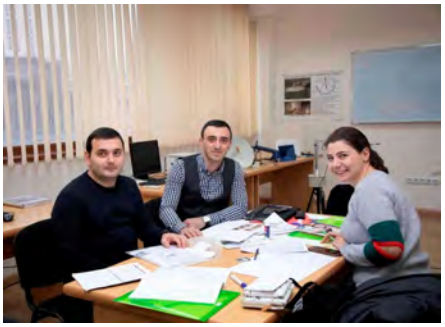
Continuity and Sustainability

BRITISH COUNCIL

Creative Spark

Higher Education Enterprise Programme

«Ստեղծարար միտք» նախագիծ

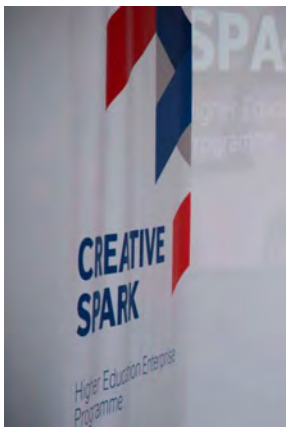


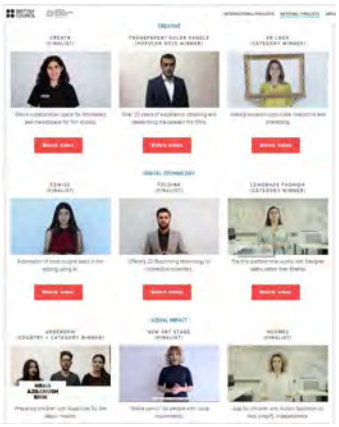
Train the Trainers
"Entrepreneurship skills and pedagogies"

over 30 participants, 10 Universities

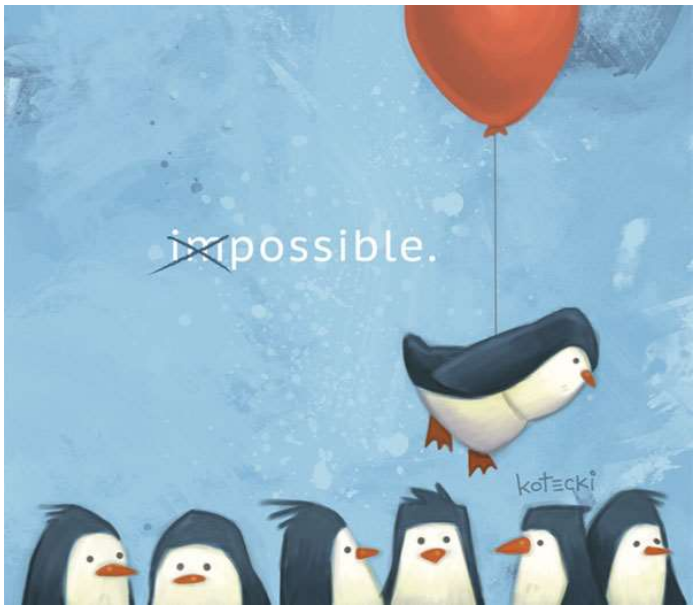
Cascade trainings for students "Creative Entrepreneurship"

over 550 participants, 10 Universities





«Big Idea Challenge video pitch» Competition
over 30 participants' teams, 2 national finalists and popular vote winner



Thank you

Q&A?

INNOCENS
INNOVATION & ENTREPRENEURSHIP

БрГТУ

Co-funded by the Erasmus+ Programme of the European Union

BUSINESS IDEA DEVELOPMENT

the experience of BrSTU

2019 Brest.

Interviewed students

In the fall of 2017 were interviewed:

144 students of **7** specialties, average age of respondents **20.5** y.o.

- **84%** thought of doing business.
- **55%** would like to choose additional courses on innovation.
- **50%** consider it a good idea if the university has a department with qualified personnel who can help with projects.
- **28.3%** said they had a business idea.

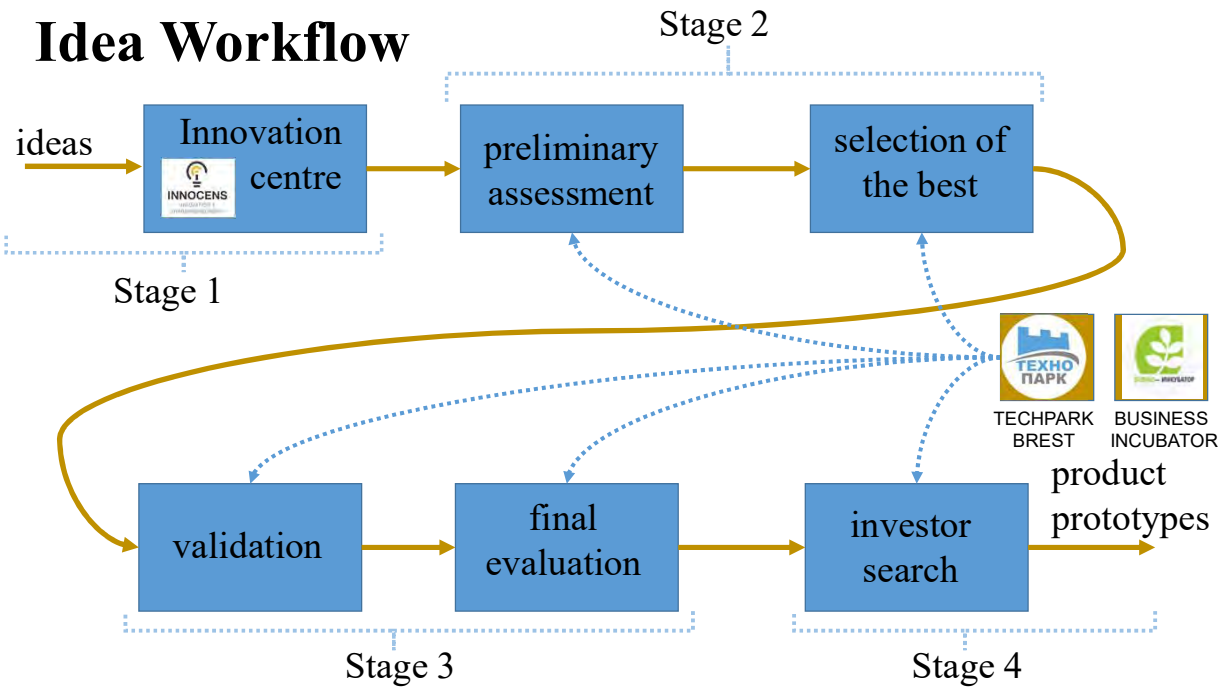
Identified problem areas

The **main difficulty** for launching an innovative startup in the country, according to respondents, is:

- **Access to finance – 49%.**
- **Country legislation – 35%.**
- **Lack of preparation – 16%.**
- Lack of innovation potential – 14%.
- Risk aversion – 14%.
- Team building – 3,5%.

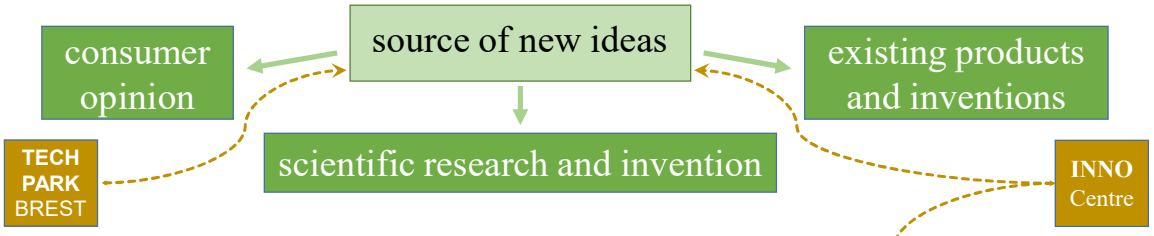
In begin 2017 year **66%** believed the university does not currently provide the necessary tools to become an entrepreneur.

Idea Workflow

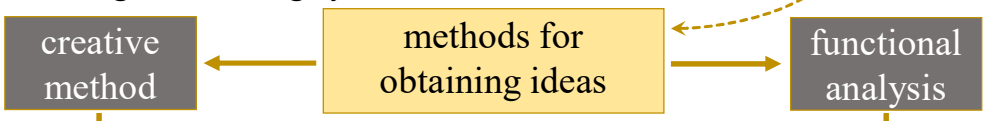


Stage 1. Search for ideas

- Market research to identify product needs and interests



- Generating ideas using systematic methods



- creating a new type of product
- improving a product

- changing a purpose of the product
- improving a product
- creating new product combinations

Attracted Mentors

Advisory board:
Dmitry Makaruk, Andrei Sytko – ceo, coo at Brest Scientifical TechnoPark,
Roman Dolny – entrepreneur and ceo at AllBeBet OU Company,
Sergey Selivonchik – entrepreneur and ceo of LLC System of industrial automation.

Board of internal experts:
Vladimir Golovko – Grand PhD in Engineering sciences,
Vladimir Rubanov – Ph.D. in Mathematics,
Olga Golovko – Ph.D. in Philology,
Natalia Chetyrbok –Ph.D. in Economics,
Shuts Vasili - Ph.D. in Technology,
Andrei Mihniyaeu – Master of Engineering sciences, Master of Business Administration.

Training courses and lectures

Courses:

- Innovation systems
- Innovation methods of intelligent systems design
- Entrepreneurship for engineers
- Fundamentals of pedagogy and psychology

Lectures on visualization of business ideas.

Holding meetings with company leaders.

Meetings with entrepreneurs of the region.

In total, more than 200 students attended the courses.

Spent the day of the entrepreneur

Since we have a technical university and most of the students have technical training programs.

We held a series of meetings and speeches of representatives of large companies, entrepreneurs and employees of the technology park.

Also, reports were made by students who already had entrepreneurial experience.

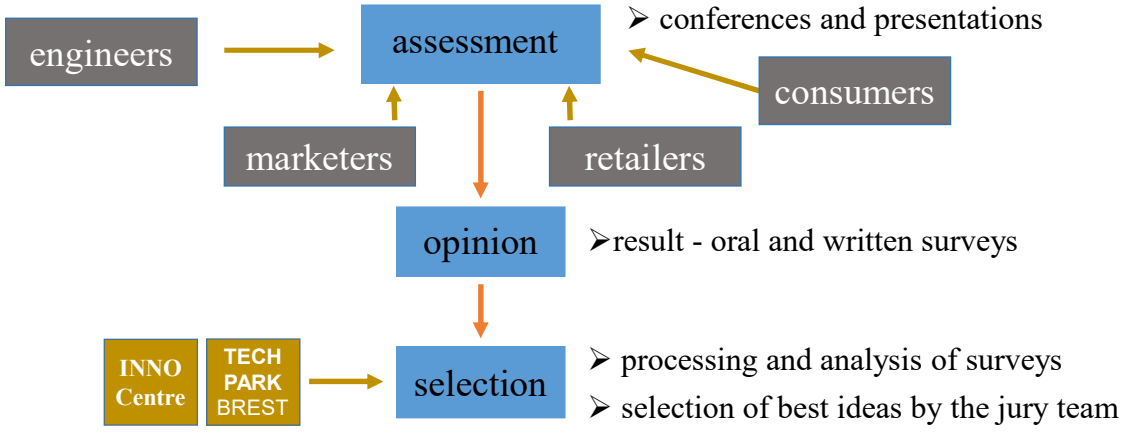
In total, more than 80 students took part in the event.

Visiting exhibitions and events

- Our students attended various thematic exhibitions and competitions.
- Excursions to large enterprises of the region and to the Brest Technopark were also provided.
- Company visit LLC Savushkin Product, LLC Gefest , Events and activities.
- For students there is the possibility of testing their ideas in specialized laboratories.
- To do this, this year the laboratory of industrial robotics was built.

Stage 2. Preliminary assessment and Selection of Best Ideas

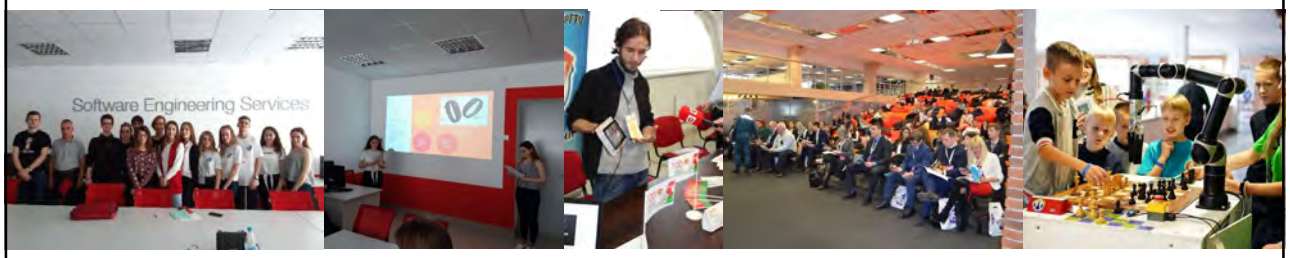
The purpose of the preliminary selection is the possible early separation of unsuitable solutions.



Presentation of business ideas

At this stage of promoting a business idea, a preliminary assessment of the ideas by involved specialists, mentors and consumers takes place.

Presentations of ideas take place at the sites of the innovation center of the Brest Technical University, the Brest Scientific and Technological Park or the involved partners in the form of conferences. Presentations are also held as part of festivals and competitions, for example, "100 Ideas for Belarus"



Attracted organizations and universities

Partner companies and universities are large enterprises of the Republic of Belarus.

Brest Scientific Technopark, AllBeBet OU – private Estonian start-up company, LLC System of industrial automation – private company integrator of automated systems.

Stage 3. Validation and Final Evaluation

- Drawing up a business plan; analysis of profitability using investment calculations; cost, profit and cost coverage analysis (by specialists and experts from partner organizations)

- Obtaining Opinion of Evaluation Teams
  - ✓ Experts from involved organizations and universities
  - ✓ Experts from Board of internal experts

Each idea was classified according to the **following criteria:**

- Novelty or Innovation in the Business Model
- Commercial Potential
- Social Impact
- Strenght Team
- Quality of the Pitch

Stage 4. Investor search

- **Partner and attracted Organizations and Universities**
  - ❑ Technopark
  - ❑ EPAM Garage
  - ❑ Epol Soft
  - ❑ Belarusian Chamber of Commerce and Industry. Brest Branch
- **Internet platforms for startups**
  - ❑ https://startupnetwork.by/
  - ❑ http://investin.by/
  - ❑ http://brest-region.by/
- **Direct investment search**

As a result, the creation of a prototype of the product, its adaptation and market launch.

Examples of our projects

- Project and realization-

Chess robot named Nastya.

Idea - Katerina Taberko, developers - Artem Skarubo, Sergey Allakayev, Anastasia Khristolyubova

- Project and realization -

Built-in information board with functions for aggregating information content and personalizing user alerts.

Denis Kulbeda and Nikolay Tereshkevich

- Project -

Creation of advertising, trading and gaming application for mobile devices.

Nikita Yushkin, Alexandra Kuptsova,

Richard Krasnov

Continuing work on a startups

- Getting investments
- Bringing the products to the market
- Search for new investors and companies
- Attracting More Students
- Participation in contests and exhibitions
- Conducting weekly meetings with mentors
- Further promotion and development of the innovation center
- More information in regional media
- Interaction with other teams at other universities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БрГТУ
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Thank you for attention

BATUMI SHOTA RUSTAVELI STATE UNIVERSITY – BSU
BATUMI, GEORGIA

"InnoCENS"-Project

Innovation Competition

at Batumi Shota Rustaveli State University

The final project INNOCENS conference

Nur-Sultan, Kazakhstan

October 1-5, 2019

Activities were held in Innovation Center of Batumi Shota Rustaveli State University (BSU) of "INNOCENS"-Project

- Opening Innovation Center in BSU
- Studding process in Innovation Center
- Entrepreneurial ship Day
- announcing Business Idea Competition
- Mentoring Process
- Assigning the commission for overview
- Innovation Competition at innocenter
- Global Innovation Competition in Valencia

Studding Process: Trainings and Workshops in Innovation Center of BSU of "InnoSENC"-Project

- In autumn of 2018 started studding process in Innovation Center of BSU of "INNOSENC" -project

Studding Process: Trainings and Workshops in Innovation Center of "InnoCENS"-Project

Trainings: Learning by doing was organized in Innovation Center of BSU of "InnCENS" – project since October of 2018.

a) Ideation – Creativity, Detecting Problems, Sources of Ideas
b) Customer Discovery – Customer, Development Customer Creation, Beachhead Market
c) Value Propositions (Qualify why customer choose us, competitors)
d) Business Model
e) Team Building
f) Marketing (Facebook, Twitter,.., Social Networks, Google Advertisements, Leaflets, webpages)
g) Prototyping (Create model for example in Fab Lab Laboratory)
h) Intellectual Property (how to prepare Patent, Copyright …)
i) Validation (Interviews, Surveys)
j) Company Creation (Documentation)
k) Elevator Pitch (Talking to Investors)

Studding Process was conducted using main innovative pedagogic principles:

✓Guest lectures
✓Posters
✓Hands on demos
✓On-line class/e-learning
✓Group works and discussions
✓Videos and avi-materials
✓Competitions
✓Co-teaching

Entrepreneurship Day

- The Entrepreneurial Day Was Organized in Innocenter of BSU in 26 December of 2018
- In the meetings were considered next issues:

a) Inspirational talk by a local entrepreneur

b) Presentation of the services offered by innocenters

c) Small workshop on lean canvas, team building, Entrepreneurial culture and other tool that can used in a competition.

Announcing Business Idea Competition

- In the February 2019 was announced Business Idea Competition in BSU
- Were prepared Advertisements for Social Networks - Facebook, webpages of Universities.
- Were prepared Leaflets.

Mentoring Process

- The mentors contacted the entrepreneur via email and offered dates for meetings were scheduled.
- What was done in a mentoring meeting?

a) Evaluation of ideas and teams.

b) Evaluation of business models.

c) Creation and evaluation of MVP plans.

d) Evaluation of team building, partner agreements

- All the meetings were scheduled in the CRM

Assigning the Commission for Overview Cases of Participants

- In the Mart 2019 was Assigned Commission for Overview Cases of Participants

a) Internal jury members: Tamar Siradze Deputy Rector of BSU; Giorgi Tavamaishvili Head of Department of Strategic Development and International Relations of BSU; Enver Khalvashi Professor, Member of Academic Conceal of BSU;

b) External jury members-Anrepreneurals: Architect Aleksi Kinkladze; Designer Soslan Lomadze; Employer in the Telecommunication sector Nugzar Chedia

Steps done by **INNOCENTRE** for Pitch Competition

STEP 1:

Simple form to apply by April 30th

STEP 2:

INNOCENTRE selected TOP 10 ideas

Sent from each team:

Business Model Canvas

5 minute presentation

STEP 3:

Innocent provided coaching and training in Elevator Pitch!!!

STEP 4:

Pitch competition in university (BSU) held in May 2019

Pitch competition in university (BSU) held in May 2019

5 criteria was used by InnoCENS Jury for Assessing Business Ideas

5 (very good) - 1 (very low)

1) Novelty or Innovation in the Business Model
2) Commercial Potential
3) Social Impact
4) Strength Team
5) Quality of the Pitch

Datas of Competition

№	Issues	Dates
1	*Number of business ideas submitted to the competition*	*23*
2	*Number of students participated in business ideas competition*	*69*
3	*Ideas which involved students from other universities*	*1*
4	*Number of ideas selected for local pitch competition*	*11*
5	*Date of the local pitch competition*	*07/May/2019*
6	*Maximum number of points from the jury*	*5*
7	*Number of points received by the top 3 ideas*	*128 (I), 127 (II), 125 (III)*

Ideas of INNOCENS Competition

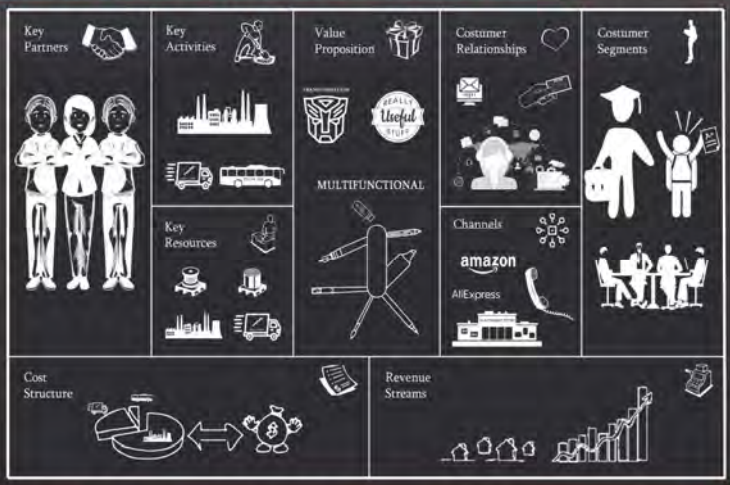
№	Startups	Novelty of the idea
1	G.A.I - Group	By means of technologies via application we provide, the farmers will receive harvest of good quality without excessive difficulties. Finally we will have high standard harvest for export of domestic manufacturing
2	The car working on salty water	Instead of fuel, we use saline water which helps us to avoid exhausting resources, namely oil saving and air cleanness.
3	Porto Franco Guitars	Grows under the Georgian economy. Prices and ETC.
4	Individual sewage system	There is no precedent of using this system in Georgia
5	Smart trash box	The idea of "smart trach box" is already innovative because this type of product is actually in use. It has a lot of positive features to emphasize its innovation, namely it helps in the clean-up service organized and operative work that will facilitate a lower loading of city streets with clean-up vehicles, and its main function is to create much more clean
6	Brain Gym	It is new experience for everyone. It dedicates modern technologies to actually improve our cognitive abilities. It creates new social platform for people to interact. Raises awareness of importance to exercise brain activity.
7	SWP-Solar Wind Power	It is new experience for everyone. It dedicates modern technologies to actually improve our cognitive abilities. It creates new social platform for people to interact. Raises awareness of importance to exercise brain activity.
8	Delta Pen - group	Multi-use, efficiency, comfort and less expenses
9	Device for Sightless	Innovative in our business idea is that, unlike similar products, our product creates perfect comfort for consumers; it is much safer, mobile and compact.
10	SUNNY	Sunny- will be made with waterproof (high quality plastics) material. It will have several sections: 1. Food 2. Drink 3. Charger 4. Transformable backrest, which will turn into a raincoat 5. Clock 6. Compass 7. Chlorophyll phosphorus (visual effect that makes it attractive and visible)

VISUALIZATION OF THE PEN

ΔELTA PEN

BUSINESS MODEL: Delta Pen

ΔELTA PEN



Global Competition in Valencia (Spain)

STEP 5: Business Plan Was Submitted – Aug 20th 2019
STEP 6: The Team Participated in INNOCENS Global Competition in Valencia (Spain) – Sep 13th 2019

INNOCENS

Thank you for Attention

InnoCENS Project,
Prof. Gizo Patskhaladze

Nur-Sultan 1-5 Oct, 2019

ANEL

INVESTIGATOROBOT

INNOCENS

We are winner team of
“Innovation business idea competition”
by InnoCENS

Friendship from TUMO

Problem from Environment

Solution from National Polytech... University...

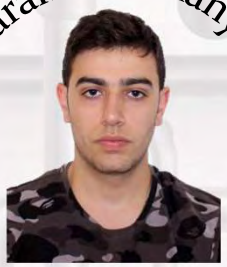
Laboratory from

Tech support from Armenian National Engineering laboratory ANEL

Business support from NPUA Innovation Incubator

INVESTIGATOROBOT

Andranik Voskanyan



NPUA
Yerevan,Armenia

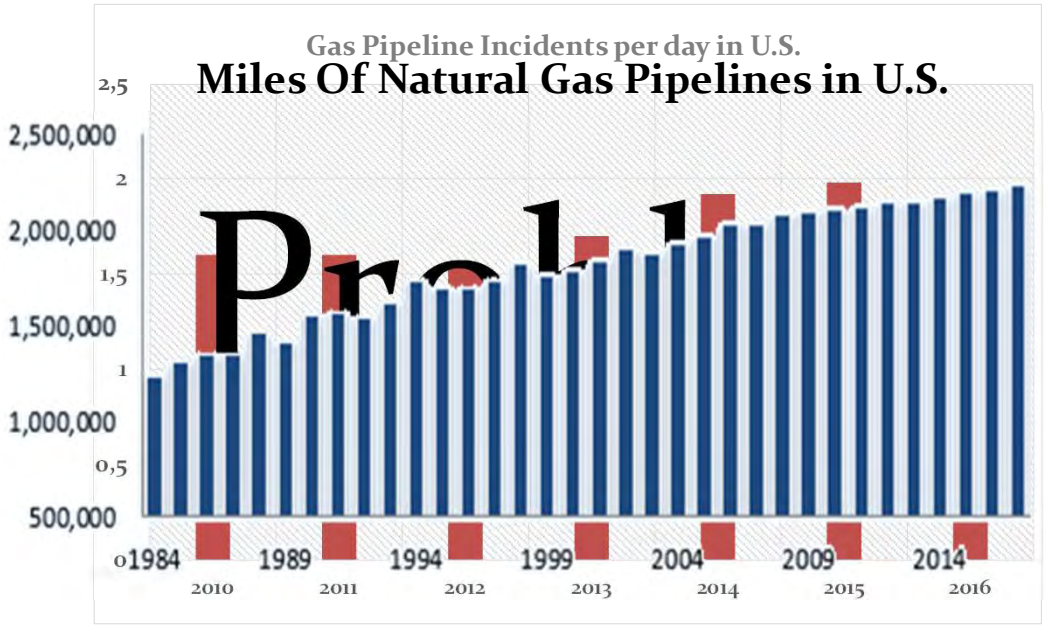
Arthur Hakobyan

Physmath school
Yerevan,Armenia

Ervand Terteryan

NPUA high school
Yerevan,Armenia

InvestigatoRobot.SFI@gmail.com



InvestigatoRobot.SFI@gmail.com

Company

Product — INVESTIGATOROBOT

Costumers — *All pipelines companies*

Price — *About 2500 $ - 3000$*

InvestigatoRobot.SFI@gmail.com

our customers are…

1. *Sewage treatment companies*
2. *Water pipeline companies*
3. **Gas pipeline companies*
4. **Oil pipeline companies*

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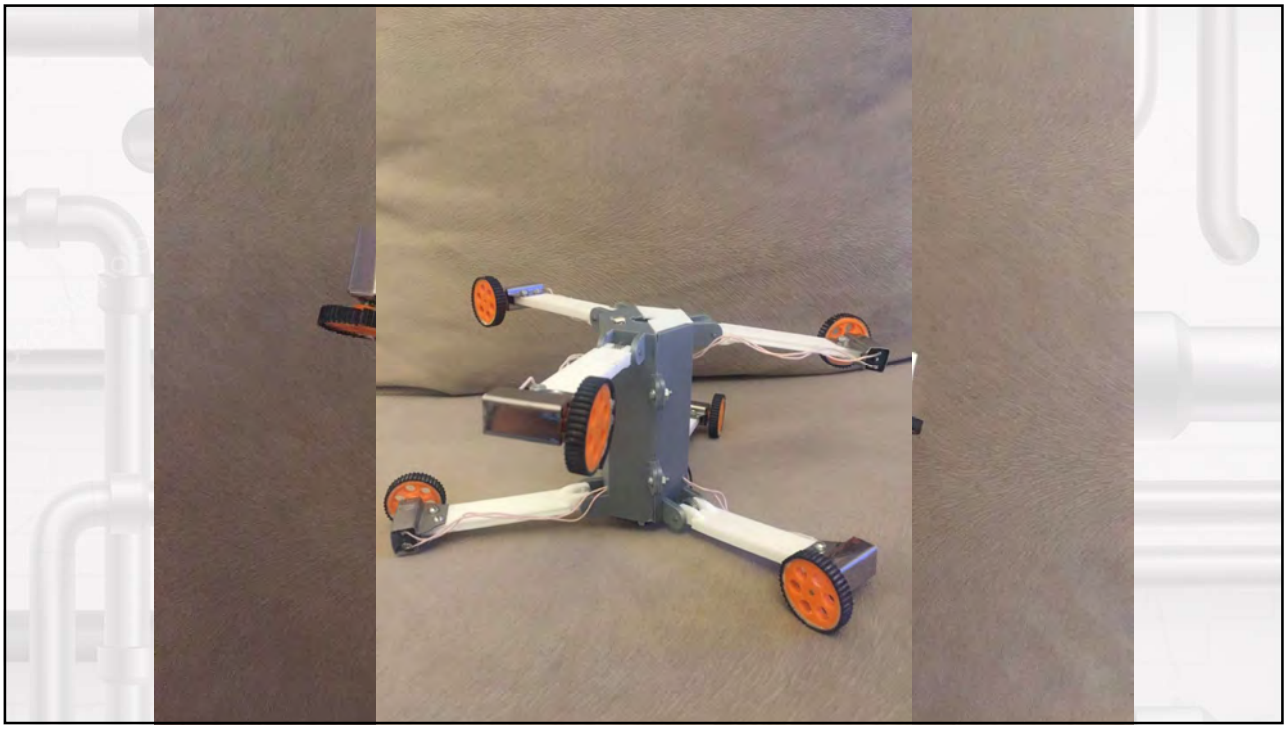

	Cheap	Automatic	Without cable	Move to top and dawn	Lightweight	Variable size
	✓	✓	✓	✓	✓	✓
	✗	✗	✗	✓	✗	✗
	✗	✗	✗	✗	✗	✗
	✓	✗	✗	✓	✓	✗

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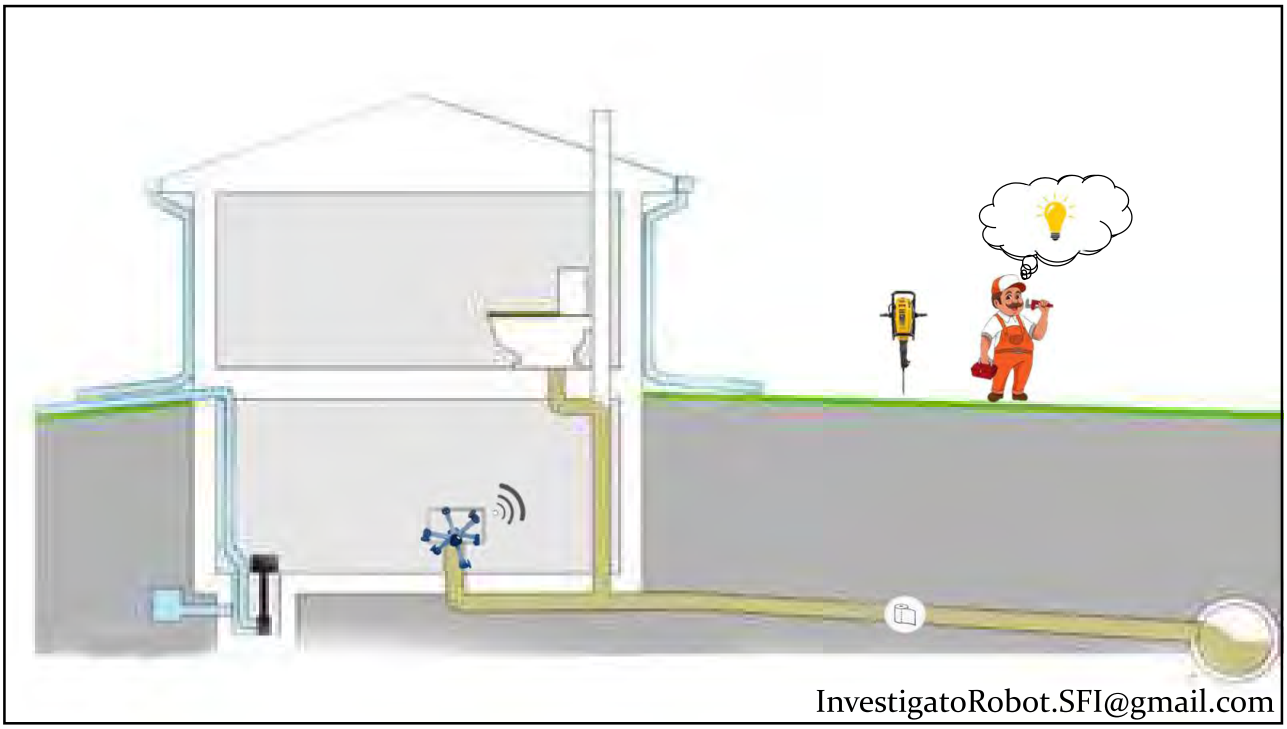
InvestigatoRobot.SFI@gmail.com


Winner startup
teams 2018
Yerevan, Armenia
St.Petersburg, Russia
InvestigatoRobot.SFI@gmail.com

Thank you

InvestigatoRobot.SFI@gmail.com