Cesis Space Education Center
Strategic Plan Summary

Content:

1. GENERAL INFORMATION

1.1. Justification of the center and priorities

According to the National Development Plan of Latvia for 2014-2020[1] one of the strategic objectives is "education and research". Pre-text to specific goals and Measurable Outcomes for the strategic objective states that "The main challenges to more investment in research and development include a shortage of employees in science and research". Specific Measurable Outcomes of the strategic objective include:

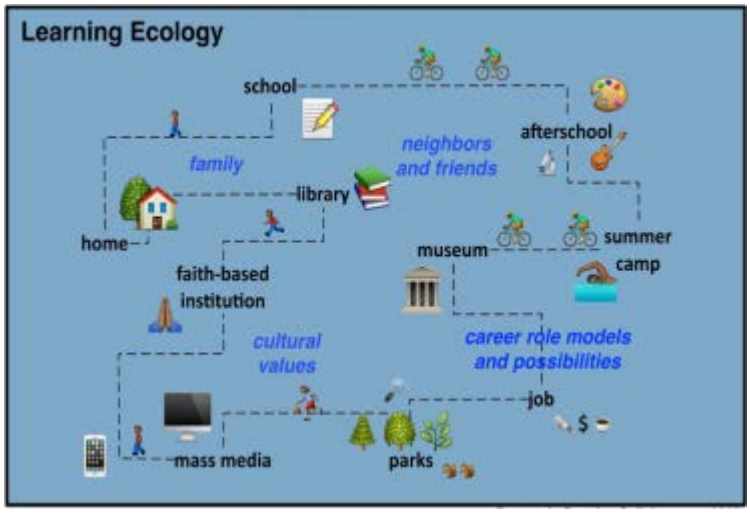
a) Number of researchers employed in the private sector, as a percentage of the total, full-time equivalent;
b) Number of students obtaining degrees or qualifications at universities and colleges;
c) Higher education (percentage of the population aged 30 to 34 with higher education).

According to the National Development Plan of Latvia for 2014-2020 Strategic Objective "Development of Competencies" - for a person to be able to obtain and maintain decent employment, to take care of him or herself and his or her family and to contribute to the development of the country, various competencies – a set of knowledge, skills and attitudes – are required, such as language skills, knowledge and command of information and communications technologies, communication and cooperation skills, entrepreneurial ability, civic consciousness, creativity, ability to think critically, to plan finances, to assess risks and identify solutions to such risks. These competencies need to be upgraded throughout one's lifetime, because it is impossible to anticipate the future needs. Individual measures within Strategic Objective include:

1) Introduction of innovative forms of curriculum content and activities in elementary and secondary education to promote creative and entrepreneurial ability: a digital learning environment, contemporary methods of foreign language acquisition, improvement of natural and social science curricula, strengthening of the career education system;
2) Creation of opportunities for talents to be discovered and developed, including support for youth science and technology centres, academic summer camps for pupils, provision of science workshops, competitions and research projects;
3) Improvement of the competencies of the teachers and work experience advisers involved in vocational education in accordance with trends of the labour market; capacity building of vocational education institutions (including teachers) with respect to adult education;
4) Introduction of module based education programmes (flexible, successive and structured subject blocks) in vocational education, development and approval of methodological teaching materials (including digital materials).

Cesis Municipality fully recognizes global challenges, EU and national priorities. Moreover, the municipality is committed to investing its own resources to address global issues while working on EU and National priorities. According to Cesis Municipality Sustainable Development Strategy until 2030[2], quality education is one of the priorities.

The largest challenge for the Municipality and the region since regaining of independence has been boosting economic activity. In 2007 the municipality started an NFI grant project "Vidzeme Center for Innovation and Entrepreneurship" with a purpose to promote innovation and entrepreneurship in the region. During the project it was recognized that interactive science and technology center concept is the most effective form of promoting values of innovation and entrepreneurship to children, teachers, families.
In 2010 a science center ZINOO was opened in Cesis.



As soon as ZINOO was opened it was recognized by schools and families as an effective tool to promote values and skills of curiosity, creativity, innovation and entrepreneurship. In 2016 municipality has noted that increasing needs for the interactive education tools will require methodological and infrastructure extensions of science center ZINOO within a period of 5-7 years. In 2017 the municipality initiated research into developing a new thematically oriented science education center with several key objectives of a) evaluate science centers in Scandinavia and decide on the thematic orientation of new science center; b) develop a list of social services that the new science center can offer; c) develop a concept for thematic orientation.

[1] https://www.pkc.gov.lv/sites/default/files/inline-files/NDP2020%20English%20Final___1.pdf

[2] http://www.cesis.lv/uploads/files/C%C4%93su%20Strat%C4%93%C4%A3ija_2015_final.pdf

The need to develop further existing science center ZINOO is defined in Cesis Municipality Investment plan that is part of Development Programme 2013-2019[3]. With its central location in the Vidzeme region it is an ambition for the Cesis municipality to become regional leaders for informal science education. Also, it is expected that new science center can attract tourist families and school groups from neighbouring countries of Estonia, Russia, Belarus and Lithuania.
Learning today and in the future will no longer associate only with schools. Museums, after school activities, mass media and even leisure activities become part of the life-long learning.. [4]

Cesis Municipality strongly believes that a science center can take a leading role in promoting culture of learning in the society due to its unique ability to communicate values of learning and innovation across many societies and groups. Also, science centers can generate learning experience with leisure, after school, cultural, family and career related activities.

1.2. Description of the current situation

The history of science center in Cesis started with a NFI founded project "Vidzeme center for innovation and entrepreneurship" (hereinafter - VIUC). The original purpose of the project was to establish an innovation center and business incubator with a goal to promote regional innovation and entrepreneurship. During the implementation of the project it was recognized that a current business incubator in Cesis is able to complete all necessary business development functions. After careful and in-depth evaluation of the local innovation ecosystem, it was suggested by the VIUC partners to develop a technology demonstration center. The idea was supported by local politicians and financial partners. ZINOO in Cesis was opened in September of 2011. Since the opening it has been a popular place for school visits and families. ANNEX 01 contains all the major activities that ZINOO in Cesis has accomplished since opening.

Cesis municipality since 2010 has invested considerable financial resources to strengthen organizational, technical and human capabilities at science center ZINOO. With the financial support from the municipality. science center ZINOO in Cesis has been able to organize various outreach activities, develop technical capabilities and increase education capabilities. All the above are critical in running a science center in a long-term sustainable manner. Historic achievements will guarantee a credibility for local and international partners - both public and private. Technical capabilities and competencies will ensure that a science center is technically self-sufficient and can replay on it own ability to build new exhibits, repair and upgrade them. Educational capabilities are essential in developing new educational and outreach activities.

Current situation of a science center in Cesis can be summarized below:

1) Current science center has developed strong technical and educational capabilities since 2010;
2) The science center has very experienced and motivated staff with strong and visionary leadership, list of all the major projects and events are summarized in ANNEX 01;
3) With the development of new science centers in the neighbouring countries, current format of the science center is not viable and sustainable.
4) Current financial capabilities of the science center and municipality are not sufficient to develop modern science center according to global trends and growing local (regional) needs.
5) Municipality has conducted (in 2018) a competition for the design of the building (see ANNEX 02) and started (in 2019) a procurement for construction of the building.

1.3. Objectives (planned changes)

In 2017 Cesis Municipality contracted Latvian Association of Science Centers (LZCA) to make an in-depth research about science centers in the Northern Europe and development of Strategy Concept. The purpose of the Strategy Concept was to understand if the development of science center in Cesis has to follow the current direction of covering multitude of STEM topics or choosing one or several thematic directions. The guidelines from the municipality in developing the strategic direction for the new science were:

1) the science center should be able to promote STEM on regional and national level;
2) synergies between the science center, local schools, companies and universities should increase local capacity for innovation and research;
3) attracting tourists from surrounding regions and countries should increase general economic activity in the region.

Above the directions indicated by the municipality for the new science center, municipality recognizes the general purpose of the science center to address global and regional challenges. The purpose of the science center in Cesis can be summarized with the following goals that can also be measured in a long-term:

1) Increasing a science capital in the society;
2) Promote interest of young people towards STEM sciences and related career;
3) Support school system to improve quality of education.

[3] http://www.cesis.lv/uploads/files/Attistibas_programma_investiciju_plans_ITI_uz_14_03_2017(1).pdf

[4] https://www.ecsite.eu/activities-and-services/news-and-publications/digital-spokes/issue-42#section=section-indepth&href=/feature/depth/stem-learning-ecosystems-critical-approaches

2. STRATEGIC DIRECTION

During the research mentioned above, all the largest science centers in Northern Europe were evaluated and all their thematic orientation examined. It was concluded that all science centers can be distinguished in two ways - general science centers that cover all possible STEM fields and science center that choose one or several STEM related sciences or fields.

Firstly, it was concluded that an expansion of a science center in Cesis has to be thematically oriented. Building a larger science center with general STEM orientation would put Cesis in a direct competition with a science center AHHAA in Tartu, Estonia that is only 175 km or 2 hour drive away from Cesis. To decide on the possible thematic orientation of science center in Cesis 5 criteria were developed to compare possible solutions. The criteria for choosing thematic orientation of general topic were:

1) the topic is not competing with other science centers in a 500 km radius;
2) the topic has a historic background in the region;
3) there is economic and industry background for the topic;
4) current popularity and a potential for popularity of the topic in the society;
5) economic and innovation potential of the topic for development of high added value products and services.

After careful investigation and comparison it was decided to choose “Space” as a main thematic orientation. The deciding factors for choosing “Space” as a thematic orientation was:

1) no competitors in all of the Northern and Eastern Europe;
2) deep tradition for space exploration in Latvian science and industry;
3) positive attitude in the society towards space that is proved by a high number of visitors to space-related events organized by ZINOO in Cesis;
4) high possibility for innovative products and services in the sector.

Additionally, it was noted that the topic of space and space exploration has a wide and deep coverage across many industries and economic sectors, including: healthcare, food production and processing, material sciences, electronics, robotics, communication, design, architecture, computer programming, economics, law, arts; not to mention that space exploration covers a wide range of natural sciences of physics, astronomy, mathematics, chemistry, biology, and more. Based on this premise, four distinct topics have been identified:

1) “History” to explain how various social, political and economic movements impacted rise of the space age.
2) “Cosmology” to show practical applications of physics, mathematics, geometry and other sciences to learn about the origins of space and life.
3) “Technology” to show various hardwares needed to get to space and related engineering competencies to develop the hardware.
4) “Healthcare” to show the fundamentals of healthcare and how developments of space medicine helps to improve lives on Earth.
5) “Living” show technologies befing building sustainable living entities in space and on earth

2.1. Mobile equipment

During the process of developing a Concept strategy (mentioned above), the list of more than 100 various mobile equipment ideas have been generated according to the topics. List of the ideas for the mobile equipment and their descriptions are available in latvian only in ANNEX 06. Besides the mobile equipment there is a list of educational installations planned to be developed in cooperation with Riga Technical University. List of educational installations and detailed descriptions available in ANNEX 03.

2.2. Educational activities

Educational activities are at the center of the science center activities. Development of infrastructure, mobile equipment and educational installations serve the purpose of delivering new insights, knowledge, skills and values in an engaging and playful manner. According to the research conducted for the branding strategy (see “Branding”) three main target groups have been identified in the following priority:

1) Families as a cornerstone of any social structure who are first role-models to their children; who must lead and teach values of curiosity by example; who can motive for learning through teamwork.
2) Teachers as a cornerstone of every educational process who can inspire children to pursue specific careers; who can create positive associations towards learning; who can teach the critical thinking.
3) Children and students as future members of the society who should find learning new skills and knowledge as fun even if its hard; who should learn to solve complex problems of the future; who should learn to work in a team.

The most important educational activities are listed in the table below according to target groups:

No.	Activity	Target groups	Method, Content

1,	Excursion	Families with children ages 3-6	Learning about basic STEM concepts by "playing" with mobile equipment. Parents are instructed on how to inspire children for curiosity, reading and exploration by their own example.
2.	Adventure packs	Families with children ages 7-18	A variety of special thematic educational packages that involves a series of tasks and experiments that can be completed within 60-90min. It is planned to develop at least 50 adventure packs on various topics (astronaut training, food, rocket science, etc) for various age groups.
3.	Teacher courses	Teachers of all backgrounds and ages	Specific courses to teachers of any background on how to inspire children for learning through topics of space. Special courses are designed for teachers in STEM, Arts, Languages, Literature, Geography, History, and more.
4.	Workshops	School children ages 7-14	Interactive workshops involving various tools and materials to deliver specific skills and knowledge according to school curriculum. There is a plenty of space related workshops developed by ESA[5] and NASA[6] that can be adapted to local needs.
5.	Projects	School children ages 15-18, university students	Special project involving the use of industrial engineering and scientific equipment (maker-space equipment, test labs, etc) to learn the basics of scientific research and to identify possible future career possibilities in the space industry.
6.	Summer Camps	Teachers, School children ages 9-18, university students.	A variety of space camps related to the topics of space mostly for school children. Space camps are organized using existing infrastructure (building, installation, mobile equipment) and already developed workshops, teacher courses, adventure packs.
7.	Competi-tions	School children ages 9-18	A variety of competitions can be organized among school teams competing on building rockets, cansats, weather balloons and more.

2.3. Branding

In 2019 Cesis municipality contracted LZCA to make a research on how society perceives STEM and space related topics in order to develop a Branding strategy. According to theory Brand strategy[7] defines what the organization stands for, a promise it makes, and the personality conveyed. And while it includes name, logo, color palette and slogan, those are only creative elements that convey the brand. Instead, the brand lives in every day-to-day interaction with customers and shareholders. For Cesis Space Education Center the branding strategy consist of:

1) Purpose to the society or how we want to contribute.
2) Mission statement or how our customers stakeholders perceive us.
3) Answer to the question "Why space?"
4) Promises to the customers and stakeholders.
5) Name of the science center; logo and design manual.

Purpose of the science center is to increase science capital in society, foster critical thinking and good reasoning skills, disseminate scientific information, develop educational content and popularize STEM related careers.

Mission statement: "as technology, society and the world around is changing at an ever increasing speed, common experiences between children today and their parents grow thinner. Science center is a great place to appreciate this dynamic new future and embrace these rapid development. Through exhibitions, workshops and educational activities there is a story to be conveyed, one that offers a common experience for the futuristic space age we are inevitably coming to, and builds an understanding we can share between us."

Many members of the society would ask "Why Space?". Here is our answer:
"Increasingly we hear that the future of our civilization is in space. But space is still a great unknown that both attracts and frightens. Yet we know conquering the space frontier has been beneficial, especially looking at the many tech spin-offs that we see around us every day. The great unknowns of space are inspirational, can turn on curiosity and serve as a great tool to increase science capital within our society."

Promise to the customers and stakeholders is made of 3 parts:

[5] https://www.esa.int/Education

[6] https://www.nasa.gov/stem

[7] http://www.marketingmo.com/strategic-planning/brand-strategy/

1) How we function: “Parents, children and teachers in the center will have a chance to learn about the world around us, develop a better understanding about the universe and the society we live in.”
2) What we offer: “Visiting a science center is like an interaction and development through play, where children can be children (play, explore, learn), parents can be parents (help children to explore and learn), teachers can be teachers (explain the unknown, inspire, be role models). In a game everyone has their role, and only by playing together is it possible to complete the mission”
3) How much time to invest: “We think that lack of time is an excuse to not do something. It only shows that the motivation to find time is insufficient, as the offered activity is not interesting, motivating, or requires too much effort. Science center has to be very aware of time management and constantly balance time spent on activities to keep participants interested.”

Name of the science center is still under development. Logo and visual manual is still under development.

3. COOPERATION

3.1. Norwegian partners

Close cooperation with **NAROM of Andoya Space Center** in Norway to develop new space related learning tools, methodologies and learning installations. A specific cooperation plan and strategy has been developed doing the first initial visits described in ANNEX 05.

3.2. Universities and scientific institutions

Universities will benefit from cooperation with the science center as students will have the possibility to join various educational activities or to participate in the development of new educational installations. While the science center will benefit by receiving new insight on how to promote specific STEM related subjects through the topic of space exploration. Business organization who are interested in promoting their specific field of study or career choices to the general public would also be a strategic partner.

3.3. Other innovation centers in Latvia

Science center in Cesis will cooperate with other science centers in the country to exchange information on offered services, methodological approaches, outreach and marketing activities.

3.4. Schools and Teachers

Schools will benefit from visiting a science center during the NFI period for free to take part in educational activities offered in the center. Schools, teachers in particular, will also contribute to the development of new educational programs.

3.5. Vocational education institutions in Latvia

Vocational schools can use the science center to inspire their students in space related engineering studies while science center will provide students with specific study or hands-on projects.

4. GOVERNANCE

4.1. Institutional governance

Several institutional governance models for the new science center in Cesis have been discussed in municipality, such as: a) a structural unit within Education board; b) municipal agency; c) municipality established company with limited liability. After discussions and comparisons all possible institutional governance models, it was decided that a Municipal Agency is the most appropriate model in terms of flexibility and oversight.

4.2. Process management

From the experience at science center ZINOO in Cesis it is important to organize the governance of the science center primarily around the services (see part 6 “SERVICES” in the full Strategy Document). The overall management of the science center will be organized with a goal to ensure the best possible service quality and accessibility to the visitors (target groups). Successful process management will include 3 critical aspects:

1) Key Performance Indicators (KPIs) will be established to evaluate and improve the services offered. Some of already indicated KPI will be: number of admissions,feedback rating, number of returning visitors.
2) Skills and competencies have to be identified and developed within staff of the science center to deliver the services. Some of already identified skills and competencies include: mentoring visitors, running workshops, basics of pedagogy, project management, technical competencies, science literacy, space industry knowledge.
3) Supporting functions have to be identified in order to ensure the most effective delivery of services. Most critical support function include: supplies and logistics, technical repairs, training, communications.

4.3. Organizational structure

To ensure most effective operations at the science center there should be a very simple, yet effective organizational structure. From the experience of science center ZINOO in Cesis, a 2 level organizational structure is sufficient. To make the organizational structure interesting for the staff members, an analogy with space related naming system can be introduced. Currently, the concept of "Space Mission" management structure is suggested and it is made of 2 important units:

1) Mission Control is responsible for organizing, managing and supporting "Missions" or SERVICES while ensuring overall sustainability of the whole organization. The key functions in Mission Control would include:
    a) Head of Space Center or CEO, responsible for general planning and development;
    b) Head of Content, responsible for the development of new Missions or educational activities;
    c) Head of Technology responsible for technical maintenance and technical availability of Missions, Supplies and Logistics;
    d) Head of Administration responsible for Accounting, Human Resources, and Finance
    e) Head of Communications, responsible for internal and outside communications (marketing)
    f) Head of Projects responsible for developing new projects according to development goals.
2) Edunaut Corps[8] is responsible for delivering Mission to Target Audiences. Among Edunauts there will be several ranks based on their experience and level of competencies.
    a) Captain - most senior and experienced of all Edunauts;
    b) Commanders - very experienced in all of the Services offered by the science center; can perform all the services listed.
    c) Specialists - Edunatus with expertise and skills in one or few services.

5. SUSTAINABILITY

5.1. Social sustainability

Social sustainability addresses the need to regularly keep in contact with most important stakeholders who ensure that the science center is delivering its social goals. To be sustainable on social goals there have to partners who share the same social goals and can both gain from the science center and contribute to its growth. The most important social partners that have been identified are:

1) Local and regional Municipalities who are interested to see the science center as an innovation hub that can attract young people to the region. Targeted funding from municipalities could be used to develop new innovation and training programs to attract young people to the region.
2) Local and regional Education Boards who are interested to develop innovative education approaches and improve the quality of education. Common projects can be developed to train teachers, improve teaching tools in schools, improve environment for creativity in Schools.
3) Local and regional Tourism Boards who are interested to attract tourists from other regions, countries and improve economic activity in the region. Common projects and funding could be used to promote the science center in other regions as a tourism destination.

Besides to local and regional partners there has to be an open dialogue with national institutions, like Ministry of Science and Education, Ministry of Economics, Ministry of Regional Development. Also, a regular contact with leading political parties have to be established to lobby concepts of science capital in national strategic documents.

5.2. Environmental sustainability.

Environmental sustainability is important primarily for the local populations, but it can also be used as a positive case study on global level. The environmental sustainability of the science center will be ensured through these critical aspects:

1) Location of the science center is outside of city limits and will not create additional environmental, trafic, logistical or other stresses to the city.
2) Building of the science center will be equipped with state-of-the art green technologies to reduce the human footprint on the planet.
3) Surroundings of the science center provides a lot of possibilities for recreation through walking, cycling and other outdoor activities, that reduces consumption of technology based equipment, improves health, while reducing the need for services that generate high pollution or CO2 emissions.

5.3. Economic sustainability.

Economic Sustainability of the science center is ensured by thorough financial calculations. ANNEX 04 contains detailed calculations starting with the first year of operations after the end of NFI project. Calculations are made based on current experience of science center in Cesis. Summary of the projected cash-flow is represented below.

[8] The term developed from Astronaut Corps, but with emphasis on Education

Cesis Space Center Cash-Flow TOTAL 5 years

	Year 1	Year 2	Year 3	Year 4	Yea4 5	TOTAL
No. of Visitors	73 850	55 675	71 325	84 925	100 015	**385 790**
INCOME	**1 135 980**	**948 402**	**1 190 246**	**1 380 678**	**1 828 516**	**6 483 822**
School Children	65 070	55 037	64 696	73 208	121 720	**379 731**
Families	429 550	339 850	425 400	461 350	609 500	**2 265 650**
Indiv.Visitors	156 800	136 000	172 800	198 400	240 000	**904 000**
Atractions	44 310	44 540	71 325	118 895	140 021	**419 091**
Corporate	63 200	82 000	82 000	82 000	154 200	**463 400**
Cafe, Shop	369 250	278 375	356 625	424 625	500 075	**1 928 950**
EXPENSES	**1 105 625**	**1 013 311**	**1 208 164**	**1 388 576**	**1 761 019**	**6 476 695**
Variable Costs	708 363	612 284	772 818	929 974	1 230 619	**4 254 058**
Maintenance	30 062	31 427	33 346	33 802	42 000	**170 637**
Administration	367 200	367 200	367 200	367 200	367 200	**1 836 000**
SALDO	**30 355**	**-64 909**	**-17 918**	**-7 898**	**67 497**	**7 127**

6. INDICATIVE TIMETABLE

Detailed project plan is presented in ANNEX 07, summary below.

6.1. Project preparation (2019)

During the NFI project preparation there would be two separate preparation directions. First would be the project concept preparations, which include:

1) building cooperation networks with Universities, Norwegian partners, Schools;
2) developing educational programme outlines;
3) analyzing costs of mobile equipment and educational installations;
4) assembling and training of the team, assigning task, going on study visits;
5) organizing first outreach activities;
6) building a space theme room in current location

Second would include all the necessary preparations for the construction project, including:

1) Running procurement for technical specification and construction;
2) Participating in the development of the technical project

6.2. Project implementation (2020-2022)

Year	Activity
2020	Developing educational methodologies, mobile demonstration units and educational installations, first national outreach activities
2020	Organizing first outreach activities
2020	Initiating construction of the building
2021	Testing and implementing methodologies, building demonstration units and education installations, outreach activities.
2021	Construction completed
2022	Transferring mobile equipment to new building
2022	Opening to first visitors

7. SWOT ANALYSIS

INTERNAL FACTORS

STRENGTHS	WEAKNESSES
- Very clear and engaging theme - Many successful public outreach events related to the theme - Extensive experience in exhibition development - Extensive experience in managing science centers and international projects - Well developed cooperation model with Riga Technical University - Extensive experience in cooperation with teachers and organizing trainings to teachers - Extensive experience in cooperating with private businesses - Passive and energy efficient building to reduce maintenance and running costs for the science center - Strong image of Cesis in space-related activities (space festival, first latvian space rocket)	- No established contact network for international tourism PR - Few people in our area knowledgeable about the Space subject - Insufficient competencies in designing premises and mobile equipment - Insufficient experience in building technologically complex exhibits - Insufficient technological capacity to design and build educational installations
EXTERNAL FACTORS	
OPPORTUNITIES	**THREATS**
- Becoming a regional ESERO representative - Participating in ESA programs - More involvement in ECSITE programs - Development of new national space-themed educational activities and events - Need from schools and teachers to develop new educational activities - Good geographical positioning (close to Riga, middle of Vidzeme region, close to Estonia and Russia) - Cesis as a tourism destination - Strong image of Cesis in Latvia as a “family friendly city” - Growing infrastructure and new businesses in the Cirulisi area of the city. - Variety of family-friendly activities in the surrounding region - High quality nature trails in the direct vicinity of the Science Center - Good infrastructure and accessibility for the Cirulisi area - Greater economic activity and new jobs in the region - New science centers in Latvia (Ventspils, Daugavpils, Liepāja) that will enhance the overall interest in Latvia for STEM	- Low genuine flight hardware availability - Political instability that can influence national educational priorities - Changing regulations and laws - Insufficient local funding for future development - Political instability after regional reform - Lack of competencies at national level to create, design and develop technologically complex educational methodologies, mobile learning equipment and educational installations