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Digital Maturity Level Measurement and Strategic Improvement Maturity Level at PT.XYZ

Lia D Sanjaya[1], Dodie Tricahyono[2]

[1,2] School of Economics and Business, Telkom University, Bandung, Indonesia

Abstract
In the era of dynamic and rapidly evolving digital landscape, industries are undergoing disruptive transformations driven by the adoption of advanced technologies such as Clouds System, Internet of Things (IoT), and Automation. These digital tools are increasingly utilized to enhance system integration, operational efficiency, and cost-effectiveness.
This research investigates digital readiness and transformation journey of PT. XYZ, a company engaged in the growing, processing, and global distribution variety of unmanufactured tobacco (semi-processed). In pursuit of digital competitive advantages, PT. XYZ has implemented various digital tools and system, including adopting Enterprise Resource Planning (ERP) system, weather sensors, smart treatment systems, and digital applications across multiple departments.
There are two objectives of this study: first, to measure the level of digital maturity at PT. XYZ applying the Forrester Digital Maturity Model 4.0, which encompasses four main dimensions—Culture, Technology, Organization, and Insights—across 28 indicators. Second, to provide recommendations for enhancing digital maturity using the Digital Strategy Development framework from the MIT Sloan Management Review initiative in collaboration with Deloitte University Press to guide PT. XYZ in improving its digital maturity. This study applies qualitative research methodology gathering data and information using questionnaires and interviews from leadership roles, including Supervisors, Heads, Managers, and Executive Management. The analysis results indicate that PT. XYZ is at Maturity Level 3 – Collaborators in its digital transformation journey, meaning PT. XYZ has the capability to adopt and implement cloud-based systems, digital technologies in their operations, and has leaders with digital leadership competencies. To advance to Maturity Level 4 – Differentiators, several strategies can be implemented by PT. XYZ, such as enhancing employees (staff level) digital competencies, developing measurement and evaluation tools for digital projects, and improving collaboration and understanding of internal and external digital strategies.

Keywords: *Digital Transformation, Digital Maturity, Maturity Level, Digital Strategy*

1. Introduction

The rapid advancement of technology has significantly transformed various industries, necessitating the adoption of digital tools to enhance system integration, operational efficiency, and cost-effectiveness. In the current digital era, organizations are increasingly leveraging technologies such as Cloud System, the Internet of Things (IoT), and Automation to drive innovation and competitive advantage. These advanced technologies enable businesses to streamline processes.

Digital transformation is not a one-time event but a continuous journey that integrates digital technologies into organization's operations. It requires a strategic approach to manage the changes in processes, culture, and overall interactions. The successful implementation of digital technologies progresses through various stages of maturity, from basic adoption to routinized, continuously improving systems. Measuring digital maturity is essential for organizations to assess their current capabilities, identify gaps, and strategically focus on key areas for digital integration and advancement.

Digital transformation is a process to restructured economies, organizations, and societies (Bouwman et al., 2019; Unruh and Kiron, 2017) in Radicic, D., & Petković, S. (2023). Digital

transformation gives significant impacts which requires industries and companies to adjust their corporate strategies and business models (Linz et al., 2017) in Radicic, D., & Petković, S. (2023). Digital worlds is the new era, so companies go digital and adopt the digital era changes brought by Industry 4.0 (Linz et al., 2017; Rachinger et al., 2019) in Radicic, D., & Petković, S. (2023).

As the response of the digital and industry 4.0 era, where technological developments are moving very fast, the world has seen how technological developments can help business processes effectively and efficiently, PT. XYZ transform the company's system update process by utilizing digital technology. IBM stated that Industry 4.0 is the era intelligent processing, providing real-time data and increased productivity.

This digital transformation journey is also taken by PT XYZ, a company engaged in the growing, processing, and global distribution variety of unmanufactured tobacco, has embarked on a digital transformation journey to achieve sustainability and competitive advantage. The company has implemented various digital tools, implementing Cloud based systems such as Enterprise Resource Planning (ERP), Internet of Things in Agronomy such as weather sensors, and adopting smart technology in Inventory such as smart storage and smart treatment systems, and digital applications across multiple departments. These initiatives are supported and initiated by management executives and directors, highlighting the importance of leadership roles in driving the success of digital transformation.

The digital implementation carried out by PT. XYZ over the last 5 years includes: (1) Adoption of Enterprise Resource Planning (ERP) - a cloud computing program that aims to be an enterprise resource planning that provides easy accessibility through servers. This Enterprise Resource Planning (ERP) system integrates each department under one umbrella, namely Acumatica and acts as a repository of the company's business data center. The f Enterprise Resource Planning (ERP) system technology using Acumatica is expected to become a system from the financial side to the process with the aim of optimizing efficiency, integrated data from incoming data and data out of inventory. (2) SharePoint for cross-department shared information purpose - web based document management and collaboration platform used to store data, manage and share content, and access information internally that can increase cross-departmental communication and collaboration. (3) Utilization of the Internet of Things (IoT) - in agriculture is a system that integrates physical devices, sensors, and communication technologies to monitor and manage various aspects of agriculture in real-time. For example, using weather sensors to monitor weather conditions in farming locations such as rainfall and temperature in real-time. (4) Creation of Internal Application Systems - several systems are created to support digital processes across departments. (5) Smart Technology - Smart storage and smart insect treatment, which aims to control commodities automatically connected to the internet based on nitrogen injections and maintain moisture.

Responding to the digital implementation that has not yet reached the highest target and the existence of a strategic plan adoption of digital technology, it is necessary to know and understand how the position of PT. XYZ in their digital transformation process and how digital readiness at PT. XYZ to move to a digital workflow powered by advanced technology. To successfully adopt 4.0 technology, organizations need a well-structured digital strategy consisting of well-developed action plans and clear roadmap (Antony et al., 2021, Chiarini et al., 2020). The first step that can be taken to implement this digital strategy is through an assessment on how ready the organization is to adopt 4.0 technology (Antony et al., 2021, Krishnan et al., 2021). The assessment model to measure on is digital maturity model, this is one of the most popular tools for understanding digital readiness (Felch et al., 2019). This maturity assessment tools help companies understanding their developments in the digitalization journey, giving them a comprehensive picture of the changes needed in the implementation of technology, across different departments (Antony et al., 2021, Proença and Borbinha, 2016, Schumacher et al., 2016). This first approach to digital maturity measurement using an assessment tool will help PT. XYZ build a clear strategy and roadmap towards innovation or technology before its operational implementation. This assessment tool will help organizations develop a clear understanding of where they are today, where they need to go, and the next steps they need to take in digital transformation.

2. Concepts and Research Methodology

2.1 Digitalization

According to Balsmeier and Woerter (2019) in Schildt Henri (2022) the concept of digitalization defines as the process by which companies start to utilize and integrate digital technology, researchers describe digitalization as the increased implementation of digital technologies. According to Berente, Lyytinen, Yoo,

& Maurer, 2019; Burton-Jones et al., 2020; Faik et al., 2020; Qiu, Gopal, & Hann, 2017 in Schildt Henri (2022), digitalization is the new representation of a new social logic that prescribes the supports of human knowledge and human routines with fast information flows, with algorithms, integrated data, and automated processes. It is a sophisticated system composed of objectives, expertise, organizational practices, identities, and physical structures that comprehend and implement a more accountable, optimized, and adaptable world. This viewpoint enhances the ongoing efforts to comprehend how established institutional logic influences the development and adoption of information systems within the company.

Digitalization represents a crucial strategic challenge for both private and public entities. Emerging technologies like Artificial Intelligence (AI), machine learning, blockchain, smart technologies in materials and manufacturing, the Internet of Things (IoT), and cloud computing are revolutionizing how organization's structure and strategize internally, as well as engage with external stakeholders. (Kringelum, Louise B et al: 2024). Digital literacy involves understanding and utilizing information and communication technology to keep pace with digitalization advancements in the business environment (Sudrajad et al, 2023).

2.2 Digital Transformation

Digital transformation driven by technology adoption strategies has a crucial influence on organizational performance. It's not only about implementing new technologies, but also about strategically integrating them into business models, operations, and culture (Deloitte, 2015). Digital transformation involves rethinking processes, structures, and even the value proposition itself (Vial, 2019). A key aspect of successful digital transformation is recognizing that technology serves strategy, not the other way around. Meanwhile, technology provides tools, and strategic vision that guides its implementation and determines its effectiveness (Deloitte, 2015). Strategic alignment guarantees that technology investments effectively support organizational goals and to overall business goals and drive meaningful change. Additionally, digital transformation requires a holistic approach that considers the entire organization. Changes in organizational structure, processes, and culture are often necessary to fully utilize the potential of new technologies (Vial, 2019).

Organizations that effectively incorporate digitalization into their strategic development typically focus on five key actions: articulating and sharing the company's vision and strategy; aligning resources and activities for implementation; maintaining ongoing operational improvement and efficiency; prioritizing customer or user needs and expectations; and enhancing the skills of top managers, middle managers, and employees. (Kringelum, L. B., Holm, C. G., Holmgren, J., Friis, O., & Jensen, K. F., 2024).

2.3 Forrester Digital Business Maturity Model 4.0

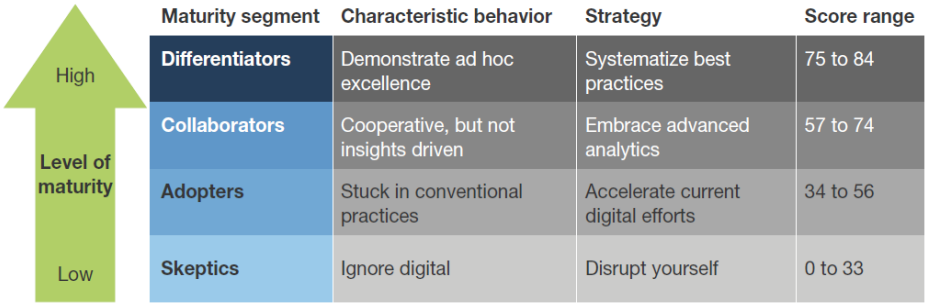
To measure maturity level, this research uses a Forrester Digital Business Maturity Model 4.0. Luiz da Silva, J., Lopes Vieira, A. C., & Vasconcelos Silva, S. (2022) in Gollhardt et al., (2020) digital maturity enables organizations to move towards achieving digital transformation Gökalp and Martinez (2021) highlight that the aim of digital transformation is to enhance business value by improving organizational performance through process optimization, increased productivity, and the creation of new market segments via continuous information processing. Presently, organizations are focused on shifting their paradigms in the digital market and developing methodologies to achieve the added value that digital transformation brings to their businesses (Rautenbach et al., 2019; Peixoto et al., 2022) and adapt their products and services to be more flexible to meet the demands of heightened competition and global integration through innovative value chain configurations. (Vereycken et al., 2021). Digital maturity level measurement refers to an assessment of an organization's ability and readiness to adopt and utilize digital technology to achieve its business goals (Sina et al., 2023).

Forrester Digital Business Maturity Model 4.0 assists in assessing the fundamental aspects of a company's overall digitalization regarding its level of transformation, such as the implementation of effective strategies, digital human resources, and business efficiency. The Forrester Digital Business Maturity Model 4.0 is measured across four dimensions. These dimensions are (1) **Culture** - this dimension focuses on the company's preparation for digital transformation by empowering employees with digital technology literacy and/or providing them with digital training. (2) **Technology** - this dimension focuses on the need for the appropriate adoption of technology for the company. (3) **Organisation** - this dimension

focuses on governance, digital strategy, and the implementation carried out by the company. (4) **Knowledge** - this dimension focuses on the company's ability to leverage digital technology to achieve its goals (Gill & VanBos, 2016).

The Digital Maturity Model 4.0 classifies the digital maturity of organizations into four levels: Skeptics, Adopters, Collaborators, and Differentiators (Vanboskirk, S., and Gill, Martin, 2017). **Level 1: Skeptics** - companies at this level are not actively advancing their use of technology and show minimal innovation. Many financial services, public sector entities, and telecommunications firms have limited experience with innovation. They possess unclear digital strategies and lack effective implementation of marketing technology, customer experience management, social media, and digital training. Skeptics resist change, have minimal digital sales, and do not invest in technology. **Level 2: Adopters** - companies at this stage have begun to embrace digital technology and are willing to allocate resources, though their adoption remains limited. Adopters have more effective marketing strategies compared to skeptics but still have constrained software budgets. **Level 3: Collaborators** - companies at this level are more inclined to collaborate both internally and externally to foster digital practices and innovation. According to Forrester's Global Business Technology Marketing Survey from 2015, approximately 94% of collaborators are customer centric. These companies are starting to adopt data analytics in their operations and have skilled workforces. **Level 4: Differentiators** - companies at this level implement mature digital businesses by integrating business system process end to end, dynamic digital strategies, marketing teams, customer experience, and insights to create customer-centric experiences.

Picture 1. Digital Maturity Level Segmentation 4.0



Maturity segment	Characteristic behavior	Strategy	Score range
Differentiators	Demonstrate ad hoc excellence	Systematize best practices	75 to 84
Collaborators	Cooperative, but not insights driven	Embrace advanced analytics	57 to 74
Adopters	Stuck in conventional practices	Accelerate current digital efforts	34 to 56
Skeptics	Ignore digital	Disrupt yourself	0 to 33

Source: Vanboskirk, S., and Gill, Martin (2017). *The Digital Maturity Model 4.0*.

2.4 Digital Strategy Development

To level up digital maturity, this research uses strategy of Digital Strategy Management based on MIT Sloan Management Research in collaboration with Deloitte University Press, adapting and leveraging digital technology improve operations is a crucial goal for almost every business. According to digital transformation development strategy, it refers to a strategic approach used to change traditional business models to be more digital and efficient. This process involves an analysis of current business conditions, an understanding of the company's digital ambitions, and the development of a roadmap to achieve these goals. In terms of implementation, it includes the practical steps taken to execute the strategy that has been planned (Nabiela et al, 2023). Some companies appear to make fundamental changes that their leaders believe are necessary to achieve successful digital implementation. Based on a global survey of over 3,500 managers and executives and 15 interviews with executives and thought leaders, MIT Sloan Management Review and Deloitte's third annual study on digital business reveal five key practices for companies that are evolving into more mature digital organizations or for those looking to enhance their digital efforts**: (1) Digital Culture and Innovative** - implementing systemic changes in how they organize and develop their workforce, spurring innovation in the workplace, and fostering a digitally-minded culture and experience. For instance, more than 70% of respondents from digitally mature companies say their organizations are increasingly organized around cross-functional teams compared to only 28% of companies at the early stages of digital development. These fundamental changes have significant implications for organizational behaviour, company culture, talent recruitment, and leadership tactics. **(2) Strategic Planning** - digitally mature companies is consistently done further ahead compared to less mature companies, with nearly 30%

looking five years or more ahead compared to only 13% for companies that are not digitally mature. The digital strategy of mature companies focuses on technology and core business capabilities, linking digital strategy with the company's core business, focusing on organizational change and flexibility to allow the company to adapt to the rapidly changing digital environment. **(3) Innovation Investment** - in digitally mature entities, innovation or experimentation can be conducted repeatedly, and digitally mature organizations can also fund these efforts in the face of more urgent investment needs. **(4) Digital Environment** - employees and executives are highly likely to leave the company if they feel they do not have the opportunity to develop digital skills. Digitally mature companies understand the need to develop digital talent. These businesses create an attractive environment to achieve career growth ambitions while acquiring digital skills and experience, making employees want to stay. **(5) Digital Leadership** - the need for support from leaders with a vision to lead digital strategy and commit to achieving this vision of digital maturity. How digital initiatives can be implemented within the company.

2.5 Strategic Management

According to Fred R. David in the book Strategic Management 16th edition in 2017, strategic management is the art and science of formulating, executing, and assessing cross-functional decisions that help organizations reach their objectives. Its implementation emphasizes integration, specifically by combining management, marketing, finance/accounting, production/operations, research and development, and information systems and technology to achieve organizational success. Strategic management as an art and knowledge in formulating, implementing, and evaluating cross functional decisions that enable an organization to achieve its goals (Anggadwita et al., 2016).

2.6 Research Methodology

This research applies to a methodology that synthesizes knowledge from existing literature, research, case studies, and other relevant sources. A qualitative approach was carried out using questionnaires and in-depth interviews a total of 42 participants from leadership roles on various levels, including Supervisors, Department Heads, Managers, and Executive Management to capture valuable insights and relevant information for this research. Participants using a comprehensive framework encompassing four key dimensions—Culture, Technology, Organization, and Insights—across 28 indicators based on Forrester's Maturity Assessment Framework. After finding the level of maturity level, this research proposes a strategic framework from MIT Sloan Management Review research initiative in collaboration with and sponsored by Deloitte University Press to guide PT XYZ in advancing its digital maturity. Using the strategic framework from MIT Sloan Management Review research to level up the maturity, in this research the strategy is categorized under five categories: (I) Digital Culture and Innovative, (II) Strategic Planning, (III) Innovation Investment, (IV) Digital Environment, and (V) Digital Leadership.

Table 1. Operational Variable

Dimension	Indicators	Code	Category
Culture	*Competitive Digital Strategy*	*P1*	II
	Supporting Leaders	*P2*	V
	Digital Leadership	*P3*	V
	ICT Training	*P4*	V
	Internal and External Digital Strategy Knowledge	*P5*	II
	Digital Innovation Risk Management	*P6*	III
	Internal Collaboration	*P7*	IV
Organization	*Digital Shared Values*	*P8*	IV
	Digital Resources	*P9*	IV

	Supporting Employees	*P10*	IV
	ICT Competence	*P11*	I
	Collaboration across departments	*P12*	IV
	Digital Program within Organization	*P13*	III
	Collaboration with External Parties	*P14*	I
Technology	*Technology Development Budget*	*P15*	III
	Collaboration with IT Team	*P16*	I
	Flexible and Iterative Development Approach	*P17*	V
	Modern Technology (Cloud, APIs)	*P18*	III
	IT Matrix Tool	*P19*	I
	Innovation using User Instrument	*P20*	I
	Innovation through Technology	*P21*	III
Knowledge	*Digital Adoption Goals*	*P22*	II
	Digital Strategic Collaboration	*P23*	II
	Digital Implementation KPI	*P24*	I
	Integrated System	*P25*	IV
	Strategic Digital Planning	*P26*	II
	Strategic Digital Development	*P27*	II
	Digital Information and Knowledge	*P28*	V

Table 2: Type of Research

No.	Research Characteristics	Type
1	Research Objective	Descriptive, Explorative
2	Research Methodology	Qualitative
3	Unit of Analysis	Company
4	Research Setting	Non contrived
5	Time Horizon	Cross-Sectional

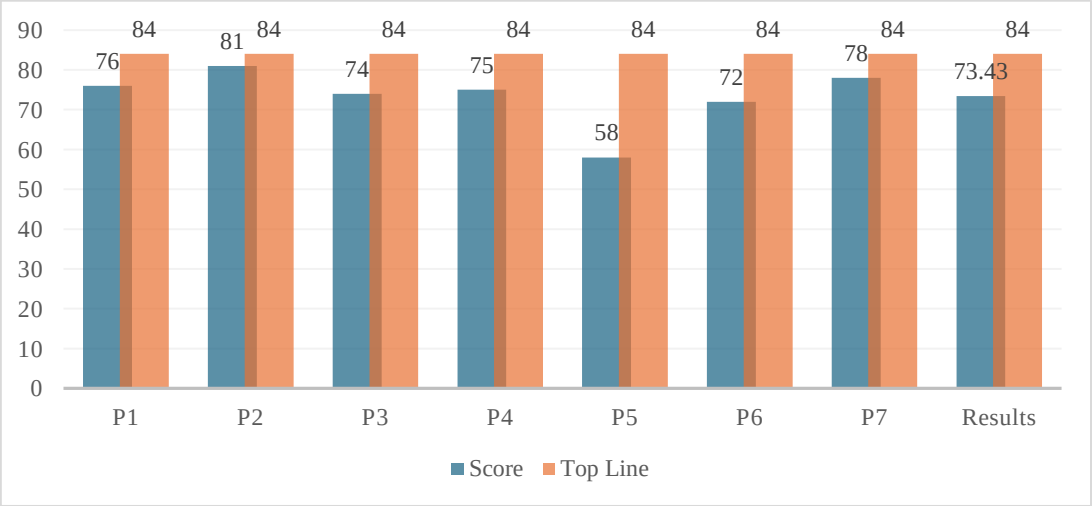
Qualitative methodology utilizes questionnaires, interviews and study documentation, which are then analysed using simple calculations to find out the maturity level. In conducting qualitative research exploration, questions of "how" and "why" are used to delve into variables. Qualitative research offers a flexible and exploratory approach to investigate complex social phenomena. Qualitative research involves descriptive and exploratory analysis of data, meaning the data collected cannot be directly quantified (Kusumawardani et al., 2015).

3. Results and Discussion

3.1 Maturity Level Measurement – Culture Dimension

The cultural dimension was measured using 7 questionnaire statements with 7 indicators which are Competitive Digital Strategy, Supporting Leaders, Digital Leadership, ICT Training, Internal and External Digital Strategy Knowledge, Digital Innovation Risk management and Internal Collaboration showing digital maturity result is 73.43 which means that culture dimension of PT XYZ at the Level 3 – Collaborators of digital maturity level.

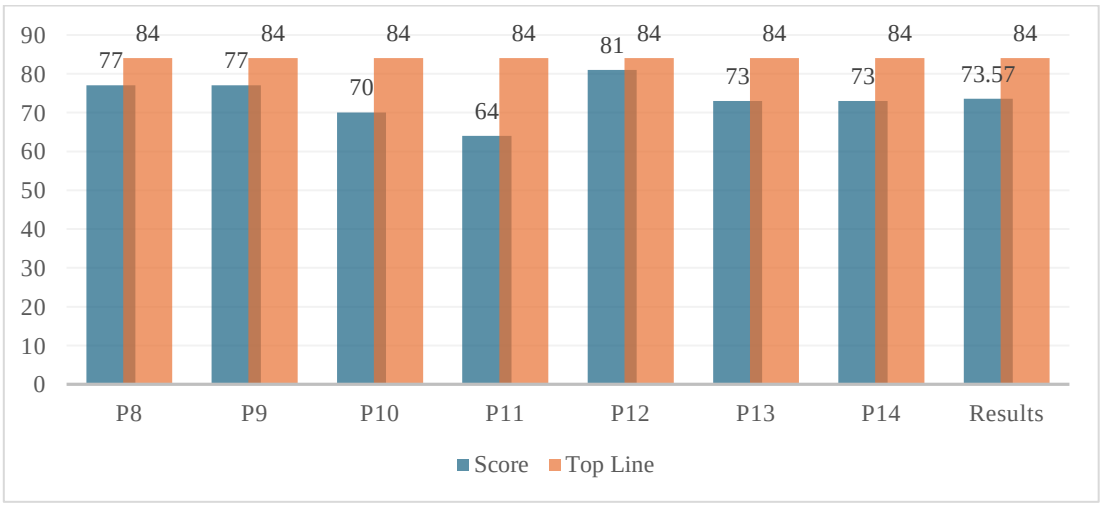
Figure 1. Maturity Level – Culture Dimension



3.2 Maturity Level Measurement – Organization Dimension

The organizational dimension was measured using 7 questionnaire statements with 7 indicators which are Digital Shared Values, Digital Resources, Supporting Employees, ICT Competence, Collaboration across Departments, Digital Program within Organization, Collaboration with External Parties showing digital maturity result is 73.57 which means that organization dimension of PT XYZ at the Level 3 – Collaborators of digital maturity level.

Figure 2. Maturity Level – Organization Dimension



3.3 Maturity Level Measurement – Technology Dimension

The technology dimension was measured using 7 questionnaire statements with 7 indicators which are Technology Development Budget, Collaboration with IT Team, Flexible and Iterative Development Approach, Modern Technology (Cloud, APIs), IT Matrix Tool, Innovation using User Instrument and Mobility through Technology showing digital maturity result is 73.71 which means that technology dimension of PT XYZ at the Level 3 – Collaborators of digital maturity level.

Figure 3. Maturity Level – Technology Dimension

3.4 Maturity Level Measurement – Insights Dimension

The insight dimension was measured using 7 questionnaire statements with 7 indicators which are which are Digital Adoption Goals, Digital Strategic Collaboration, Digital Implementation KPI, Integrated System, Strategic Digital Planning, Strategic Digital Development, and Strategic Digital Development showing digital maturity result is 72.43 which means that insights dimension of PT XYZ at the Level 3 – Collaborators of digital maturity level.

Figure 4. Maturity Level – Insights Dimension

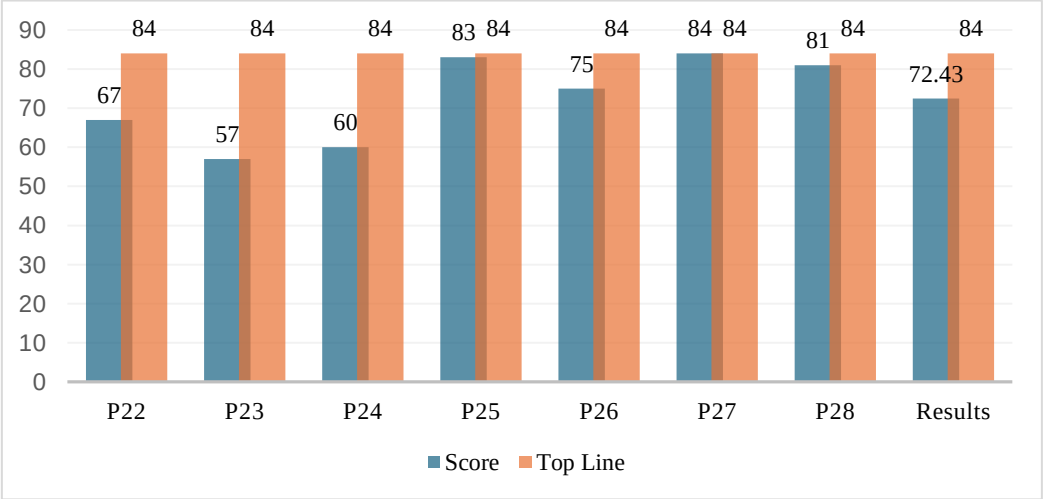


Figure 5. Maturity Level Score Result

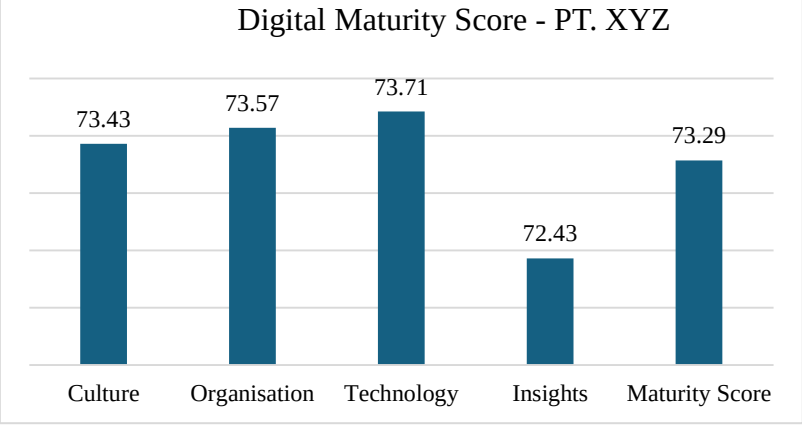


Figure 5 shows the result of digital maturity measurement level of PT. XYZ measured by 4 dimensions; Culture, Organisation, Technology and Insights with 28 indicators, with final score digital maturity is 73.29.

3.5 Conclusion and Recommendation

Based on the data collected and the results of the Forrester 4.0 digital maturity assessment with 4 dimensions: Culture, Organisation, Technology and Insights with 28 indicators, PT XYZ achieved final score of 73.29, indicating that the company is currently at Maturity Level 3 – Collaborators in its digital transformation journey. At this level, the company has reached a good degree of maturity in several digital aspects. Companies at this level have collaborated internally and externally to enable digital practices and innovation. Maturity Level 3 indicates that the company has successfully implemented various digital initiatives and has a strong foundation for more integrated development. Maturity Level 3 – Collaborators also indicates that the company and its leaders have and have implemented a clear digital strategy. Every employee collaborates effectively in achieving digital goals with the adoption of cross-functional systems to achieve more integrated operations. Additionally, the company keeps up with digital technology developments and adopts the latest digital systems to remain competitive and innovative. The development of employees' digital skills is achieved through training and digital programs, which are then implemented into the company's operations to enhance efficiency and effectiveness.

To achieve Level 4 of Digital Maturity – Differentiators, several strategies can be implemented by PT. XYZ, including first: enhancing employee (staff level) digital competencies to support the next level project of maturity strategies. Second, developing measurement and evaluation tools for IT digital to track progress, measure outcomes, and refine strategies to optimize programs with data-driven insights. Third, improving collaboration and understanding both internal and external digital strategies. It's essential to ensure that all parties involved have a clear understanding of the project's goals and expectations. Start by clearly defining the company's objectives and encouraging partners to express theirs. This mutual understanding forms the basis for a collaborative relationship. By establishing common goals, companies not only align efforts but also foster a shared sense of purpose, making it easier to tackle challenges and celebrate successes collectively.

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