

THE PUBLIC POLICY HUB

Technology Integration in Education in Egypt

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The opinions expressed in this paper are those of the authors and do not reflect AUC Policies or views. They are published to stimulate further dialogue on issues and challenges facing Egypt in an attempt to expose graduate students to practical policy solutions.

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(1) Abstract

The use of technology has overtaken all the fields of modern life. Technology in the field of education in Egypt was used since the time of Mubarak. However, the educational system in Egypt has been deteriorating till we have become the 139th in the world ranking in Davos conference in which educational systems' qualities are being assessed (El Bawaba, 2017). Therefore, the government has to take an action towards this issue as this threatens the entire society with the increasing rates of unemployment. Technology prepares the students for the life of the twenty first century as they can develop their competencies to be able to boost up their motivation for knowledge and information (Ghavifekr, Abd Razak, Faizal, Ghani, Ran, Meixi and Tengyue, 2019). Today, there is a substantial gap between the skills and knowledge students gain in school and the skills and knowledge that workers require in workplaces and communities. For example, the labor market needs students who can speak one or more foreign languages, but in Egypt, youth do not even speak Modern Standard Arabic well "Fosha" (Osama, 2011). Egyptians have to be more productive than being consumers, and in order to do this, education has to be given special attention.

Recently, one of the Ministry of Education's giant projects is integrating technology in education. It involves improving the teaching and learning processes to boost the educational outcomes and increase student engagement. Our paper investigates the Ministry's new project of integrating technology in the secondary stage. In addition, we explore examples of countries which implemented the integration of technology in education so that we can know how they successfully integrated it, and to avoid all the barriers they faced during their implementation of the technology integration in their educational systems. The investigations include other emerging economies like Indonesia, Malaysia and Singapore. Finally, the conclusion sheds light on recommended measures that the Ministry of Education should consider to better integrate technology in education.

(2) Introduction

The global approach for applying the sustainable development goals is being adopted in many regions in the world. Coping with this initiative, Egypt has announced its vision in 2030 for sustainable development. Digging deeper in the social dimension, specifically the seventh pillar that tackles education and training, it is found that it seeks "A high quality education and training system available to all, without discrimination within an efficient, just, sustainable and flexible institutional framework. Providing the necessary skills to students and trainees to think creatively, and empower them technically and technologically.

Contributing to the development of a proud, creative, responsible, and competitive citizen who accepts diversity and differences, and is proud of his country's history" (Egypt Vision 2030, p.13). Thus, some decision makers may think that integrating and applying technology, with all its diverse forms, is mandatory in any educational development program. However, integrating technological support is not as easy as it seems to be, as many countries, including Egypt (Warschauer, 2003) have

struggled to implement such a leap in their educational systems (World Bank, 2018). According to the World Bank MENA Education Flagship Report 2018, educational reform is not a unifactorial process that is resolved by reforming just the educational tools or curricula, but educational improvement is a multifactorial process that needs sociocultural integration as well. It introduced a triad approach to help educational reform in the MENA region as follows (World Bank, 2018):

- A concerted **push** for learning that starts early for all children regardless of background, with qualified and motivated educators, that leverages technology and uses modern approaches and monitors learning.
- A stronger **pull** for skills by all stakeholders in the labor market and society that involves coordinated multi-system reforms within and beyond the education system.
- A new **pact** for education at the national level with a unified vision, shared responsibilities and accountabilities. Education is everyone's business and not just the responsibility of the education system. (para.4)

Different studies that are mentioned in this paper (Warschauer, 2003); (Jarboe, 2001); and (Worldbank,2018) have demonstrated that integrating technology in the educational system is not the sole responsibility of the Ministry of Education, but it is a multifactorial process in which different parties in society play a crucial role. There are many external and internal factors that hinder the success of the educational development programs and integrating technology.

Social development and Involvement of main stakeholders are considered to be the main external factors influencing the success of the development of technological education. On the other hand, human, digital, and physical resources are the most important internal factors that need to be addressed wisely like teacher preparation, the use of smart devices, internet availability in schools, reasonable students number in classes. This is in addition to other crucial factors for a healthy learning environment such as qualified scientific labs, comfortable desks for students and teachers, healthy aeration, and well-functioning play grounds for different physical activities.

While the Egyptian Ministry of Education is highly investing in the digital and physical resources in the public school, there are other factors that strongly influence the success of integrating technological aids in the educational process. It is insufficient to focus on enhancing the physical and digital resources in the public school; the desired technological leap in the educational process requires also qualifying teachers, and promoting social integration of other stakeholders such as the private sector and civil society. A study was conducted in 1998-2001 (Warschauer, 2003) where the author examined how the Egyptian government had introduced the integration of some physical resources of technology such as computers, internet, and other modern resources in some public schools and their impact on the educational process. The author concluded that “an overemphasis on the mere presence of computers or Internet connections,

without a corresponding emphasis on social mobilization and transformation, can squander resources while leaving inequity intact” (Warschauer, 2003).

Additionally, Jarboe (2001) advised any educational system to “focus on the transformation, not the technology” (p. 31). One fruitful example of successfully reforming the technological education is described by (Potashnik, 1996) when he mentioned the Chilean government that devoted small proportion of their effort in purchasing technological equipment, and invested more in human and social development by forming coalitions for schools and communities, developing long term teachers training programs, and promoting the local autonomy of teachers and schools in each district.

Consequently, these studies suggest that there should be more emphasis on developing the human resources, such as qualifying teachers and school leaders to use and implement technology in the educational process effectively. One major reason for the failure of the improvement trial for integrating technology in some Egyptian public schools was due to the unequal enhancement of different resources; physical, digital, human, and social resources (Warschauer, 2003).

The Ministry of Education focused on improving the physical and digital resources. For example, it introduced a great number of computers into schools, but neglected other necessary resources such as human and social resources, for instance, they did not spend sufficient time for teachers’ preparation on how to use soft wares and social integration. On the other hand, there should be a full respect to the time factor in implementing any change. Sobhy (2018) advised the government to prepare well for the educational reform, and she mentioned the British experience that was designed to take 4 years for preparation, but the preparation process extended to 6 years and yet faced some critiques. Her rationale was that integrating technology without sufficient preparation may increase the discordance gap which imposes an additional hindrance for educational improvement.

Recently, Egypt witnessed the emergence of some initiatives focusing on preparation of teachers and school leaders such as “Teachers First” and others. These initiatives are extremely important in implementing the technological approach in the educational process via qualifying teachers technologically, this will be reflected positively on the students by creating a developed technological atmosphere for them to learn and enhance the human resources in Egyptian schools. On the other hand, there is an important obstacle that needs to be addressed properly because it can hinder the sustainability of the educational reform, which is the low wages of teachers which causes their reluctance to develop themselves towards any promising initiative, and increases their low self-esteem within the society. The government should keep an open eye and work on raising the social standard of teachers in their societies. This emphasizes the role of investment in human and social resources and raising the teachers’ value within different communities.

In conclusion, as illustrated by Warschauer (2003) in his study, the mobilization of social forces in order to provide an equitable and improved educational system is considered to be one applicable solution for the problem of integrating technology in the reform of educational process. Technology can play a crucial role in improving that system if the development of human and social resources complements the physical and digital resources. In other words, too much provision of equipment is not a mandate for the educational process reform in a developing country as ours.

Our policy paper focuses on exploring the introduction of the tablets to the first secondary stage in the national educational system. Furthermore, it tackles the implementation processes that are now taking place in Egypt. Through further exploration into this new program, we are able to assess the program partially, bearing in mind that it started only at the beginning of the second term in February 2019. Then, we will be able to better suggest new measures and policies in order to best integrate technology in the Egyptian educational system to meet the Egyptian vision 2030 efficiently.

Therefore, our research question is: To what extent are the plans to integrate technology in secondary schools following good practice for effective technology integration?

This paper is divided into three key sections beginning with the history of education during Mubarak's rule and the current situation in Egypt, then an overview of the case studies of integrating technology in education in developing countries such as Indonesia, Malaysia, and Singapore. Finally, the final section concludes the recommendations for integrating technology in Egypt.

(3) Methodology

This paper builds on data that was collected by making interviews with official decision makers, teachers, students, and parents, reviewing the best practices and lessons learned in the field of education system through a review of experiences from different countries that integrated technology in education, and using articles, and research papers that tackled the same topic.

We had two interviews with the relevant stakeholders such as Dr. Gihan Osman; an assistant professor of instructional design and technology at the Graduate School of Education and the Center of Learning and Teaching at the American University in Cairo, and Dr. Deena Boraie; the Dean and Professor of Practice of the School of Continuing Education at the American University in Cairo (AUC).

We had two interviews with two teachers working in two different governmental secondary schools, with two students enrolling in two different governmental secondary schools, and with one student's parent. All of these interviews helped to give more information about integrating technology in education.

There are many limitations that the researchers faced while collecting the data. For instance, they were not able to conduct any surveys because of the difficulty

of accessing school teachers and students, and there are no official published papers about the new system.

This paper was concluded in March 2019, so we expect that there will be a time-gap between writing this paper and discussing it at the end of the year.

During this gap, there were some changes as it is a new system that faces continuous changes.

(4) History and Current Situation in Egypt

One of the essential elements before evaluating any policies is to take a step back to know the situation before implementing any new policy. That is why we chose the Mubarak's rule because it is the latest stable period before the current rule of President Abdel Fattah el-Sisi.

- History of education during Mubarak's rule (multiple ministers of education):

Education during Mubarak's rule suffered from the deterioration of its conditions till the Egyptian education system was ranked 139 among 140 countries during the Davos conference (Alwabh news, 2017). This period witnessed unreasonable decisions for the public: for example, the decision to cancel "the six-primary grade" or keep it that resulted in a one year gap in the educational levels.

Another confusing decision was to shift "Thanawya Amma" into a two-year stage instead of one year. In addition, the teacher's salary was around 800 EGP that led the teachers to give private tutoring. Furthermore, the schools' infrastructure deteriorated, and the number of students in one class increased to be around 55 students (Masrawy, 2016).

Furthermore, according to Hussein (2016), the following problems were prevalent during Mubarak's rule:

1. The increase in students' numbers versus classroom capacity.
2. The outdated curriculum content.
3. Memorization and obedience that were required from the students in order for them to get high grades.
4. Lack of academic integrity (cheating).
5. The electric power infrastructure condition.
6. Private tutoring prevalence.
7. Inconsistency between labor market needs and curriculum content.
8. Assessing students through exams only.

- Current situation of education during Tarek Shawki, the minister of education from February 16, 2017 till the present time:

Minister Tarek Shawki is trying to change the educational system to make it like the education in developed countries such as Singapore, Korea, Indonesia, and Finland by integrating technology in education. This section will discuss the new vision of integrating technology in five parts: the main idea and philosophy behind the new system, the tools of the new system, the content of the tablets, grades and exams, and the teaching skills of the teachers (Talkshow Masrawy, 2018).

Before explaining the new system, we must know some statistics about the secondary stage in Egypt. The schools are divided into a Government sector and a Private sector. The capacity of each classroom in the governmental schools is around 41 students, while the capacity of each classroom in the private sector is around 30 students. Figure 1 shows the number of schools, classrooms, and students in each sector (Husam, 2018).

Figure 1:The distribution of secondary stage schools, classrooms and students

Secondary stage	Government Sector	Private Sector
Schools	2 226	1 108
Classrooms	34 301	6 995
Students	1 426 010	215 208

1-The main idea and philosophy behind the new system

The philosophy behind the new system is to build the future and improve the present. Building the future means building a new educational system for Egypt that is entirely different from the previous one. Improving the present refers to the primary educational phase till the secondary educational phase by changing the evaluation system in these years. This system aims to produce productive students who are qualified enough for university after 14 years of pre-university education (Talkshow Masrawy, 2018).

2-The tools of the new system

This new system will depend on technological devices: the tablets that will be given to teachers, supervisors, and students in high schools, screens in classrooms, and Wi-Fi in schools (Talkshow Masrawy, 2018).

3-The content of the tablets

Students will be able to access the Egyptian Knowledge Bank at any school, the Cultural Hubs “ksor El-Sakafa” for free. The students also can access the Egyptian Knowledge Bank outside of the school through the Wi-Fi or mobile SIM card that will be available at a low price. The idea

behind connecting tablets having free internet inside the school is to encourage students to go to the schools. Tablets will contain videos in Arabic Language, interactive programs to explain the lessons, the series of “Al Adwoa” (Talkshow Masrawy, 2018).

“AL ADWOA” is a secondary source for textbook that people buy to help kids with the national curriculum but now Nahdet Misr, the publishing company that produces Aladwoa, is working with the government to turn it into a software which can be accessed by the tablets. The Egyptian Knowledge Bank is a digital online library that contains knowledge to be disseminated to teachers, students, researcher, and university students.

“The available sources vary from stories and audio-visual products for children to highly technical material, scientific journals and specialized books for researchers in various sciences and subjects” (EKB, 2016).

According to an interview with a parent, parents pay 100 EGP while receiving tablets as a kind of insurance on the tablets. Moreover, parents sign on a commitment document. The document states that the parent will pay around 4500 EGP “or what is equivalent to the cost of the tablet’s cost” to get another new tablet in case of any damage to the tablet. Therefore, if the tablet breaks down and the cost of repairing the tablet exceeds the 100 EGP, the parents will pay 4500 EGP to buy a new tablet.

According to an interview with a student in a public secondary school, there are some stipulations such as: it is not allowed to use the tablet for any other purposes than the educational ones only. In other words; if the student uses the tablet in any purpose other than education, the tablet will be out of the educational system and the student will not be able to apply for the exams and receive the grades, as well.

4-Grades and Exams

The new system does not put much weight on grades but emphasizes on the quality of education and learning. Grades used to be the main tool used to assess academic achievement. That led parents to pay a lot for private tutoring in all subjects (Talkshow Masrawy, 2018).

Based on this new vision for the evaluation, the exams will be open book, and the test will evaluate understanding rather than memorization. The new exam system started in 2019 as the students in the first secondary stage took four tests during the academic year via the tablets, and they received their grades online. The questions will be MCQs or short essays which are chosen randomly from the question bank. Each school can choose any exams from the software as all exams are equal. Thus, the exam would not be on the national level, but it will be at the school level (Talkshow Masrawy, 2018).

There will be around 10-12 exams in the secondary stage. And then they will take the average of the best 5-6 exams to determine which university the student will enroll in. This system of grading was applied in 2018-2019 (Talkshow Masrawy, 2018).

The exam is on the school level, not the national level. That means that every school can choose different exams from the Question Bank, which is available on the tablets. The exams will be sent to each student's tablet separately that will help the Ministry to reduce the expenses set for securing the exam processes.

5- Teachers (roles- training)

According to Dr. Tarek Shawki: Teachers were trained to use new tools like tablets. Also, they were trained to teach life skills. Eventually, there will be licensed teachers who are able to train their peers. (Talkshow Masrawy, 2018).

Furthermore, there is the "LENGO" online platform which is used by teachers to share their experiences and helps to evaluate teachers and share knowledge (Teachers First, 2017).

(5) Case studies for integrating technology in education in developing countries: (Indonesia, Malaysia, Singapore)

As Tarek Shawki mentioned that Egypt looks forward to being similar to the educational system in Indonesia and Singapore by integrating technology in education system, we tackle the educational system in these two countries (Talkshow Masrawy, 2018). Furthermore, we add Malaysia in the paper as it is a successful case in integrating technology in education.

I. Indonesia

A capacity building toolkit for teacher education for teacher education institutions (TEIs)-Institutes that prepare future teachers- took place in South East Asian countries in February 2010. This was a strategic plan to develop the capacities of pre-service teachers' information and communication technologies (ICTs) and education competencies (Pannen & Lim, 2012). This tool is used to assess the needs and the situation of the state of the TEIs in their use for ICTs in teaching, learning and administration.

A case study has been held on four TEIs to figure out how they implemented this strategic plan for using ICTs. Some of them focused their use of ICT in curriculum, assessment, and practicum (Pannen & Lim, 2012). One of the institutes set outcomes:

- 1- Curriculum analysis and development for 5 courses that use ICT in the teaching and learning processes, including the university's e-learning portal.
- 2- Developing ICT mediated teaching and learning activities for the courses.

3- Developing the lecturer's ICT competencies.

According to Pannen and Lim (2012), these outcomes are assessed through the following KPIs:

- 1- 80% of the curriculum's content consists of the use of ICT
- 2- The whole content of the five courses is to be uploaded to the university's portal
- 3- All the teaching and learning activities should be conducted as planned in the previous 2 points.

Furthermore, the faculty of Mathematics and Science Education which prepares Mathematics and Science teachers at primary and secondary level set goals for increasing the students' ICT literacy and lecturers' use of ICT in teaching activities in four courses: Basic Mathematics, General Physics, General Biology, General Chemistry (Pannen & Lim, 2012).

The outcomes of this project were assessed through the following KPIs:

- 1- Lesson plans include a required use of ICT
- 2- Teachers' and students' manuals include the requirement of using ICT
- 3- Pre and post-tests on lecturers and students prove the enhancement of their competencies in using ICT

However, there were some challenges such as: the senior staff's reluctance to change, lack of funding, and the shortage of qualified staff (Pannen, Lim, 2012).

As recommended in Indonesia's case, if the English language was a problem for teachers, local software companies created Indonesian local language software programs (Khan, Hasan & Clement, 2012).

II. Malaysia

The Ministry of Education in Malaysia pumped a large amount of money to improve the IT infrastructure facilities including providing schools with a server room to handle applications, management databases and provide security (Samuel & Zaitun, 2017). Also, the Ministry provided computer with broadband internet access and email facilities (Samuel & Zaitun, 2017). Furthermore, the classrooms are equipped with multimedia courseware and presentation facilities that include interactive activities to grab the students' attention (Samuel & Zaitun, 2017).

Malaysia has paid so much attention to the pre-service teachers. All Malaysian pre-service students are exposed to at least one course of productivity tools like presentations, spreadsheets, and database (Teo, Lee, Chai & Wong, 2009). They are also taught to create their own homepage, email in laboratories where everyone has access to the internet through his/her computer as it is a hands-on learning experience.

A case study was held in Malaysia to assess the effectiveness of using Interactive Whiteboards (IWB) in the classroom, and whether this has negative or positive effects on the secondary school students (Singh & Mohamed, 2012).

The findings revealed that that students felt that the level of class engagement increased while using the whiteboards specially in learning and teaching science. They loved to touch the screen, move objects, and solve the puzzles on them. “Students were motivated in learning with the use of IWB. There were positive responses such as “more interesting”, “more interactive”, interesting animation’, “very colorful” and “can pay attention better”. The only negative comment was “sometimes very slow and lag a bit”. Students were also of the opinion that using the IWB is also good for the environment as less use of paper and ink” (Singh & Mohamed, 2012).

III. Singapore

Singapore is extremely advanced in integrating technology in education. According to the Economist (2018), Singapore’s education system is considered to be the best today. The Country consistently comes at the top of the OECD, Programme for International Student Assessment (PISA) (The Economist, 2018). The government considers technology as a facility that enhances the quality of education, and not a mere achievement in itself that should be achieved and implemented. Therefore, still the role of the teacher is very crucial as the teacher is the one who designs how the student uses technology to learn. In Singapore, there are students representatives or teachers’ assistants (TAs) whose work is to help the teacher and facilitate a smooth running for the class. These students receive a basic technical training to relieve some of the burden of the teacher while he/she is busy doing other things in class (Lim, 2006). Also, teachers set half a day at the end of each school year for “Best Practice” seminars as they are best examples for integrating ICT in lessons to help each other plan for the lessons (Lim, 2006).

In conclusion, after investigating the current situation in the educational system in Egypt, we would like to provide decision makers with a list of recommendations to better integrate technology in education

(6) Recommendations

We divided the recommendations into three main axes: (Systems, Tools of the new system, and Training)

I. System:

The current Ministry of Education’s approach to the new system is to change the curricula, use technology to enhance the education system, but the new policy lacked the monitoring and evaluation elements that any effective policy should have. Therefore, we recommend designing an intermediate and final monitoring and evaluation system, done in each year.

“Afshari et al, (2009) states that it is crucial to have those who have a stake in the outcomes, including teachers, parents, students, and the community involved in the creation of the vision by contributing their knowledge, skills, and positive attitude” (Khan, Hasan & Clement, 2012). Egypt can learn from Indonesia that the ministry should include all the stakeholders in the process of the preparation while preparing for all of these new interventions. Hence, we recommend the following steps:

- 1- Allow the integration of social initiatives by the Non-Governmental Organizations (NGOs) within the governmental plan for improving the educational process such as forming school-community coalitions, developing and implementing long-term teacher training programs, and promoting local autonomy for teachers and schools in each district.
- 2- Allow the interactive communication and integration among different stakeholders such as parents, the private sector, NGO, the Ministry of Higher Education, the Ministry of Communication and Information, the Ministry of Investment, and Media.
- 3- Hold awareness campaigns through different means of media to inform the stakeholders of the new system’s objectives.
- 4- Raise social awareness about the technological approach in education emphasizing its crucial role in the preparation of skillful youth able to tolerate and deal with the global advancements in all fields. Also, considering the cultural background of each and every governorate in Egypt, which may not help spread the usage of technology in education.

II. Tools of the new system:

The Ministry of Education in Malaysia pumped a large amount of money to improve the IT infrastructure facilities including providing schools with a server room to handle applications, management databases and provide security (Samuel & Zaitun, 2017).

The technological intervention that the ministry wants to introduce is the tablets, and there was no mention of an internet infrastructure, or an IT unit. Thus, we recommend the following steps:

- 1- Enhancing the internet infrastructure similar to Malaysia to make sure that the internet coverage is the same all over Egypt especially in remote governorates or less privileged governorates like Sinai or Upper Egypt governorates.
- 2- Offering offline applications as the price of the internet package is relatively high especially for those who live under the poverty line. Furthermore, there should be the option of having offline exams just in case of any network disruptions.
- 3- Having an IT unit or a separate IT department that is only concerned with maintaining and upgrading the network as implemented in Malaysia.

4- Encouraging the production of Arabic software programs (Khan, Hasan, Clement, 2012) as in Indonesia if the English language is a problem for teachers.

III. Training:

The journal article entitled “The Obstacles to the integration of ICT in education: Results from a worldwide educational assessment” demonstrated the results of a case study held to assess the integration of ICT in education, and figure out whether it is effective or not, and if not effective, what are the obstacles that hinder this effective integration of the ICT. The results of the study show that teachers do not have sufficient ICT skills and knowledge. This study was held on primary, lower secondary, and upper secondary levels in many countries like Canada, Bulgaria, Finland, Hong Kong, Hungary, and Iceland.

Therefore, effective training to the teachers should hold to make sure that the integration of ICT in education is effective. Moreover, in Singapore, there are teaching assistants (TAs), whose work is to help the teacher and facilitate a smooth running for the class. These students receive a basic technical training to relieve some of the burden of the teacher while he/she is busy doing other things in class (Lim, 2006). Furthermore, teachers set half a day at the end of each school year for “Best Practice” seminars as they are best examples for integrating ICT in lessons (Lim, 2006). After our interviews with the teachers, we realized that the training of “Teachers First” was not effective as it was short and it was almost held almost 5 months before actually receiving of the new tablet, so most of the teachers forgot the content of the training.

The Minister of Education focused on brief training given to the teachers, and he did not mention any details about training the administrations. Consequently, we recommend the following steps, according to our interviews with teachers:

- 1- Training the administration body to use the new technology, identify and assess quality indicators and key performance indicators.
- 2- Increasing the share of investment in the human and social resources. This includes giving the teachers more pedagogy and communication skill training to make sure that their skills go in line with the skills required to use the new technology in schools as it is a new system that needs more effort and sufficient time for preparation.
- 3- More effective training to the teachers on how to use technology in the learning and teaching processes.
- 4- According to the Singapore case study, we recommend having seminars among teachers to help each other plan for lessons.
- 5- We recommend having teaching assistants who receive technical training to help the teachers in the classrooms as implemented in Singapore.

6- According to the Pannen & Lim case study in Indonesia, we recommend coordinating with the Ministry of Higher Education to include in the curricula of the Faculty of Education the knowledge and skills of integrating technology in education. This will be more cost effective and efficient as the future teachers will already have the knowledge, so they may not need extra training on how to use technology in the classrooms.

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The Public Policy HUB provides a processing unit where policy teams are formed on a regular basis, combining experienced policy scholars/mentors with young creative policy analysts, provide them with the needed resources, training, exposure, space, tools, networks, knowledge and contacts, to enable them to come up with sound, rigorous and yet creative policy solutions that have a greater potential to be effectively advocated and communicated to the relevant policy makers and to the general public.

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