

## Digital Learning on Smart Space to Promote High Performance Digital University

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Received: 3 October 2023; Revised 11 October 2023; Accepted 22 October 2023

**ABSTRACT:** *The organization or university has a framework method that defines its organizational structure. Standards of information and administration, as well as administrator policies, goals, missions, strategies, and strategies to develop and drive the organization to be efficient and effective, are all important for a digital university. The university develops information systems to support use, management, and other essential tasks, such as teaching, research, and administration. It also systematically collects data and communicates and exchanges knowledge to bring ideas to improve the organization. This results in an efficient work process, making the organization a high-performance digital university. The objective of this research is to explore literature and synthesize elements of Smart Space to promote high performance digital universities. The results of the research showed that the components of Smart Space consist of 6 components as follows: 1) Communication, 2) Information sharing, 3) Real-time, 4) Wireless, 5) Network, and 6) Interactive. Transforming traditional classrooms into smart learning spaces encourages learners to access resources and engage in collaborative activities. It also promotes effective communication and the sharing of data with cloud-based platforms. This research explored the characteristics of intelligent learning spaces in order to improve the effectiveness of teaching and learning management. Collaborative communication between learners is important, and instructors play a vital role in the learning environment, both during and after school hours. Current platform technology, such as teleconferencing, facilitates this communication. Encouraging collaboration through intelligent learning spaces can foster critical thinking and problem-solving skills for learners.*

**Keywords:** Digital learning, Smart space, Digital university

### 1. Introduction

Thailand must adapt by accelerating the development of science, technology, research and development, and innovation (STI). STI is the main driver of comprehensive development and capacity building in this digital era. (Umnapiang, 2022, p. 3). This technological change has profoundly impacted all sectors of society, including the government and the private sector. Educational institutions have developed new curricula to support employers. The higher education development plan for digital universities aims to use the internet to transform opportunities for the benefit of the university and social networks. Future technologies are being integrated into the curriculum, and learning environments are adapting to anytime, anywhere learning. Learners have convenient access to information both inside and outside the university (Peters, 2000). Technology supports high-quality learning processes. To develop students for Thailand 4.0,

they must be taught knowledge, morality, and 21st-century skills to live well, survive in society, and make a living, as stated. Teaching and emphasizing morality to students helps them survive in society, including through teamwork. Working together can help students achieve their goals, and encouraging learners to collaborate with each other fosters positive relationships (Puncreobutr et al., 2022). Everyone has a role to play in a team, working together on the ground in a conducive environment. Explaining knowledge to each other in a group provides an opportunity to ask questions and present new ideas. Interaction within the group helps build relationships. Organizing successful teaching and learning environments is important. The 12th National Economic and Social Development Plan discusses adaptation by accelerating the development of science, technology, and innovation as the main driving factors for development in all aspects. Digital learning and smart spaces are driving change that impacts the quality of life and education. This article presents knowledge about digital learning on smart spaces to promote high-performance digital universities (Johnson, D. W., & Johnson, R. T., 2017). The objective of this research is to explore literature and synthesize elements of smart space to promote high-performance digital universities. Definitions in this research: 1) *Digital Learning*: The effective use of technology for teaching and learning, which is applied in an online format with learners as the center of collaboration, with a pattern that reinforces effective learning and has feedback from learning to improve and develop. 2) *Smart Space*: Physical spaces where communication is unlimited. To create more interaction with each other by using Internet technology to meet users' needs for change with interactive and connected devices. 3) *High Performance Organization (HPO)*: A framework, guidelines, and the algorithm of the work process integrate information technology, resources, activities, and organizational structure. Business processes, transaction processes, standardization of information, and related administration are all important for an HPO. Additionally, administrator policies and goals, missions, strategies, and strategies to develop and drive the organization to be efficient and effective are essential (Bagorogoza et al., 2023).

## 2. Literature Review

### Digital Learning

From the study of data related to digital learning, it is related to creativity, effective teaching, feedback, and collaboration. Digital learning is defined as a variety of educational strategies that use technology to help students. This includes blended learning, flipped learning, and other strategies that use digital tools. Digital learning is intended to enhance learning. There are many ways to elevate and engage high-tech thinking in the classroom, and the possibilities are endless. As a teacher, you can access improvements that can help students learn in new ways. Children today are more proficient in using and open to new technological experiences than ever before (Lin et al., 2017). Student-centered engagement and collaboration can increase student achievement. Mobile technology has been integrated into the classroom and has become part of the educational process for the 21st century generation. Teachers use it to elevate and reinforce their lessons in expert areas, such as using full spreadsheets of apps related to the subject to achieve course objectives (Peters, 2000). Therefore, it can be concluded that digital learning refers to the effective use of technology for teaching and learning. It is applied in an online format with learners as the center of collaboration, with a pattern that enhances learning effectively. Learners have feedback from learning to improve and develop their skills (Bygstad et al., 2022).

### Smart Space

Smart Space is the application of technology to enable unlimited communication. It leads to a digital workplace by using wireless networks, cloud technology, and IoT devices such as Bluetooth Low Energy (BLE) Beacons. Smart Space uses these technologies to collect data and identify the location of users within the organization. This data can then be used to create new knowledge through data analytics or to be applied to various applications (Marin Lujak, 2019). Smart Space is a physical or digital environment created to allow more interaction between humans and technology. With open technology, internet connection, and smart city technology, Smart Space creates a collaborative and smart ecosystem. It connects digital offices, smart homes, and factories, as well as machines, sensors, and software. Smart Space is a physical environment that uses technology. Humans and machines can interact with each other through monitors and sensors. Smart environments can help people be more productive in their personal and professional lives. They can also help us use less energy, make our lives easier, and reduce stress. A smart space is a physical environment that uses data to improve the lives of its users. Smart spaces are designed to make our lives better by providing comfort, productivity, security, and convenience. Smart spaces adapt to the needs of their users and dynamically meet the changing needs of applications through a collaboration between interactive and connected devices (Bhardwaj, S., Ozcelebi, T., Lukkien, J. J., & Lee, K. M., 2018).

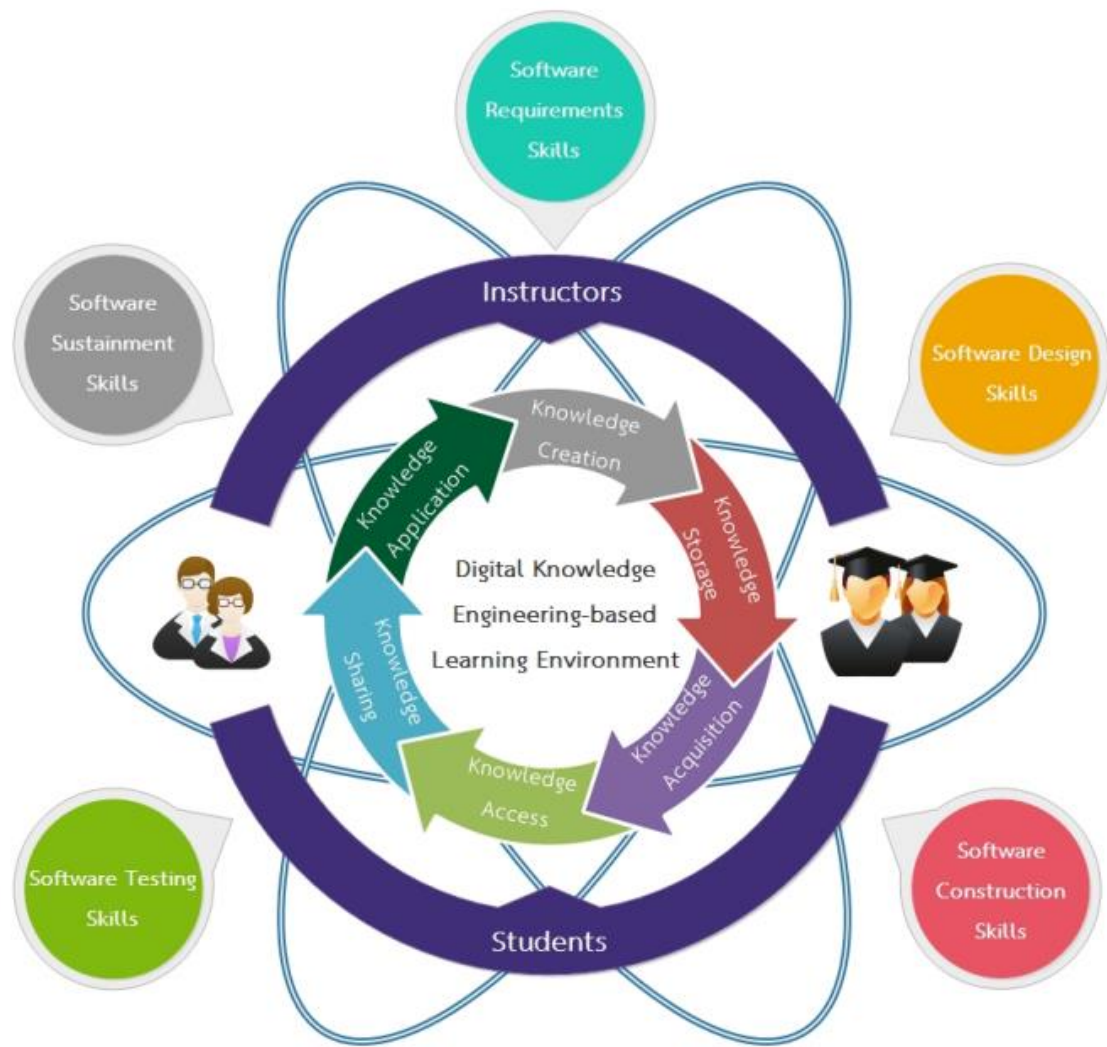


Figure 1. Digital Learning Process (Thanachawengsakul et al., 2019)

A study of research on smart space concept said that smart space is a space rich in embedded information and communication technology that works with a set of specific applications. Features of smart space design include adapting intercommunication and semantic collaboration, communication interoperability, and the comprehensive Smarts PACE architecture, which is a contemporary solution for smart spaces. Smart lighting that manages energy, capability analysis, reliability and availability, and optimization are all important features of smart spaces. Technology agreements in smart spaces involve interacting with the environment. What is needed is clear: real-time interaction with each other. This is because the agent must be able to interact with and discuss component requirements and change them at the time of execution. Software systems in smart spaces must be responsive, interactive, open, adaptable, and automated. Technologies in smart spaces include active, digital, network, security, and local resources (Marin Lujak, 2019). Smart spaces use sensors, actuators, and computer devices to detect and control their environment. They also interact with residents. In Smart space modeling, dynamic correlation must be established between the elements of the area where interaction with the device constitutes a dynamic process state. This model is flexible in terms of controlling the environment of the smart space. Environmental factors are represented by matrix elements. This linear smart space model is useful for controlling contextualized systems and demonstrating the performance of the proposed mode.

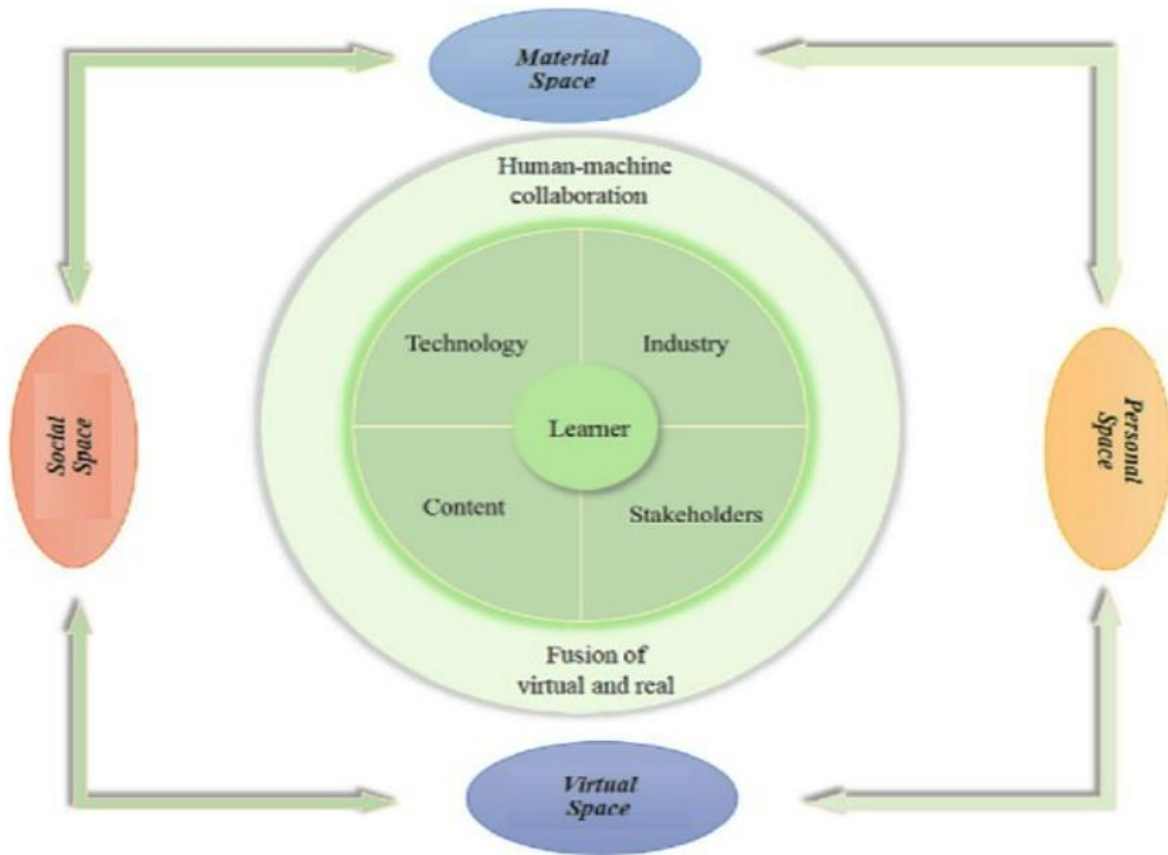


Figure 2. Smart Space Model (Zhang et al., 2023)

In conclusion, Smart Space refers to physical spaces with unrestricted communication. Smart Space uses internet technology to create more interaction with each other and to meet users' needs for change with interactive and connected devices. The author summarizes the synthesis of the Smart Space concept.

### High Performance Organization

A high-performance organization (HPO) is one that has the features and capabilities that enable it to deliver excellent performance over the long term. "High-performance enterprise analysis" organizations evaluate the sustainability of high performance and how to become a high-performance organization (André de Waal, 2019). A high-performance organization (HPO) is an organization with clear communication and coordination. Everyone in the company is important and contributes to its success. People understand their role and how their efforts contribute to the creation of desired results. An HPO is an organization that has achieved continuous success and outstanding performance recognized in its industry group. It generates business returns and returns to stakeholders sustainably and has outstanding capabilities. This enables it to create and maintain superior competitiveness. High-performance organizations (HPOs) refer to these high-intensity work environments leading to loss of productivity, high staff turnover, absenteeism, distress, and increased rates of fatigue in professionals. This effect usually starts at the leadership level and permeates through the organization. So, how can an organization promote a sustainable, high-performance culture where employees are flexible and able to strive for the best results (Jo et al., 2023). A high-performance organization (HPO) is an organization that achieves long-term financial success compared to other organizations and has the ability to adapt to the environment and respond quickly by prioritizing long-term operations in an integrated manner. The management structure is consistent, with continuous improvement and development of the organization's core capabilities and an emphasis on the importance of people as real assets. A high-performance organization based on the concept of de Waal consists of five factors: 1) quality management factors, 2) cultural values, openness, and exchange of learning factors, 3) sustainable growth factors, 4) continuous improvement factors, and 5) quality of life factors (de Waal, A., 2007). Therefore, it can be concluded that a high-performance organization

(HPO) refers to a framework, approach, or algorithm of the work process that integrates information technology, resources, activities, and organizational structure. HPOs also involve the standardization of business and transaction processes, information, and administration, as well as policies, goals, missions, and strategies to develop and drive the organization to be efficient and effective.

### Digital University

Universities in the digital age are transforming into digital universities by changing their mindset, culture, and work practices, and by bringing the right technology to bear. To achieve their goal of becoming digital universities, universities need to develop digital skills for their employees and think strategically. Factors related to the university include: 1. Change mindset and culture: Becoming more agile and flexible and embracing digital technology. 2. Change processes and workflows: Implementing performance improvement processes and using digital tools to collaborate and communicate more effectively. 3. Choose the right technology: Investing in hardware, software, and applications to support digital transformation. 4. Develop digital skills: Training employees on how to use new technologies and adopt new ways of working. And 5. Think strategically: Using data and analytics to make informed decisions about how to allocate resources and improve student outcomes (Bygstad et al., 2022). Digital universities use technology to serve students, staff, and communities in all aspects, focusing on using digital technology to create new business models and drive various forms of service. They develop learning platforms and create digital media to support 21st-century learning and results-oriented education. They also modernize the curriculum and apply AR/VR innovations to teaching and learning in various fields. In addition to teaching, digital universities also operate in tandem with an emphasis on research services. They integrate and link databases in various aspects of the university and develop information systems for executives to support planning and analysis (Purwanto et al., 2023). They also promote software for the effective management of university resources. Overall, digital universities are transforming higher education by using technology to improve teaching methods, learning, and research (Bećirović & Dervić, 2023).

### 3. Research Method

Step 1: Define the topic; The first step in research is to clearly define the topic or problem to be studied by specifying the scope of the study and the research questions to be answered. In this case, the topic or problem to be studied is "digital learning on smart space to promote high-performance digital university." Step 2: Conduct a literature review; A literature review is the process of collecting and analyzing relevant research to gain knowledge and understanding about the topic or problem being studied. To conduct a literature review, you can use search engines such as Google Scholar, Scopus, and Web of Science to find relevant articles, books, and other resources. Step 3: Analyze and synthesize the documents was content analysis form, data analysis using content analysis technique.

### 4. Results

From the study of the components of the Smart Space, as shown in Table 1

*Table 1. Synthesis of elements of Smart Space*

Smart Space	Merlin's (2019)	Salika (2019)	Tricia. s (2019)	Marin L. 2018)	Sachin B. (2018)	Results
1) Communication	✓	✓	✓	✓	✓	✓
2) Share information	✓	✓		✓	✓	✓
3) Real-Time	✓	✓	✓	✓	✓	✓
4) Wireless	✓	✓		✓	✓	✓
5) Network	✓	✓	✓	✓	✓	✓
6) Cloud	✓			✓	✓	
7) IoT	✓	✓		✓		
8) Sensor	✓	✓	✓			
9) Interactive		✓	✓	✓	✓	✓
10) Integration		✓	✓			

From Table 1, Shows that the synthesis of elements of Smart Space consists of 6 components: Communication, Information sharing, Real-time interaction, Wireless connectivity, Networking, and Interactivity. Transforming traditional

classrooms into smart learning spaces can encourage learners to access resources and engage in collaborative activities. Smart spaces can also promote effective communication and data sharing with cloud-based platforms. This research explored the characteristics of intelligent learning spaces to enhance teaching and learning management. Collaborative communication between learners is important, and instructors are an important element in the learning environment, both during and after school hours. Current platform technology, such as teleconferencing, facilitates collaborative communication in intelligent learning spaces. Encouraging collaboration through intelligent learning spaces can foster critical thinking and problem-solving skills for learners.

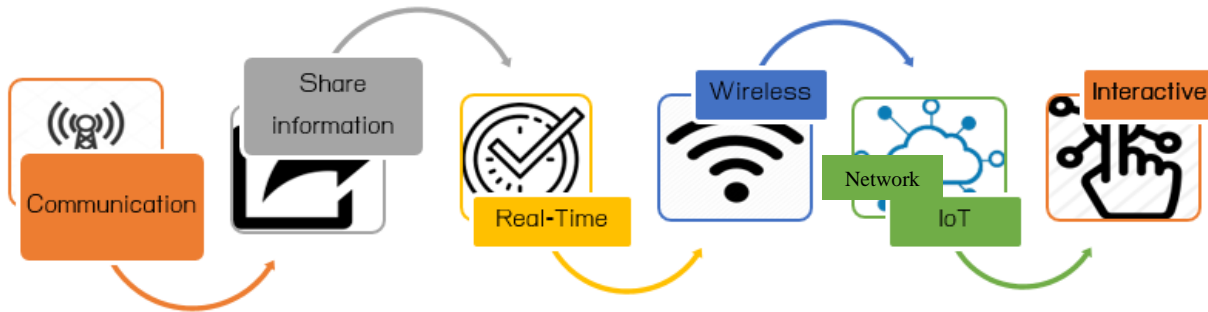


Figure 3. Smart Space

## 5. Discussion and conclusion

Digital universities refer to the introduction of digital technology into the campus environment. This involves investing in hardware and software, enhancing academic knowledge, and developing IT systems. Digital universities focus on data storage, transmission, processing, and interpretation. Instructors use technology as part of teaching and learning, and students can attend classes at any time, regardless of location. All stakeholders can comfortably work, store, and search for information, and executives can also work more efficiently. Digital universities are framed by a workflow algorithm that integrates information technology, resources, and activities, considering the organizational structure. Standards for information, administration, administrators, policies, goals, missions, strategies, and strategies are developed and driven to make the organization efficient and effective. Management has a clear vision and direction. To transform ordinary universities into digital universities, digital technology is used as a driver of change in a better direction. More efficient work strengthens the working atmosphere, resulting in a good image and satisfaction for both service recipients and stakeholders. Information systems are developed to support use and management, and data is systematically collected. Knowledge is communicated and exchanged to bring ideas for improving the organization. This results in an efficient work process, making the university a high-performance digital university.



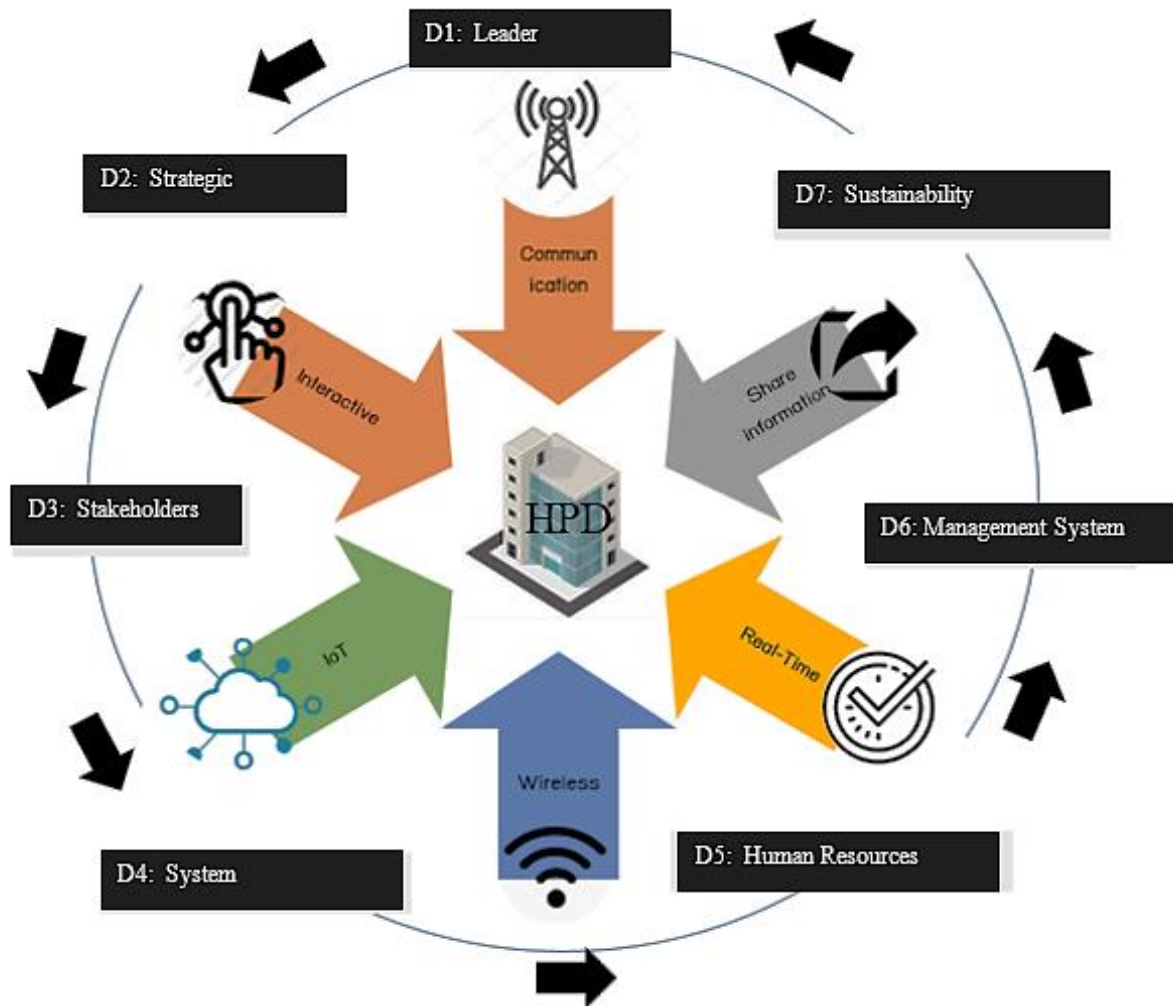


Figure 4. High Performance Digital University

From Figure 4, that high-performance digital universities are related to digital learning through the use of technology for teaching and learning. A smart space with unlimited communication fosters interaction with each other using internet technology to meet the needs of users. Method algorithms of work processes integrate information technology, resources, and activities, considering the organizational structure. Business processes and transaction processes are standardized, and information related to administration, administrators, policies, goals, missions, strategies, and strategies is developed and driven to make the organization efficient and effective.

Digital learning on a smart space to promote high-performance digital universities. Digital Learning consists of 1) creativity, 2) effective teaching, 3) feedback, 4) collaboration, by using technology for effective teaching and learning, with applications in an online format, with learners as the center to work together in a structured way to enhance learning effectively and have feedback from learning for improvement, development, together with Smart Space, found that it consists of 6 related elements as follows: 1) Communication, 2) Share information, 3) Real-Time, 4) Wireless, 5) Network and 6) Interactive. Smart Space is a physical space where communication is unlimited. It fosters interaction between learners, teachers, and stakeholders through the use of internet technology to meet users' needs for change with interactive and connected devices. The algorithm of the work process integrates information technology, resources, and activities, considering the organizational structure. Business processes and transaction processes are standardized, and information related to administration, administrators, policies, goals, missions, strategies, and strategies is developed and driven to make the organization efficient and effective. As a result, the organization becomes a high-performance organization (HPO) according to the Performance Measurement and Quality Assurance (PMQA) framework. HPOs according to PMQA criteria consist of 7 dimensions:

**Dimension 1** – Organization leaders have the following important characteristics: 1) They set the vision, mission, values, direction, and expectations for the organization. They also have good communication skills to convey this information to personnel at all levels. 2) They create a positive work environment and motivate personnel to achieve their assigned tasks. They also decentralize authority to various levels and are able to make appropriate decisions. 3) They supervise work systematically to ensure accountability for operations and fraud prevention. 4) They review the organization's performance and compare it to other departments. They also analyze performance data from all aspects, including social responsibility.

**Dimension 2** – Strategic planning is divided into three groups: 1) Internal challenges 2) External challenges 3) Other challenges. It should be tailored to the size and mission of the organization, with goals set systematically and obstacles identified. The plan should be flexible to adapt to changes in time and situation, and the targets should be linked to indicators that match the vision and mission of the organization. The plan should also be clearly communicated and translated into action.

**Dimension 3** – Stakeholders, this dimension focuses on the importance of service recipients and related parties. Good management in this dimension will lead to a positive image of the organization. Key elements include: 1) Measuring, surveying, and collecting demand data and satisfaction of service recipients and stakeholders, using the feedback to design and improve services. 2) Providing services with consideration of both the benefits and convenience of service recipients and stakeholders. 3) Connecting with clients and stakeholders to build relationships and improve relationship building methods in a way that is appropriate and aligned with strategic plans.

**Dimension 4** – System, Measurement, Analysis and Knowledge Management. This dimension focuses on the importance of data storage, knowledge organization, and measurement and analysis using information technology. Important elements for this dimension include: Continuous data collection for problem solving analysis Operational decision-making, including innovation. Information systems are readily available and easily accessible. System for collecting and transferring knowledge of personnel Seeking and exchanging best practices.

**Dimension 5** – Focus on human resources. This dimension focuses on the importance of human resources by responding to the satisfaction of personnel in various aspects, along with knowledge and capability development and potential enhancement. It involves: Providing opportunities for personnel to participate in creative expression and implementation of ideas to improve the organization. Facilitating the communication and exchange of knowledge or skills among personnel within the organization. Having rewards and incentives to support personnel morale. Creating career paths for personnel with a system for development. Developing the knowledge, skills, and abilities of personnel. Promoting health, hygiene, safety, and disaster protection. Improving the working environment to suit the operation. Assigning challenging and appropriate tasks to achieve organizational responsibility.

**Dimension 6** – Management system, this dimension encompasses business processes and procedures, both internal and external. It includes: Procedures that support people in their work to achieve their goals. The link between value-creating procedures and metrics that influence organizational success. The use of appropriate technologies and methods to increase efficiency and productivity to meet the main objectives of the procedure. Regular improvement of agency core procedures and support processes using feedback from other stakeholders. How to manage procedures efficiently to reduce work steps. Inspection of high-risk procedures, such as financial work, and the development of preventive measures.

**Dimension 7** – Sustainability is the result of managing the organization in dimensions 1 to 6. It is divided into four dimensions according to the Balanced Scorecard principle: Effectiveness dimension: This dimension measures the organization's performance against its strategic plan. Service quality dimension: This dimension measures the quality of the organization's services from the perspective of its service recipients. Efficiency dimension of government operations: This dimension measures the efficiency with which the organization uses its resources to achieve its goals. Organizational development dimension: This dimension measures the organization's progress in developing its human resources and systems.

The transition to a digital university is the use of technology in management. Therefore, digital skills are essential for driving change. Training should be provided to develop digital skills for personnel.

Further suggestions for future research should include the issue of personal data (PDPA), which is an important aspect of personal data storage for both organizations and individuals. For organizations, it is important to understand the rights of data subjects. Data controllers are responsible for the collection, use, and disclosure of personal data. Due to the development of digital universities, technology is being introduced to manage data storage in teaching and working.



## Acknowledgement

The authors are grateful for the support of Rajamangala University of Technology Tawan-Ok Chakrabongse Bhuvanarth Campus, Suan Dusit University, Bangkok Thailand, and Watkhaodin school, Bang Pakong District, Chachoengsao, Thailand.

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