



Executive summary

A study on smart, effective, and inclusive investment in education infrastructure

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Abstract

The need for smart, effective and inclusive investment in education infrastructure has been put high in the EU political agenda but has not been thoroughly analysed in EU27 countries. The goal of the study is to review recent trends and provide policy recommendations on smart, effective and inclusive investment in education infrastructure. As part of this study, comprehensive desk research, scoping interviews, national (regional) mapping exercise and analysis of good practice examples were carried out. The mapping exercise was at the core of this study and involved comprehensive analysis of EU27 current situation regarding investment in education infrastructure. The report provides the final findings of the research, including conclusions and recommendations and the good practice framework, that were validated during the expert validation workshop. The mapping revealed that although many EU27 countries mostly invest their regional and national funds in education infrastructure and carry out at least some form of investment needs assessments, forecasts and infrastructure monitoring, the efforts made to collect data on education infrastructure are usually not systematic and investment planning is not always based on current needs. The report offers 12 recommendations for all countries to implement to achieve smart, effective and inclusive investment in education infrastructure.

Executive summary

A study on smart, effective, and inclusive investment in education infrastructure

The overall purpose of this study is to review recent trends and provide policy recommendations on **smart, effective, and inclusive investment in education infrastructure** in the EU27. Not being smart, effective, or inclusive in educational infrastructure investments is not just a waste of precious resources, but more importantly a missed educational and cultural opportunity.

Within the frames of this study, education infrastructure is understood as all the **material elements that support education**. These include land, buildings, furniture, software, and equipment, which, together, provide physical, blended, and virtual spaces where teaching and learning take place.

The study covers **all levels of education and training** by ISCED 2011, including early childhood, primary, secondary, post-secondary non-tertiary, and tertiary education. The focus is on **27 Member States of the EU**. In countries where the governance of education infrastructure is decentralised, regions are subject to analysis too.

Methodology for the study included multiple approaches:

Desk research: to support different steps of the study, desk research was carried out. Sources that were analysed included: existing literature on investment in education infrastructure to fine tune the research methodologies, a wide range of reports of the European Commission, European Investment Bank, OECD and World Bank to prepare for scoping interviews and the national (regional mapping) and cross-country studies and datasets on investment in education infrastructure to support trend analysis.

Scoping interviews: a programme of scoping interviews was carried out with a total of 16 semi-structured video interviews¹ with representatives of the European Commission, OECD, World Bank, European Investment Bank and Council of Europe Development Bank.

National (regional) level mapping: mapping was the core of the study and gathered data on:

- **National (regional) approaches** to the governance of education infrastructure and investment in it, in each Member State of the EU27;
- **Trends** in investment in education infrastructure over the last 10 years in each Member State of the EU27.

Mapping was conducted in several stages. First, a mapping framework, template and guidelines for local experts were prepared. Second, a wide range of cross-country studies, reports and international databases that offer relevant information on different countries was explored. Third, a system of collaboration with national experts in all EU27 Member States was set up. The experts then proceeded with national (regional) level mapping by carrying out desk research in a local language and, where relevant, English and carrying out interviews with high-level officials and infrastructure, financial, administrative, research and/or education specialists. The experts secured the collaboration of a wide range of stakeholders, including ministries, agencies, and other public authorities at the national, regional, and local level, also experts outside the public sector and representatives of the education community. A total of 175 interviews were conducted – on average, 6 interviews per country. They helped to fill in knowledge gaps remaining after desk research and validate research results.

Analysis of trends: trends analysis was carried out based on results of the scoping interviews, desk research, and mapping exercise. To the extent that existing data allows, various aspects were explored by level of education and training and Member State, special attention was paid to trends that can be observed at the level of the EU.

Analysis of approaches to governance: having concluded trends analysis, research on the approaches to governance of investment in education infrastructure was carried out. The approaches to governance were explored based on results of desk research, scoping interviews, and national (regional) mapping.

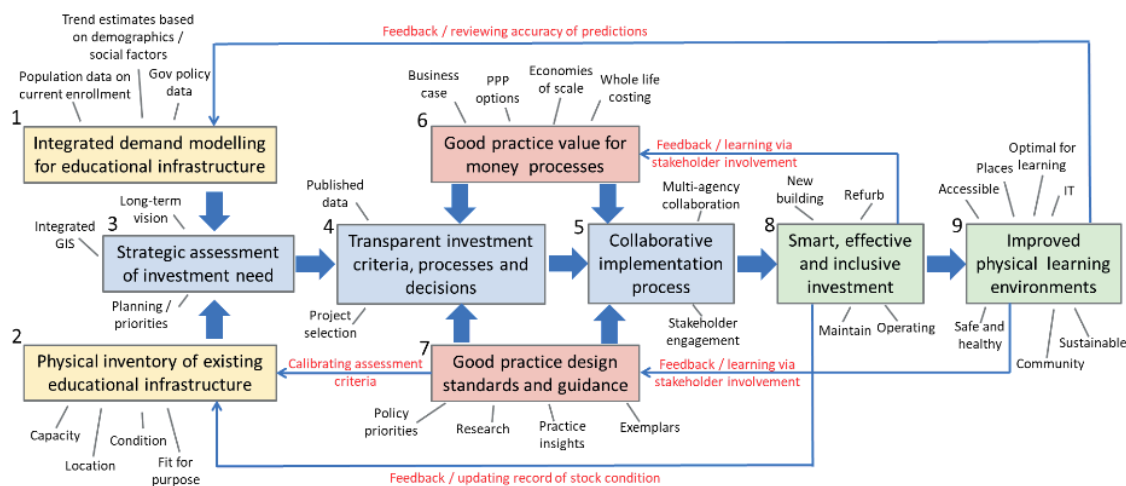
Good practice analysis: good practice examples were analysed to highlight positive examples of particular aspects of the investment process, so that taken together they provide a comprehensive array of possible action areas. 39 good practice examples were identified in EU 27 countries by local experts and 8 of them were selected for deeper analysis. These included:

- Schools of the Future (Bulgaria)
- 6Aika: Smart Learning Environments of the Future (Finland)
- My school, a quality space. A guide for basic education (Belgium)
- National Registry of School Buildings (Italy)
- Holistic Building Programme of BIG (Austria)
- 'Parque Escolar' Secondary School Modernisation Programme (Portugal)
- Use of enrolment projections and GIS for planning infrastructure investment (Ireland)
- Construction of the Life Sciences Centre (Lithuania)

¹ A semi-structured interview employs a blend of closed- and open-ended questions, often accompanied by follow-up why or how questions. It allows the interviewer to change the order of questions, and probe different directions as new information emerges. A semi-structured interview includes only a few predetermined questions and builds on a checklist of topics to be covered instead.

To provide coherence to these focused “inspirations”, a holistic model of an idealised investment process for educational infrastructure was developed – the “good practice framework”. This drew from relevant literature but is also grounded in the intelligence gleaned from the national (regional) mapping. This process of “truth tracking”² was continued as the cross-case analysis was developed, so that the idealised model is in fact grounded in the best aspects of the EU Member States’ systems. The resulting good practice framework model is provided in the figure below.

Figure A1.1 Good practice framework



Systemic characteristics:

- 1) Data, analyses and processes all at a level of granularity that gives visibility to, age, level of education, special needs, mix of subjects, location
- 2) Levels from national – regional – local – project, connected synergistically and provided with appropriate integration and user support.
- 3) Stakeholders at all levels aware of opportunities and processes and engaged in the active improvement of what is done and how it is best achieved.

Source: Compiled by the authors

Conclusions and recommendations were drawn up with regards to investment in education infrastructure. They were validated during the expert validation workshop with 23 national experts, international and national stakeholders and members of the European Commission.

Communication strategy: to make sure the deliverables reach their target audiences, the communication strategy was prepared. It details the communication objectives, key target audiences, main messages, and communication activities. The implementation of the strategy builds on the principles of co-ownership of the communication actions and the development and execution of the work plan.

Study results (conclusions and recommendations) are presented below in two chapters as trends in investment and governance.

Trends in investment

The investment trends in educational infrastructure are generally driven by two main factors - numbers of enrolled students in education at different levels, as well as scope, condition and fitness for purpose of the existing infrastructure. The number of enrolments in early childhood, primary and lower secondary education in the short term is influenced by birth rates and net migration, migration within country (e.g., from rural

² Gibson B and Hartman J. (2014). *Rediscovering Grounded Theory*. London, Sage.

to urban areas). In non-compulsory education (upper secondary and tertiary education) demographics play a much smaller role and instead the absorption rates, education requirements, school drop-out rate, variety and popularity of existing post-secondary pathways, and quality of higher education services in the country play a role in enrolment dynamics and later in infrastructure needs. While the birth rates in European Union are low, immigration as well as internal migration within countries means that a common challenge for many countries is the increasing demand for early childhood and primary education infrastructure investment.

Based on the national (regional) mapping, in 2010-2020 some of the most common priorities and objectives identified in the Member States included: school network optimisation, health and safety, energy efficiency and sustainability, accessibility of facilities, investment in ICT infrastructure, investment in equipment and modern laboratories and adapting to modern pedagogy and improving the quality of the buildings in general.

The investment in education infrastructure remained largely public. General government gross fixed capital formation (GFCF) in education comprised more than a half (58%) of the total investment in education infrastructure between 2008 and 2018³ and stabilised at around 0.3% of gross domestic product in 2017 in EU27⁴.

Priorities by level of education differ across countries. In 2008-2018⁵ ten Member States invested in infrastructure the most at the tertiary level, nine did so at pre-primary and primary levels, seven at the secondary level, and one in education not definable by level. This can be explained mainly by a cumulative effect of the trends in enrolment at different levels, and policy priorities.

Aside from the enrolment numbers and condition of the existing infrastructure, other factors have had significant impact on the needs of educational infrastructure investment in various countries. Some of these factors are common to most Member States – e.g., climate goals and environmental targets (mainly leading to energy efficiency investments or improving the infrastructure to be up with health and safety standards in the country, like removing asbestos or improving heating/cooling systems), education policy developments and reforms, horizontal policies such as inclusion of people with special needs and disabilities, digitalisation, and lately COVID-19 pandemic. Other factors are more location-contingent and include early school leaving rates, terrorist threats, risk of earthquakes and other natural disasters, increased risk of heatwaves due to climate change, and historical heritage concerns.

Another current trend revealed by mapping was the increase in more inclusive enrolment of learners, in some cases from poverty-affected regions, but most often those with special needs and disabilities. Enrolment numbers of the latter group have been increasing in many Member States. This trend is in some cases self-reinforcing, as an initial investment in more equitable infrastructure may encourage more disadvantaged learners to enrol and further increase the demand for investment.

Governance

³ Calculated without Cyprus and Croatia, and Denmark for 2018 to allow for a comparison with total GFCE for the same period. Based on Eurostat, General government expenditure by function (COFOG) (GOV_10A_EXP).

⁴ Calculated based on Eurostat, General government expenditure by function (COFOG) (GOV_10A_EXP).

⁵ The available data for GFCF in Eurostat database is presented for years 2008-2018.

Due to the nature of different levels of education, the needs assessment related to infrastructure is usually governed by different institutions and often at different levels of governance. In most cases, the needs of early childhood and primary education institutions are monitored and fulfilled on the municipal level, while universities are communicating their needs to the central government. Some countries conduct baseline data collection. A major tool allowing to conduct effective systematic infrastructure assessment is having a national digital dataset dedicated specifically to infrastructural needs. Nevertheless, in some cases there is no evidence at all that coherent monitoring and follow-up of needs is carried out either by municipal or by central authorities. It is worth mentioning that the mapping of infrastructural practices in EU Member States has little to no emphasis on vocational education.

Most EU Member States do have strategies or visions at national level towards investment in education infrastructure. Where they do not, in some cases this is due to lack of capacity for long-term planning; elsewhere the planning is done at regional or municipal level without a national vision. Also, due to their autonomy universities are largely able to make decisions about their own strategic development and often this is done outside the scope of any national planning. The documents outlining strategic vision and planning are rarely dedicated only to the issues of education infrastructure. In most cases this is done in general education strategies and plans, and in some cases in documents covering infrastructure planning in several areas. In countries where the governance of education investment is very decentralized, there is a noticeable lack of coordination between, for instance: policies for urban and rural areas, public and private initiatives, or even between different educational levels.

A strong commitment to generate and maintain design standards and criteria that would lead to smart, effective, and inclusive capital investments in education was not perceived during the mapping. Numerous countries only use general construction standards not specific to education, or use them only for some levels, notably early childhood education. Furthermore, an explicit process for updating infrastructure design standards to look back and evaluate their effectiveness, or to view such standards as part of a broader equation that would include space utilization and network efficiency was not observed in any of the countries analysed.

In general, the highest priority is given to projects to improve safety, health, energy performance, accessibility; Higher education projects seem to be more market driven than projects in other education levels. There is a greater consciousness about the value of attractive educational facilities for capturing new students and consequently have more revenue.

The Member States typically had dedicated project supervision strategies and government inspections for the construction process. However, mapping results did not reveal any easily available reports on project audits, qualification of construction companies, or the results of quality assurance and quality control reviews. The supervision of investment performance or asset performance was much less developed. Most of the countries did not carry it out in a systematic way. Mapping results also did not identify an explicit government run preventive maintenance strategy in most countries.

Mapping results suggest that the data about education infrastructure is most often collected in databases or inventories. These can be maintained at national or regional/local level – usually at the level from which the majority of funding is obtained. Majority of the countries carry out only fragmented data collection. It is also evident from the monitoring results that even though most of EU27 countries collect some data on

investment in education infrastructure and on the infrastructure itself, the complete data is not usually made available to the public, the data is only available internally for those that directly participate in planning process of investments – usually the Ministry of Education, municipalities and the education institutions themselves.

Some countries were documented to have separate databases for different funding sources, most notably, separate databases/websites for EU funding, where it was relevant. If using such (or similar) websites/databases was mandatory, at least some investments would be easier to track and compare between countries.

Aggregation of data (which is essential for proper analysis of regional/national trends) is reported to be a challenge in many countries. The main reason for this is that different institutions invest in infrastructure, with each maintaining their own data. As a result, the relevant data is either in multiple databases or not aggregated.

Countries that have strong regional institutions (municipalities, communes, states, etc.) with high autonomy collect their data on education infrastructure at regional level, as the funding for investment in it is also provided regionally. Consequently, countries that rely on state or EU funding tend to collect data at state level. This also explains data gaps in most countries – as there are differences in funding sources between levels of education, data collection also differs in the same country.

Regional funding (municipal/federal/communal) is the most common funding delivery mode in most of EU27 countries. The second most popular funding source is state (central government) funding. Higher education institutions receive investment in their infrastructure either from the state or EU funds and rely more heavily on private investors, investment loans from banks (like EIB) or invest their own funds. Funding for education infrastructure in EU27 countries is decentralised either at country level (where most of funding is regional/municipal or local) or at some levels of education (for example, pre-primary and higher education funding in most countries is decentralised due to high autonomy of these education levels), as most countries rely on a few sources of funding, including municipalities, the EU funds and private investment.

The most common investment delivery mode among all the countries mapped is public procurement. On the other hand, direct public provision as a primary funding delivery mode is not very common. Even though public-private partnerships (PPP) are used in several countries, it is only used for certain projects, in small scale or as an addition to public procurement of public provision procedures.

Early childhood education institutions are mainly supervised on the municipal level even in relatively centralized contexts, while decision-making regarding support of public universities, irrespectively of how autonomous they are, is done in the state level in a vast majority of cases. The most diversity is seen on the level of general education. Ministries of Education are the most commonly involved actors in the process of education infrastructure strategy and investment planning in more centralized settings. In the systems which are characterized by complete decentralization and delegation to the subnational level, local authorities obtain funds and cooperate with stakeholders on the respective territories to arrange effective distribution.

Recommendations

Recommendation 1: As well as the sheer numerical need for places, any estimation of the education infrastructure investment gap should take into consideration a deep assessment of the educational adequacy of facilities. Such assessment should be done

from the bottom at an appropriate level of decision making, e.g., by local authorities reporting on the needs to regional/national level.

Recommendation 2: In addition to educational drivers, the education infrastructure investment trends and challenges which are noticeable across all EU Member States (energy efficiency, inclusion of people with special needs and disabilities, digitalisation, pandemic-proofing) should be at the core of any further EU action in the field – strategic documents, investments, etc. A streamlined EU policy could provide a better common understanding of the infrastructure issues for different countries as well as at different levels within a country (national/regional/local).

Recommendation 3: As evidence shows that creating inclusive infrastructure leads to more enrolment of special needs and disabled learners, and in turn to more demand for such investment, all Member States should be encouraged to follow the best practices in this regard and mainstream inclusive investment in their planning. It would be useful if good practice models and examples (e.g., value for money and design standards) were available to public or researchers / country officials in a European platform with recommendations, examples (from real life) and some links.

Recommendation 4: It is recommended for all Member States to carry out centralised data collection on needs assessment; in case the needs are collected by different institutions or at different levels, an aggregation of data is necessary. A stronger involvement of vocational education and training in needs assessment is essential.

Recommendation 5: Achieving the objective of smart, effective, and inclusive investments in educational infrastructure may require starting by drawing a baseline of acceptable levels in each category. In very simple terms, whatever is under such an acceptable level, needs immediate attention. The items to be considered should especially include size of the classrooms, safety, hygiene, air quality, lighting. Higher values over such base line, also require a significant effort to maintain such levels. Extremely high values would constitute good practices to be evaluated and possibly replicated. Over time, EU recommendations on baseline levels could be developed.

Recommendation 6: Whereas integration of education infrastructure planning with other aspects of education or other types of infrastructure needs may be highly beneficial, having all the aspects of strategic planning and vision towards education infrastructure outlined in a single document (at any level) is necessary for clarity and comprehensiveness, as well as better follow-up of achievement of strategic objectives. However, this type of document should be built bottom-up with participation of all stakeholders, including those at local and regional level, so that it is not artificial.

Recommendation 7: In different Member States, a national discussion on design standards and criteria that includes education and build environment experts, along with users and managers, could have a highly mobilizing effect generating broad support from all kinds of stakeholders. The challenges brought by COVID-19 pandemic at the same time open up an opportunity for discussion and reimagining of educational buildings, spaces and equipment.

Recommendation 8: Development of specific standards for furniture and equipment and targeting investment towards achievement of those standards is a relatively less costly and potentially important way to improve educational outcomes.

Recommendation 9: Community oversight (not identified in any of the analysed countries) could significantly improve the supervision of investment in education

infrastructure. Parents and students associations, teachers unions, education services providers or local non-profits with the proper training, have the potential of being very protective guardians of investments in education. Moreover, their involvement from the beginning of the project creates a sense of ownership that often carries over the phases of building operation and maintenance. The needs of communities may also be included in relevant policy documents.

Recommendation 10: Aggregated, updated and transparent data about education infrastructure is essential for many purposes, including assessment of investments, comparability within and between countries, evaluation of achievement of objectives, clearer identification of needs, possibility for cost-benefit analysis, development of feedback culture at different levels, capitalisation on lessons learnt, and others. It should therefore be a priority for Member States to a) make an effort to aggregate the databases currently maintained by different institutions; b) to make all data publicly available for transparency purposes. The role of the European Commission could be to develop and maintain a European database on education infrastructure; the commitment of countries to contribute to the database could also be an incentive to aggregate and make available the data at national level. Furthermore, specific rules on reporting the data in a common format could be connected to infrastructure investments made with EU funding.

Recommendation 11: We recommend that Member States take inspiration from different elements of the good practice model, many of which are related to the previous recommendations outlined above. The strategic assessment of investment need (3) is at the starting point of sound planning of investment; it should take into account both the deep evaluation of existing infrastructure, concentrating on its capacity, location, condition, and fitness for purpose especially in constantly evolving latest educational practices (2) and demand modelling based on enrolment and demographics (1). The key elements of the investment itself are its transparency (4) and collaboration not only among institutions but also with the stakeholders (5). The properly developed cost-effectiveness processes (6) as well as design standards (7) contribute to transparency and collaboration. Finally, feedback loops are crucial in updating the information and informing future investments.

Recommendation 12: We recommend that Member States consider the apparent benefits of allowing a long term, evolutionary approach to educational infrastructure investment, such that expertise can be built up and so actions can be steered to meet current imperatives. An important aspect of any sustained effort should be a proactive approach to bridging the gap between high level policy and local implementation. A positive action could be investing in multi-stakeholder engagement in good practice forums (which would also be beneficial across the EU). This could be in a form of an online, physical, or blended meeting, conference, or working group (annual or more frequent), where policy makers, experts, academia, practitioners could meet to discuss.

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