Readiness of Latvia's Organizations for Advanced Analytics

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Abstract. **The advanced analytics is one of the core tools to provide competitive advantage, sustainable development and foster productivity of the organization. Digital transformation and advanced analytics are two key trends in the emerging age of data, analytics, and automation. Digital transformation is the process of transforming how businesses operate when faced with digital disruption. Advanced analytics is the application of predictive and prescriptive models to analyse large, complex datasets in order to make critical business decisions. The focus of the paper is to assess the maturity level of advanced analytics in the organizations of Latvia by region, size and industry. Assessment was done by several domains like Organization, People, Data, Analytics, Technologies. The quantitative online survey was performed to assess the readiness of Latvia's organizations for advanced analytics. The questionnaire was developed based on an academic literature review, reports and publications by researchers, analytical sector, industry experts and Author's professionals experience in advanced analytics industry. The overall readiness level of Latvia's organizations is 2.4 in 5 points scale. It differs by region, size of the organization and industry. Most of organizations do not have Analytics strategy, majority use spreadsheets based analytical tools, half of organizations use mostly only internal data, more than third part of organizations do not have any analytical resources. It leads to conclusion that majority of Latvia's organizations are far from ability to improve productivity, be able to maximize the potential of the digital environment, to exploit data to make data-driven and automated decisions and are far from 21st century digital opportunities. Thus, puts under danger the sustainability of the organizations itself.**

Keywords: advanced analytics, analytics maturity, analytics maturity assessment.

I. INTRODUCTION

There is no one size fits all answer to the question of how ready an organization is for advanced analytics. It is largely dependent on the specific needs, resources, and capabilities of the organization in question. The advanced analytics is one of the core tools to provide competitive advantage, sustainable development and foster productivity of the organization [1].

In general, organizations need to have a solid understanding of the data they have and what questions they need to answer. They should have an access to skilled and experienced data scientists who can use advanced analytical techniques to create models and insights from their data. Additional resources may include sufficient computing power, storage, software and tools for data mining and analytics, as well as support for implementation and integration of the results.

Organizations also need the right culture and attitude towards analytics. Successful analytics initiatives usually require buy-in from the organization's leadership, which is needed to commit the necessary resources and prioritize analytics within the organization. Additionally, staff should be trained in the use of the necessary technologies and have the opportunity to experiment and explore their data to come up with meaningful insights.

Finally, organizations should have a clear vision of how advanced analytics can benefit the organization. A clear business case for the use of advanced analytics can help formally prioritize this effort and direct the investment of resources towards the most impactful areas of the business.

Europe Union cohesion policy has set a menu of 5 policy objectives supporting growth for the period 2021-2027 where the number one is "a more competitive and smarter Europe". The majority of funds will be provided

for innovative and smart economic changes - research and skills development, support for entrepreneurship, digitization and digital connections [2].

Digital transformation and advanced analytics are two key trends in the emerging age of data, analytics, and automation. Digital transformation is the process of transforming how businesses operate when faced with digital disruption. Companies generally use digital transformation to either revolutionize entire industries or help them become more efficient and effective in their operations. Advanced analytics is the application of predictive and prescriptive models to analyse large, complex datasets in order to make critical business decisions. It includes the use of machine learning, deep learning, artificial intelligence, and other cutting-edge analytics technologies. By leveraging advanced analytics, companies can gain insight into customers, markets, processes and products, and use this data to make better decisions. This helps them to automate strategies that can improve performance and realize goals faster, more efficiently, and with greater accuracy.

Assessment of the advanced analytics ecosystem and realistic understanding of readiness level to use advanced analytics in daily decision is crucial for further development, competitions in the market and to reach the strategic goals of the organization. It is a base to allocate or attract investments for the future steps to adopt advanced analytics to make digitization process productive [3]. Analytics ecosystem can be described like the systematic computational analysis of data or statistics in a complex network or interconnected systems. [4]-[5]. In other words, the interconnected network of tools, technologies, and processes used to collect, store, process, analyse, and visualize data within an organization. It includes various components such as data sources, data warehousing and storage, data processing and analytics tools, data visualization and reporting tools, and various other supporting technologies and processes. The analytics ecosystem allows organizations to collect data from various sources, process it, and turn it into actionable insights that can be used to drive business decisions. The ecosystem can be composed of both proprietary and open-source technologies, and it can be customized to meet the unique needs of each organization. The primary goal of an analytics ecosystem is to enable organizations to make data-driven decisions based on insights derived from their data. By leveraging analytics tools and techniques, organizations can gain a deeper understanding of their business operations, customers, and market trends, and use this information to optimize their performance and drive growth.

The competition between organizations is very high and to ensure faster and smarter decision-making, organizations are forced to use advanced analytics to analyse the past, understand the present behaviour and predict and influence the future events, actions, decisions and behaviour. By implementing advanced analytics into operations, organizations significantly increase a control over daily decisions that ensures a higher potential to meet their business goals [6] – [7].

Considering the increasing demand for advanced analytics including automated decision making based on data or process automation the significance to understand the advanced analytics ecosystem maturity level in any country, industry or organization is topical. The analytics maturity assessment or detection of the analytics development level by several factors which are crucial to ensure proper analytics performance helps to identify strengths and weaknesses of the organization's analytics ecosystem and can provide detailed action plan step by step to move existing analytics ecosystem to the next level or level what is relevant to the organization to meet its strategic goals.

The paper aims to disclose the findings from the survey performed in the beginning of 2022 in Latvia where advanced analytics ecosystem were assessed to detect overall readiness level for the advanced analytics in the organizations in Latvia.

II. MATERIALS AND METHODS

Author performed the survey to assess the readiness of Latvia's organizations for advanced analytics. The questionnaire was developed based on an academic literature review, reports and publications by researchers, analytical sector, industry experts and Author's professionals experience in advanced analytics industry.

A. Global researches

Global researches and surveys about advanced analytics include Europe, but not all countries. Usually UK, France and Germany are represented. There are global level researches such a Network readiness index which is published annually by the World Economic Forum in collaboration with INSEAD, as part of their annual Global Information Technology Report [8]. This Index target to measure the degree of readiness of countries to exploit opportunities offered by information and communications technology, however it does not give understanding about advanced analytics development in specific country. General correlation is as higher index for the specific country as higher probability to have more advanced analytics ecosystem maturity.

There are very rare reports, surveys, researches which could be connected directly to the maturity of analytics, or advanced analytics and usage of advanced analytics about the Baltic States or Latvia. Several studies have addressed related and more global areas under the Smart Specialization Strategy of Latvia (2015) and following monitoring (2014-2020), but this only gives an idea whether there is a potential for analytics to be mature enough to adopt advanced analytics [9]. The report of the Smart Specialization Strategy about Information and Communication Technologies shows a medium-high science excellence level in Latvia that can increase the interest to explore exactly what is the advanced analytics level in Latvia. The latest Smart Specialization Strategy of Latvia for 2021-2027 gives some insight about analytics ecosystem and potential support for organizations to develop it [10].

B. Quantitative Survey Design

The primary source has been used to support and provide answers on the research question. The paper draws on quantitative research method. The questionnaire was developed by the author and can be divided into 6 blocks of questions: the default question block with an introduction about the topic of the survey and a metadata browser, the demography block (13 questions), the maturity assessment block (27 questions), the challenges block (4 questions), the solutions block (1 question), and the block about the impact on business (4 questions).

The Author's experience and following sources were used as generators of ideas and the following previous researches were used to design the questionnaire: Rexer analytics survey, McKinsey survey, McKinsey Global Institute research, Global Technology Adoption Survey by Dell, IBM Institute for Business Value research and MIT Sloan research. The most deeply explored and the most of ideas taken from 4 models: Analytics Maturity Quotient Framework (AMQ) [11], DELTA Plus Model [12], Defining analytics maturity indicators (DAMI) [13] and TDWI Analytics maturity model [14]. The questionnaire contains only a few questions that were directly adopted from the previous researches for this survey. Most of the questions and statements are newly created bearing background and ideas from the sources mentioned above.

To ensure an assessment of analytical maturity, 5 domains (Organization, People, Data, Analytics, Technologies.) and 13 factors (Strategy, Process, Human, Sponsorship, Culture, Process, Techniques, Usage, Governance, Quality, Sources, 'Big data' initiatives, Infrastructure) were created basing on 51 statements. The statements were assessed by respondents using a 5-point Likert scale.

The Likert scale was used for the majority of questions to assess the Analytics maturity level. The 5-point scale was used, where 1 means "strongly disagree" and 5 – "strongly agree". The online survey platform Qualtrics was used to build and run the survey. The randomized response method was used with a list of many potential answers provided to ensure reliable results (not influenced by being on the top). The adaptable/ flexible screen solution was used to ensure more reliable answers. An anonymous link was used for distribution of the survey to ensure confidentiality and to be shareable to analytical community by any respondent.

The aim was to collect at least 383 responses to ensure survey result confidence level 95% and margin of error 5%. The Central Statistics Bureau data about number of organizations in Latvia was used to detect minimum required number of respondents to ensure desired confidence level [15].

The Europe Union documentation for the definition of micro, small and medium-sized enterprises was used to define the size of the organization for the purpose of the research [16]-[19].

C. Data Collection

Target group – economically active population taking the role of director, manager, decision maker, owner of the organization in Latvia. The data of this study were obtained using an online survey platform Qualtrics. Majority of respondents were attracted using online panel provider https://intraresearch.com – an invitation to participate in the survey sent. Additional channel was created to attract respondents on homepage http://www.raaconsulting.eu/ with help of Google Ads. For quantitative data processing MS Excel and R software were used. The survey was open from 2021, December 20 to 2022, March 31. At the end, 555 completed questionnaires were received and used for analysis.

The questionnaire form was used consisting of 49 questions. The average length of interview was 28 minutes. Language of survey – Latvian.

To ensure confidentiality regarding specific company (some questions could be interpreted as sensitive), no identification asked, only the business field.

III. Results and Discussion

A. Overall readiness of Latvia's Organizations for Advanced Analytics

The survey was completed by 59% female and 41% male. The aging structure provides answers in 63% of cases in the age group 30-50 and 26% in the age group 51-60 and the rest are over 60 or under the age of 30. 34% of respondents have Master's degree and 32% have a bachelor's degree. Chief executive officers, board members or owners were represented by 16%, directors and Heads of departments by 29% and 41% senior experts with decision making power, the rest of respondents were self-employed, farmers or specialists. All regions of Latvia were represented where Riga and surrounding took 64% and Vidzeme, Latgale, Zemgale, Kurzeme almost equally were covered. All size of organizations were represented almost equally – micro, small, medium and large. All industries based on NACE classification were represented.

A comprehensive block of questions was included in the survey to cover the overall level of advancement of analytics – is it closer to basic analytics or advanced analytics and where exactly it stands. The block includes questions and statements to assess the level of development in specific areas like data, governance, people, culture regarding analytics, tools and techniques used. A 5–point scale was used to find out the respondents' level of agreement/ disagreement with the statements.

The 5 levels were used to describe the readiness for advanced analytics. Beginner (level 1) - with weak analytical capability, only spreadsheet based and issues with data gathering and quality, missing or weak quality data, no support from management. Intermediate (level 2) - silos analytical activities, better data accessibility, autonomous activities, no coordination, no data owners. Specialist (level 3) - wide operational usage with some coordination between analytical community, existing data

warehouses/repositories/data lakes. Expert (level 4) - analytical company with high quality data, integrated analytics in the many processes and decision-making, analytics as competitive advantage. Visionary (level 5) - visionary advanced companies with analytics culture and mindset, testing/adopting cutting edge tools/ techniques/ solutions, highly competitive advantage.

The overall analytics maturity level in Latvia is between 2nd and 3rd stage reaching the 2.4. Fig.1 shows distribution by analytics maturity levels of organizations in Latvia.
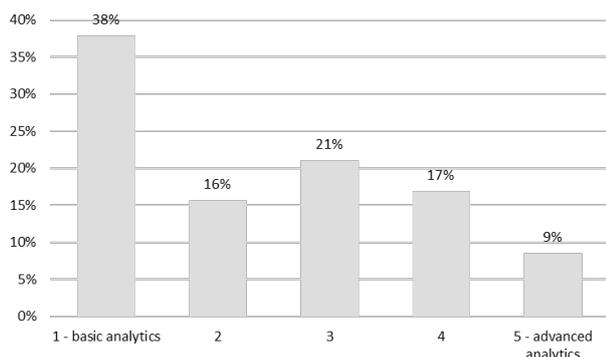
Fig. 1. Advancement level of analytics.

54% of organizations in Latvia are below the level 3rd level what could be translated - quiet weak analytical capability, mostly spreadsheet based, issues with data gathering and quality, no coordinated analytical process, no data owners, weak support from management. However, 26% of organizations could be identified to be in very solid readiness level for advanced analytics - high quality data, integrated analytics in the many processes and decision-making, existing data warehouses/repositories/data lakes, strong analytical culture and mindset, adopting new solutions and technologies, analytics used already as competitive advantage.

Most of organizations do not have Analytics strategy, majority use spreadsheets based analytical tools, half of organizations use mostly only internal data, more than third part of organizations do not have any analytical resources.

B. Readiness of Latvia's Organizations for Advanced Analytics by segments

The advancement level of analytics was explored by several segments – regions, organization's size and industry.

Regions

6 regions of Latvia were used for analysis – Riga, surrounding of Riga, Vidzeme, Latgale, Zemgale and Kurzeme according to Latvia's statistical regions and administrative units [20]. The lowest level of advancement of analytics is 2.0 in Kurzeme and Vidzeme, the highest level is in Latgale 2.7, while in Riga analytics advancement level is assessed by 2.6. Standard deviation in a range from 1.2 to 1.5.

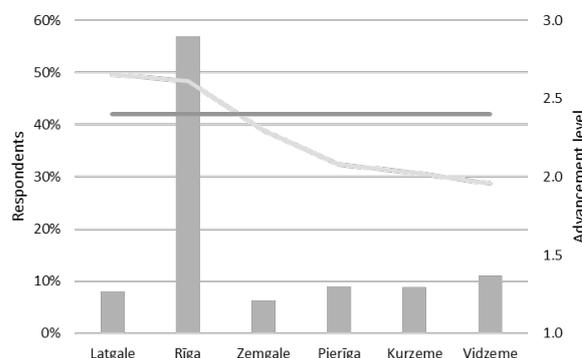Fig.2 shows distribution and analytics maturity level of organizations in Latvia.

Fig. 2. Advancement level of analytics by regions.

Size

4 segments used to differ organizations by size in Latvia – micro, small, medium and large. The lowest level of advancement of analytics is 1.7 in micro size organizations what means almost basic analytics, the highest level is in large organizations reaching 3.2 what means solid specialist-expert level ensured and are able to use benefits of advanced analytics, while small and medium demonstrates equal level 2.4 which is an average level of analytics maturity of organizations in Latvia. Standard deviation in a range from 1.0 to 1.3.

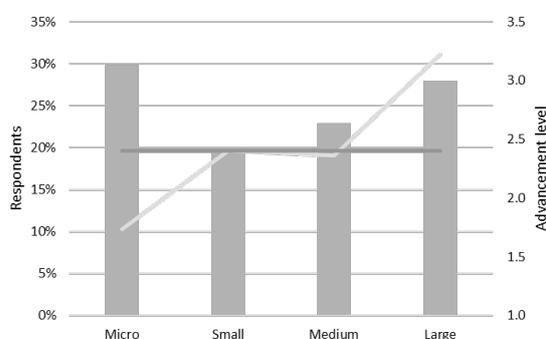Fig.3 shows distribution and analytics maturity level of organizations in Latvia.

Fig. 3. Advancement level of analytics by size.

Industry

12 segments used to differ organizations by industry in Latvia – based on NACE classification. The lowest level of advancement of analytics is 1.9 in Recreation and art industry, the highest level is in finance industry reaching 3.4. The Information Technologies and Government demonstrates higher than average advancement level of analytics with level of 2.7.

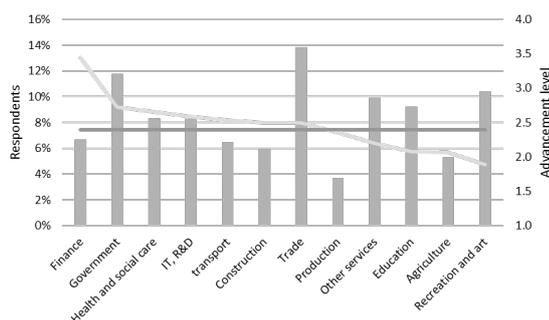Fig.4 shows distribution and analytics maturity level of organizations in Latvia.

Fig. 4. Advancement level of analytics by industry.

The split by industries demonstrates higher level of analytics in industries where historically operations were based on data and analytics, like Finance. At the same time the lowest level of readiness to adopt advanced analytics is for Education, Agriculture, Recreation and art sectors.

IV. CONCLUSIONS

Advanced analytics ecosystem becomes more and more crucial topic in any organization taking into account high digitization demand. Therefore, organization's analytics maturity assessment becomes critical to continue successful business. Thus, the quantitative survey was performed to detect the Readiness of Latvia's Organizations for Advanced Analytics. Such research is not performed in Latvia before.

Ability to assess the analytics maturity level could be attractive to any organization with a drive to use all or most appropriate for specific organization opportunities what is provided by technologies, data and digital solutions. Another reason is a rapid development of technologies, analytical platforms, increase of data volumes, data accessibility for wider audience what puts under the risk competitive advantage.

The survey was run in the beginning of the 2022. Taking into account very fast development of technologies, growing data volumes and more and more user-friendly analytical platforms, it would be required such survey to have annually to monitor readiness of Latvia's organizations for advanced analytics. Any organisation to survive in the digital century should be

The overall level of analytics in Latvia is 2.4 however large organizations, finance industry and partly Information Technologies shows very solid readiness level for advanced analytics even up to 3.4 where majority of required infrastructure and culture in the organization is in place. The one of the lowest level is in Education sector reaching only 2.1 what puts under danger Latvia to become low skilled or not appropriate skilled country for the digital century.

Most of organizations do not have Analytics strategy, majority use spreadsheets based analytical tools, half of organizations use mostly only internal data, more than third part of organizations do not have any analytical resources.

It leads to conclusion that majority of Latvia's organizations are far from ability to improve productivity, be able to maximize the potential of the digital environment, to exploit data to make data-driven and automated decisions and are far from 21st century digital opportunities. Thus, puts under danger the sustainability of the organizations itself.

The Baltic region and annual surveys should be conducted to build higher trust ability to this research and the outcomes.

It is possible to run such survey regularly, but what conclusions will be done and what actions will be taken afterwards is even more important topic. Such type survey can be used to develop country level politics, strategies for specific industries or segments. The challenge is to bring organizations who are below specialist level (3) at least to analytics maturity level 3 what allows adopt and implement many advanced analytics features or at least be well-prepared to make next steps to optimize usage of advanced analytics.

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