	dashboard	radios on APs
Additional Hardware	None	Asset tags
Data Exportability to other BI tools	CSV & Templates for PowerBI and Tableau	CSV & Asset tracking APIs
Est. Availability	July / August	July (beta)

Source: author's development

Aruba is a solution for tracking employee contacts in the office using Meridian BLE (Bluetooth Low Energy) technology is as follows: Employees receive BLE tags → Aruba access points "communicate" with employee tags → Meridian cloud application determines the location of tags → Data is transmitted for processing and visualizations in the external application → Personnel receives a message about a sick employee → Personnel determines the number of the employee's tag and searches for contact information in the external application → Tracking contacts (searching for contacts of all employees with infected colleagues) → Tracking locations (determining the average time spent by the sick employee in different areas of the office). Key features of Aruba are that:

1. Uses BLE (Bluetooth Low Energy) technology;
2. Modern points of Aruba WiFi 300 & 500 series provide the necessary coverage;
3. The solution is scaled to 1,000 labels;
4. Battery life 3-4 years;
5. Exact indication of the location on the map, not the approximate area.

BLE is:

1) Bluetooth Low Energy – one of the two Bluetooth standards, often called Bluetooth Smart;
2) Used for wireless transmission of information over short distances. Depending on the type of BLE lighthouse from 25 to 300 m;
3) Uses the 2.4GHz band. To reduce the level of energy consumption and increase the efficiency of information transmission, the entire frequency range is divided into 40 channels, divided between it by 2MHz;
4) Available on all smartphones and tablets released since 2012;
5) There are two BLE standards: iBeacon (Apple), Eddystone (Google);
6) Battery life: from 3-4 days (printed beacons) to 8 years;
7) The cost of a lighthouse is from 2 to 40 dollars.

BLE beacon includes the case (there are cases for external use), the processor on the basis of ARM, Bluetooth Smart module, the antenna which is connected to the processor, the power supply battery. Aruba Meridian allows you to get a map of the room, find the necessary objects/goods, route from the current location, API for integration with other applications. Aruba Meridian:

- The first task is to create your access token;
- To generate your access token, from the Meridian Editor web console, in the left-hand navigation pane, click Beacons, and then click Generate your access token to get started;
- The values you'll need are shown in the Controller Configuration section.

SMEs need tailored policies to support innovation in terms of the formation of Industry 4.0 and Main policy choices for innovation tools of the ecosystem of Industry 4.0 are presented by us in Table 5 and Figure 3.

Table 5. SMEs need tailored policies to support innovation in terms of the formation of Industry 4.0

	Financing	*Other*
Non-innovative SMEs		Build basic capabilities and provide incentives to innovate
Innovative SMEs	Project-based Financial support Loan guarantee	Develop innovation networks
NTBFs	Equity financing (venture capital, business angels) Seed capital Tax neutrality	Incubators, science & techno parks
Science-based Spin-offs		Conducive regulation in public research organization

Source: author's development

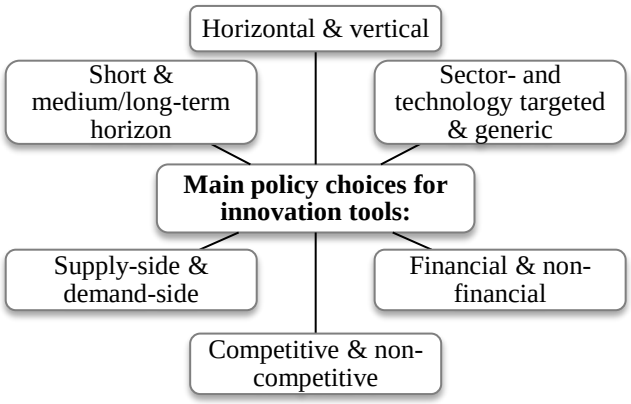

Fig. 3. Main policy choices for innovation tools of the ecosystem of Industry 4.0

Source: author's development

We believe in "angel capital", which in the seventh world is a decisive force in the range from 0 to 100 thousand euros and is able to make a significant contribution to the development of

startup industry. For example, the United Kingdom has significantly increased the efficiency of investment, creating benefits for "angels" 7 years ago. The investor, in fact, gets a choice: either pay a few thousand taxes, or invest in a startup. This not only ensured the inflow of investment, but also allowed to involve a large number of people in innovation. As a result, everyone won – both business and the state [4, p. 21].

3.4 Industrial automation of Ukraine

The beginning of the real implementation of standards in Ukraine in the field of industrial automation began on September 1, 2019 by the order of UkrNDNC № 249. It was this order that put into effect national standards harmonized with European and international standards, the method of confirmation and validity in Table 6. We consider it necessary to note that on this issue of national standards in Ukraine in the field of industrial automation, their harmonization with European and international standards have not risen and this is only the first attempt.

Table 6. Implementation of national standards and their harmonization with European and international standards aimed at accelerating the digitalization of enterprises

DSTU EN 61508-1: 2019 (EN 61508-1: 2010, IDT; IEC 61508-1:2010, IDT)	Functional safety of electrical, electronic, programmable electronic systems related to safety. -//- Part 1. General requirements
DSTU EN 61508-2: 2019 (EN 61508-2: 2010, IDT; IEC 61508-2:2010, IDT)	-//- Part 2. Requirements for electrical, electronic, programmable electronic systems related to safety.
DSTU EN 61508-3: 2019 (EN 61508-3: 2010, IDT; IEC 61508-3:2010, IDT)	-//- Part 3. Software requirements
DSTU EN 61508-4: 2019 (EN 61508-4: 2010, IDT; IEC 61508-4:2010, IDT)	-//- Part 4. Definition and abbreviation
DSTU EN 61508-5: 2019 (EN 61508-5: 2010, IDT; IEC 61508-5:2010, IDT)	-//- Part 5. Examples of methods for determining security completeness levels
DSTU EN 61508-6: 2019 (EN 61508-6: 2010, IDT; IEC 61508-6:2010, IDT)	-//- Part 6. Guidelines for IPP 61508-2 and IEC 61508-3
DSTU EN 61508-7: 2019 (EN 61508-7: 2010, IDT; IEC 61508-7:2010, IDT)	-//- Part 7. Overview of methods and measures
DSTU EN 61512-1: 2019 (EN 61512-1: 1999, IDT; IEC 61512-1:1997, IDT)	Prescription production management. -//- Part 1. Models and terminology
DSTU EN 61512-2: 2019 (EN 61512-2: 2002, IDT; IEC 61512-2: 2001, IDT)	-//- Part 2. Data structure and how-to
DSTU EN 61512-3: 2019 (EN 61512-3: 2008, IDT; IEC 61512-1: 2008, IDT)	-//- Part 3. Models and presentations for general and local recipes
DSTU EN 61512-4: 2019 (EN 61512-4: 2010, IDT; IEC 61512-4: 2009, IDT)	-//- Part 4. Recipe production records
DSTU EN 62264-1: 2019 (EN 62264-1: 2013, IDT; IEC 66226-1: 2013, IDT)	Integration of enterprise and production management systems. -//- Part 1. Models and terminology
DSTU EN 62264-2: 2019 (EN 62264-2: 2013, IDT; IEC 66226-2: 2013, IDT)	-//- Part 2. Objects and attributes for integrating enterprise and production management systems
DSTU EN 62264-3: 2019 (EN 62264-3: 2017, IDT; IEC 66226-3: 2016, IDT)	-//- Part 3. Models of activity management of production operations
DSTU EN 62264-4: 2019 (EN 62264-4: 2016, IDT; IEC 66226-4: 2015, IDT)	-//- Part 4. Attributes of object models for integration of subsystems of production operations management
DSTU EN 62264-5: 2019 (EN 62264-5: 2016, IDT; IEC 66226-5: 2016, IDT)	-//- Part 5. Commercial and production transactions
DSTU EN IEC 62443-4-1: 2019 (EN IEC 62443-4-1: 2018, IDT; IEC 62443-4-1: 2018, IDT)	Safety of industrial automation and control systems. -//- Part 4-1. Requirements for the residential cycle of development of safe products.
DSTU ISO 22400-1: 2019 (ISO 224001-1: 2014, IDT)	Automated production control systems. KPIs for production process management. -//- Part 1. Overview, General Provisions and Terminology
DSTU ISO 22400-2: 2019 (ISO 224001-2: 2014, IDT)	-//- Part 2. Definition and description
DSTU ISO 22400-3: 2019 (ISO 224001-10: 2018,	-//- Part 10. Describe work operations for getting data

IDT)	

Source: author's development

In addition to legislative reform, a key factor is stability in both the political arena and the economy. As Ukraine currently ranks 76th in the ease of doing business index, there is still work to be done. Further simplification of the regulatory framework will lead to market liberalization and, thus, will contribute to the formation of a more attractive business climate for foreign investors.

In addition, a stable and predictable tax regime and customs clearance process will also contribute to investment attractiveness, and a number of positive changes are already being taken into account (for example, replacement of corporate income tax and income tax of non-residents with a source of origin from Ukraine (income repatriation tax in Ukraine) by income distribution tax to limit the outflow of funds from Ukraine and encourage reinvestment of profits again in the company their development) [4, p. 25].

However, again, it is necessary to explain the perception of the reality of investing in Ukraine in world economic space. Some investors believe that the risks of doing business are unacceptably high in Ukraine, often based on a limited understanding of risks and/or a willingness to consider ways to transform companies and stimulate economic growth. Responsible promotion of Ukraine as an attractive area for investment is a collective commitment of business community [4, p. 25].

The reason for this was the turbulent economic and political situation that Ukraine has faced recently, which has undoubtedly affected the opportunities of domestic investors and "the appetite" of foreign investors in the market of mergers and acquisitions. In modern conditions, when the idea of national consciousness is raised to a high level, and patriotic citizens are becoming more and more, it seems necessary to use the method of color coding of visual information, for example, using the colors of national flag. Such an institutional method of identifying a national producer, firstly, will be associated with the expression of the status of product, secondly, will satisfy the patriotic feelings of citizens and, thirdly, increase funding for agricultural production in Ukraine.

As part of the publication problem, it is impossible not to mention the current and much-needed for the rapid formation of Industry 4.0 bill #7206 "Buy Ukrainian, pay Ukrainians!", Which provides a number of advantages, including: the ability to improve the model of public procurement Ukraine, overcoming unemployment, emigration, raising incomes. Main innovation of the bill is the introduction of mandatory consideration of the criterion of local component with a weight of at least 20% in the structure of the reduced price for specialized items of procurement. Local component is calculated through the level of resource localization of production of the subject of procurement according to a transparent formula established by law, according to the methodology to be approved by the government. Idea #7206 is very simple – you pay salaries to Ukrainians, use Ukrainian raw materials, materials, components, energy, finances – get a "bonus" weighing up to 20% in the structure of given price. The more "Ukrainian" products in terms of their "resource content", the greater the advantage it will have for the state as a buyer.

In addition, today in the world there is fierce competition for the right to be the location of high-tech companies. In order for Ukraine to survive in a global environment, the government needs to develop strong investment incentives for the development of non-commodity businesses, in order to create a need for innovative professionals with digital competencies.

Only on this basis it is clear that in the future Ukraine may become a more significant player in the global investment landscape [19, p. 25]. The focus of innovation policy in terms of the formation of Industry 4.0 should depend on the stage of the country's development is shown in Figure 4.

STAGE 1	**STAGE 2**	**STAGE 3**
Building management and organizational capabilities; Start collaborative projects; Need to develop STEM skills and engineering; Need for basic infrastructure – NQI and incubation; Elimination of barriers to physical, human and knowledge capital	Building technological capabilities; Incentivize R&D projects; Link industry academia; Improving quality of research, innovation and export infrastructure	Long-term R&D and technological programs; Minimize innovation gap between leaders and laggards; Collaborative innovation projects

Fig. 4. The focus of innovation policy in terms of the formation of Industry 4.0 that depends on the stages of development of the country (should depend on the stage of the country's development)

Source: author's development

The socio-economic effects of the development of Industry 4.0 in the conditions of virtual reality should include: the growing rate of expansion of cluster network space; wide introduction of advanced IT technologies in business processes of enterprises that transform the basic features of economic processes and expand communication opportunities, gradually advancing the world community to new digital era; global transformations or shifts, which are accompanied by the emergence of innovative business models, disruptive impact on traditional business strategies and radical changes in production, consumption, marketing and marketing; formation of a hybrid environment in which new economic and social ecosystems are created, based on modern IT technologies, adapted to interaction through digitized financial and material resources and functionally aimed at creating added value [8, p. 99] and the search for reserves of economic growth. Useful examples of different countries regarding national strategies and their implementation in terms of economic growth are presented in Table 7.

Table 7. The OECD is working with countries on National Strategies and their implementation in terms of economic growth

1. Supporting the implementation of National Strategies:
Georgia
Financial literacy survey using the OECD Toolkit in 2016
National Strategy designed and launched in 2016
Preparing an Action Plan to outline concrete implementation steps, roles of responsibility
Creating a finding model for implementation
2. Evaluation of National Strategies:
Hong-Kong/Netherlands/Peru/UK
Evaluation approach to be integrated the NS, linked to indicators/feedback mechanisms
No one approach for all but clear lines of responsibility, multiple and transparent flows of data, incentives for accountability
Manageable governance structure and open feedback from implementing stakeholders
Communication strategy for evaluation results
Dedicated funding
3. Improving the financial literacy of youth and in schools:
Armenia/Kyrgyz Republic
Developing core competencies, based on the OECD CCs for youth
Agreeing on clear lines of responsibilities
Adapting, existing school curricula
Committing, resources to teacher-training
Developing content
Evaluating pilots

Source: generalized by author's

Direct economic effect of digitalization of key business processes in enterprises is difficult to assess, so it is advisable to focus on indirect economic effects, including indicators of the level of quality and productivity of their work in terms of different industries. Qualitative changes in the course of digital transformation in general should be assessed through indicators of business and community satisfaction with the implemented programs, which include: creation of digital infrastructure, support of domestic developers and manufacturers in IT field, regulatory mechanisms, training of competent personnel, digital specialists, development of e-medicine, IT systems in transport and e-logistics, energy efficiency, e-security, e-education and many other areas of life [8, p. 100].

Digitalization is precisely the element that can significantly positively affect the quality and efficiency of planning and management processes in the enterprise. The ultimate goal of the implementation of digitalization processes in economic activities of enterprises is to gradually increase the profitability of production and improve investment attractiveness in various sectors of the economy.

For example, in Ukraine there is no effective infrastructure and appropriate incentives for the emergence of powerful developers in industrial engineering. Their quality and quantity can dramatically affect industrial innovation, R&D, export marketing, etc. The activities of industrial engineering companies are aimed at finding and developing new industrial products, generating ideas, industrial design, prototyping, etc.. Finding a relevant strategy for this problem, stimulating the emergence and growth of this important segment, especially for sectors such as food and processing industry, metallurgical engineering, agriculture – will quickly create and develop industrial engineering industry and make it attractive for investment.

4 Conclusion

As a result, it should be noted that indeed the digitalization of business processes of enterprises opens new horizons and opportunities for the formation of added value in almost all sectors of the economy. In addition, in the post-pandemic period, digital technologies will become an integral part of the socio-economic life of Society 5.0 and identify key vectors for the development of government digital policy. Digitalization is becoming a driver

for the development of Industry 4.0, as it is able to increase the efficiency of the economy at all levels of aggregation, the formation of new quality and standard of living. The use of digital technologies lays the foundations for the process of modernization of traditional sectors of the economy and stimulates the emergence of new innovative industries that accelerate Ukraine's economic growth and bring to a new level of competitiveness in global economic system in virtual reality.

Thus, key decision should be to conduct large-scale but focused educational initiatives to integrate best ICT practices in industrial sectors with the involvement of relevant associations, vendors, international brands, etc. It is necessary to form focus groups of experts – knowledge carriers and promoters – and "fuse" them with industrial sectors. The result should be the creation of "industrial ICT reactors", ie joint competent groups – representatives of ICT and industry, focused on cooperation and development of new products and services. This approach will allow ICT to penetrate the industrial sector and affect the emergence of new developments, R&D, innovation.

Based on the results of our research, we came to the conclusion that the lack of state support for enterprises seeking to introduce digital technologies into production slows down the digitalization process in Ukraine; imperfection of the regulatory framework for digitization of industry and production in terms of the formation of Industry 4.0; lack of priority of digitalization in the strategy of state development; technological backwardness from the leading countries of the world, because in some sectors of the economy we have 3 and 4 technological systems. Considering the positive effect of digitalization for business, we can identify a number of opportunities: increase productivity; reducing the level of fraud, increasing the level of transparency and ease of operations; production automation; expanding sales channels through new opportunities that open up virtual reality.

References:

[1] Azzam M., Sami N., Khalil T. (2020). Egypt X.0? Moving behind Industry 4.0 towards Industry X.0 Towards the Digital World and Industry X.0, *Proceedings of the 29th International Conference of the International Association for Management of Technology, IAMOT 2020,* pp. 103–117, https://www.scopus.com/inward/record.uri?eid=2-s2.0-85092635745&partnerID=40&md5=b617deaa3f8f46ae4417254d1a784d50. (in English).

[2] Bao G., Zeng F. and Wang M. (2020). Study on Human Resource Allocation Efficiency Based on DEA Analysis. *International Journal of Circuits, Systems and Signal Processing, 14,* pp. 826-832. (in Ukrainian).

[3] Briukhovetska N.Yu. and Chernykh O.N. (2020). Industry 4.0 and digitalization of the economy: opportunities to use foreign experience in industrial enterprises of Ukraine, *Economics of Industry, 2(90),* pp. 116–132. (in Ukrainian).

[4] Business and Art Ambassadors of Ukraine (2018). *Special Edition Kyiv International Economic Forum "Destinations", 8.* (in English).

[5] Colotla I., Bland D., Knizek C. and Spindelndreier D. (2018). *Avoiding the Hidden Hazards of Industry 4.0.* Boston Consulting Group. (in English).

[6] Goloborodko O. (2018). Digital economy: trends and prospects for the avant-garde character of the development, *Effective economy,* 1, http://www.economy.nayka.com.ua/pdf/1_2018/8.pdf. (in Ukrainian).

[7] Heyets V., Voynarenko M., Dzhedzhula V., Yepifanova I. & Trocikowski T. (2021) Models and strategies for financing innovative energy saving activities, *IOP Conf. Series: Earth and Environmental Science*, 628, 012004, doi:10.1088/1755-1315/628/1/012004.

[8] Huley A.I. and Huley S.A. (2018). Socio-economic effects of Industry 4.0 development in the state, Ukrainian Journal of Applied Economics, Vol. 3, no. 4, pp. 96–105. (in Ukrainian).

[9] *Industry X.0 – the benefits of digital technology for manufacturing* (2020). June 12. https://www.accenture.com/ru-ru/about/events/industry-xo-book. (in Russian).

[10] *Innovation network Industry X* (2020). https://www.accenture.com/us-en/services/industry-x-0/innovation-network. (in Russian).

[11] Isaacson W. (2017). *Innovators: how a group of hackers, geniuses and geeks made the digital revolution.* Kyiv: Nash Format Publishing House. (in Ukrainian).

[12] Kraus N.M. and Kraus K.M. (2018). What changes does Industry 4.0 bring to the economy and manufacturing? *Formation of market relations in Ukraine,* 9(208), pp. 128–136. (in Ukrainian).

[13] Kraus N.M., Kraus K.M. and Andrusyak N.O.

(2020). Digital cubic space as a new economic augmented reality, *Science and innovation,* T. 16, 3, pp. 96–111. https://doi.org/10.15407/scin16.03.096. (in Ukrainian).

[14] Mamatova T.V., Chykarenko I.A., Moroz E.G., Yepifanova I.Y., Kudlaieva N.V. Management of enterprises and organizations under the conditions of sustainable development. International Journal of Management, 11(4), 2020, pp. 151–159

[15] Marcel-Mihai S. (2018). Industry X.0 – Digital Disruption and Smart Manufacturing IT&OT Transformation Journey. *Proceedings of the 12th IEEE International Symposium on Applied Computational Intelligence and Informatics (SACI) 17-19 May,* pp. 000105-000106, doi: 10.1109/SACI.2018.8441024 (in English).

[16] Milgram P. and Kishino A.F. (1994). Taxonomy of mixed reality visual displays, *IEICE Transactions on Information and Systems,* 12, pp. 1321–1329. (in English).

[17] Missikoff M. and De Panfilis S. (2012). *An Introduction to BIVEE.* http://wordpress.bivee.eu/resources/newsletter-may-2012/. (in English).

[18] Rania E.I., Amr E., Hoda M.H. (2020). Open Systems Science: Digital Transformation and Developing Business Model toward Smart Farms' Platform. *International Journal of Circuits, Systems and Signal Processing, 14,* pp. 1054-1073. (in English).

[19] Schaeffer E. (2017). *Industry X.0: Realizing Digital Value in Industrial Sectors.* Kogan Page. (in English).

[20] Shantarenkova M. (2017). *Notes on digital enterprise. Industry X.0 – "Itization" is endless!* Part 2, December 12. (in Ukrainian).

[21] Smit J., Kreutzer S., Moeller C., Carlberg M. (2016). *Industry 4.0. European Parliament.* Directorate General for Internal Policies Policy Department A: Economic and Scientific Policy. (in English).

[22] Smith J., Kreutzer S. Moeller C. and Carlberg M. (2016). *Industry 4.0: Study for the ITRE Committee.* Policy Department A: Economic and Scientific Policy, Europian Parlament, EU. (in English).

[23] Trstenjak M. and Cosic P. (2017). Process Planning in Industry 4.0 Environment, *Procedia Manufacturing,* Vol. 11, pp. 1744–1750. (in English).

[24] Tupa J., Simota J. and Steine F. (2017). Aspects of Risk Management Implementation for Industry 4.0, *Procedia Manufacturing,* Vol. 11, pp. 1223–1230. (in English).

[25] Voynarenko M, Dzhedzhula V., Hurochkina V., Yepifanova I., Menchynska O. (2021). Modeling of the process of personnel motivation for innovation activity *WSEAS Transactions on Business and Economics,* 18, 424-433.

[26] Voynarenko M, Dzhedzhula V., Yepifanova I. Modeling of the process of personnel motivation for innovation activity *WSEAS Transactions on Business and Economics,* 17, 2020, pp. 467-477

[27] Vyshnevskyi V.P., Viietska O.V., Garkushenko O.M., Knyazev S.I., Liakh O.V., Chekina V.D., Cherevatsky D.Yu. (2018). *Smart-industry in the era of digital economy: prospects, directions and mechanisms of development:* monograph. NAS of Ukraine, Inst. Of Industrial Economics. (in Ukrainian).

[28] *What is Azure?* (2020). https://azure.microsoft.com/ru-ru/overview/what-is-azure/. (in Russian).

[29] Bolfa Traian Eugen, Studies Regarding Tourism Development Perspectives in the Existing Economical and Environmental Context, WSEAS Transactions on Environment and Development, pp. 197-203, Volume 15, 2019.

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Nataliia Kraus, assessment of digitalization of business processes, selection of literature and its analysis.

Oleksandr Manzhura, generalization of features of industrial automation in Ukraine.

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