European Bank
for Reconstruction and Development

EvD
Independent
Evaluation

KNOWLEDGE PAPER

Understanding Digitalisation

Case Study of the Kafr El-Sheikh Wastewater Expansion Project

Arab Republic of Egypt

EvD ID: SS22-178

EBRD EVALUATION DEPARTMENT • November 2023

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Abbreviations

ABI	Annual Bank Investment
BAT	Best Available Techniques
CoO	Country of Operations
CSD	Climate Strategy and Delivery
EIB	European Investment Bank
ETI	Expected Transition Impact
EU	European Union
EvD	Evaluation Department (EBRD)
GET	Green Economy Transition
GHG	Greenhouse Gas
HCWW	Holding Company for Water and Wastewater
KWSC	Kafr El-Sheikh Water and Sanitation Company
MEI	Municipal and Environmental Infrastructure
OL	Operational Leader
PIU	Project Implementation Unit
PPP	Public Private Partnership
RO	Resident Office
SCADA	Supervisory Control and Data Acquisition
SCF	Strategic and Capital Framework
TC	Technical Cooperation
TI	Transition Impact
ToC	Theory of Change
TQ	Transition Quality
WWTP	Waste Water Treatment Plan

Executive Summary

This paper examines the digitalisation components of the Kafr El-Sheikh Wastewater Project, in light of the EBRD's Approach to Accelerating the Digital Transition (the 'Digital Approach'). The objective is to highlight lessons from the Bank's experiences with digitalisation, which in turn will support the ongoing implementation of the Digital Approach.

The Kafr El-Sheikh Project

The Kafr El-Sheikh Project is a €55 million sovereign loan to co-finance a European Investment Bank (EIB) loan of €77 million and a Neighbourhood Investment Fund (NIF) grant of €10.4 million for the expansion of wastewater treatment in the Kafr El-Sheikh governorate in the Arab Republic of Egypt. The primary use of financing was for the construction of two new Waste Water Treatment Plants (WWTPs) and the expansion of three pre-existing WWTPs.

There were two clear digitalisation components to this project. Firstly, the WWTPs were to be installed with digital Supervisory Control and Data Acquisition (SCADA) systems. Secondly, an EBRD-managed Technical Cooperation (TC) assignment helped the national water holding company develop a mobile phone application ('Mobile 125 app') to improve communication and engagement with customers. This study focuses on the installation of a SCADA system at the Motobas WWTP, which lies within the Kafr El-Sheikh governorate, as part of the upgrade plan there. This study also focuses on the development of the Mobile 125 app.

Lessons from the Bank's previous experience with digitalisation

Assessing the course of implementation, as well as the outcomes that digitalisation has contributed to on the Kafr El-Sheikh project, provides six lessons for the EBRD to consider on its journey of becoming a digital partner across the regions where the Bank works.

Lesson 1: Digitalisation can deliver economic and environmental benefits, but only if organisations respond to financial incentives

SCADA systems demonstrate how digitalisation can raise productivity and deliver economic and environmental benefits by automating processes that used to be manual. However, these mechanisms are broadly reliant on an assumption that organisations are responsive to financial incentives. In this case, the state entities that operate the WWTPs financed by the EBRD have limited maneavourability to respond to financial incentives, particularly those related to reducing headcount and thus, reducing operational costs. This undermines a key link between digitalisation and productivity, and by extension, the relationship that digitalisation has with several of the EBRD's Transition Qualities (TQ), including Competitive and Green.

Lesson 2: Digitalisation changes the labour requirements and structure of implementing organisations, which may not match the local context

Digitalisation can change both the number and type of employees required within an organisation. The Motobas WWTP, for example, previously required 50 employees, who were primarily low-skilled, to operate. Comparatively, operating the Motobas WWTP using a SCADA system requires 15 employees, though these employees need to have more expertise. This can cause challenges if local labour markets do not have the capacity to provide skilled employees, or if implementing organisations face restrictions in employing higher-skilled workers on higher wages.

Lesson 3: Digitalisation can improve the visibility and transparency of monitoring processes

Both the SCADA system and the Mobile 125 app make monitoring water quality more visible, helping promote compliance with standards and regulations. These examples demonstrate the potential of digitalisation to improve the visibility and transparency of monitoring processes, thus helping support well-governed organisations.

Lesson 4: The 'digital readiness' of implementing organisations is a critical success factor

Both the SCADA system and the Mobile 125 app demonstrate issues with the 'digital readiness' of implementing organisations. Several stakeholders of the Motobas WWTP suggested that the SCADA system was too advanced given their capability. Similarly, the development of the Mobile 125 app had challenges stemming from the Client's lack of experience in this area.

The successful design and installation of digital systems requires the appropriate capacity and skillset at implementing organisations. With new tools and processes introduced by digital transformation, implementing capacity can become a significant constraint, with limited understanding of how to effectively design and use digital systems to maximise their potential. This lesson is reflected in the Digital Approach, which puts a strong emphasis on building digital capacity for clients alongside financing the introduction of new digital systems.

Lesson 5: To support the Bank's clients and partners through the digital transition, the EBRD needs to have its own internal capacity and expertise

The EBRD's relative inexperience in explicitly supporting digitalisation was visible in this case study. There was a limited technical understanding of different digital systems, or of the challenges that clients might face in implementing digital solutions. This had a direct knock-on effect on implementation, including a misalignment between capacity building efforts and the problems experienced by clients.

However, over the course of this project and a similar follow-on project (Fayoum Wastewater Expansion), there is evidence of the Bank's learning. On the second project, there was a stronger focus on an initial digital maturity audit of the implementing organisation, as well as targeted capacity-building to develop digital skills.

This finding emphasises the importance of continuing to build capacity internally to support the digital transition. Without adequate internal expertise, the EBRD will not meet its ambition of being the digital partner of choice to clients across its Countries of Operation (CoO).

Lesson 6: The sustainability of digital systems should not be taken for granted and local champions should be identified where possible

The effect of digitalisation on the sustainability of this project's outcomes is mixed. There are multiple mechanisms through which digitalisation can improve sustainability, including both the physical sustainability of infrastructure and the financial sustainability of the Client. However, there is a clear risk that digitalisation systems themselves are not sustainable. It seems likely that the SCADA system within the Motobas WWTP will not be used in the long-run, due to capacity constraints in the implementing partner and organisational incentives that favour analogue systems over digital upgrades.

This finding highlights the need to explore the sustainability of digitalisation-linked interventions and to identify appropriate mitigation strategies. This could include identifying champions within the Client to help ensure ownership and the adoption of new digital tools.

1. Introduction

1. **In 2021, the Bank launched the EBRD Approach to Accelerating the Digital Transition (the 'Digital Approach' paper).** This set out the Bank's first comprehensive framework for supporting digitalisation projects and described the relationship between digitalisation and the Transition Impact (TI). However, as the Digital Approach paper noted, the EBRD has a track record of supporting digitalisation, even if the Bank has not always used terminology specific to digitalisation.

2. **In this exercise, EvD examined a mature project with digital components with a focus on understanding the outcomes and risks associated with digitalisation.** The selected project was the Kafr El-Sheikh Wastewater Expansion project (BDS14-328) in the Arab Republic of Egypt, which was approved in December 2014. The focus of EvD's examination was the installation of a SCADA system in the Motobas WWTP, as well as the roll out of the Mobile 125 app to customers. The report is primarily based on data collected at the end of 2022.

3. **The objective is to provide evaluation lessons that illustrate some of the conceptual outcomes and risks associated with digitalisation, as outlined in the Digital Approach.**

4. **This is not a project evaluation.** The project was not at a mature enough stage where EvD would consider it for a standard project evaluation. In addition, the original benchmarks were not framed around digitalisation. Instead, the focus is on exploring the outcomes stemming from the digital components. The relationship set out in the Digital Approach paper, linking the Digital Transition to each of the six TQs, is used as a starting point.

2. Exploring the Context: The EBRD's Digital Journey

2.1. The EBRD's Approach to Digital

5. **The EBRD's Digital Approach paper sets out the Bank's framework for supporting digitalisation projects and describes the relationship between digitalisation and TI.**[1] It introduced new definitions into the Bank's lexicon, such as the distinction between digital and digitalisation, and it established three broad pillars that collectively structure the Bank's work in this sphere:

- **Foundations**: The bedrock on which a digital ecosystem can grow, including the policy and regulatory mix to promote digitalisation, investing in the roll-out of essential digital infrastructure and supporting the development of digital skills.
- **Adaptation**: Helping organisations reach their full digital potential, including investing in the digitalisation of the private sector, supporting the digitalisation of municipal services and providing advisory services for digitalisation.
- **Innovation**: Creating space for transformational change by supporting a start-up, enabling a friendly ecosystem and investing in digital-first companies.

[1] The EBRD Approach to Accelerating the Digital Transition, 2021-2025 (BDS21-122)

6. **In addition, the Digital Approach paper provided a high-level illustration of how digital transformation has both opportunities and risks for each of the six TQs *(Table 1, below)*.** The Impact Team is currently working with the Digital Hub, the cross-cutting unit supporting the implementation of the Digital Approach across the Bank, to develop a more sophisticated guide on how digital transformation can support the TQs. This will be integrated within the Bank's Expected Transition Impact (ETI) scoring system.

Table 1: Digital Transformation: Opportunities for and risks to the EBRD's TQs (reproduced from the Digital Approach paper, with no additions from EvD)

Transition Quality	Opportunities	Risks
Competitive	▪ Renewed business dynamism in mature industries ▪ Increased productivity across the economy ▪ Emergence of new products and services markets and accelerated innovation ▪ Consumer benefits in the form of greater transparency, lower prices, more choice and instant availability of products and services ▪ Enhanced global competitiveness	▪ Entrenched dominance of market leaders due to 'winner takes all' dynamics, with long-running negative impacts on innovation, price and productivity ▪ Abusive behaviour by dominant firms ▪ Policy frameworks struggle to keep up with rapid technological change
Green	▪ Smarter energy use ▪ Resource efficiency gains and waste reduction ▪ Improvements in environmental and climate monitoring and resilience ▪ Digital solutions for climate mitigation and adaptation, plus diffusion of business models that support behavioural changes	▪ Increased energy consumption ▪ Environmental degradation linked to extraction and processing of raw materials ▪ Electronic waste generated by hardware and products
Inclusive	▪ Wider access to learning and employment opportunities and reduced labour market bias ▪ Strengthened financial inclusion, including through digital literacy ▪ Improved access for underserved groups, including through digital accessibility and the better use of data	▪ Discriminatory practices reinforced ▪ Skewed benefits to different segments of the population widen gaps ▪ Stranded skills and jobs in sectors undergoing digital transformation heighten concerns related to a just transition
Integrated	▪ Reduced transaction costs and increased transparency and traceability across value chains ▪ Emergence of wider and deeper digital markets benefitting businesses and customers ▪ Adoption of big data collection technologies ▪ Cross-border digital payments	▪ Data flow regulation and restrictions on digital trade ▪ Restrictiveness of services affects digital trade in services ▪ Lack of definition of goods and services across borders ▪ Regulatory fragmentation
Resilient	**Financial services:** ▪ Attraction of unbanked customers, also through better risk assessment ▪ Improved financial services and more efficient banking operations ▪ Improved quality of supervision and regulatory compliance **Energy:** ▪ Lower cost of delivery and extended lifetime of power generation and network infrastructure assets ▪ Improved safety, sustainability and reliability of energy systems	**Financial services:** ▪ Exposure to illegal activities and increase in operational risk ▪ Cybersecurity, data protection and privacy concerns ▪ Potentially lag in effective supervision of new fintech firms **Energy:** ▪ Increased vulnerability to cyberattacks and data protection issues

	▪ Energy savings through smart applications	▪ Increased direct energy use by consumers and data centres/network services
Well-Governed	▪ Improved national and local governance and reduced corruption through e-governance ▪ Better decision-making and more efficiency due to better data availability ▪ Greater trust in governments where legal principles support transparency and e-participation	▪ Data privacy and cybersecurity concerns leading to mistrust in institutions ▪ Governments struggle to anticipate regulatory needs ▪ Mismatch between digital readiness of public services, businesses and individuals

2.2. The Project Context: Digitalisation underpins improvements in municipal infrastructure

7. **The Kafr El-Sheikh project was approved in December 2014.** It consisted of a sovereign-loan of €55 million to the Arab Republic of Egypt, to be on-granted to the Client, the Kafr El-Sheikh Water and Sanitation Company (KWSC). The Client is a state-owned company incorporated in Egypt and is the sole provider of piped drinking water and wastewater services in the Kafr El-Sheikh governorate, which has a population of 3.2 million people. The EBRD provided co-financing alongside the EIB sovereign loan of €77 million and an EU NIF grant of €10.4 million. The Bank also provided TC support for capacity building, policy dialogue on tariff setting and a project awareness campaign aimed at local community groups. The loan had a 15-year maturity with a five-year grace period. The lead financier was the EIB.

8. **This project was approved before the introduction of the TQs.** The TI objectives of this project were described in the Board Memorandum as "Economic inclusion", a "framework for markets" and "private sector participation". Although it was not described as a TI, the Board Memorandum provided an extensive overview of the expected "Environmental improvements" as a result of this project. The ETI score at project approval was 60.

9. **The intended use of financing was for the construction of two WWTPs, the expansion of three existing WWTPs and laying 700km of pipes alongside 52 pump stations.** The construction of this infrastructure, combined with the TC, was expected to provide first-time sanitation to 470,000 residents in three rural districts of the Kafr El-Sheikh governorate, along with reduced pollution in Lake Burullus and in the local groundwater.

10. **There were significant digitalisation and infrastructure components to the TC.** The newly constructed WWTPs and upgraded WWTPs are being built with SCADA systems. These integrated software and hardware platforms provide WWTP managers with the data and capacity to manage the plant *(see Box 1: page 4)*. Within Egypt, experts interviewed by EvD estimated that of approximately 500 WWTPs within the country, less than 20 were operating with SCADA systems – 4% or less nationwide. At the point of data collection for this case study, a SCADA system was operational on one of the upgraded WWTPs – the Motobas WWTP.

11. **The TC assignment helped develop a Mobile 125 app with the Holding Company for Water and Wastewater (HCWW) to receive customer complaints and to enable digital payments.** The mobile phone application was launched by HCWW, is available to customers and was a recipient of an award at the EBRD's Digital Oscars in 2022. It currently enables customers to submit complaints, make payments and access information on how to use water sustainably. Further TC support is being provided to HCWW as part of the Fayoum Wastewater Expansion Project (BDS17-

043), which will help expand Mobile 125 app's capabilities to enable the submission of meter readings and more payment options.

Box 1: What is a SCADA system?

A SCADA system in a WWTP is responsible for monitoring and controlling processes in the treatment of wastewater. There is a spectrum in the range of operating capabilities of SCADA systems, but their key characteristics are as follows:

- Sensors placed throughout the treatment plant measure various parameters, such as water flow, pH levels and the concentration of different chemicals in the water.
- The data from these sensors is sent to a central control system, which uses software to analyse and process the information.
- The control system can then make decisions based on this data and issue commands to various equipment in the plant, such as pumps, valves and mixers.
- The system can also alert operators if there are any issues or abnormalities detected, allowing them to take action quickly to prevent any problems from escalating.
- In addition, some SCADA systems can store data from previous cycles, allowing operators to analyse trends and adjust the treatment process to optimise efficiency and ensure that the treated water meets the required quality standards.

Potential benefits of SCADA systems include:

- Improved process control: Operators can monitor the treatment process in real-time, making adjustments as needed to ensure optimal performance.
- Increased efficiency: The systems can optimise the use of resources, such as chemicals, energy and water, resulting in cost savings and a reduced environmental impact.
- Better quality control: The systems can detect and respond to issues quickly, preventing the discharge of poorly treated water that may harm the environment or public health.
- Enhanced safety: The systems can alert operators to potentially hazardous situations, such as chemical spills, allowing them to take prompt action to mitigate risks.
- Enhanced reporting: The systems can generate detailed reports on treatment performance, which can be used for compliance monitoring and process optimisation.

Potential risks from SCADA systems include:

- Maintenance and upgrades: The systems require regular maintenance and occasional upgrades to stay current and functional. This can be expensive and require significant technical expertise. If not maintained properly, SCADA systems can break down.
- Data overload: The systems can produce a vast amount of data, which can overwhelm operators unless well-managed. Critical alarms or trends may be missed if the data is not properly analysed and acted upon.
- Integration with existing systems: Integrating a SCADA system with existing equipment and processes can be challenging. There is a risk that the SCADA systems may not be compatible with older systems or might require extensive modification to existing processes, leading to unexpected downtime and costs.

3. Lessons on Supporting Digitalisation

Lesson 1: Digitalisation can deliver economic and environmental benefits, but only if organisations respond to financial incentives

12. **SCADA systems demonstrate how digitalisation can raise productivity and deliver economic and environmental benefits by automating processes that were manual.** For the Motobas WWTP, the full implementation of a SCADA system reduces the number of employees required at the plant from 50 to 15, according to stakeholders' estimates – approximately a 70% reduction. At the employee level, this implies a significant increase in per-capita productivity. At the organisational level, this process can lead to substantial cost savings, with the majority of operational expenditure at the Motobas WWTP currently going towards wages.

13. **In addition, SCADA systems can significantly improve resource efficiency and generate cost and energy savings in WWTPs.** Beyond generating environmental benefits, this affects the plant's productivity and operational costs, thereby affecting its competitiveness. The effect on resource efficiency and energy savings is generated via:

- Efficient chemical use: SCADA systems monitor chemical usage rates to ensure that only the required amount of chemicals is used. This reduces consumption and cost.
- Optimising aeration: Aeration is one of the most energy-intensive processes in wastewater treatment. SCADA systems monitor dissolved oxygen levels in the water and enable closer adjustments, reducing energy consumption and improving treatment efficiency.
- Reduced pump energy consumption: SCADA systems monitor and optimise the operation of pumps, reducing energy consumption and prolonging the life of equipment.

14. **Stakeholders estimated that the Motobas WWTP operated with a SCADA system would reduce energy consumption by 15% and reduce chemical consumption by between 25% to 50% (full annual data was not yet available).** These estimates correspond with previous studies on how SCADA systems can lead to energy and resource savings.[2] In turn, this can strengthen resource efficiency for WWTP operators; energy accounts for approximately 30% of the plant's operating costs.

15. **The mechanism by which SCADA systems can reduce resource and energy usage leads to environmental benefits, as well as cost savings.** The Motobas WWTP did not have forecasts on how significantly SCADA systems would reduce the plant's environmental footprint. However, using the estimate of energy reduction as a proxy, it would be reasonable to assume a 15% fall in greenhouse gas (GHG) emissions from reduced energy consumption.

Box 2: Anaerobic and aerobic treatment of wastewater

This analysis does not include the environmental benefits from upgrading and expanding WWTPs and ensuring that wastewater is treated using aerobic systems, rather than discharged into drainage channels under anaerobic conditions. Whilst aerobic treatment of wastewater generates carbon dioxide (CO_2), anaerobic treatment generates methane, a more potent GHG. Ensuring that a higher volume of wastewater is treated using aerobic systems can therefore

[2] United States Environmental Protection Agency (EPA), Energy Efficiency in Water and Wastewater Facilities: A Guide to Developing and Implementing Greenhouse Gas Reduction Programmes, August 2015

significantly reduce a wastewater system's total GHG emissions. However, this is more dependent on expanding the capacity of WWTPs, rather than directly linked to digitalisation. Accordingly, this is not covered in detail in this report

16. **By delivering environmental and economic benefits, SCADA systems help contribute to the Green and Competitive TQs.** The mechanisms broadly map onto the 'opportunities' presented within the Digital Approach paper *(Table 1: page 2)*. SCADA systems can increase productivity, competitiveness, help deliver smarter energy use and bolster resource efficiency gains.

17. **However, these mechanisms are broadly reliant upon an assumption that organisations are responsive to financial incentives.** In this case, operators of the Motobas WWTP demonstrated a clear financial incentive to reduce energy and resource costs, but they were not incentivised to reduce employee headcount.

18. **The state entities that run the WWTPs cannot let go of unskilled staff, nor can they offer higher salaries for new roles to attract more qualified workers.** State entities in Egypt face significant barriers when it comes to reducing their number of employees due to government directives that aim to maximise employment. This reduces organisational incentives to expand the use of SCADA systems. Wages account for approximately 60% of the cost of operating a WWTP, but local water companies cannot realise any financial benefits from reducing headcount.

19. **This finding reveals a key lesson on the link between digitalisation and productivity.** Organisations operating within certain policy frameworks – i.e., unable to reduce low-skilled staff numbers in exchange for more costly yet qualified candidates to fill digitally-orientated roles – may not be able to make this transition. Therefore, they will not realise the many benefits of digitalisation.

Lesson 2: Digitalisation changes the labour requirements and structure of implementing organisations, which may not match the local context

20. **Digitalisation has a complicated relationship with the creation of new work**. Digitalisation can create jobs, as demonstrated by the Mobile 125 app, for which HCWW is now employing 92 people to respond to customer complaints submitted via the mobile phone application. However, as noted within the Digital Approach paper, it can also lead to job losses, particularly for low-skilled and routine workers with stranded skills.[3] The installation of SCADA systems in WWTPs provides a case study of this dynamic in practice, with the number of required employees at the Motobas WWTP estimated to fall from 50 to 15 with the implementation of a SCADA system – a 70% reduction. Headcount numbers would be reduced even further with the latest SCADA systems, at more than 90%, as this system would require fewer than five employees for an equivalent sized plant and allow for fully remote operations.

21. **The requirements for employees also change.** Operating digital systems, such as SCADA, requires workers with more advanced skills. This means companies must either upskill or train their existing workers or replace unskilled workers with skilled workers.

[3] Mandle, Employment Effects of Digitalisation, December 2021

22. **This can create significant challenges for implementing organisations, as demonstrated by the Motobas WWTP.** The Motobas WWTP is in a remote, rural area with poor connectivity to the nearest urban city. During the tendering phase for the WWTP, the project implementation unit advised international contractors that more advanced SCADA systems would not be feasible given the location and the lack of skilled workers locally. The implementation of an even more basic SCADA system was described as "too advanced" by representatives from the local wastewater company. There were concerns that they would not be able to employ operators with the prerequisite set of skills.

23. **The challenge for Motobas WWTP to find skilled employees in rural areas is compounded by not being able to offer higher salaries to skilled workers.** Interviewees emphasised that their capacity to offer higher salaries as a state entity was severely restricted, amid requirements to follow government-set salary structures.

24. **One potential solution that addresses this challenge is to provide training and capacity building for unskilled labourers.** For the Kafr El-Sheikh project, both USAID and Germany's Gesellschaft für Internationale Zusammenarbeit (GIZ) provided training on the operations and maintenance of wastewater systems to relevant stakeholders, including the national water company and the local water company. The implementation plan for Motobas WWTP also involved a transition period, during which the WWTP was operated in tandem by the international contractor and local water company staff to help build capability and upskill the local workforce.

25. **However, training does not happen in isolation from a dynamic labour market.** Local officials were keenly aware of the risk that trained staff would leave for better-paid roles in major cities. For the organisations able to train and upskill employees, the risk is that those employees' skillsets become more attractive to other organisations, thus reducing employee retention. For state entities that have restrictions on how much they can raise wages, they cannot use expenditure and resources to train their employees and then compete further with other potential employers, particularly from the private sector. A local government official involved in training shared his view: "Employee retention is not my issue. I do the training and then afterwards, it is a natural course of life what people do." Employee retention is exacerbated in some cases, such as the Kafr El-Sheikh project, by the rural and inaccessible location of the WWTPs.

26. **Furthermore, a range of stakeholders suggested there might continue to be a capacity gap, even with significant training, given the high levels of specialisation and expertise required for SCADA systems.** This implies a high likelihood that some employees will be left with stranded skills, unable to fully participate within the Motobas WWTP once a SCADA system is fully implemented.

27. **The lesson from this case study is that available local labour markets are a critical pre-condition for a successful digital transformation.** Whilst the introduction of a SCADA system may lead to a significant reduction in the number of jobs at a WWTP, it will also create new job opportunities that require more specialised skills and knowledge. This has implications for how WWTPs with SCADA systems access local labour markets, with an underlying assumption that there is a skilled workforce in place (or alternatively that a skilled workforce would be willing to move there) and that organisations can attract skilled employees. Without a skilled local workforce in place, new digital systems may not be operated effectively.

Lesson 3: Digitalisation can improve the visibility and transparency of monitoring processes

28. **SCADA systems can have a significant impact on the quality of water discharge from WWTPs.** In addition to more efficient and accurate monitoring of key water quality parameters, SCADA systems provide more transparency over water quality issues. This includes highlighting where discharge water is not meeting quality standards and making it more difficult to circumvent testing. However, assessing the extent to which the installation of a SCADA system made a direct contribution to reduced environmental pollution is challenging. This is partially due to poor data on water quality prior to the installation of SCADA systems.

29. **For many of the local stakeholders interviewed for this study, improving the quality of water discharge was the biggest environmental benefit from the project.** WWTPs in Egypt, particularly in rural areas, rarely meet Best Available Techniques (BAT) for the quality of water effluent. Stakeholders informed EvD that before the upgrade, the Motobas WWTP was not in compliance with EU standards. Similarly, all 23 WWTPs in the Fayoum governorate had "some form of operational shortcoming". As a result, they produced "an effluent, which is not compliant with Egyptian or EU environmental regulations".[4] This has a visible impact, with reports of sewage coalescing in local lakes, irrigation canals and along the coast.

30. **There is also potential for reducing spillage from the wastewater system through customer complaints via the Mobile 125 app.** During the initial period that the mobile phone application was operational, HCWW triaged 61,923 complaints. This included complaints related to open leaks or spillages from wastewater pipes in residential areas.

31. **These examples demonstrate the potential of digitalisation to improve the visibility and transparency of monitoring processes.** Both SCADA systems and the Mobile 125 app make monitoring water quality more visible, helping promote compliance to standards and regulations. The contractor installing a SCADA system at the Motobas WWTP said the single biggest benefit was the degree to which it supported compliance. This point was reinforced by another interviewee who noted that there had been cases of WWTPs submitting inaccurate water quality readings to testers, which a SCADA system would help counteract. Overall, SCADA systems illustrate how digitalisation can improve data quality and visibility, contributing to well-governed organisations.

Lesson 4: The 'digital readiness' of implementing organisations is a critical success factor

32. **The Digital Approach paper highlighted that digital systems can have a detrimental effect on governance if there is a 'digital mismatch' between the system and implementing capacity.** This recognises that without the appropriate capacity and skillset to effectively operate a digital system, governance can become worse through misuse or limited oversight.

33. **There are some emerging signs that the installation of a SCADA system could become an example of a 'digital mismatch', ultimately having a negative effect on governance.** Several stakeholders, including the implementing entity, raised concerns over their capacity to effectively

[4] European Bank for Reconstruction and Development, Egypt: Fayoum Wastewater Expansion Project (BDS17-043), March 2017

use SCADA systems in the long-term, both with respect to daily operations and ongoing maintenance.

34. **As with SCADA systems, the Mobile 125 app highlights 'digital readiness' challenges.** The launch of the Mobile 125 app had issues that were partially attributable to initial capacity constraints, including:

- Lack of technical capacity on how to develop an appropriate ToR for the technical service provider. This led to a dispute between the agency and the service provider over the scope of the project, in particular for the mobile payment function.
- No experience in the procurement market for digital services.
- No budgeting for initial marketing and the dissemination of the mobile phone application to the target audience, thus complicating outreach. This key lesson means a marketing budget is now included in subsequent phases of the mobile phone application.

35. **Although these challenges were circumvented and HCWW was able to launch the mobile phone application, capacity issues are causing ongoing challenges.** The mobile phone application's functionality is not as comprehensive as HCWW planned. This has led to some resistance within the organisation around prioritising more resources for its development.

36. **The successful design and installation of digital systems requires the appropriate capacity and skillset within implementing organisations.** With the new tools and processes introduced by digital transformation, implementing capacity can become a significant constraint if there is limited understanding of how to effectively design and use digital systems to maximise their potential. This lesson is reflected in the Digital Approach paper, which puts a strong emphasis on the need for clients to build capacity whilst financing the introduction of new digital systems.

Lesson 5: The Bank historically did not have digital expertise, but signs are emerging that this improved even before the Digital Approach was launched

37. **The EBRD's relative inexperience in explicitly supporting digitalisation was visible in this case study.** There was a mixed understanding of the different types of SCADA systems, as well as the types of capacity challenges that implementing organisations might face during implementation. The Kafr El-Sheikh project did include a TC component to support capacity building during the implementation phase through "key performance indicators preparation, business plan development and International Financial Reporting Standards (IFRS) implementation". But there was no element addressing the challenges resulting from digital transformation. Similarly, HCWW's perception in regard to the Mobile 125 app was that the EBRD was initially not well-equipped to help address these challenges, as the Bank lacked the technical and specialised expertise necessary to develop an appropriate ToR. This suggestion can be partially evidenced by the lack of clarity in the ToR developed jointly by the EBRD and the HCWW on whether the Mobile 125 app would provide capacity for customers to make payments. It was also evidenced by the limited focus on building digital capacity within HCWW as part of the TC assignment.

38. **In contrast, the follow-up assignment with HCWW (which is an ongoing implementation as part of the Fayoum Wastewater Expansion Project) includes an initial "Information and Communication Technology (ICT) Needs Assessment for HCWW and Fayoum Wastewater Company (FWWC) to outline gaps in staff know-how and skills".** The purpose of that assignment was to "examine closely the potential for integrating ICT in the Client's customer service delivery,

which currently lacks capacity to provide comprehensive support to end-users". Following the Needs Assignment, the consultant is required to develop an "ICT Action Plan to outline a strategy for integrating new and adapting existing technologies and skills in outreach and communication activities, including the use of ICT in customer service provision". This appears to recognise that appropriate institutional capacity and 'digital readiness' is a precondition to successful digital transformation and demonstrates the internal development of the EBRD's digital understanding in this timeframe.

39. **This finding emphasises the importance of continuing to build capacity internally in order to support the digital transition.** Without adequate internal expertise, the EBRD will not meet its ambition of being the digital partner of choice to clients across its CoO. This lesson is also reflected in the Digital Approach paper, which prioritises the development of digital skills for EBRD staff, particularly for client-facing staff supporting the Bank's partners through digital transformations.

Lesson 6: The sustainability of digital systems should not be taken for granted and local champions should be identified where possible

40. **There are numerous mechanisms that enable digital systems to support sustainability.** However, the long-term sustainability of SCADA systems was presented as a clear challenge by implementing agencies, with a significant likelihood that it would not be used in the long run. There are better prospects for the sustainability of the Mobile 125 app, not least because the EBRD is continuing its engagement with HCWW on developing its ICT capacity.

41. **The clearest challenge to the sustainability of SCADA systems is related to the technical capacity and skillset of the local water company. Specialist technical expertise is needed to install and manage SCADA systems.** Without access to skilled staff, or without having the capacity to attract skilled staff, there are major doubts as to whether the Motobas WWTP will be operated using a SCADA system. Representatives from both the Project Implementation Unit (PIU) and the local water company explicitly stated that there was a strong possibility they would operate the plant manually rather than using a SCADA system.

42. **There is also a sustainability-linked infrastructural challenge, which has not yet been tested.** SCADA systems require a reliable source of power to operate effectively. They also rely on internet connectivity to transfer data and enable remote monitoring and control. Stakeholders noted that power cuts in the remote and rural region, in which the Motobas WWTP is located, are frequent. It was not clear whether there would be enough bandwidth in the mobile internet connection to transmit the significant amounts of data generated by the SCADA system.

43. **In addition, there is the financial challenge of the ongoing cost of maintenance.** Wastewater services within Egypt are not run on a full cost-recovery basis, with municipal water companies requiring cash transfers from HCWW to continue operations. Representatives from KWSC noted the importance of ongoing maintenance for long-term sustainability, but also stated it was unclear which entity would bear financial responsibility.

44. **The high cost of a SCADA system compounds the risk to financial sustainability in some cases.** The SCADA system in the Motobas WWTP requires an external maintenance service provider, whilst more advanced systems also come with software-as-a-service subscription packages to enable remote support and live troubleshooting. These types of ongoing maintenance costs imposed by digitalisation – via an external service provider, or through an external subscription service – are more difficult for state entities in Egypt to accommodate when

compared to higher labour costs or one-off capital expenditure. State entities in Egypt are not agnostic between expenditure on internal labour and expenditure on external service provision. Stakeholders emphasised that there is a strong commitment to keeping functions in-house in order to retain or increase employment. This creates additional challenges with respect to meeting the long-term financial commitments related to the maintenance of digital systems, such as SCADA, as well as transitioning to other software-as-a-service systems.

45. **Another critical element in the sustainability of any new system, whether digital or not, is local ownership and 'champions' within the implementing organisation.** Whilst there were supporters for digitalisation at the national level for SCADA systems, it was not clear whether ownership was in place on an operational level. There was a broad recognition of the potential benefits of using SCADA systems, but stakeholders frequently expressed concerns about the feasibility of implementation in that context and whether the technology was appropriate.

46. **However, unlike SCADA systems, the Mobile 125 app is more likely to be sustainable.** The system is currently operational and there are strong champions for it within the implementing organisation, such as the Head of the Customer Services Unit, who sees the application as a new route to triage customer complaints. Sustainability is reinforced by the follow-on exercise with HCWW as part of the Fayoum Wastewater Expansion Project, which provides an immediate opportunity to build capacity and implement lessons learned from this initial exercise. Furthermore, developing the mobile phone application to facilitate payments would provide a financial incentive for continued upkeep and investment.

47. **This case study demonstrates the challenge of ensuring the sustainability of digital systems.** Whilst digitalisation can support both environmental and financial sustainability, digital systems themselves are not always sustainable. Mechanisms to promote the likelihood of sustainability include long-term, digital-focused capacity building, as implemented as part of the Kafr El-Sheikh and Fayoum Wastewater Expansion Projects. It also requires the identification of 'digital champions' within organisations to ensure ownership, positive cultural change and the proactive adoption of new digital systems.

4. Conclusions and Suggestions

48. **This project provides a case study to illustrate some of the concepts set out in the Digital Approach paper, such as the linkages to the TQs.** In doing so, it highlights a key point made in the Digital Approach paper: that even though the Approach and the emphasis on digital transformation is new, in reality the EBRD has been supporting projects with digital transformation components for a significant amount of time. However, the positive and negative outcomes from these projects are not always captured within the Bank's historical results measurement frameworks, given the limited focus on digital transformation when these projects were approved. This limits the Bank's capacity to develop effective learning loops and build upon what has worked and what has not with respect to projects with digitalisation components.

49. **Digital transformation has significant potential to generate TI, but it also brings risks.** In this case, there are risks that the SCADA system within the Motobas WWTP will not be fully implemented, and even if it is, there is potential for job lost and stranded skills. More broadly, the sustainability of digital transformation is a key concern, particularly for public sector entities not fully responsive to market incentives to support digital transformation.

50. **A key part of risk mitigation is using and adopting the right technologies, based on the digital readiness of the Client and appropriate and targeted capacity building.** The comparison between how the Bank approached developing a mobile phone application with HCWW on the Kafr El-Sheikh project to the subsequent Fayoum Wastewater Expansion Project demonstrates an increased emphasis on analysing clients' digital readiness as a starting point for digital transformation. Over the lifespan of this project, the Bank's partners also observed how the Bank developed its own, initially rudimentary, digital capacity and skills. As recognised within the Digital Approach paper, this is an ongoing journey.