TOOLKIT FOR PLANNING DIGITAL TRANSFORMATION IN THE PUBLIC SECTOR

DIGITAL READINESS ASSESSMENT OF THE ORGANISATION

METHODOLOGY AND MANUAL

#TRUSTWORTHINESS
& SECURITY

#INCLUSIVENESS
AND ACCESSIBILITY

#Digital by default

#once only principle

#INTEROPERABILITY
BY DEFAULT

#Openness &
transparency

#PUBLIC
SECTOR
INNOVATION

#CROSS/
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CONTENT

ABBREVIATIONS

AI	Artificial intelligence
API	Application programming interfaces
BCP	Business continuity plan
BiH	Bosnia and Herzegovina
CAF	Common assessment framework
CERT	Computer emergency response team
CSO	Civil society organisation
DC	District of Columbia
DTPT	Digital Transformation Planning Toolkit
DGRA	Digital government readiness assessment
DMS	Document management system
BFP	Budget framework paper
eID	Electronic identification
EU	European Union
GDPR	General data protection regulation
GSB	Government service bus
G2G	Government-to-government
G2B	Government-to-business
G2C	Government-to-citizens/consumers
G2E	Government-to-employee
GDP	Gross domestic product
HR	Human resources
HRMIS	Human Resources Management Information System
ICT	Information communication technology
IDDEEA	Agency for Identification Documents, Registers and Data Exchange
IDS	Intrusion detection system
IT	Information technology
IPA	Instrument for pre-accession assistance
IPS	Intrusion prevention system
ISO	International Organization for Standardization
IoT	Internet of things
LG	Local government
NAC	Network access control
NGO	Non-governmental organisation
OSCE	Organization for Security and Co-operation in Europe
PARCO	Public Administration Reform Coordinator's Office
PIPLS	Project for Improving the Performance of Local Services
PIP	Public investment programme
PKI	Public key infrastructure
PULS	Improvement of local government services
VAT	Value-added tax
RAK	Regulatory Agency for Communications
SMS	Short message service
TV	Television
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UPS	(Uninterruptible power supply (source
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPS	Uninterruptible Power Supply (Source)

METHODOLOGY OF DIGITAL TRANSFORMATION OF PUBLIC ADMINISTRATION AND ADMINISTRATION IN BOSNIA AND HERZEGOVINA

A toolkit for assessing digital readiness and developing a roadmap for the digital transformation of public administration institutions and local self-government institutions (LSGs)[1] in Bosnia and Herzegovina (BiH) has been developed as part of the Project for Digital Transformation in the Public Sector in Bosnia and Herzegovina (2020–2024), which is implemented by UNDP with the support of the British Embassy in Bosnia and Herzegovina.

The methodology was developed through the expert contribution of UNDP BiH staff engaged in the above-mentioned project and engaged consultants. The starting point for the development of the methodology was the 'Digital Government Readiness Assessment' (DGRA) of the World Bank (World Bank, 2020; World Bank, 2019). In 2020, the World Bank offered a comprehensive set of diagnostic tools for assessing the readiness of digital governments in order to help developing countries assess their own readiness for digital transformation. Through the use of qualitative and quantitative tools, this set of tools allows the analysis to identify the strengths and weaknesses of the current status of a digital government and propose future activities for improvement and/or development of a comprehensive national ICT strategy (World Bank, 2020).

The World Bank's methodological framework for assessing the readiness of digital governments is the result of research conducted into best international practice and expert views on digital governance. It consists of 67 questions covering nine basic foundations that build an open and agile infrastructure and operations of a digital government: (i) leadership and governance, (ii) user centric design, (iii) public administration and change management, (iv) capabilities, culture and skills; (v) technology infrastructure, (vi) data infrastructure, strategies and management; (vii) cybersecurity, privacy and resilience; (viii) legislation and regulation and (ix) digital ecosystem (World Bank, 2020).

It is important to note that this tool is intended for assessing the readiness of a national digital governments and as such has been piloted in several countries (World Bank, 2020).

As previously mentioned, the aim of this handbook is to provide guidance and instruction for conducting a detailed comprehensive assessment of the digital readiness of institutions and local self-government units (hereinafter referred to as institutions/LSGs) in BiH with the aim of identifying the current state of digital maturity and for developing a roadmap for the digital transformation of specific institutions/LGLGs. In other words, compared to the World Bank's DGRA, which targets the national level of a digital government, this document provides guidance for the digital transformation of individual institutions in BiH. In this regard, the process of developing the methodology was carried out through the following phases.

1.   Adopting the relevant framework

In this phase, a team of UNDP BiH experts conducted a comprehensive review and analysis of the tools available for assessing the digital readiness and digital maturity of institutions/LGLGs in BiH. A comparative analysis was conducted and a relevant framework was adopted using inclusion criteria. The inclusion criteria for the tool:

■ targets government and administration,
■ is developed based on clearly defined principles of digital transformation,
■ offers a comprehensive overview of areas relevant to the digital transformation of government and institutions/LGLGs,
■ applies a methodology validated in the context of public administration.

Following the identified inclusion criteria, the DGRA tool of the World Bank was adopted as an adequate starting point and framework for the development of a methodology for assessing digital readiness and for creating a road map for the digital transformation of government institutions and local self-government units in BiH.

2.   Development of the methodology

In this phase, the analysis and adaptation of the adopted framework was carried out and the proposed methodology for assessing the digital

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1 The methodology is intended for all administrative levels in BiH, including institutions at the state and entity level as well as local self-government units. The term 'public administration institution' or 'LGU' is used throughout the document.

readiness and creating a road map of institutions/ LGLGs in BiH was adopted. A team of UNDP BiH experts analysed the DGRA questionnaire and, in accordance with their own expertise and knowledge of the legislative and institutional framework of the digital transformation of public administration in BiH, proposed corrections and changes to the DGRA questionnaire in order for it to suit individual institutions. The new questionnaire contains a total of 106 questions.

3. Conducting the pilot research

As part of the pilot research, an assessment of the digital readiness of five local self-government units and one entity government institution was conducted. Six consultants were engaged to conduct assessments and offer a critical review of the proposed methodology.

4. Adoption of the methodology

The results and knowledge obtained by conducting the pilot research were used for additional harmonisation of the methodology and the final methodology for assessing the digital readiness and the creation of a road map for the digital transformation of institutions/ LGLGs in BiH was adopted. A panel of consultants from the field together with a team of experts from UNDP BiH participated in this phase.

The aforementioned process resulted in the development of a set of tools for planning digital transformation in the public sector in BiH, namely the Digital Transformation Planning Toolkit (hereinafter, the DTPT or DTPT methodology).

- **Manual** with guidelines and instructions for institutions and local self-government units in BiH that are on the way to achieving the digital transformation of their processes and services. The manual explains the foundation of digital transformation as well as the process of analysing digital readiness and creating a digital transformation roadmap.
- **Questionnaire for assessing** the digital readiness of an institution/LG. The questionnaire allows for the calculation of indicators, both according to the individual pillars of digital government and the overall indicator of the institution/LG's digital readiness.
- Proposal for the structure of the **Roadmap for the digital transformation** of an institution/ LG.

The goal of this set of tools as well as the proposed methodology is for institutions/LGLGs in BiH to utilise instruments that will enable them to assess their current situation and diagnose challenges and opportunities through an examination of several important segments of the digital management ecosystem and to develop recommendations for future strategic actions in the direction of their digital transformation. The offered methodology should serve as a tool for strategic planning of digital transformation activities in the relevant institution, which will result in a digital transformation strategy as well as a road map and action plans.

The developed DTPT methodology (Digital Transformation Public Toolkit) is based on the DGRA (Digital Government Readiness Assessment) methodology of the World Bank but it is adapted to the level of individual institutions/LGLGs with special focus on BiH institutions at all levels of government in BiH. The characteristics of the DTPT methodology in relation to DGRA can be summarised as follows:

- The DTPT methodology targets individual institutions/LGLGs whereas the DGRA methodology is used at the national level.
- The DTPT, like the DGRA, is based on nine pillars of digital government; however, all of them are adapted to individual institutions, both conceptually and through issues that need to be addressed through an assessment of the institution/ LG's digital readiness.
- Although they rely on the DGRA principles, the DTPT principles of digital transformation represent the foundation for the transformation of an institution rather than the entire e-governance of a country.
- In addition to assessing digital readiness, the DTPT places special focus on creating a road map for an institution/LG's digital transformation.
- The DTPT methodology was developed taking into account the legal and institutional framework of BiH and therefore its application in other contexts would require additional adaptation of all of the pillars of digital governance.

1 INTRODUCTION

Digital transformation implies processes related to profound changes that occur in all sectors of the economy and society as a result of the adoption and use of digital technologies. The governmental institutions of countries around the world follow global trends and are on the path to achieving fundamental transformation of the way the public sector functions as well as the way of providing services to users. In other words, government institutions at all levels of administration are undergoing digital transformation in order to provide public services more efficiently, transparently and cost-effectively, which has become critical for meeting the expectations of modern citizens. The digital transformation of public administration results in a number of benefits, both for citizens and business entities and for the public administration itself. The most common benefits are reflected in more transparent and efficient administration and through savings in the provision of public services.

The permanent development of new technology has made it possible for some organisations to connect with their users through digital transformation in various ways, such as information, decision-making assistance, gathering information on user satisfaction and the like. These different levels of interaction between an organisation and the users show that each organisation is different and that the process of digital transformation in each organisation is different. This is because some organisations have to introduce processes of digital technologies that are highly complex, while for others, in the context of digital transformation, it is enough to introduce basic processes.

The transformation process itself includes phases such as digitisation, digitisation and finally digital transformation, while respecting the already promoted and well-known principles of 'once only' and 'digital by default'. **Digitisation** implies the transformation of data and information into a digital format that can be stored, processed and transmitted using digital and information technology. **Digitalisation**, on the other hand, implies the transformation of processes and operations in such a way that they are automated

using digital and information technology. Finally, **digital transformation** implies comprehensive change throughout an organisation that leads to a completely new way of providing services. Today, public administration institutions and administrations are moving from the digitisation of individual administrative services to a complete redesign of operations and processes with the aim of digital transformation. It is important to note that in this continuum some governments and institutions of public administration progress faster and some more slowly. In other words, the governments of different countries around the world are at very different stages of their path to the digital transformation of public services. Only a small number of countries is considered mature within the context of e-government implementation, while the vast majority are still in the early stages of the digital transformation process. Nevertheless, it is evident that local governments in developed countries have a noticeable level of digitised processes and services with visible progress in the field of digital transformation.

The reasons for institutions or entire governments to lag behind in terms of following global digital transformation trends can be linked to a number of factors, such as the lack of a national digital strategy, a disconnect between different levels of government and a lack of funds as well as misdirected public management reform efforts. In this regard, a systemic approach to the process of digital transformation implies one of the prerequisites and foundations for improving the overall situation, namely digital readiness.

In addition to speeding up and facilitating business, digital transformation is also a source of economic development and innovation with direct consequences reflected in terms of GDP growth. Acknowledging that the public sector is based on integrity, transparency, responsibility and the rule of law, it is quite clear that accessible reliable and user oriented e-government services can play a significant role in achieving the aforementioned principles and in raising the level of citizen trust in the government.

2 PURPOSE

IBearing in mind the lack of a digital transformation agenda for institutions/LGLGs in BiH as well as the fact that BiH is at the beginning of the digital transformation journey, the United Nations Development Programme (UNDP) developed a set of tools for the implementation of the digital readiness assessment of institutions/LGLGs in BiH with the aim of creating a roadmap for the digital transformation of such institutions. This is intended to serve the further development of implementable projects and their positioning in relevant strategic and financial documents, such as strategies, CSR, budgets, PIP and the like. The previously mentioned lack of a digital agenda refers primarily to the lower levels of government, given that institutions in BiH at the state level have been trying for years to implement the top-down principle of introducing digitisation of institutions and the complexity of the organisation of BiH. Yet this turned out to be an approach that is not applicable in the existing social organisation of the country. The reason for this claim lies in the fact that the responsibility for life events is located mostly at the level of municipalities and cantons where a bottom-up approach is used and where visible results for citizens and business entities can be obtained in a shorter time. This will serve exclusively to assess the digital readiness of various institutions at all administrative levels in BiH, with the aim of creating a roadmap for the digital transformation of each individual BiH institutions/LG. Support for this task was provided through the Digital Transformation Project in the Public Sector (2020–2024), which is supported by UNDP and the British Embassy in Bosnia and Herzegovina, and the Project for Improving the Performance of Local Services (PIPLS) in Bosnia and Herzegovina, which is supported by the Government of Sweden.

Digital transformation implies a process that begins with an assessment of the initial situation followed by clear planning of the digital transformation roadmap, with clearly set goals, and the implementation of planned activities as well as the final evaluation and further monitoring of implemented projects. In line with that logic, the purpose of this handbook is to offer guidelines and instruction on the following:

■ conducting a detailed and comprehensive assessment of the digital readiness of an institution or local self-government unit with the aim of identifying the current state of digital maturity (initial state);
■ creation of a road map for the digital transformation of the institution/LG (desired state).

The analysis of the initial situation and the creation of a road map for digital transformation provides the basis for initiating change in a systematic and coordinated manner. Digital transformation is a continuous process that for most institutions has the same goal, but for each institution the path to achieving this goal is different.

A digital transformation roadmap is nothing more than a plan for coordinating and initiating change in an institution. Detailed planning for the path of digital transformation enables more efficient fulfilment of the desired goal and avoidance of unnecessary costs. Each institution is unique in terms of the initial state and consequently the scope of activities required to achieve digital transformation is different. Depending on the initial state, digital transformation can be a very complex and demanding process. This is because it involves a combination of organisational changes, changes to the mindset of civil servants, the adaptation of processes and finally the implementation of technological projects.

The essence of the digital transformation roadmap for any institution/LG is the creation of a list of measures with briefly described projects ordered according to priority in terms of their implementation, before which it is necessary to carry out an integrated and systemic assessment of the digital readiness of the relevant institution/LG. The implementation of measures from the roadmap of digital transformation for a certain institution/LG leads to significant changes within the institution/LG, but also the overall environment for the provision of public services. In addition to speeding up and facilitating the provision of public services, increasing the transparency and efficiency of the institution/LG, namely helping

to prevent corruption, it will increase revenue, savings, contribute to greater user satisfaction and be a generator of the development of the digital economy.

The main purpose of implementing measures and projects from the digital transformation roadmap of a given institution/LG is to improve performance and adapt more quickly to an environment that is undergoing rapid and continuous change. The ultimate goal is to increase user satisfaction, which is a key goal when it comes to the public sector. The use of new technology enables the optimisation of business processes, cost reduction and the automation of business processes, which along with the introduction of new technological solutions will enable employees to perform their daily tasks in a faster and more efficient manner. The necessity of digital transformation in relation to the provision of better services to users, increased efficiency, effectiveness, availability, transparency, openness and general well-being is recognised by an increasing number of institutions and governments around the world that are investing significant financial and other resources in shaping their digital transformation.

In addition, the openness of government data is a very important tool that can help prevent corruption and allow citizens to better monitor the use of public funds and the policymaking process. Apart from the indisputable benefits for citizens in the form of increased efficiency, effectiveness, availability and transparency of digitally transformed public administrations the benefit in the form of increased trust between institutions and citizens is also very important. This is because it is increasingly obvious that digital technologies contribute to reducing the gap between citizens and business entities on the one hand and public administrations on the other. Furthermore, the digitalisation of public administration results in an increase in the availability of public services to all population groups. This applies in particular to vulnerable and threatened social groups (persons with special needs, disabilities) and to users of services in rural areas. It is very important to emphasise that the use of digital tools strengths the integrity and responsibility of public service providers, enhances the fight against corruption and helps to achieve sustainable economic growth and development and improve the business and investment climate.

The establishment of transparent and accessible e-government portals, the use of digital tools to reduce administrative obstacles to the interaction between citizens and public administration, the digitisation of public procurement and the establishment of digital mechanisms to protect whistle-blowers from retaliation are just some of the clear indicators that digital transformation, among other things, helps in the fight against corruption, i.e. contributes significantly to the suppression of this negative social phenomenon that is a burning problem in transition countries such as Bosnia and Herzegovina.

3 PILLARS OF DIGITAL TRANSFORMATION

The public sector in Bosnia and Herzegovina (BiH) has for a long time resisted digital change, citing the high risk of data compromise as a key reason. However, the real reason lies in the fact that this process was not given much attention because digital transformation was not on the political agenda at all and all of the benefits of using digital transformation were not made clear and visible to management. With new achievements in the field of security of information systems and the constant IT education of employees such fears have over time been overcome, so today the public administration's readiness for digital transformation is mostly visible. This genesis of the development of digital awareness takes place in a similar way in all institutions/LGLGs in BiH. The low level of utilisation of technology and digitisation in the public and private sectors has been the result of a lack of institutional access to digital transformation in BiH, which slows down the overall development of the country. However, with the EU Digital Agenda for the Western Balkans and the domestic strategic frameworks related to e-government as a segment of the public administration reform strategy and other efforts in this area this process is gradually accelerating.

The process of building an innovative, open, agile and accessible digital public administration implies the establishment of modern mechanisms for the use of today's ICT tools, which directly benefits the development of the digital economy in each country. The digitisation of the provision of public services not only increases administrative efficiency and transparency but also enables balanced economic growth and facilitates active communication with the public.

Within the DTPT methodology, the assessment of the digital readiness of institutions/LGLGs is based on two basic steps:

- initial state (assessment of digital readiness),
- desired state (creating a road map).

The assessment of the digital readiness of an institution/LG is based on a comprehensive questionnaire organised around nine areas that represent the pillars of digital transformation:

1. **Management**
2. **User oriented design**
3. **Public administration reform**
4. **Organisational culture and employee skills**
5. **Technological infrastructure**
6. **Data infrastructure, strategy and management**
7. **Cyber security, privacy and resilience**
8. **Legal basis**
9. **Innovation ecosystem**
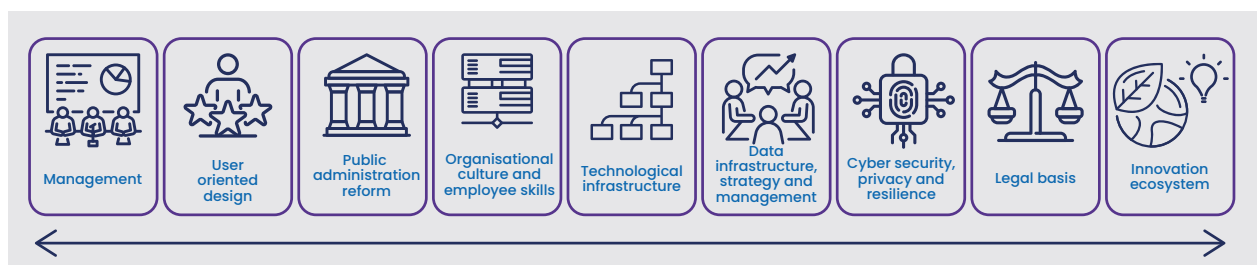
The pillars of digital transformation are presented below along with the questions that need to be addressed when assessing the initial state, namely the digital readiness of an institution/LG.

A. MANAGEMENT

The vision of the need for digital transformation of institutions/LGLGs is a very important part of the mechanism for the digitisation of business processes and represents one of the first prerequisites for a public administration institution becoming part of the digital community in BiH. Of course, it is not enough for the management structure of an institution/LG to have a vision. For the purposes of implementing actions arising from strategic documents, road maps, etc. provide an implementation infrastructure that responds to legal, technological and institutional as well as cultural changes to the approach to providing e-services to citizens and the business community. Decision makers in institutions should be at the service of all of the implementation structures that are the main bearers of the technological implementation of modern ICT solutions that exist on the market today and in the daily work of public administration. The goal that public administration at all administrative levels in BiH should strive for is that each unit of public administration has a clearly defined vision and strategy with mechanisms for auditing the performance of the implementation of strategic goals and with the provision of budget lines for each individual implementation action as well as secured funds for the sustainability of the implemented actions.

The common vision of the management structure should be the development of a modern public administration that will ensure and respect the principles of the complex administrative space in BiH, on which the functioning of the public administration in BiH is based. It should contribute to the successful process of joining and bringing the public administration closer to the high criteria set by the public administrations in the countries in the environment, while preserving the public interest and meeting the needs of citizens and the business community.

The key to a successful public administration reform in this area is that the management structures of the institutions/LGLGs provide and systematically implement the policy of personnel development. This applies in particular to middle-level management, who understand the necessary changes, opportunities and challenges and possess good leadership skills. It is necessary to pay special attention and have a strong focus on change management, project planning and adequate establishment of mechanisms and tools for periodic monitoring and performance measurement.

It is necessary to examine the following questions during the assessment of the digital readiness of an institution/LG in this area:

1. *Is there a specific strategic document that defines the vision of digital transformation?*
2. *Is there an action plan or road map that supports the vision of digital transformation?*
3. *Are there measurable indicators for monitoring the use of modern digital technologies in the work of the institution/LG?*
4. *Does the institutional leadership (e.g., elected officials, ministers, heads of department, etc.) understand and support the vision of digital transformation?*
5. *Is there a systematised organisational unit that can respond to the challenges of digital transformation?*
6. *If it exists, is the organisational unit responsible for digital transformation structured to have separate teams for planning, development, operations and support and security?*
7. *Does the organisational unit responsible for the field of digital transformation cooperate regularly with other organisational units of the institution/LG?*
8. *Is there active coordination in the planning and implementation of digital transformation activities with other levels of government (cantonal/federal/state level, if it is done at the local level or similar)?*
9. *Does the organisational unit that supports digital transformation have defined standards when announcing public procurement for IT?*
10. *Is there communication with citizens when creating strategic documents?*
11. *Is there systemic support for the implementation of digital transformation that entails planning funds at the level of each fiscal year (BFP) to ensure the implementation of new and the improvement/maintenance of existing digital solutions?*
12. *Do you use donor funds to support and implement the vision and priorities of digital transformation?*
13. *Are budget funds provided and planned, namely activities for the promotion of e-services and modern ICT solutions in the process of digital transformation in the institution/LG? Please describe the actors, partners, leaders and processes.*

B. USER ORIENTED DESIGN

User oriented design as a pillar of digital transformation refers to the design of ICT solutions directed towards the user. This approach to the design, development and implementation of e-services by the institution implies the inclusion of users (residents, business entities, etc.) in the process of developing ICT solutions at all stages of development through a combination of research and design tools in order to generate a service that will be available and acceptable to them. Improving and modernising the work of public administration implies the inclusion of citizens, the business community and employees of public administration in the daily work of institutions and therefore also in the process of digitisation of the process of providing public services. It is crucial to ensure that public administration institutions, including local self-government levels, organise processes in such a way as to experience the benefits of progress and digitisation. Risk and experimentation are therefore important, because facing risks naturally and logically leads to innovation. Furthermore, innovation increasingly relates to cooperation. This is not only between lower and higher administrative levels of public administration but also with other participants in the private and civil sectors and with user groups as well as with global partners.

One of the main reasons why the provision of public services in BiH has not become a more important activity is probably that different levels of public administration have quite different ambitions and visions and as a consequence different levels of progress in terms of their digital readiness. Therefore, it is important to adopt a 'variable speed' model for providing e-services so that all public administration institutions responsible for providing public services can progress at a different pace and in different areas of activity through the process of 'positive competition'. At the same time, they should be stimulated and encouraged to constantly increase the pace of digital transformation and to expand the scope of its strategic goals and ambition. It is necessary to pay special attention to the main advantages of this approach, namely user oriented design reflected in the mechanism for collecting user feedback in order to enable the establishment of e-services that are fully focused on the real needs of users.

Through the assessment of the digital readiness of an institution/LG in this area, it is necessary to examine the following aspects:

1. *Do you use modern digital solutions in your daily work (e-document, electronic signature, etc.) and do you offer e-services?*

2. *Are the principles of user oriented design applied during the development of e-services (once only, one-stop-shop, 'digital by default')?*

3. *Is there a systematised organisational unit or officials whose competence is to communicate with users regarding digital transformation, namely to improve the process of providing e-services of the institution/LG?*

4. *When developing e-services, do users (citizens, business entities, etc.) participate in the process of collecting functional requirements for their development?*

5. *Are civil society organisations (CSOs) and other similar interested parties involved in the process of creating user oriented services?*

6. *Are users from rural areas and those with special needs/disabilities adequately included in the process of designing e-services of the institution/LG?*

7. *Do you use an innovation lab where service prototypes can be tested/presented involving citizens/business entities before their implementation?*

8. *Is there any way to collect feedback from users in order to improve services, especially e-services?*

9. *Can citizens communicate through web chat or similar services on the website of the institution/LG two-way directly with certain officials of the institution/LG on issues such as the state of their case and the like and are statistics on how many of these requests are answered monitored?*

10. *Do you provide different channels for the provision of e-services (public administration portals, mobile platforms, TV, websites, social networks, etc.)?*

11. *Are e-services accessible to all, taking into account location, connectivity, skills, accessibility and disability (special needs)?*

12. *Is statistical data on the use of services collected and is user satisfaction with the services provided regularly monitored?*

C. PUBLIC ADMINISTRATION REFORM

The process of public administration reform requires a holistic approach that is guided by values and institutionalised at all levels of government and society. It can be realised through an interactive four-step process that includes undertaking an analysis of the context and situation, articulating a common vision of the transformation of public administration and how digital transformation will be used to achieve strategic goals, designing a strategy and roadmap for the implementation of the digital transformation of the institution of public administration based on key pillars and the introduction of monitoring and evaluation mechanisms for continuous improvement.

It is necessary that all administrative levels of public administration, with the necessary and foreseen level of mutual coordination, define their approaches through quality management policies and to choose ways that will enable institutions to provide their services faster, better, cheaper and to reduce the overall burden on those to whom these services are provided. Emphasis should be placed on strengthening the interoperability of the most important electronic registers run by public administration institutions under their jurisdiction. Interoperability is ensured by the data exchange platform: unique information systems for electronic data exchange between all administrative levels in BiH. The basic function of these platforms is to enable standardised and systematically arranged communication using existing information systems and faster exchange of data between citizens, the business community and officials for the purpose of electronic service provision as well as the automatic exchange and use of a large amount of data that exists in the registers of public institutions.

As a starting point for the establishment of virtual one-stop-shop systems, the catalogue of available e-services as well as electronic registers (together with the meta-registry) for each administrative level in BiH needs to be available in one place and offer the possibility of executing transactions that the e-service offers at the highest level of sophistication, namely the level of complete automation of public services.

It is necessary to examine the following through the assessment of the digital readiness of the institution/LG in this area:

1. *Apart from PARCO documents, are there priorities in relevant strategies and related action plans that treat public administration reform and at the same time refer to the institution/LG (vision, goals and mechanisms for digital transformation)?*

2. *Have you followed standard procedures for digitisation and the optimisation of e-services (e.g., CAF, ISO 9000 certificate), use of change management mechanisms based on feedback from e-service users, etc.?*

3. *Has a single administrative place (one-stop-shop) been implemented in the institution/LG in any form?*

4. *Do you obtain the information necessary to provide a service from other institutions on an official basis*

5. *Is there a catalogue of offered services (e.g., for each service a brief description, requirements and criteria, related forms to fill in, duration, related administrative fees or charges, instructions)?*

6. *Does the institution/LG offer electronic services, namely conducting administrative procedures online (at least 1 procedure)?*

7. *Is an information system used for managing documents, finances, human resources, office, etc.?*

8. *Is there an interface on the website for direct user communication with the institution/LG in terms of sending remarks, suggestions, praise and the like and are statistics/monitoring on the response to these requests kept?*

D. ORGANISATIONAL CULTURE AND EMPLOYEE SKILLS

The digital transformation of processes in an organisation is not only a technological issue because the technological change itself requires a number of other adjustments, ranging from those related to the organisational culture to changes in employee skills. In other words, investing in technology alone is not enough if employees do not have the knowledge and skills they need to get the most value out of the digital tools implemented. The issue of adoption and acceptance of technology by employees in the organisation is considered a significant predictor of the success of the implementation itself. In this context, it is important to note that a successful digital transformation includes the creation of a strategy and the definition of the necessary digital transformation skills as well as a training system, which results in the successful adoption of technology.

In this context, the systematisation of jobs and employment should be guided by the vision and principles of digital transformation whereby in addition to administrative knowledge and skills all employees should also possess a certain level of technical skill. The systematisation of workplaces should clearly differentiate the level of digital skills according to workplaces, ranging from the simplest skill of using office applications through to analytics and system administration as well as the issue of the certification for certain positions. The analysis of digital readiness in this area implies an analysis of the existence of cooperation between different departments and sectors within the institution as well as a readiness to share knowledge. Furthermore, it is necessary to establish whether there is a clear systematisation of workplaces within the institution that defines the necessary skills for each workplace and where it is necessary to address two types of skills: business and technical/digital. In addition to the necessary skills, some jobs also require certain industry certifications. Through the process of analysing digital readiness, it is necessary to establish whether the institution has a systematic approach to the training and education of its employees as well as their professional advancement. In the event that the institution does not have staff for

certain technical activities it is necessary that there is a willingness to engage an external expert or consultant. The latter is determined in accordance with this area of the institution's digital readiness assessment.

It is necessary to examine the following through the assessment of the digital readiness of the institution/LG in this area:

1. *Are there enough trained and qualified staff (with business and technical skills) to implement the digital transformation strategy?*
2. *Is there stimulation of professional IT staff whose duty it is to implement digital transformation?*
3. *Is there a clear overview of the required business and digital skills in line with the job positions in the systematisation of jobs?*
4. *Does the systematisation of jobs foresee the engagement of personnel whose job description refers to project management, digital transformation, security of information systems, and the like?*
5. *Are there defined conditions for employees regarding the possession of industrial certificates relevant to digital transformation and related ICT technology in the systematisation of jobs?*
6. *Is a multidisciplinary (team) approach and knowledge exchange used in digital transformation projects when it comes to specific skills?*
7. *Are the employees who work on the development of e-services familiar with (passed training) how to apply user oriented services?*
8. *Is there a system of targeted training and education for employees that includes the improvement of digital skills?*
9. *Is there a culture of cooperation and joint work on projects aimed at digital transformation as well as a culture of 'digital by default' among the officials in the institution/LG?*
10. *Has an external IT expert or digitisation expert (outsourcing) been engaged in the past three years with the aim of implementing any of the digitisation projects?*

E. TECHNOLOGICAL INFRASTRUCTURE

Common infrastructure in the form of digital platforms and services, standards and interoperability represent the basic building blocks towards the greater digital efficiency of any institution, primarily in terms of cost reduction and improvement of data exchange. Stakeholders may include relevant ministries at all levels of government in BiH, especially the ministries of transport and communications and the ministries of finance, the IDDEEA Agency, ICT players from the private sector, academia/specialised institutes, etc.

Technological infrastructure as a pillar of digital transformation treats essential issues of digital transformation by analysing those concrete infrastructure and systems without which it would be redundant to speak about a digitally transformed institution. The assessment of the institution in this section begins with an analysis of the use of workstations, servers, network infrastructure, communication networks and the used software and platforms on which the used software is based. Further assessment of the institution in this area continues through an analysis of the existence of key records/registers in digital form and the existence of associated e-services. In this area it is very important to analyse the existing software and associated platforms from the aspect of their mutual compatibility and ensuring the necessary prerequisites for their mutual integration, namely the exchange of electronic data both between these registers and with the registers of other institutions at different levels of government in BiH.

The evaluation of the institution in this area continues through an analysis of the redundant functions of the existing systems, both those systems in the data centre and those segments of the information system related to telecommunication networks and the like. Here it is very important to process data backup, disaster recovery function and the business continuity plan (BCP). Without these functions and associated components it is impossible to imagine a serious and reliable information system with future e-services for citizens and a fully digitised single administrative place (one-stop-shop).

When assessing the technological infrastructure of the institution, the analysis of the information system from the aspect of its consolidation must not be bypassed. Although cyber security is treated in a separate section, it is also necessary in this section to touch on the general security mechanisms on the data centre and telecommunications network, namely the hub of the data centre (data centre hub), primarily in terms of the existence or non-existence of licensed network devices for the protection of the information system with related services (firewalls, IDS, IPS and similar).

If there are already solutions for the integration of different data sources, such as GSB (government service bus), it is necessary to analyse such solutions as well as key API (application programming interface) solutions if they have been implemented. In this segment it is important to touch upon the different models (G2G, G2B, G2C and G2E) of electronic data exchange if they exist, namely the necessary prerequisites and their fulfilment if they do not exist.

The assessment in this section ends with an analysis of core applications and possibly used technologies such as Cloud (cloud services), IoT (Internet of Things), Smart solution (smart solutions/cities), Blockchain (data storage and exchange) or AI (artificial intelligence).

It is necessary to examine the following through an assessment of the digital readiness of the institution/LG in this area:

1. *Is there a server room implemented in accordance with current standards (access control, video surveillance, cooling, ventilation, humidity, fire alarm, static floor, UPS, backup power supply)?*
2. *Has the digital architecture been developed in terms of the existence of an adequate data centre, telecommunication/computer networks, installed devices with the function of improving security, redundant functions of key equipment and the like?*
3. *Are shared resources with other institutions used (central data centre, SSO, e-payment, personal mailbox)?*
4. *Is and if so to what extent is the existing software (customised, application and operational) in the institution/LG licensed and mutually compatible?*
5. *Is the infrastructure provided for data backup and disaster recovery function with a provided disaster recovery location?*

6. *Is there a business continuity plan (BCP) in any form?*

7. *Was the existing ICT system consolidated and if so when and to what extent?*

8. *When building digital architecture, were some of the standards from the framework of interoperability guided?*

9. *Is the institution the owner of the code for specifically developed applications that were developed and purchased by external companies or donated by various organisations?*

10. *Is the implemented infrastructure in your institution/LG independent when it comes to the use of equipment from different manufacturers?*

11. *Has a secure and reliable data centre hub been implemented that includes installed 3-layer network devices?*

12. *Have services been implemented to manage network resources and user rights such as Active Directory and the like?*

13. *Is there a catalogue of internal applications that are in use within the institution/LG?*

14. *Is there a common portal for digital governance that serves as a front-end user environment for digital services, an intranet portal and the like?*

15. *Has the technological infrastructure been implemented for the establishment of a help desk in terms of inquiries about the services of the institution/LG, which includes a telephone line, an up-to-date e-mail contact and records of calls/interventions?*

16. *Is the availability map defined and high system availability established (e.g., 4 nines 99.99%) for digital services and platforms?*

17. *Is the Government Service Bus (GSB) used to integrate different data sources for the needs of service applications?*

18. *Do you have developed standardised application programming interfaces (APIs) for online services?*

19. *Are innovative technologies such as Cloud services, Smart solutions, IoT, Blockchain or AI used?*

F. DATA INFRASTRUCTURE, STRATEGY AND MANAGEMENT

The assessment of an institution's data infrastructure, strategy and management (DTPT) involves analysing the institution's data, its availability, structure, type and related exchange, standards, protocols, and policies. Stakeholders can include digital state, entity or cantonal government and innovation teams, associated ministries of finance, interior and the like as well as other key agencies at various administrative levels, such as statistical agencies, identification documents and the like. It is important to differentiate between the data that the institution uses to provide services (relevant to this assessment) and the data used by the private sector. Collaboration with various organisations (CSOs/NGOs) and representatives of the private sector is especially important.

The digital transformation of any institution relies largely on data management activities. The ability of an institution to collect, store, analyse and exchange data using new technologies is crucial for improving service delivery and increasing the efficiency of such an institution. The success of digital transformation depends on the quality of the established basic registers that will enable the institution to use and share a set of standardised data with other institutions or organisations, aimed at achieving greater efficiency.

The assessment of an institution from the perspective of data infrastructure should primarily start by observing the existence of ISO 9001 standards and digital data management as well as associated procedures. It is important to process basic registers in terms of their definition, digitisation and readiness for potential exchange with other interested institutions, companies, civil society organisations and citizens. It is important to analyse all procedures related to data management, access rights, use and maintenance of related ICT systems, applications, databases and the like.

In this section we also touch upon the necessary legal basis, namely the legal obligations in the context of electronic data exchange. It is desirable to classify records/registers for which there is a legal basis as well as registers for which it is necessary to provide valid signed agreements between institutions that provide their electronic data in exchange as well as registers that use

personal data. In this section it is desirable to analyse the protection of personal data, GDPR compliance and vertical and horizontal G2G models of electronic data exchange.

If the institution publishes its own data as open data and encourages its use then it is necessary to analyse such cases with specific reference to the type of such data (public procurement, plans, decisions, resolutions, brochures, etc.) as well as to indicate the places and methods of publishing this data and the standards and meta-data catalogues used. This information can also be analysed from the perspective of assessing the level of digital services.

The assessment in this section ends with an analysis of Big Data and AI if their implementation is present in the institution.

The following should be examined through an assessment of an institution's/LG's digital readiness in this area:

1. *Have you adopted policies, standards and guidelines for managing data (collection, storage, sharing, exchange and reuse)?*

2. *Are data management policies, standards and guidelines implemented in your institution/ municipality?*

3. *Do you have a list of registers containing basic information about each register?*

4. *Do you use basic data registers from other institutions or still collect and store your own data?*

5. *Do you use data sharing agreements or protocols for data exchange with any third party?*

6. *Have you defined, digitised and ensured the availability of your registers to other institutions that should have the right to access them (G2G)?*

7. *Are any of your basic registers part of a unique/ shared central electronic registry?*

8. *Do you allow any third-party access to electronic registers and applications, such as private companies, civil society organisations, etc. (G2B & G2C)?*

9. *Do you proactively publish your datasets as open data and encourage their use (such as publishing documents related to public procurement on the website)?*

10. *Do you electronically use certain reference data from higher administrative levels in BiH in terms of obtaining information ex officio (such as IDDEEA electronic records, electronic records of business entities, land and cadastre databases, registers of immovable property, etc.)?*

11. *Do you use big data technology?*

12. *Do you use predictive analytics and artificial intelligence (AI) for better business decision-making?*

G. CYBERSECURITY, PRIVACY AND RESILIENCE

In addition to the default detailed analysis of relevant solutions for information system protection, the assessment of an institution's digital readiness in this area primarily covers relevant security policies, guidelines and protocols. Security and continuity management of any institution are vital elements of the digital transformation process. Therefore, the assessment in this area also addresses the level of staff training on cybersecurity and data protection as well as the systems in this regard. This segment should include a detailed analysis of the business continuity plan, if it exists, as well as the protocol for responding to computer incidents, threats, disasters and the like. The analysis of these protocols should also include an analysis of associated risks, which should be an in-tegral part of them or a separate document. The analysis in this section can also cover vulnerability assessments and various penetration testing of information systems, including social engineering. The progress of digital administration in any institution must be accompanied by strong cybersecurity, privacy and resilience efforts to ensure that users of the institution's future e-services maintain trust in online information and related e-services. Cybersecurity is particularly important for the protection of personal data (compliance with GDPR) and requires inter-institutional and international cooperation to respond to growing threats. Stakeholders within the institution may include national cybersecurity centres, national agencies for key and critical

infrastructure, ministries of internal affairs, security, defence and the like. Therefore, if they exist, the assessment in this section should also cover these forms of cooperation.

The assessment in this section should also cover the existence of a separate organisational unit or personnel directly responsible for cybersecurity issues and their direct authority in the context of protecting all digital data, equipment and platforms as well as a security plan that includes BCP and protocols for responding to computer incidents.

The following questions need to be examined to assess an institution's/municipality's digital readiness in this field:

1. *Does the institution/municipality have a separate organisational unit or individual staff specifically responsible for cybersecurity issues?*
2. *Have you adopted a security policy/guidelines/ protocol?*
3. *Does your staff collaborate with other institutions on cybersecurity issues (CERT and similar)?*
4. *Are critical processes, critical infrastructure and associated responsible persons defined in the institution/municipality?*
5. *Have you defined a targeted recovery time for the information system in the event of any malfunction, incident, accident, disaster or similar?*
6. *Do you have an adopted procedure in case of response to computer incidents?*
7. *Are you planning/implementing training in the*

field of cybersecurity, both for your employees in terms of raising awareness of possible security threats and for administrators of information systems?
8. *Have basic cybersecurity solutions been implemented to ensure basic cybersecurity levels on workstations (firewall, antivirus solutions, antispam, antimalware, anti-phishing and similar)?*
9. *Do you conduct at least one annual exercise to test the resilience of ICT systems?*
10. *Are there any platforms in the institution/ municipality for updating systems before deployment on online systems in a test environment?*
11. *Have you implemented advanced security solutions, such as NAC, IPS, IDS and encryption of content in various storage locations and similar?*
12. *Have you implemented cluster technologies, such as cluster firewalls, cluster switches, certain servers that work in a cluster, parallel links and similar to ensure high availability of services?*
13. *Is the operational and application software in the institution/municipality regularly updated and does it have official support in terms of technical assistance?*
14. *Have you planned/implemented periodic penetration testing carried out by authorised and certified organisations?*
15. *Is there a specific security verification procedure for experts (company employees or independent experts) who can be engaged in your institution/ municipality for highly sophisticated interventions or the maintenance of complex information systems?*

H. LEGAL BASIS

In strategic positioning and planning for the digital transformation journey it is necessary for institutions/LG"s to consider any key principles defined at higher levels of government as well as horizontal and vertical alignment with broader strategic priorities. In this regard, on its digital transformation journey the institution/LGs needs to address the laws and regulations to which each individual digitisation project is subject. Some of the laws that need to be addressed (at all relevant levels of government) include laws and regulations that regulate electronic signature, electronic

identity and electronic document issues, laws and regulations that address information security issues, laws and regulations that regulate data protection and access to information rights and laws and regulations that regulate administrative procedures, office operations and administrative and regulatory fees. In addition to these regulations, for the successful implementation of e-government projects an analysis and potential amendments to individual sectoral laws and regulations are necessary.

This area of assessing digital readiness implies the institution's/LGs readiness for digital transformation by addressing legal and other regulations relevant to the digitalisation of public services or the extent to which the existing legislative and institutional environment is or is not supportive of the digital transformation of public services.

Digital transformation requires a healthy legal and institutional environment that provides for compliance with laws for data privacy, digital signature, digital identification, user service protection, etc. In order for public administration to fully realise the potential of digital transformation of services it is necessary to have supportive legal regulation or laws and regulations that create conditions for the digitalisation of individual services.

The following should be examined when assessing the digital readiness of an institution/municipality in this area:

1. *Are the necessary prerequisites in place for implementation of laws and other regulations that regulate electronic signature, electronic identity and electronic documents?*

2. *Are the necessary prerequisites in place for implementation of laws and other regulations that regulate the protection of personal data?*

3. *Are the necessary prerequisites in place for implementation of laws and other regulations that regulate the protection of classified data?*

4. *Are the necessary prerequisites in place for implementation of laws and other regulations that regulate information security?*

5. *Have all necessary procedures been adopted for accessing equipment, data and the locations where equipment and data are stationed?*

6. *Have issues related to administrative procedures, office operations, administrative and regulatory fees been elaborated for the legally valid implementation of digital transformation?*

7. *Is there regulation related to the use of Cloud services, Smart solutions, IoT, Blockchain and AI?*

I. INNOVATION ECOSYSTEM

The priority for executive and local government institutions is to provide services to citizens and businesses. That is why open participation and dialogue between institutions and citizens, the private sector, civil society and the academic community are necessary. Dialogue and collaboration with stakeholders who have a significant role in the digital ecosystem contribute to strengthening the innovative capacity of institutions and improving the overall digital ecosystem and ultimately to the development of a modern digital economy. Stakeholders relevant to all public administration institutions on their digital transformation journey and in general for providing services to new generations include the private sector, universities, innovation and entrepreneurship centres, civil society organisations and associations, investment institutions, and others. This area of digital readiness assessment involves analysing the collaboration of institutions with relevant participants in the digital and innovation ecosystem in which the institution operates.

The following need to be examined in this area of assessing the digital readiness of institutions/local government units:

1. *Are there documented initiatives for cooperation with academic institutions?*

2. *Are there realised projects through contracts/ agreements with academic institutions?*

3. *Are there documented initiatives for cooperation with civil society organisations?*

4. *Are there realised projects through contracts/ agreements with civil society organisations?*

5. *Are there documented initiatives for cooperation with the business sector?*

6. *Are there realised projects through contracts/ agreements with the business sector?*

7. *Do you organise public discussions or dialogues with relevant stakeholders in the digital and innovation ecosystem with the aim of improving cooperation but also the overall environment in which the institution/local government unit operates?*

8. *Do you provide incentives or other forms of support to stakeholders in the innovation ecosystem (academia, civil society and the business sector)?*

9. *Is there a plan for establishing technological innovation parks/support for start-ups?*

10. *Do you cooperate with international institutions in BiH on your digital transformation journey?*

4 VISION AND PRINCIPLES OF DIGITAL TRANSFORMATION

The institutionalisation phase of the digital transformation roadmap requires establishing a systematic approach to digital transformation by defining a strategy and concrete action plans within the institution's operational plans. Considering the pillars and areas of digital transformation presented above as well as the final goals for each area, it is possible to define the overall vision of the digital transformation as well as priorities for each area as outlined below.

VISION OF INSTITUTIONAL DIGITAL TRANSFORMATION

Establishment of an open and accessible government with high-quality digital public services and better digital communication between the institution and stakeholders improves administrative and operational efficiency through digital transformation.

PRIORITIES AND PRINCIPLES ACCORDING TO THE DIGITAL TRANSFORMATION PILLARS

Management
Clear vision, leadership and management of the digital strategy.

User centred design
Provision of agile and accessible high-quality services according to real user needs with increased public engagement and open participation of citizens and businesses in designing the e-services.

Public administration reform
Optimisation of processes for digital delivery and sustainability following the principle of 'digital by default'.

Organisational culture and employee skills
Train employees to develop digital skills and create a culture of cybersecurity, collaboration, knowledge sharing, innovation and creativity throughout the institution as a basis for continuous improvement.

Technological infrastructure
Use of whole-of-institution and whole-of-government standardised technological and data infrastructure.

Data infrastructure, strategy and management
Improvement of data collection, analysis and sharing capabilities using new technologies and the 'once-only' principle.

Cybersecurity, privacy and resilience
Establishment of protocols and BCP to ensure security and privacy and minimise the risks of any cyber threat.

Legislative and institutional framework
Transparency in decision-making and the provision of public services.

Digital and innovation ecosystem
Understanding the existing digital ecosystem and encouraging innovation, education and entrepreneurship in Bosnia and Herzegovina.

5 DIGITAL TRANSFORMATION PROCESS AT THE LEVEL OF AN INSTITUTION

As previously mentioned, digital transformation involves a process that begins with assessing the current state (starting point) followed by clear planning of the digital transformation roadmap (desired state), with clearly set goals, implementation of planned activities and final evaluation of implemented projects. In other words, the digital transformation process proposed by the DTPT methodology consists of two main phases that include analysis and planning as well as the implementation phase.

The phases of the digital transformation process for an institution are as follows.

01 Analysis	02 Planning	03 Implementation
An analysis of the institution's/LGs digital readiness is conducted. **DTPT questionnaire**	A digital transformation roadmap for the institution/LGs is created. **DTPT roadmap**	Institutionalisation and implementation of identified priorities and measures. **Alignment with the legislative and institutional framework of implementation**

1. ANALYSIS: Conducting an analysis of the digital readiness of an institution/municipality.

This phase involves conducting a detailed and comprehensive assessment of the digital readiness of an institution or local government unit (LGs) in order to identify its current state of digital maturity. The analysis covers the nine pillars of digital transformation and is conducted by an expert in the field of ICT using the DTPT questionnaire.

The analysis is carried out using several research approaches.

■ *Desk review* - This method involves reviewing the available documentation and data relevant to public institutions/municipalities in Bosnia and Herzegovina (BiH) as well as those relevant to the institution/municipality being assessed. Based on the review of the available data and information, it is necessary to create basic conclusions about the institutional framework for digital transformation of the institution.

■ *Document analysis* - It is necessary to conduct a qualitative research analysis of the internal documents of the institution, which form the basis for conclusions drawn for each pillar of digital transformation.

■ *Collecting primary data using semi-structured interviews* - In this phase, it is necessary to interview relevant managerial employees of the institution/municipality with the aim of deepening knowledge about the level of digital readiness for each pillar of digital transformation.

In order to create a quality roadmap for digital transformation it is crucial to analyse the collected strategic and other important documentation, such as relevant strategies, action plans, laws, decisions, regulations, annual budgets, DOPs, instructions, guidelines and similar. After completing a careful and detailed analysis of all the above-mentioned documents and gaining insights into the existing equipment and systems and after conducting interviews and creating an assessment of the digital readiness of a particular institution the development of a roadmap for the digital transformation of the corresponding institution is initiated. This document will serve the management of that institution during the further creation of strategic and action documents as well

as when projecting other financial documents such as annual budgets and the three-year budget document (DOP).

Activities in this phase:

1. *Identification of documents and data as well as relevant laws and bylaws for public institutions in BiH and those relevant to the institution being assessed.*
2. *Review of the identified documents from the previous step and conclusions drawn about the institutional framework for digital transformation of the institution.*
3. *Identification of internal documents and data relevant to the digital transformation of the institution.*

4. *Review of identified documents from the previous step and conclusions drawn about the digital readiness of the institution for each pillar of digital transformation.*
5. *Identification of those employees in the institution who will be invited to provide input for the DTPT questionnaire.*
6. *Interviews and working meetings conducted with employees of the institution using the DTPT questionnaire, with the aim of answering all of the questions it contains.*
7. *After summarising the client's responses collected during the interviews, proceed to filling out the DTPT excel questionnaire.*
8. *Produce diagrams and analyse the results based on the analysis located in a separate sheet of the DTPT questionnaire.*

2. PLANNING: Development of the roadmap for digital transformation of an institution/local government

The results of the analysis of digital readiness are used as a diagnostic tool that serves as a basis for developing recommendations for specific future actions aimed at improving the digital readiness of an. In other words, the conclusions drawn about the state of digital readiness of the institution serve as a presumption for defining priority projects and activities whose implementation should increase the institution's level of maturity on the path to digital transformation and consequently increase user satisfaction with the institution's services.

Each question in the DTPT questionnaire also represents a potential basis for creating priorities or measures to improve digital readiness. The digital transformation roadmap should be the fundamental document for the institution's planning in the field of digitisation, especially in the process of developing a three-year work plan, budget planning and action plan development.

The digital transformation roadmap for any institution represents a list of measures and projects arranged according to priorities in terms of their implementation and for which it is necessary to assess the digital readiness of a specific institution in an integrated and systematic manner.

Digital transformation of an institution involves a process of consideration of the introduction of digital technologies into the operations of the institution up to their complete implementation and integration. It also involves staff, because it is not enough to just introduce digital technology. It is essential to train employees as well. Therefore,

projects from the Digital Transformation Roadmap can also relate to areas such as digital marketing, digitalisation and automation of business processes, digital procurement, digitisation of the commercial sector, big data, artificial intelligence (AI), cloud solutions, smart solutions (smart city) and more.

The preparation of a roadmap for the digital transformation of a specific institution requires continuous dedication to the specificities of that institution as well as the relevant level of government, its associated e-services and relevant regulations. Special emphasis is given to regulations that serve as the legal basis for maintaining electronic registers, their interoperability with other levels of government (G2G), businesses (G2B), employees (G2E and providing the highest possible level of e-services to citizens (G2C).

To achieve the principle of 'digital by default' the digital transformation must encompass the entire service delivery chain, including the introduction of user centred service design so that citizens have digital services that they will gladly use (G2C), providing such services to the economy (G2B) and establishing complete digital data exchange with other institutions/agencies (G2G). In addition, it is necessary to apply widely available mobile technologies by transforming business processes with consistent implementation and the use of common digital services throughout the public administration as well as renewing and upgrading the ICT infrastructure and developing new models of leadership and management.

The roadmap document for digital transformation must contain strategic actions to support the digital transformation agenda. This document actually arises from the previous Digital Readiness Assessment (DTPT) of a specific institution, which is adapted to assess the digital performance of institutions at different administrative levels in BiH. During the preparation of the DTPT assessment and the roadmap for digital transformation, it is necessary to take into account the specificities of the institution and its associated level of government. Accordingly, a series of meetings are held with key decision makers in the relevant institution as well as expert IT personnel most qualified to be involved in these activities.

The activities in this phase:

1. *Developing a roadmap for the digital transformation of the institution, using the proposed structure of the roadmap as a template (**Please Note:** Section 5.1 provides brief instruction for completing the roadmap).*
2. *Validating the roadmap through a working meeting with relevant employees of the institution.*

3. IMPLEMENTATION: institutionalisation and implementation of identified priorities and measures

All projects and activities on the path of digital transformation should be aligned with the wider legislative and institutional framework in which the institution/local government operates. The Digital Transformation Roadmap document of a particular institution should be an intermediate document that will be further elaborated into actionable projects in the planning phase by relevant staff of the institution. This document can also serve as a good starting point for the development of a separate sectoral strategy, namely the Digital Transformation Strategy of the corresponding institution for a six-year period. If the institution/local government decides not to develop a separate sectoral strategy then the Digital Transformation Roadmap document can be used to revise an existing framework development strategy of the institution. Whatever option the institution/local government decides on it will still be necessary to urgently start development of an action plan for implementation of the digital transformation of the institution. The document of the Digital Transformation Roadmap can be best utilised when creating an action plan document, because it contains the analysed and summarised current state and description of specific projects together with deadlines for implementation, responsible persons and expected results as well as clear indicators contained in annex to the document.

Parallel to the development of the appropriate strategy and the corresponding action plan, the institution/local government must also start to revise financial documents, such as the annual budget and the three-year budget framework paper (BFP). These financial documents need to be adjusted to the project as soon as possible with clear and achievable amounts for the digital transformation projects and activities that the institution/local government decides to finance through its own budget. It is also very important to consider the cost of maintaining and updating the implemented projects in financial terms in order to ensure their sustainability. When it comes to those projects and activities that the institution/local government will not be able to include in its own budget, it is necessary to form a project team as soon as possible. The team, together with a relevant consultant, will prepare project proposals/feasibility studies for various international organisations, embassies and institutions in relation to the approval of funds, programmes such as the IPA programme of the European Union and similar grants and loans.

A project team must be appointed by the leader of the institution for each of the mentioned projects, led by a project coordinator who will oversee the project's implementation and regularly report to the institution's leader. This is one of the mechanisms through which the institution/LG would conduct monitoring and evaluation of project activities, with defined teams responsible for the further development and maintenance of implemented systems.

The activities in this phase:

1. *Using the roadmap for digital transformation created in the previous phase, initiate the process of developing a digital transformation strategy and action plans for the institution. Take into account the broader legislative and institutional framework in which the institution/LG operates.*
2. *Implementation of the roadmap, namely the action plans.*
3. *Evaluation and assessment of implemented projects and continuous improvement.*

The next section provides a proposed vision and the principles for digital transformation.

5.1. INSTRUCTIONS FOR COMPLETING THE DIGITAL TRANSFORMATION ROADMAP

The Digital Transformation Roadmap for public administration institutions or local self-government units consists of eight basic parts:

1. Introduction and purpose of the Digital Transformation Roadmap
2. Executive summary
3. Methodology and scope of the Digital Transformation Roadmap
4. Situational analysis - analytical overview and findings of the digital readiness assessment
5. Vision of digital transformation, key principles and horizontal and vertical alignment with broader strategic priorities
6. Main priorities
7. Institutional governance of the implementation, monitoring, evaluation and financing of the Digital Transformation Roadmap
8. Action plan

The following sections briefly explain the parts of the Digital Transformation Roadmap (the Proposal for the Structure of the Digital Transformation Roadmap also includes examples where appropriate).

1. Introduction and purpose of the Digital Transformation Roadmap
In this section a brief introduction to the process of creating the Digital Transformation Roadmap for a public administration institution or a local government unit should be provided, emphasising the basic purpose of the roadmap.

2. Executive Summary
This section provides a brief overview of the entire project, highlighting the methodology used, the adopted principles of digital transformation and briefly describes the chapters of the Digital Transformation Roadmap.

3. Methodology and scope of the Digital Transformation Roadmap
The methodology used and the steps of the digital readiness assessment of the institution or local government unit should be presented in this section. In other words, it is necessary to explain the three aforementioned steps as well as the DTPT methodology itself. **The proposal for the structure of the Digital Transformation Roadmap provides an example/suggestion for the text for this section.**

4. Situational analysis - analytical overview and findings of the digital readiness assessment

In this section the results of the assessment of the digital readiness of the public administration institution or local self-government unit are presented. It contains the recommendation that they be presented following the structure below.

- **Digital readiness of the institution/LG** - Present graphs from the 'analysis sheet' along with a brief discussion of the results. An example/proposed text for this section is given in the Proposal for the Structure of the Digital Transformation Roadmap.
- **Management** - Narratively summarise the main conclusions in this area on the digital readiness of the institution/LG.
- **User oriented design** - Narratively summarise the main conclusions in this area on the digital readiness of the institution/LG.
- **Public administration reform** - Narratively summarise the main conclusions in this area on the digital readiness of the institution/LG.
- **Organisational culture and employee skills** - Narratively summarise the main conclusions in this area on the digital readiness of the institution/LG.
- **Technological infrastructure** - Narratively summarise the main conclusions in this area on the digital readiness of the institution/LG.
- **Data infrastructure, strategy, and management** - Narratively summarise the main conclusions in this area on the digital readiness of the institution/LG.
- **Cybersecurity, privacy, and resilience** - Narratively summarise the main conclusions in this area on the digital readiness of the institution/LG.
- **Legal basis** - Narratively summarise the main conclusions in this area on the digital readiness of the institution/LG.
- **Innovation ecosystem** - Narratively summarise the main conclusions in this area on the digital readiness of the institution/LG.

5. Digital transformation vision, key principles and horizontal and vertical alignment with broader strategic priorities
The vision of digital transformation should clearly describe the goal of digital transformation as well as the direction of the changes and inspire actions in line with the desired goal. In this sense, section 5 of this document provides a proposed vision as well as principles of digital transformation for the institution/local government unit (LG). In addition to the text provided, it is necessary to consider the broader legislative and institutional framework in which the institution/LG operates. This applies

in particular to laws and regulations that address the issue of digital transformation and key strategic documents that are important for the implementation of digital transformation in the institution/LG in line with the recommendations from the DTPT. The proposed structure of the Digital Transformation Roadmap provides an example/proposed text for this section.

6. Main priorities

This section outlines the main priorities for all nine areas of the DTPT and provides a brief description of each area (refer to the table provided in the Proposal for the Structure of the Digital Transformation Roadmap - one table for each area/priority). This chapter should be structured into subheadings corresponding to each area, each subheading should contain the relevant table.

- **Priority:** Priorities should be clearly formulated, achievable within the timeframe of the strategic documents, mutually aligned, measurable using objective indicators and socially and environmentally acceptable. The main priorities of the Roadmap will be the nine areas used in the DTPT analysis. A brief description of each area should be provided along with a reference to where they are located in the existing strategic documents of the institution/LG (development strategy and three-year plans), if applicable. The Manual and the DTPT questionnaire provide a proposed priority list based on the observed areas (Chapter 5).
- **Measures:** Measures provide a more detailed elaboration of priorities. Measures should be clearly formulated, achievable within the timeframe of the strategic documents, mutually aligned and measurable using objective indicators. Each measure is marked with a hierarchically lower number of the relevant priority. Measures must at least contain a connection to the priority, the name of the measure, a description of the measure with approximate areas of activity, indicators for monitoring the results of the measure, the developmental effect and contribution of the measure towards achieving the priority, an indicative financial construction with sources of financing, the implementation period for the measure and the institution responsible for coordinating and implementing the measure. Measures are the priority recommendations provided in the DTPT questionnaire. Each one should be linked to one of the nine areas and briefly elaborated upon. Some measures may be internal and applicable only at the

institutional level - this should be highlighted separately. For others, if possible, provide a reference link to the existing strategic documents.
- **ndicative strategic projects:** Strategic projects contain a brief description, the expected effects and an indicative financial framework. This is equivalent to recommendations/projects from the DTPT questionnaire.

Please Note: The Proposal for the Structure of the Digital Transformation Roadmap provides an example/proposed text for this section.

7. Institutional management of implementation, monitoring, evaluation and financing of the Roadmap for Digital Transformation

Here, it is necessary to elaborate on the role of the institution/LG in the process of strategic/triennial planning and list the existing documents in this segment. It is essential to explain how the specific roadmap will be incorporated into strategic planning, budget, etc. It is necessary to make a distinction again between the roadmap, which is a product of the DTPT analysis and represents an intermediate document, and the need for a detailed elaboration into implementable projects in the planning phase when all proposed measures are considered and aligned from the perspective of BFP/Budget/PIP, which define the financial framework for action in the next 1+2 years.

8. Action plan

Here is the three-year action plan for the digital transformation of the institution/municipality. It should be emphasised that this is a set of proposed priority measures based on the DTPT questionnaire, with the note that these measures and projects need to be aligned with the three-year planning process and key strategic documents of Bosnia and Herzegovina, the Federation of Bosnia and Herzegovina, Republika Srpska and the key strategic documents of the institution/municipality. These tables provide a detailed breakdown of the tables listed in the main priorities. It is important to note the following sequence and adhere to the numbering of priorities, measures and activities:

1. Priority - 1.1. / Measure - 1.1.1. / Activity/project. Priorities relate to nine areas (a total of nine priorities), while each priority may have multiple measures and each measure can have multiple activities.

Please Note: The proposed structure of the Digital Transformation Roadmap provides an example/suggestion for this section of the text.

6 CONCLUSION

The expansion of digitalisation has imposed the need for conducting a Digital Transformation Readiness Assessment (DTPT) of public administration institutions/LG using a standardised tool for systemic assessment and strategic planning of activities, with the final result being the corresponding Digital Transformation Roadmap.

The implementation of digital transformation of institutions/LG in Bosnia and Herzegovina (BiH) is imperative because of its undeniable benefits in terms of providing better services, more efficient operations, significant savings, greater transparency and user satisfaction, which consequently contributes to stronger citizen participation in public life. As the digital transformation of each institution is a complex and demanding task that needs to be undertaken in an integrated and systemic manner, the Digital Transformation Roadmap of a particular institution stems from the previous assessment of the institution's digital readiness based on a comprehensive questionnaire organised around different key dimensions or pillars that represent the foundations of digital governance.

The Digital Transformation Roadmap of a particular institution in BiH as well as the corresponding Digital Transformation Readiness Assessment (DTPT) are based on standardised UNDP guidelines and a tool adapted for assessing the digital performance of institutions at different levels of government and local government units. The DTPT assessment is therefore the basis for the development of the Digital Transformation Roadmap, which further serves as an intermediate document that can be a good basis for the development of subsequent strategic, action and financial documents, such as annual budgets and BFP of any institution in BiH, namely an intermediate document that contains strategic actions to support the digital transformation agenda of any institution in BiH.

The priority of action from the Digital Transformation Roadmap belongs to projects and activities in the section with the lowest results in the corresponding DTPT assessment. Analogously, projects and activities from the highest rated section have the lowest priority during implementation of the Digital Transformation Roadmap projects of a particular institution in BiH.

REFERENCES

World Bank. (2019). Digital Government Readiness Assessment Questionnaire, January 2019, Washington, DC.

World Bank. (2020). Digital Government Readiness Assessment Toolkit: Guidelines for Task Teams, Washington, DC.