Comparative and Collaborative Data Management as a Driver for Regional Competitiveness Efficiency in the Economic Development Region

Andjar Prasetyo[1(✉)], Trisnani Trisnani[2], Heri Wahyudianto[3], Agustinus Hartopo[4], Joula Olvy Maya Sondakh[5], Juliana Carolina Kilmanun[6], and Ndoheba Kenda[7]

[1] Regional Development Planning Agency of Magelang City, Magelang, Indonesia
andjar.prasetyo1@gmail.com

[2,7] National Research and Innovation Agency, Jakarta, Indonesia

[3,4] Regional Development Planning Agency of Papua Province, Jayapura, Indonesia

[5] Research Center for Macroeconomics and Finance, National Research and Innovation Agency, Jakarta, Indonesia

[6] Research Center for Behavioral and Circular Economics, National Research and Innovation Agency, Jakarta, Indonesia

Abstract. The complexity of data quality management is revealed when people, processes and technology are involved in the process. The use of regional competitiveness data is a prerequisite for the analysis of economic development area boundaries in Central Java Province. This study aims to describe and analyse how regional competitiveness is managed based on six challenges that are considered to be closely related to data management. The research method refers to a qualitative approach that tends to describe the results of analyzing using study sites in Purwomanggung Development Area, Central Java Province. Secondary data is supported by stakeholders related to the study; primary data are presented with sources from tracking regional competitiveness needs. Collecting data took four months from July to October 2022. The analysis was presented by visualising regional competitiveness data in five regions within the boundaries of Purwomanggung Economic Development Area. The study results found regional competitiveness data management based on indices, aspects and pillars for five regions in Purwomanggung Economic Development Area. The differences in regional competitiveness data management were due to the management of policy and regulatory issues, governance issues, human and behaviour issues, process and quality issues, technological issues, and cultural and organizational issues. The implications of this research place policy challenges as a key strategic process in the management of regional competitiveness data.

Keywords: Comparative, Collaborative, Data Management, Regional Competitiveness, Efficiency.

1   Introduction

Data management [1]–[3] is one of the strategic scenarios in the development process, complexity is revealed when the data quality management process involves people, processes [4]–[9], and technology [10]. At times, poor-quality data can be tolerated

under certain conditions, for example, because there is so much data. After all, organizations [6] struggle to determine the quality of data, or because data is easy to copy, share, and manipulate in the name of need and time. In thirty-five urban districts in Central Java as a complex organization [11], [12] , it has become a natural thing to accept data quality problems, which are used for problem-solving, and integrate actions into business processes. It is common knowledge [13], [14]that data is an asset, but most organizations do not treat data the way they treat their other assets. The phenomenon that appears is marked by not knowing how much data they have or what the condition of the data is; create data for their direct purposes and do not consider the potential for wider use.

Many don't distinguish between data that might carry value and vice versa. An organization does not manage its data. In many organizations, the lack of understanding of their data is a huge blind spot, which is also a waste of resources. Data governance suites that affect various aspects based on data quality management are a way to overcome this blind spot. In essence, data quality management by using product quality management methodology interventions to data, aims to improve data quality and to maintain the level of data quality that needs to be submitted by an institution [15] and utilized for development, including data on regional competitiveness [16], [17] in the Central Java Province region. . The use of regional competitiveness data is an absolute requirement to be able to analyze the boundaries of economic development areas in Central Java Province.

Regional [18]–[20] competitiveness in Central Java Province is one of the development indicators used to map and measure the achievement of development activities in the region in utilizing potential by optimizing resources, ecosystems [21], [22], and regional potential to create high and sustainable competitiveness and prosperity; interpret the results of measuring regional competitiveness for the development of functions and roles of regency/city regions in the system of regional economic development and regional development; motivating stakeholders of development actors (all institutions, regions, the business world, and the community) in realizing the creation of added value for development, to increase regional and national self-sufficiency and competitiveness to achieve prosperity and sustainable development; and basis in the formulation, determination, evaluation and monitoring [4], [7], [23]–[25] of regional development policies, programs and activities (regency, city, province). One of the eight regional development scopes in Central Java Province is the Purwomanggung development area, this area topographically and demographically supports Central Java Province with Yogyakarta Province. The importance of the Purwomanggung region and the differences in the achievement of regional competitiveness scores in the districts/cities that are members of Purwomanggung are taken into consideration in this study as a locus of study.

However, data quality [26]–[29] in penetrating regional competitiveness is an important factor in showing good performance in development activities, optimizing resources, ecosystems, and regional potential, the more mature an organization's understanding of data management will shape the value of regional competitiveness the better, and vice versa. Despite the complexity of the index, four aspects, twelve pillars, twenty-three dimensions, and ninety-seven indicators, the data on regional competitiveness is structured in a tiered manner. The Regional Competitiveness Index is generated

from four aspects: innovation ecosystem, enabling environment, human capital, and market factors. The performance aspects are then derived from measurements of the twelve data pillars: business dynamism, innovation capacity, technological readiness, institutions, infrastructure, regional economy, health, education and skills, product market efficiency, employment, and access to finance. These include regulatory, entrepreneurial, interaction and diversity, R&D, commercialization, telematics, governance, security and public order, transport, clean water and electricity, regional finance, economic stability, health, education, skills, internal competition, taxes, and charges.

The sensitivity in the promotion of data quality is technically characterized by various challenges, such as policy and regulation, data governance, people and behavior, process and quality, technology, culture, and organization. Therefore, this study considers it important to describe the challenges in managing regional competitiveness data as an assessment in improving data quality leading to the purpose of using regional competitiveness. The purpose of this study is to describe and analyze the management of regional competitiveness on the basis of six challenges that are allegedly closely related to data management, using a qualitative descriptive approach.

2   Method

The research method refers to a qualitative approach that tends to describe the results of the analysis with study locations in the Purwomanggung development area, Central Java Province, and analyzes based on challenges. Secondary data is supported by stakeholders related to the study; primary data is presented by tracking regional competitiveness needs. Data collection took place for four months from July – October 2022. The analysis is presented by visualizing regional competitiveness data in five regions within the boundaries of the Purwomanggung economic development area. Comparative analysis of regional competitiveness is argued with challenges limited by descriptions of policy and regulatory challenges; data governance challenges; human and behavioral challenges; process and quality challenges; technological challenges; and cultural and organizational challenges.

3   Result and Discussion

Knowing how the area is described internally in the development process and the impact it has on the surrounding area provides benefits for regional competitiveness. Complete, valid, and accurate data in producing the final measure of regional competitiveness provides for the accuracy of policy [20], [30], [31] determination. These include policy and regulatory challenges, data governance challenges, human and behavioural challenges, process and quality challenges, technological challenges, and cultural and organizational challenges.

3.1   Data in Regional Competitiveness Mapping

The economic development area of Purwomanggung is one of the eight areas that have been divided by the provincial government of Central Java. The regional grouping aims to optimize local potentials, maintain the diversity of produce results, and create an equal development with strong superior produce features. Furthermore, the Central Java Provincial Spatial Planning Document 2009-2029 states that the regional system is a general direction for the development of functional linkages [32] of cities and surrounding areas within a single system of cities within Central Java. Purwomanggung area includes Magelang city, Magelang, Temanggung, Wonosobo and Purworejo regency. In this study, Purwomanggung is the location where regional competitiveness is described and then analysed from the perspective of challenges.

The data in this study is used in regional competitiveness mapping (RCM) released by the Central Java Provincial Government in 2022. The final RCM data is in the form of an index, which is an accumulation of four aspects of RCM. The four aspects of RCM consist of the innovation ecosystem [23], [33]–[35], enabling factors [4], [6], [10], [36], human resources [8], [9], [18], [20], [32], and market factors [23], [24], [35], [37]. Each aspect has a score that comes from the accumulation of dimensions, the accumulation of dimensions comes from measuring indicators. The RCM has ninety-seven indicators divided into twenty-three dimensions. The description of each pillar, dimension and indicator is not explained in this study. The publication results in the form of RCM indices and RCM aspects are used for visualisation as a complement to the analysis in this study.

In the Purwomanggung development area, the RCM results show differences between districts and towns. Purwomanggung is one of the five areas that are standardised in the acceleration of development in Central Java province. The differences in the results of the RCM aspect are explained in Fig 1.
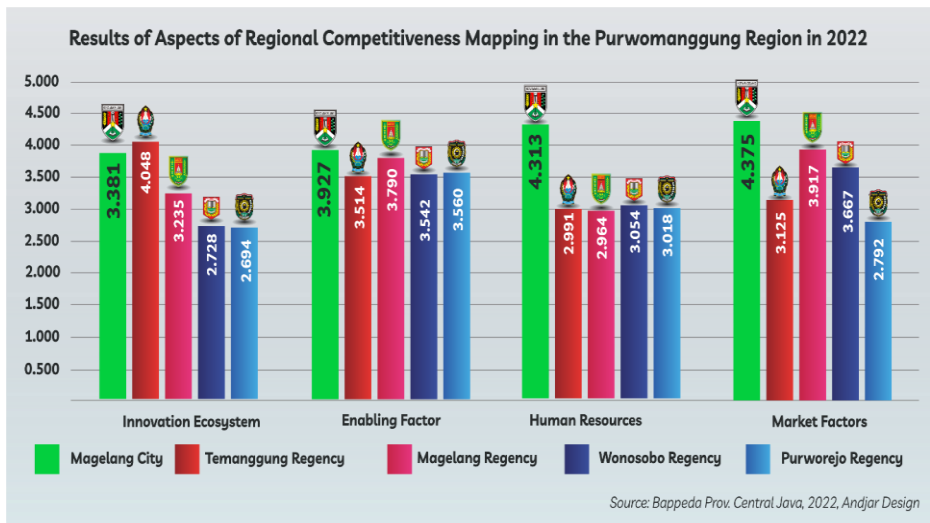

Results of Aspects of Regional Competitiveness Mapping in the Purwomanggung Region in 2022

Source: Bappeda Prov. Central Java, 2022, Andjar Design

Fig. 1. Results of Aspects of RCM in the Purwomanggung Region in 2022

The RCM aspect shown in Fig. 1 is then accumulated and the final result is obtained in the form of an index, it is known that there are five regions to compare the RCM Index, which is visualised in Fig 2. Magelang City has the highest competitiveness score at 4.124, followed by Magelang Regency at 3.476. Temanggung Regency with a regional competitiveness index of 3,420 points is third. Wonosobo Regency ranks fourth with a competitiveness index score of 3,247 points, and Purworejo Regency ranks last.
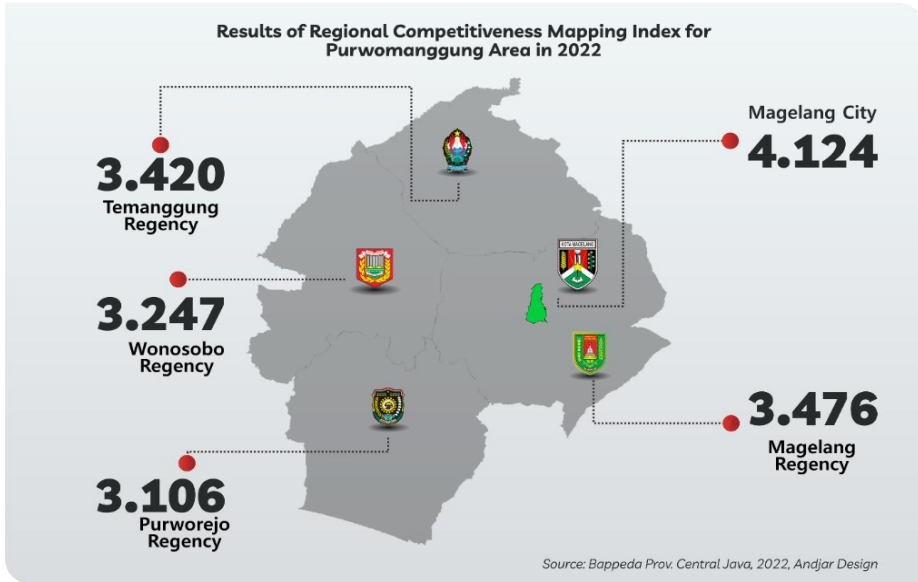

Fig. 2. Results of RCM Index for Purwomanggung Area in 2022

Comparing the five regions does not show radical values, but there are many differences regarding the availability of the data presented. Although the indicators required are the same across regions. There are also similarities in the availability of data between the regions. Although the competitiveness index score is close to the regional competitiveness maturity value (maturity value = 5), there is still room for improvement from the required ninety-seven indicators. Efforts to increase the Regional Competitiveness Index scores in the five regions are analyzed in terms of challenges to quality and sustainable data management.

3.2   Regional Competitiveness Data Quality Challenges

The ability to organize data is influenced by various factors, in this study the focus being analyzed is the challenge of data management. The six challenges in this study

are conceptualized as data challenge circles which are visualized in Fig. 3. The challenges have intersecting relationships and can work well if there is the harmonization between challenges.

Source: Andjar Design, 2022

Fig. 3. Data challenge loop

Data works as a symbolic system that uses defined conventions to represent real objects, events and people. There are six challenges to the creation of sustainable data quality which require attention, these are:

a. Policy and regulatory [38], [39] challenges, the relevant ecosystem used in government in Indonesia is the emergence of policies due to certain problems. Policy mechanisms tend to produce rules that are used to limit functions and adjustments. Thus, a commitment is needed that is technically answered by regulations so that data quality can be maintained and easily achieved on a regular basis. Knowledge [13], [40] of data-as-data is very important in at least the two most important aspects of using data, namely interpretation, and quality. Using data always involves interpreting these signs. In order to achieve this, it is necessary to establish rules [41], [42] for the implementation of data management within the scope of the municipality.

b. Data governance [26], [43]–[46] challenges lead to knowledge of how data works is also important to take advantage of data opportunities: what can be learned from data, how can data be used to improve operations, and how can data be used to drive value either directly, through monetization, or indirectly, through insights about customers, products, and partnerships. Data management challenges can be carried

out by appointing and establishing data management organizations [12], [47], including personnel, support personnel, data producers, regional-level data management secretariats, and regional-level data forums through regional head decisions. Furthermore, it is important to implement the consolidation of internal data governance within local government through data forums facilitated by the data management secretariat.

c. The human and behavioural challenge [48]–[51] is to ensure that data producers and data consumers build knowledge, develop skills and have access to the information needed to use and interpret data in general and organizational data specifically. The human and behavioural challenges are pursued through coordination in the context of the implementation of data and metadata standards and; the establishment of a funding scheme for the organization of data through local income and expenditure budgets and other funding sources [52]–[54]. In addition, strengthening the capacity and skills of data managers and analysts within local government is useful and necessary.

d. Process and quality [27], [29], [55]–[57] challenges are believed to help people within the organization see the relationship [53], [58], [59] between process quality and data quality, that is, recognize data as input to and output of (i.e., a product of) organizational processes. Defining and managing processes so they produce higher quality and more reliable data; ensuring that data producers understand how their choices affect data consumers' ability to use data. Activation and active interaction [11] between the data management secretariat and the data management forum are key in anticipating the data management process and the quality of the data managed.

e. Technological [60]–[64] challenges become strategies by understanding the role of technology in creating and managing data; recognizing how data depends on and is independent of technology; recognizing how choices related to technology affect the creation, accessibility, and use of data and its quality; and, ultimately, taking a data perspective on choices about technology. The development of information systems/portals [65]–[67] referring to regulations is an effort that needs to be made to provide solutions to technological challenges.

f. Cultural and organizational [68]–[72] challenges, affiliated with building leadership accountability for data and leadership commitment to quality to get value from data. Changing the culture to deliver on that commitment. Assign responsibilities along the data supply chain. Reducing data usage barriers. Implement corporate data oversight through formal data governance practices. Actively foster desired behavior around data through policies and incentives. Cultural and organizational challenges, through increased collaboration [73], [74] and cooperation [75]–[77] with data organizers, both between organizations in each region, as well as encouraging similar efforts at the central agencies and regional government levels. Another effort is to identify for map the programs and review activities as a reference in compiling data within the scope of local government. Then in maintaining the continuity of data quality, tiered guidance in organizing regional-level data periodically.

These six challenges can answer the incomplete data on the ninety-seven indicators required for regional competitiveness. The impact is that the achievement scores are increasing and the quality of the data used can be accounted for on an ongoing basis. The outcome in the form of clear and valid acceleration of the development of the Purwomanggung Area can be achieved due to the availability of quality data.

4   Conclusion

The results of the study found the management of regional competitiveness data based on indexes, aspects, and pillars for five regions in the Purwomanggung economic development area. Differences in regional competitiveness data management between Magelang City, Magelang Regency, Temanggung Regency, Purworejo Regency, and Wonosobo Regency occurred due to responses to policy and regulatory challenges; data governance challenges; human and behavioral challenges; process and quality challenges; technological challenges; and cultural and organizational challenges. The implications of this study place policy challenges as an important strategic process in managing regional competitiveness data based on stakeholder commitment.

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