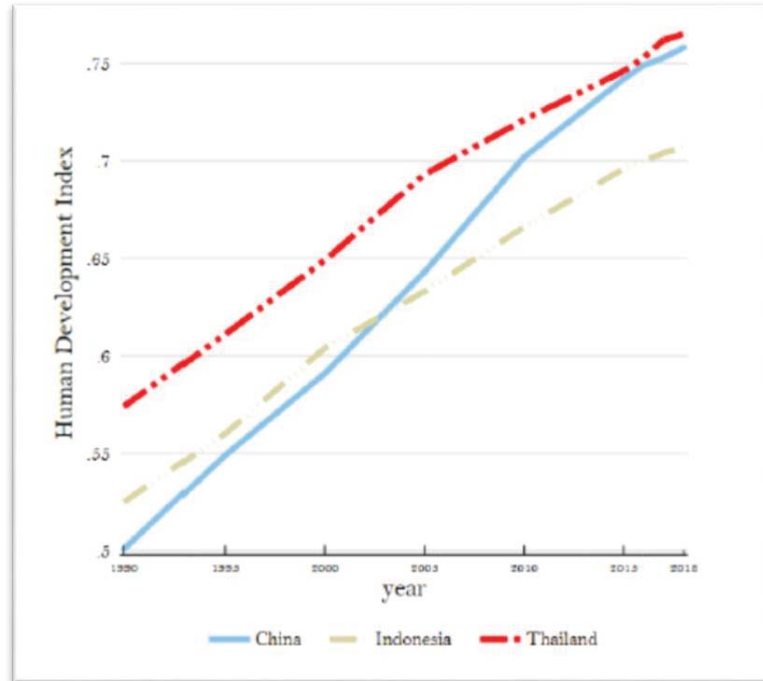


## CHAPTER I INTRODUCTION

### 1.1. Problem Background

Higher education is one contributor to the development of human resources and research quality in a country. Given the strategic position, high-quality higher education is a necessity for all countries, including Indonesia.

The Human Development Index (HDI) is a measurement used to identify a country's long-term development for three aspects: health rates and life expectancy, access to education, and living standards. In 2018, Indonesia was ranked 111<sup>th</sup> with an HDI of 0.707, which is still under average among other countries (UNDP, 2019). Even there was an improvement in the HDI score, Indonesia's HDI score is relatively low compared with other countries in the Asia region, such as the Philippines (rank 106<sup>th</sup>) and China (rank 85<sup>th</sup>).



Source: Human Development Report 2019  
 Figure 1. Indonesia HDI compared to others

Table 1. Indonesia HDI value and rank compared to others

	HDI value	HDI rank	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita (2100 PPP US\$)
Indonesia	0.707	111	71.5	12.9	8.0	11,255
China	0.758	85	76.7	13.9	7.9	16,127
Philippines	0.721	106	71.1	12.7	9.4	9,540
East Asia and the Pacific	0.741	-	75.3	13.4	7.9	14,611
High HDI	0.750	-	75.1	13.8	8.3	14,403

Source: Human Development Report 2019

The quality of higher education was used as a benchmark and showed the conditions in the quality of human development and innovation

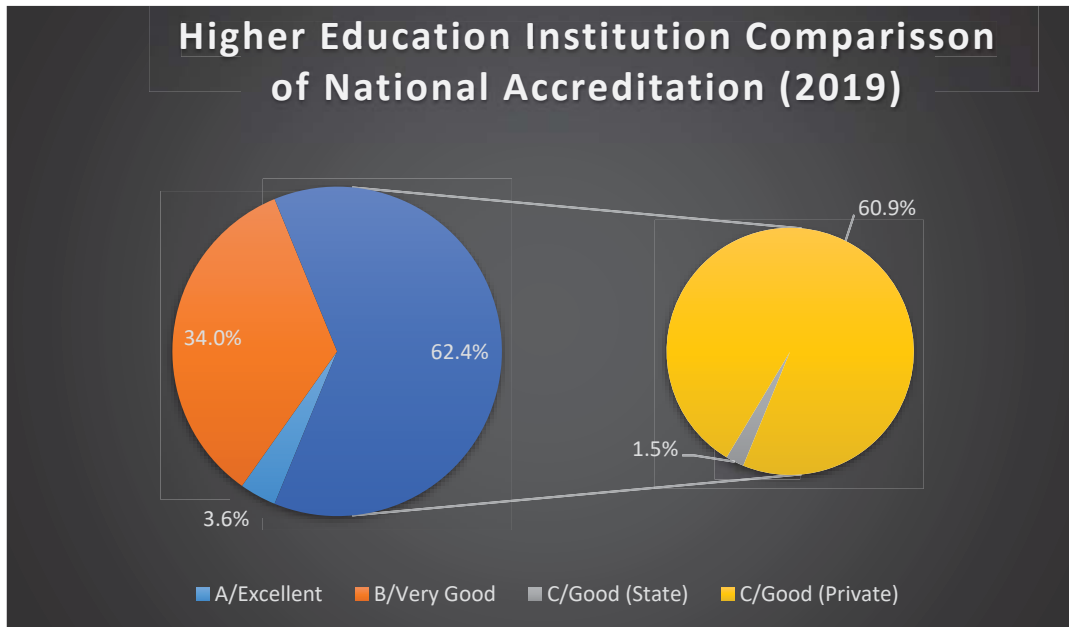
in a country. Through the National Accreditation Board for Higher Education (BAN-PT), Indonesia conducts assessments of all universities and study programs in Indonesia using specific measurements. The measurement itself, which is carried out based on the National Higher Education Standards (SN-Dikti), aims to guarantee and provide a classification of higher education quality for each tertiary institution that is actively operating in Indonesia.

The year 2019 showed that only 3.6% of the total 2,666 public and private universities in Indonesia had achieved the A (=superior) classification. Meanwhile, there are still more than half (62.4%) of active tertiary institutions in Indonesia that fall into the C (=Good) classification.

*Table 2. Accreditation of Indonesian Higher Education Institution*

	Classification of National Accreditation			
	Qty	A/Excellent	B/Very Good	C/Good
<b>Total</b>	2666	3.6%	34.0%	62.4%
Higher Education Institution in Religion (State owned)	72	0.3%	1.8%	0.6%
Higher Education Institution in Religion (Private)	550	0.0%	1.2%	19.4%
Higher Education Institution under other Ministries	85	0.3%	2.6%	0.4%
Higher Education Institution (State owned)	105	1.6%	1.8%	0.5%
Higher Education Institution (Privatee)	1854	1.5%	26.6%	41.4%

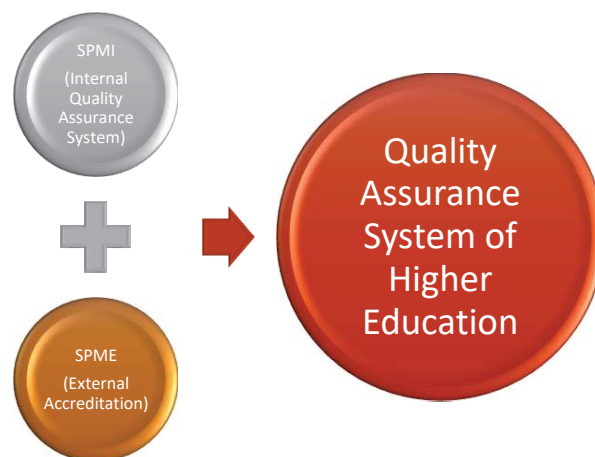
*Source: Indonesian National Accreditation Board (BAN-PT)*



Source: Indonesian National Accreditation Board (BAN-PT)  
 Figure 2. Comparison of Indonesian Higher Education Institution Accreditation

The efforts to improve the quality of education in Indonesia gained momentum again after 1998. After the reformation, universities in Indonesia received autonomy in managing institutions and administering higher education and research (Direktorat Penjaminan Mutu, Dirjen Belmawa, 2018). In 2012, Law (UU) No 12 of 2012 concerning Higher Education was enacted. It provides a foundation for autonomy and an obligation for all higher education institutions in Indonesia to systematically implement the Quality Assurance System. It is also explained that the Higher Education Quality Assurance System consists of an Internal Quality Assurance System (SPMI) and External Quality Assurance System. Internal Quality Assurance System must be independently organized, managed, and developed by every higher

education institution in Indonesia. External Quality Assurance System (SPME) is carried out through the accreditation process by BAN-PT or any independent accreditation body. Higher education accreditation, as referred to in the statutory regulations itself, is a tool to determine whether a study program or higher education institution is eligible according to the National Standards for Higher Education (Direktorat Penjaminan Mutu, Dirjen Belmawa, 2018).

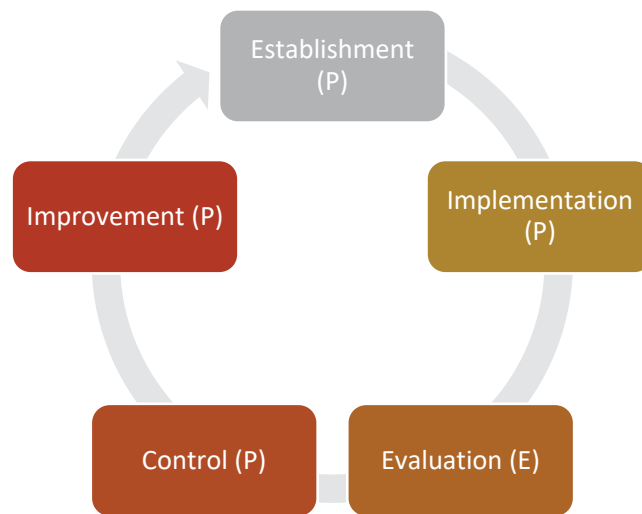


Source: Handbook of Internal Quality Assurance System 2018  
*Figure 3. Internal and External Quality Assurance System as Parts of Higher Education Quality Assurance System*

In order to maintain the same minimum level of quality for each tertiary institution, several standards that apply nationally are also determined as the National Higher Education Standards (SN-Dikti). The SN-Dikti was enriched with other higher education standards that can be developed by each

institution as the result of the higher education autonomy that becomes the reference for each university in implementing the SPMI.

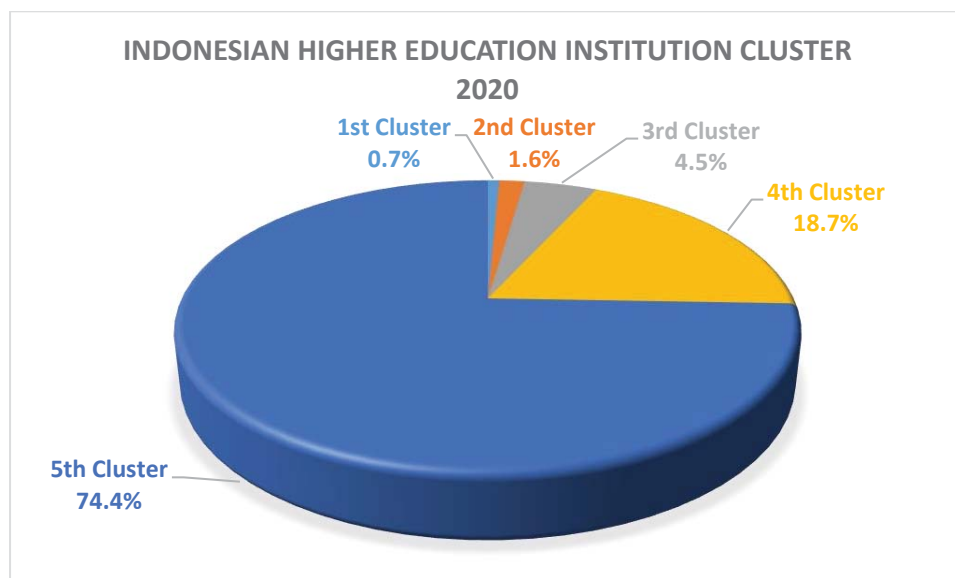
Implementation of this Internal Quality Assurance System starts with the establishment of higher education standards, implementing higher education standards, evaluating the implementation of higher education standards, controlling the implementation of higher education standards, and increasing higher education standards. This cycle of internal quality assurance systems is often abbreviated as PPEPP; Establishment (P), Implementation (P), Evaluation (E), Control (P), Improvement (P).



Source: Handbook of Internal Quality Assurance System 2018  
*Figure 4. Quality Assurance Cycle of Higher Education Institution*

Even though it refers to the National Standards for Higher Education and the same quality assurance cycle framework, the autonomy given to each

university to develop its Internal Quality Assurance System makes its implementation varied and very dynamic. After running for some time, the quality of the implementation of the Internal Quality Assurance System, which is reflected in the External Quality Assurance System results through the accreditation process, still gives a picture of the uneven quality of higher education in Indonesia.



Source: Ministry of Education and Culture

Figure 5. The cluster of Indonesian Higher Education Institution

The cluster system in 2020 showed a large deviation in the quality of tertiary institutions in Indonesia. The cluster system showed that from 2,136 universities, there were 15 universities that had a position in cluster 1 (the best cluster); 34 universities in cluster 2; 97 universities in cluster 3, 400 universities in cluster 4, and the rest of 1,590 universities in cluster 5.

The criteria in making clustering system consider four main aspects, such as the quality of human and student resources (input), the management of higher education institutions (process), short-term performance achievements achieved by tertiary institutions (output), and long-term performance achievements of tertiary institutions (outcomes)(Kemdikbud RI, 2016). The aspect of the quality of human and student resources (input) has a 20% contribution which mostly consists of an assessment of the final education of a lecturer, the academic position of the lecturer, and the ratio of the number of lecturers to students. The aspect of higher education institutional management (process) has a 25% contribution given to the accreditation value of study programs and institutions. The aspect of short-term performance achievements (output) has 25%, with the greatest value related to the number of scientific articles, research work, and student affairs. The aspects of the long-term performance of higher education (outcomes) have the biggest contribution (30%), which is measured by the innovation performance, performance of community service activities, patents, number of cited articles, and quality of graduates.

The internal audit system as a part of higher education quality assurance has an important role in creating the continuous improvement culture within a higher education institution. The continuous improvement culture will organically improve the higher education quality. A digital transformation in this area will hopefully increase the effectiveness of



quality assurance and continuous improvement within higher education institutions.

## 1.2. Industry Characteristics

The difference in income source for the education and operation of public and private higher education institutions has contributed to the different characteristics of governance and priorities. Private universities that most of their funding depend on public funds have a governance character that considers efficiency a lot compared to state universities, where most of their funds come from the state budget. A lean organization, rapid development, flexibility in business processes, and technology dependence to support effective and efficient governance processes are characteristics of private higher education governance.

Several factors also influence the competitiveness of private universities in Indonesia (Hartono et al., 2019). Government regulations bind all universities. Changes in regulations or the establishment of new regulations require adjustments by all universities. This regulation forces universities to run in the corridor of national standards set by the government. Technological developments provide alternative forms or new learning methods to society. Technology also provides opportunities for universities to increase competitiveness by increasing operational effectiveness and efficiency. Various forms of partnership, research funding,

and revenue from research and patents also provide opportunities to increase universities' competitiveness through the breadth of networks and intellectual property.

Globalization, openness to public participation, and new needs that no longer always rely on formal diplomas also present challenges to the world of Indonesian higher education. A world-class university franchise network, as well as various online courses and certified distance learning platforms, give the opportunity to enter Indonesia and provide various offerings of higher education products. The wider variety of new forms of professions and competencies that have emerged and are needed in the future is also an opportunity as well as a challenge for both old tertiary institutions and for new institutions that are able to see the potential for the birth of new study programs.

### 1.3. General Context of Digital Transformation

In the context of higher education, higher education competitiveness which is the result of achieving the perceived quality of the needs of students, parents, lecturers, and the community, forms the quality specification itself. A balance of perceived quality from academic elements with the needs of society needs to be formed (Prakash, 2018). This perception of quality ultimately determines the quality output of higher

education, which determines the quality specifications of inputs, processes, and outputs that need to be realized in higher education (Gajaseneni et al., 2015).

The main objective of digital transformation in higher education is to redefine the forms of educational service products that are influenced by technological developments and the development of higher education or higher education processes to increase process effectiveness and efficiency (Seres et al., 2018). This arises from the phenomenon that not only teaching and learning activities are affected by changes in digital technology, but also how technology also demands changes in the more agile governance to be able to adapt to the needs of students, teachers (lecturers), and education staff (Almaraz-Menendez et al., 2016).

In the context of transforming the educational services, several trends are widely applied in universities (Neborsky et al., 2020):

- Implementation of an out-of-the-box strategy in which university management begins to consider using various digital platforms, including MOOCs, to open opportunities for increasing the value of learning products that are not limited to places, can be organized on a mass scale, and more personal for students.
- “Passport to Education,” a new student participation scheme in online learning programs implemented by Boise State University and

Georgia Institute. This program offers a distance learning program that costs 30% less than a full-time course. This program allows students to access courses they like by subscribing for a particular time.

- Establish collaborative networks between universities. In 2016, six universities from various countries agreed to launch a program where students from one university can take courses from MOOCs provided by other universities. This program was initiated by TU Delft (Netherlands), École Polytechnique Fédérale de Lausanne (Switzerland), Australian National University, the University of Queensland (Australia), University of British Columbia (Canada), and Boston University (USA).
- Implementation of Blended Learning or often called Hybrid Learning. There are six main models, among others, face-to-face (where lecturers provide material presentation assisted by digital equipment), rotation (students rotate in a series of independent online courses), flex (most of the material delivery is provided through an online platform, and the lecturer acts as a companion), labs (the entire curriculum is delivered via a digital platform but accessed in a fixed location), self-blend (students enrich their conventional lectures with a wide selection of online materials), online drivers (all curricula and teaching are delivered via digital platforms)

- Micro-Colleges; a form of offering a concentrated short-term learning program. This form of learning has begun to be held in various countries that also take advantage of various platforms. The level of micro education is given to various professional areas such as 3D food printers, pet daycare, urban agriculture, online competition management, data visualization and analytics, drone pilots, crowdfunding, so on. As an example of its application, a student can graduate from the Supply Chain Management program after taking a micro education level. The program is presented online for five courses (each of which is equivalent to 13 weeks of meetings, 8-12 hours per week) plus one semester of study on the MIT campus.
- Blockchain in the college sector. This concept supports the issuance of diplomas and digital certificates and protects them from fraud. The registration and verification process is made easy and possible from various locations. Blockchain is also developed for various documents and other information such as personal data, profiles, resumes, portfolios, and student payments verification. This practice provides an example that digital transformation can contribute to higher education administration.

- Virtual Reality (VR) technology. The use of VR in higher education can be used to develop a learning process that requires high costs and risks, such as medical operations, flight simulations, and so on.
- Artificial Intelligence. Since 2017, the Georgia Institute of Technology has been experimenting with virtual assistant teachers tasked with answering student questions and facing various learning difficulties. This technology is also utilized in foreign language learning programs by providing simulations of the native environment of the language from which it is originated and at the same time recognizing the gestures and facial expressions of students.
- Learning chatbot. Chatbots are starting to be used widely in the college world. This technology is used for language learning, economics, and various subjects. It has begun to be developed for other functions such as supporting student learning motivation, providing feedback for technical cases related to the platform, and collecting important information for evaluating the learning process.

Digital transformation in the context of developing higher education governance is widely realized through the process of utilizing big data in the analysis of supporting policies. Traditional higher education governance indicates a great deal of focus on reporting. The form of development of this

model is that various forms of reporting can only be produced by a minimum number of people and more widely distributed in the organization. Furthermore, stakeholders no longer rely on reporting and presenting data but how they can have direct access to integrated data while having sufficient tools to conduct analysis and make strategic decisions (Seres et al., 2018). For example, the use of big data in decision making can be implemented in:

- The process of tracking and admitting new student admission,
- The complexity of scheduling lectures and the various activities that accompany it,
- Collecting student data and information that is used to monitor learning performance and then provide appropriate assistance or support. Through the right system, this data and information can become real-time academic advisors that help students graduate on time with well-maintained academic performance.

The digital transformation in Indonesia's higher education institutions has not optimal yet. The shape of digital transformation in Indonesia is mostly implemented at the national level and manifested in information systems and the integration of university data, such as:

- Pangkalan Data Pendidikan Tinggi (PDDikti) web-based data repository (<https://pddikti.kemdikbud.go.id/>) is an information

system that collects data from each university. The data is then put together and becomes databases to assess the quality and performance of higher education and integration with other information systems.

- SINTA: Research index information system
- SAPTO: National accreditation information system
- SIMTENDIK: Education Personnel Information System
- SERDOS: An information system for certification of educators or lecturers
- SIMLITABNAS: National research information system
- ARJUNA: Journal accreditation management system
- SILEMKERMA: Cooperation information system

The implementation of digital transformation at the individual university level varies according to their capacities and resources. Several forms of digital transformation that have been widely implemented in various universities include:

- Learning service technology such as e-learning supported by LMS and distance learning programs.
- Academic information systems and learning governance
- Information system for new student admissions
- Human resources information system
- Document management information system



- Research database information system, community service, and student affairs, and
- Various forms of information systems or other governance support applications with a limited scope of operations.

Most of the technologies implemented use technology and information systems based on ORACLE or SAP, which are commonly used in various industries. However, its integration so that it can be developed and utilized into governance and analysis of big data that is integrated and used strategically is still very limited.

#### 1.4. Opportunities and Benefits of Digital Transformation

The potential for developing digital transformation in Indonesian universities is still vast. The technology availability, examples of good practices in other countries, and the emergence of new competencies enable the development of new education services. Implementing digital transformation to support the development of agile higher education institutions is still wide open. Various governance processes that run traditionally or conventionally are ready to be developed further.

These days, the Indonesian government is focusing on strengthening the higher education quality. The existence of digital transformation in higher education institutions gives opportunities to develop their governance and

education quality. Digital transformation on higher education quality management is an option for the development of this research.

This digital transformation of quality management targets the internal quality audit process of higher education. In its current implementation, the quality internal audit process comes with a conventional method where auditors use manual forms and questionnaires filled in through a direct question and answer process accompanied by the presentation of evidence. The auditors write down the discussion and findings on the audit worksheet to be recapitulated and distributed. It is difficult to collect evidence that is useful for analysis and benchmark future development systematically. Monitoring improvements and analyzing their effectiveness are also difficult. Digital transformation gives an opportunity to resolve this issue by providing an online internal audit platform that integrates and records various evidence, data, and information. This becomes a base for further evaluation and strategic decision-making.

In more detail, the digital transformation in this internal quality audit process will provide benefits in the form of:

1. The transformation process from manual to digital
2. Increasing the ease, effectiveness, and efficiency of planning, allocating resources, implementing and evaluating the audit process.
3. Ease of storing and accessing data and audit evidence before, during, and after the audit process

4. Cost efficiency in conducting internal quality audits
5. The effectiveness of corrective actions monitoring that ensures the continues-improvement
6. The availability of the departments and study programs performance information from year to year. The Rectorate can use it as performance monitoring that helps the managerial decision-making process.

For government and society, this digital transformation is also beneficial in:

1. Creating high-quality standard universities
2. Contributing to the development of appropriate science and technology that is implemented in the realm of higher education, especially regarding the internal quality assurance system.
3. Achieving the government target in educational inclusion.
4. Ensuring the learning process despite the Covid-19 pandemic.

#### 1.5. Threats and Challenges of Digital Transformation

The threats that exist in the plan to implement digital transformation in the Internal Quality Audit process include:

1. A form of digital transformation that other universities easily imitate
2. Data security issues

Meanwhile, the challenges in implementing this digital transformation include:

1. Support from management in implementing digital transformation
2. The number of business processes and activities that use manuals
3. Requires training and habituation for auditors and auditees
4. Feasibility considerations related to costs incurred with the benefits obtained.
5. Requires a longer implementation time than the manual method
6. The user's reluctance in implementing the new program.