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Architecture of AI-driven business model on a digital ecosystem

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Abstract

This research presents an artificial intelligence architecture framework that drives business models in a digital ecosystem using synthetic methods. This architecture focuses on integrating the potential of artificial intelligence to revolutionize the learning process and create new businesses. The system consists of four key components: 1) Recommendation System – analyzes behavior and learning progress to tailor content to individual understanding; 2) Adaptive Test System – adjusts the difficulty level of questions to suit individual learners; 3) Collaboration Tools – allow learners to exchange ideas and develop business models together; 4) Business Intelligence Tools – make practical learning easier and apply it to real-world situations. The system supports data analysis for business decision-making. The evaluation of the system indicates that it is very good (mean = 4.83, S.D. = 0.15). The proposed architecture is developed in a digital ecosystem with the function of facilitating learning and creating business plans for student entrepreneurs. This approach promotes strong governance within higher education institutions, optimizing entrepreneurial development within the various stages of education, testing, practice, and entrepreneurship assessment. This will lead to best practices in the effective use of artificial intelligence tools in such a way as to create an innovative and sustainable educational environment.

Keywords: Adaptive testing, BI tools, AI-driven business models, collaboration tools, recommendation systems.

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1. Introduction

Artificial intelligence (AI) has become a major driving force that is revolutionizing higher education [1]. AI has become the key to changing business models [2]. It enables businesses to analyze data effectively. This has led to the development of business models that can create a sustainable competitive advantage Nguyen, et al. [3] especially in an environment in

which technology and innovation are key variables. AI has come to play a huge role in marketing. Big data management and analysis enable businesses to quickly respond to changes in market demands [4]. One of the key ways to help strengthen the capacity of entrepreneurs in the digital era is through the development of AI architecture to drive business as part of the digital ecosystem. These technologies play an important role in enhancing the capabilities of organizations in terms of data management and supporting effective decision-making processes. AI has enabled entrepreneurs to apply associated technologies without the need for specialized expertise Zöller and Huber [5] with business intelligence tools such as Microsoft Power BI and Google Looker allowing organizations to transform raw data into valuable insights to formulate business strategie [6]. Recommendation systems play a prominent role in optimizing e-commerce platforms and streaming services with the ability to accurately analyze and present products or services that meet the needs of consumers [7]. Adaptive testing is applied in the education and training sectors to adapt learning styles to the needs of individual learners, resulting in more effective learning [8]. Technology-Integrated Collaboration Tools AI such as Microsoft Teams and Slack help streamline internal coordination and reduce communication barriers [9]. In education, Adaptive Learning Systems help learners develop according to their potential and interests, while Intelligent Tutoring Systems can provide real-time guidance and support that meets individual needs [10]. In addition, powered by virtual learning tools, AI also stimulates student engagement, an important factor in optimizing learning in the dimension of business and entrepreneurial development. Integrating AI into the educational curriculum has the potential to revolutionize the learning process and create business innovation [11]. A business development support system with complete AI needs to consist of a variety of components [12]. These include a business intelligence recommendation system that analyzes learning behavior in such a way as to tailor content to the needs of each user, in conjunction with an adaptive test that adjusts the difficulty level of questions to suit each learner to ensure accurate evaluation, and encourage collaboration Silva, et al. [13] tools that allow learners to exchange ideas and jointly develop a business model [14]. The National Artificial Intelligence Policy has been developed to support the adoption of AI in the business and education sectors [15]. The integration of AI in business architecture and strategic management improves efficiency and reduces operational costs [16]. Organizations that can properly adopt AI will have high growth potential and be able to compete internationally. Businesses must be prepared to grasp the opportunities and meet the challenges of digital transformation. The development of AI architecture drives business models to support learning and business development in higher education institutions - an urgent need in the digital era in that there is a need to prepare students and graduates to adapt and succeed in a rapidly changing business world [17]. Research and development in this area will help create an innovative educational ecosystem, supporting the development of young entrepreneurs and promoting sustainable economic growth in the long term.

2. Research Objectives

This descriptive research study reviews the relevant literature. The focus is on architecture of AI-Driven business model on a digital ecosystem. It consists of the following steps:

- Review the trends, research, and literature related to architecture of AI-Driven business model on a digital
- ecosystem.
- Analyze and synthesize relevant research.
- Design an architecture of AI-Driven business model on a digital ecosystem.
- Evaluate an architecture of AI-Driven business model on a digital ecosystem.

3. Literature Review

3.1. Recommendation Systems

Recommendation systems play an important role in increasing the efficiency of digital businesses [7]. Examples of successful recommendation systems include those of Amazon, Netflix, and Spotify, which use AI to learn user behavior and develop algorithms that can continuously improve the results of recommendations [18]. In addition, the combination of techniques involving deep learning in the recommendation system can improve the of the algorithms when it comes to predicting user interest [3]. The application of collaborative filtering techniques using K-Nearest Neighbors (KNN) and Singular Value Decomposition (SVD) in the online lesson recommendation system helps learners receive courses or learning content that is suitable for their interests and knowledge level. This is based on data from other learners with similar behaviors and is as follows: 1. Using K-Nearest Neighbors (KNN) in the lesson recommendation system finds similarities between learners or during lessons to recommend appropriate content. User-based KNN: This tool recommends courses to learners based on similar learner behaviors. Item-based KNN: This tool recommends lessons that are similar to lessons that users have already taken or have rated highly [19]. 2. Singular Value Decomposition (SVD) in lesson recommendation systems can be used to analyze and reduce the dimension of data. This enables the system to identify complex relationships between learners and lessons, and can be used to generate a Matrix Factorization [20]. 3. Integration of KNN and SVD to optimize the lesson recommendation system involves using KNN to first find a group of learners with similar behavior, and then using SVD to adjust the recommended score to ensure greater accuracy. AI can be used to improve the learning experience of students. By recommending courses or learning resources that align with students' interests and needs, the system suggests approaches to learners that allow them to use AI to analyze their behavior and learning progress. The main elements are as follows: 1. Learning Data Collection: Collect data from learners such as test results, participation in activities, and use of learning materials for analysis. 2. Learner Behavior Analysis: Use AI to analyze the collected data to identify learners' learning styles, interests, strengths, and weaknesses. 3. Personalized Content Adaptation: Improve and present learning content that is suitable for each learner's level of understanding and needs in order to help learners improve and develop continuously [21].

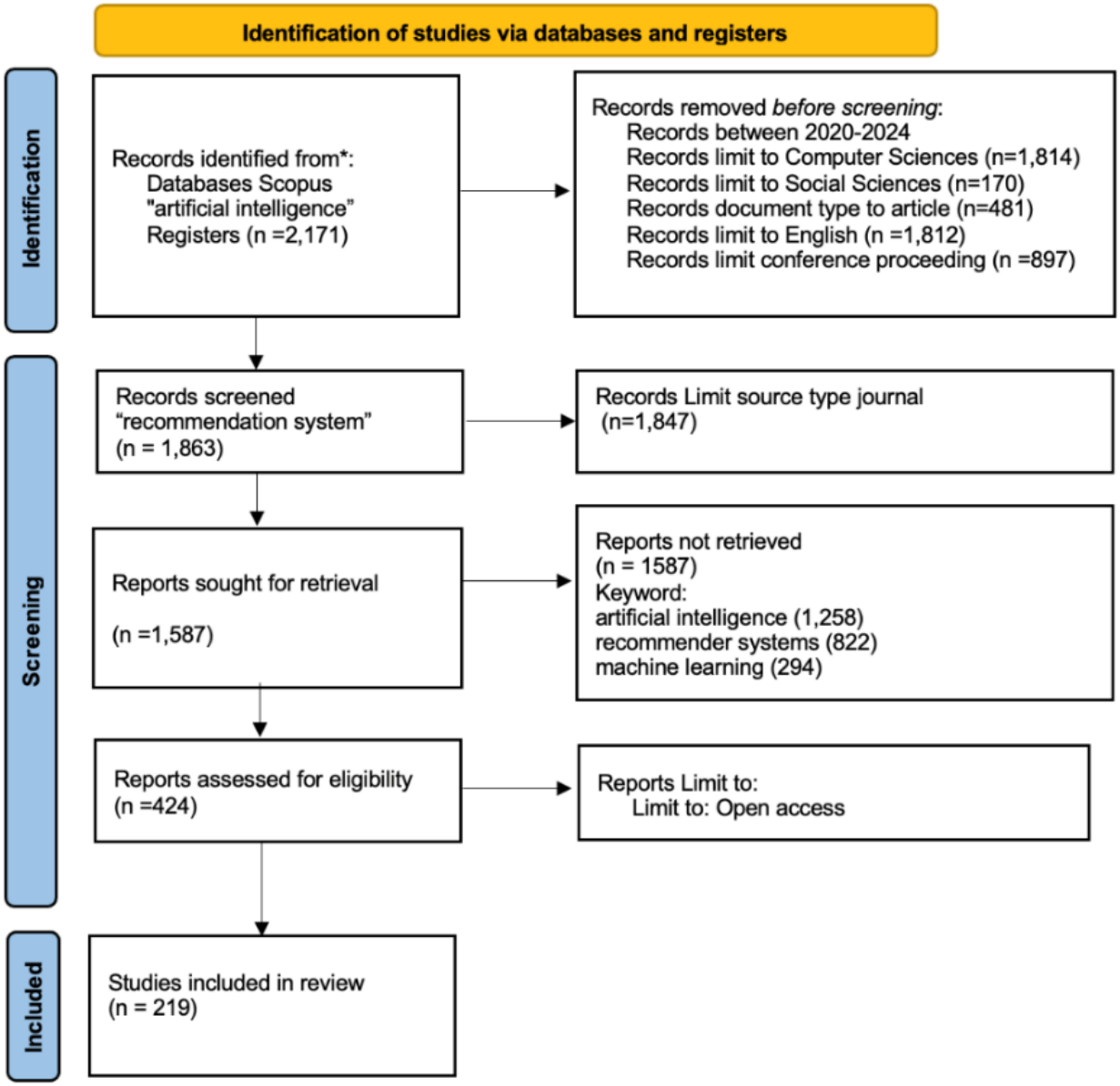

Figure 1.
The systematic reviews and meta-analyses (PRISMA) of the recommendation system.

After searching for results published in Scopus using the keyword "recommendation system", as shown in Figure 1, 2,171 studies were examined using a bibliographic analysis. involving a systematic literature review and meta-analysis according to the selection criteria for the research.

Step 1: Filter irrelevant and screened data related to "Artificial Intelligence" and "Recommendation Systems" research to identify 1,863 research papers.

Step 2: Exclude the research "Articles in Progress" and limit the types of papers to "Articles" and "Conference Papers" to identify 1,646 research papers and 1,630 research papers.

Step 3: Qualified report, leaving 1,587 research papers

Step 4: Limit the types of research papers to those published between 2020 and 2025 and English, leaving 1,587 research papers. Exclude sources not related to journals and conference papers. This left 424 research papers, and 219 open access papers were opened, leaving 219 research papers.

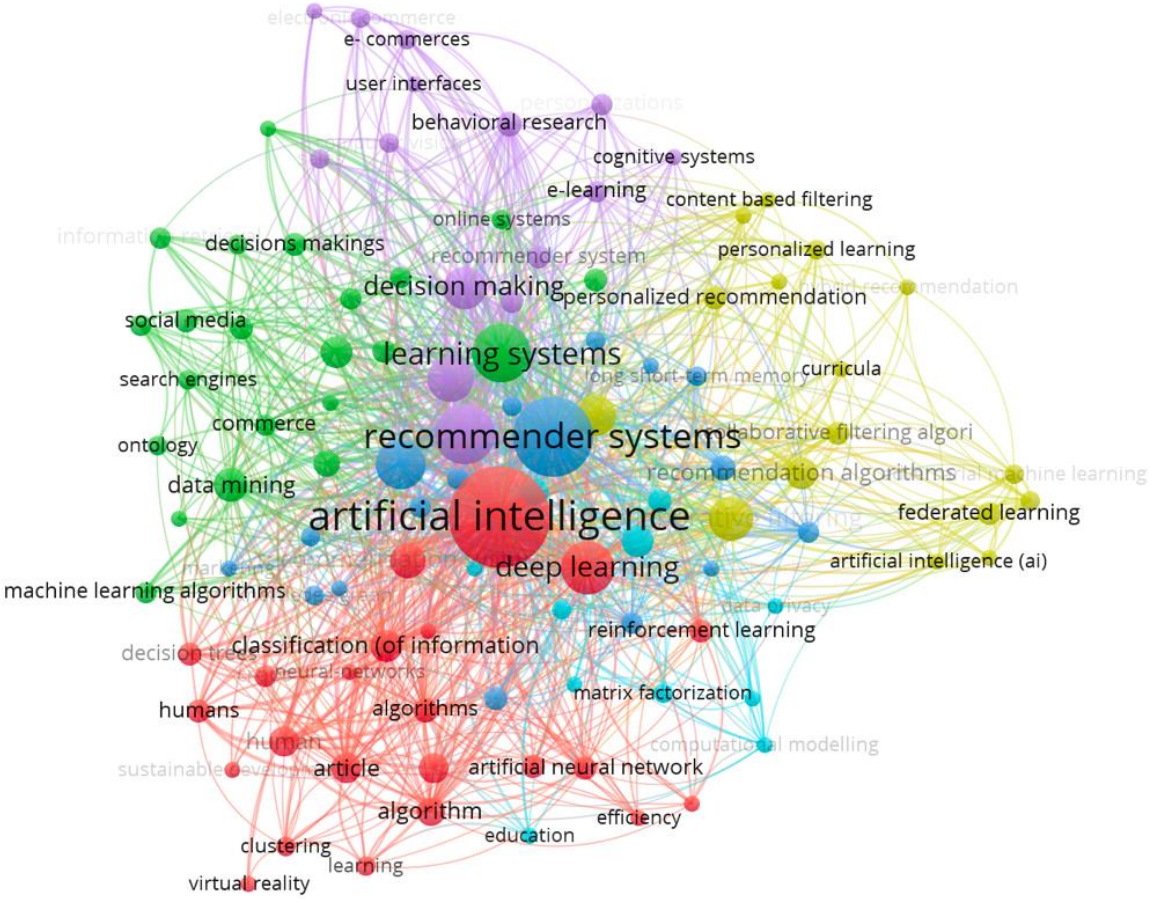

Figure 2.
The bibliometrics analysis of the Recommendation System.

3.2. Adaptive Test & AutoML

The Adaptive Test is an AI-based testing system that optimizes the difficulty level of questions for each test taker. It allows for accurate measurements and supports personalized learning [8]. Examples of systems relating to successful Adaptive Tests include the GMAT and the Duolingo English Test, which use AI to tailor the test to the learner's abilities [22]. AI enables entrepreneurs to create efficient models without data science expertise [5, 23, 24]. AutoML significantly reduces the time it takes to develop AI models and makes it easier for businesses to adopt AI [25]. Adaptive Testing and Automated Machine Learning (AutoML) uses AI to help adjust the difficulty level of the questions according to the ability of the test taker [18, 26]. The Adaptive Test involves 3 steps [23, 24, 26, 27]: 1. Start with a general question: The system will start with a question of moderate difficulty to assess the learner's basic knowledge. The system will then present more difficult questions. If the learner answers incorrectly the system will present simplified questions. 3. Continuous Assessment of Ability: The system will continuously assess the learner's ability and adjust the questions accordingly. Adaptive learning is an approach that tailors learning content and activities to the needs and abilities of the individual learner. BKT: This is used to track and evaluate learners' progress by predicting the probability that learners will answer questions or perform activities correctly. 2. Reinforcement Learning (RL) is a branch of machine learning that focuses on learning through interaction with the environment with rewards or punishments based on the actions that occur. In the context of adaptive learning, RL is used to personalize the content and learning paths of learners by analyzing learning behaviors and outcomes to make the learning experience more effective. RL is used to customize learning paths and content in real time. By learning from learners' reactions and outcomes it can be used to increase learning efficiency and increase learner satisfaction. BKT and RL involve powerful algorithms for developing adaptive learning systems. The choice of which algorithm to use depends on the purpose and context of the desired learning.

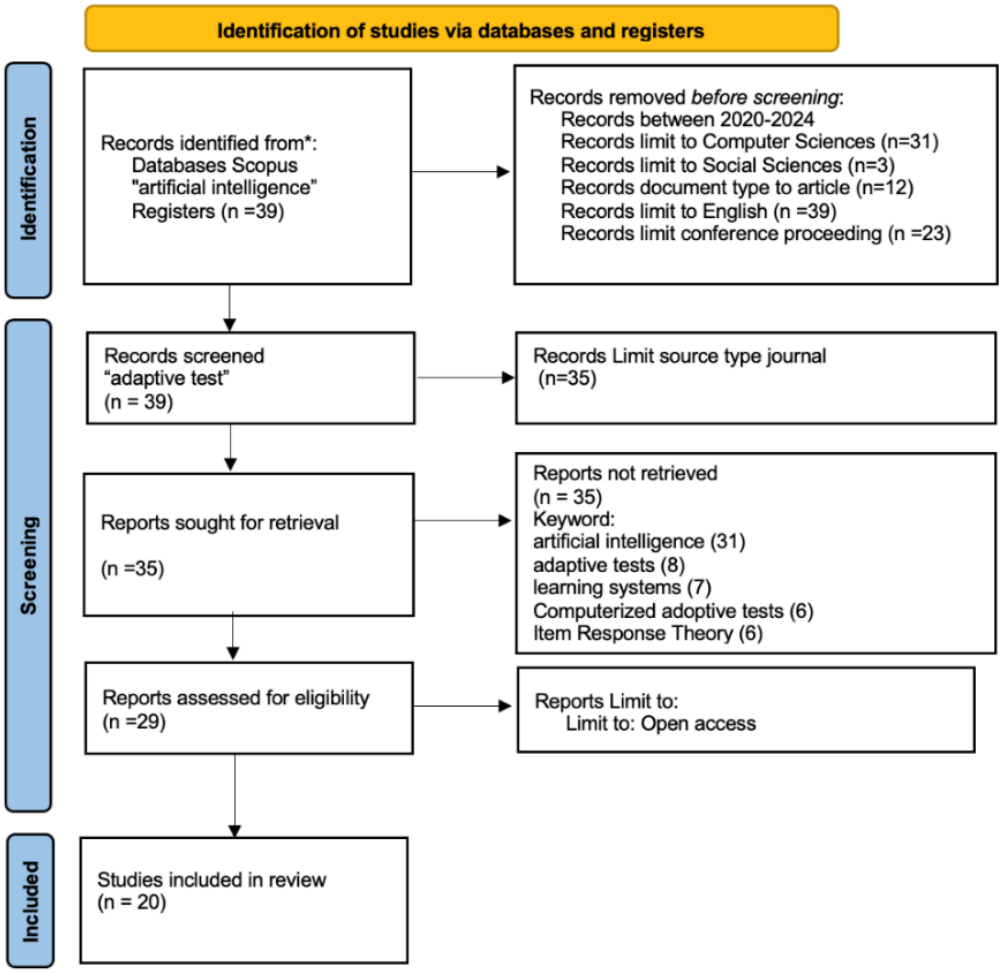

Figure 3.
The systematic reviews and meta-analyses (PRISMA) of adaptive testing

After searching the Scopus database for results using the keyword "recommendation system" 39 studies were analysed using a bibliographic analysis. The results are as shown in Figure 3. This indicates that 39 studies from the Scopus database were used for systematic literature review and meta-analysis. This number is based on the selection criteria used for the research.

Step 1: Filter irrelevant and screened data related to "Artificial Intelligence" and "Adaptive Testing" research with regard to 39 research papers .

Step 2: Limit the document types to "Articles" and "Conference Papers" reducing the number down to 35 research papers.

Step 3: Qualified report, 29 research papers left

Step 4: Limit the research papers to those published in English between 2020 and 2024 resulting in 29 research papers and open access to 20 research papers.

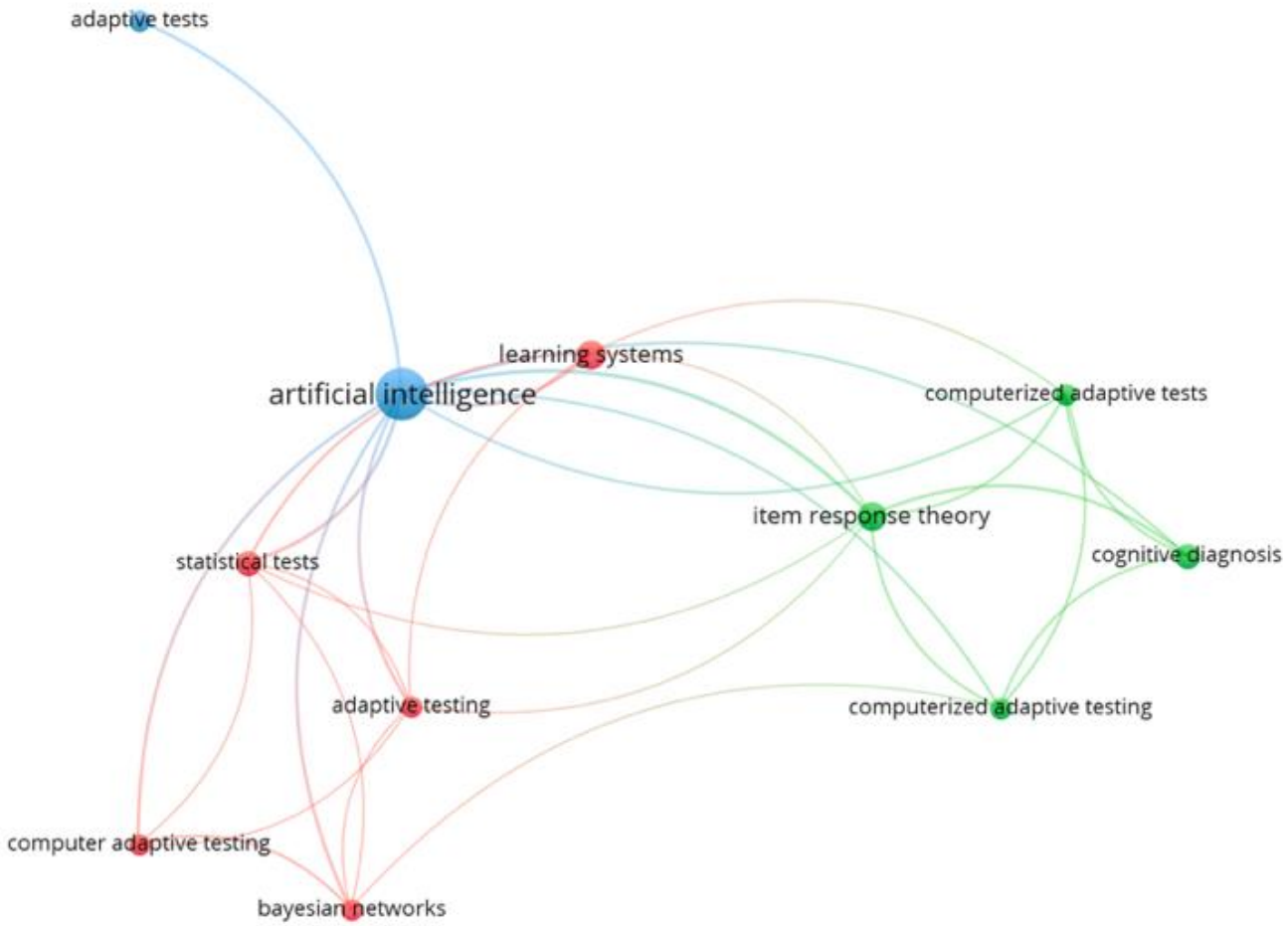

Figure 4.
The bibliometrics analysis of the Adaptive Test.

3.3. AI-Powered Business Analytics Tools (BI Tools)

AI-powered business analytics tools enable organizations to collect, analyze, and visualize data in an easy-to-understand format. AI-driven BI Tools can help organizations make strategic decisions more effectively. These tools use machine learning techniques and natural language processing to analyze data from various sources and generate meaningful reports [28]. AI-driven BI Tools can improve the accuracy of forecasting and business planning in higher education institutions. These tools can be used to analyze student data to improve teaching and learning and management[29, 30]. Powered by Business Intelligence (BI) AI enables organizations to analyze and manage insights effectively. These tools include Microsoft Power BI, Google Looker, and Tableau [28]. AI-driven BI Tools can reduce the time it takes to analyze data and help executives make strategic decisions faster [31]. BI Tools can also be integrated with other systems to create automation that helps to streamline business operations [16]. BI tools such as Power BI are suitable for practical learning and can be applied in real-world situations [32]. Power BI is a BI tool from Microsoft that stands out in terms of its ability to connect with other Microsoft programs such as Excel to create easy-to-understand data visualizations [33]. Google Looker is a BI tool from Google that helps to create data visualizations and connects to Google services such as BigQuery and Google Analytics.

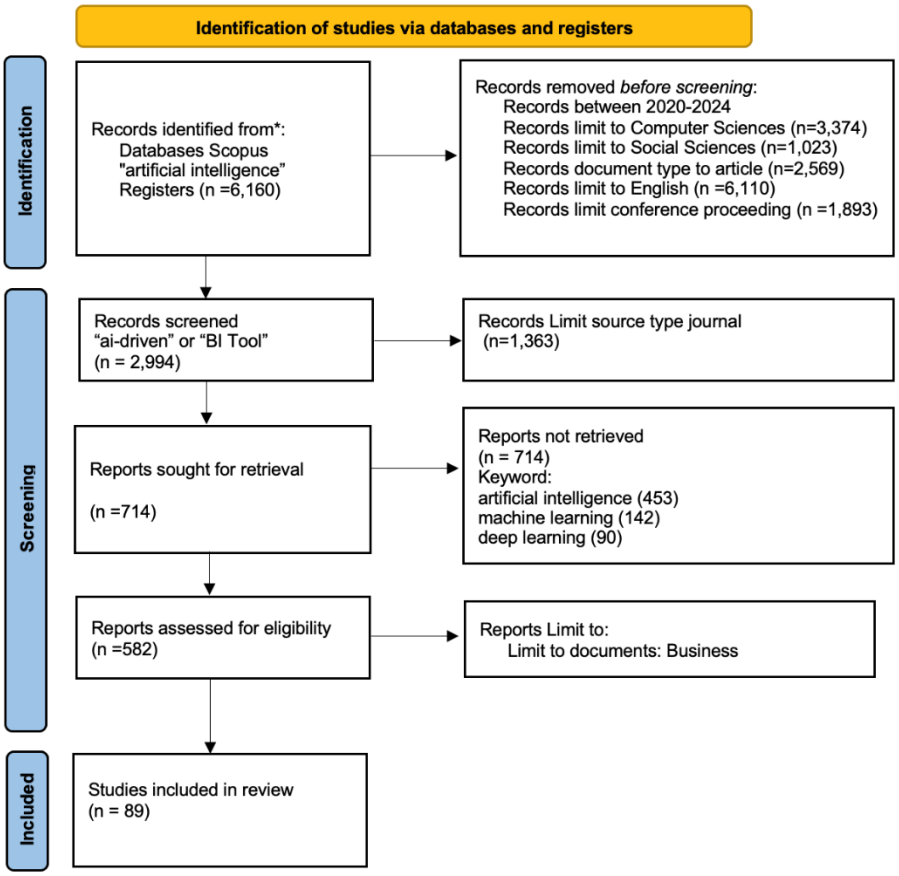

Figure 5.
The systematic reviews and meta-analyses (PRISMA) of business intelligence tools

After searching for results published in the Scopus database using the keyword "AI-Driven BI Tool", 6,160 studies were analysed using a bibliographic analysis. Thus, 6,160 studies were used for systematic literature review and meta-analysis, based on the selection criteria for the research study.

Step 1: Filter irrelevant and related to "Artificial Intelligence" and "Business Intelligence" research, leaving 2,994 research papers.

Step 2: Limit the document types to "Articles" and "Conference Papers" to reduce the number to 714 research papers and 714 research papers.

Step 3: Qualified Report, 582 research papers left

Step 4: Limit the types of research papers published in English between 2020 and 2024 leaving 582 research papers. Exclude sources not related to journals and conference papers, left 493 research papers. Of these, 89 research papers were opened, leaving 89 research papers.

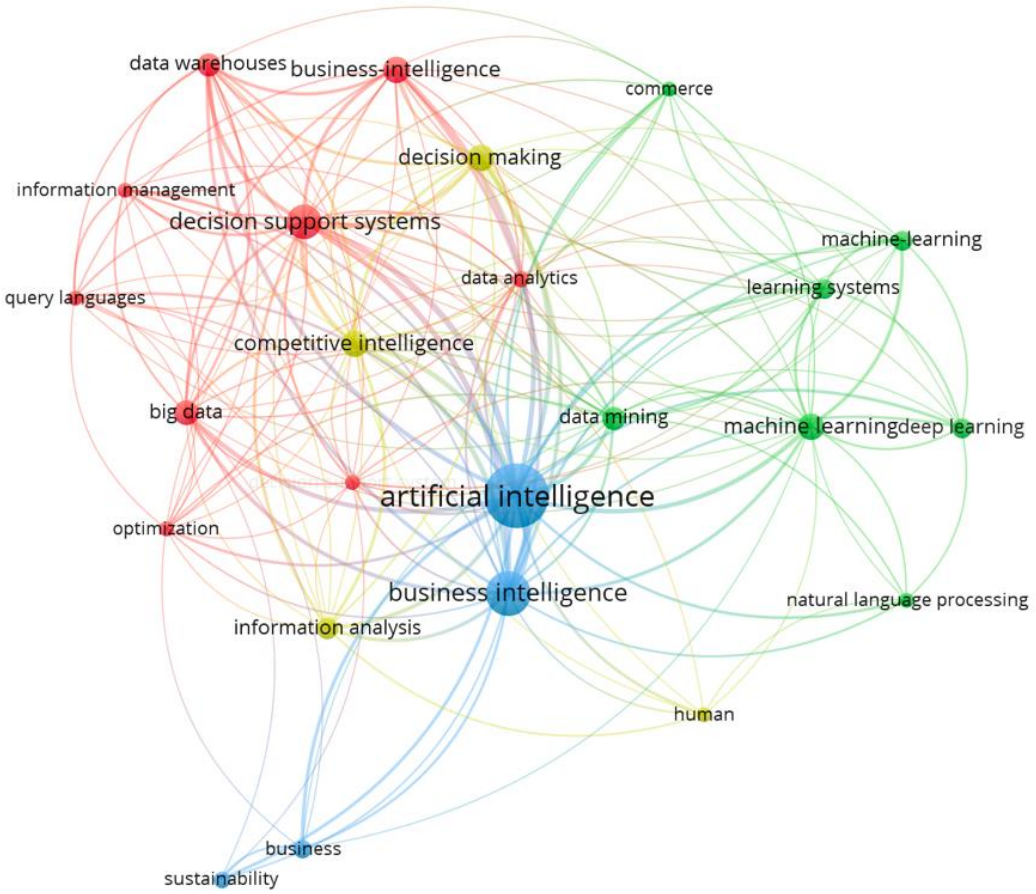

Figure 6.
The bibliometrics analysis of business intelligence tools

3.4. Collaboration Tools

AI-powered collaboration tools allow teams to communicate and collaborate effectively. A study by Eisenstein [34] shows that such tools can improve team productivity and communication within organizations. These tools use natural language processing and machine learning techniques to analyze communication and make recommendations for improvement. A study by Li, et al. [35] showed that collaboration tools powered by AI can help reduce conflict and increase understanding between team members in higher education institutions. These tools can also be used to support collaboration between students and faculty. They demonstrate that using AI-based collaboration tools helps strengthen team productivity in organizations by reducing communication and project management barriers. Examples of these tools include Microsoft Teams, Slack, and Google Workspace, all of which offer particular features [36, 37]. AI-based collaboration tools help with meetings, analyzes work data, and recommends appropriate time management [30, 32].Using AI-powered collaboration tools can help employees be more productive and reduce errors caused by unclear communication [9]. AI can also Smith and Johnson [38] help analyze user sentiment to improve the collaboration experience

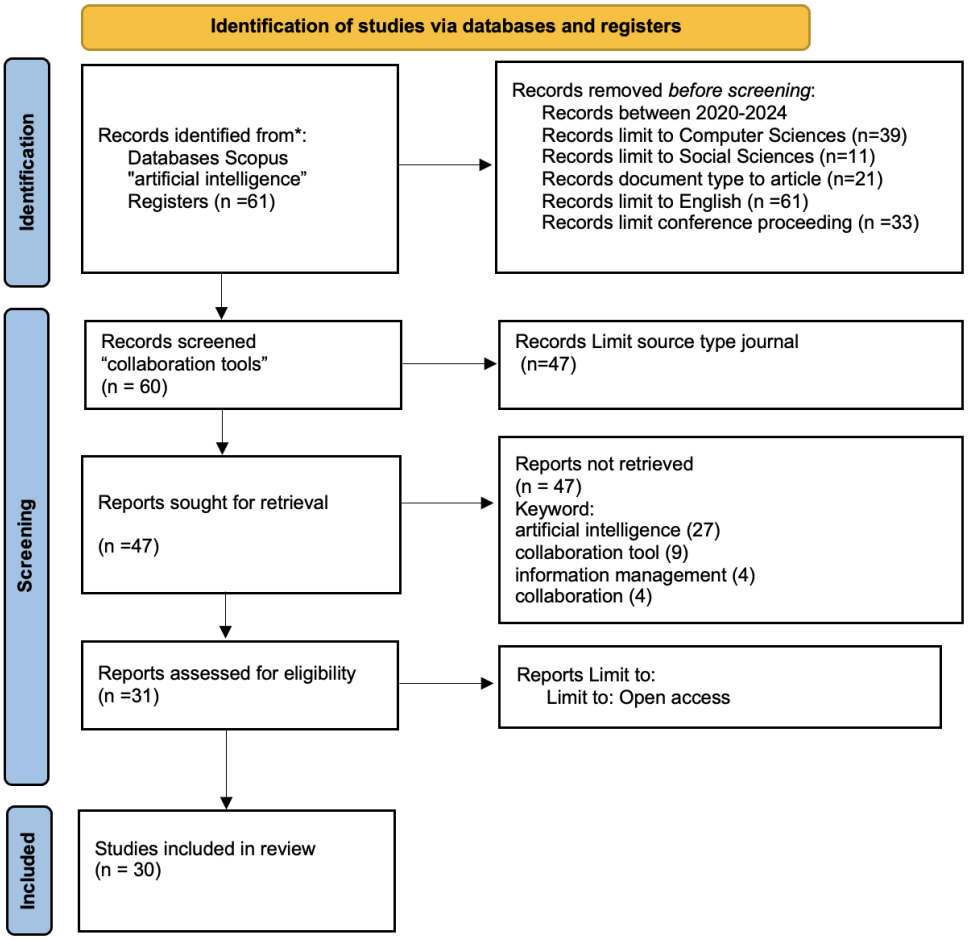

Figure 7.
The systematic reviews and meta-analyses (PRISMA) of collaboration tools.

[39]. After searching for results published in the Scopus database using the keyword "collaboration tool", 61 studies were analysed using a bibliographic analysis. The results are as shown in Figure 7. As a result, 61 studies were used for the systematic literature review and meta-analysis based on the selection criteria for the research study.

Step 1: Filter irrelevant and screened data related to "Artificial Intelligence" and "Recommendation Systems" research to obtain 61 research papers.

Step 2: Exclude the research papers "Articles in Progress" and limit the types of papers to "Articles" and "Conference Papers" resulting in 48 research papers and 47 research papers.

Step 3: Qualified Report, research papers left.

Step 4: Limit the types of research papers published in English between 2020 and 2024 leaving 31 research papers. Excluding sources not related to journals and conference papers, 30 research papers remained and access was opened, leaving 30 research papers.

3.5. Digital Ecosystem

A digital ecosystem is a network of organizations, people, technologies, and platforms that are interconnected through digital infrastructure and information exchange. This system enables interoperability, value creation, and innovation in a variety of industries. It consists of hardware such as servers and cloud platforms [40]. Machine Learning, NLP, and the languages used to develop various models such as GPT-4, DELL E2, Python Imaging Library, D3.js, React, HTML, CSS, FlaskA PI [41]. 3. The digital ecosystem can be driven by industry. Based on the drive and role of the main contributors [40] The Business Acceleration Platform (BAP) is a training and business practice source for target groups in the form of students, graduates, entrepreneurs, and internal and external personnel. The incubator uses both digital platforms and face-to-face meetings to provide mentorship, focusing on peer mentoring in which experienced students help new student entrepreneurs [42]. Currently, Thailand has not yet developed this tool to promote learning and develop entrepreneurial skills in artificial intelligence.

Table 1.
Elements of the Digital Ecosystem.

Component	Specification	Synthesis
People	Entrepreneur students, start-up entrepreneurs, and individuals interested in doing business.	Dhewanto, et al. [43]; Sunday, et al. [44]; Marinelli, et al. [45]; Ferreira, et al. [46]; Hannigan, et al. [40] and Roundy [41]
Hardware	It contains a Stand-alone PCs, Mobile apps, and desktop apps	Dhewanto, et al. [43]; Sunday, et al. [44]; Marinelli, et al. [45]; Ferreira, et al. [46]; Hannigan, et al. [40]; Roundy [41] and Evstratov [47]
Software	It includes programs used to develop AI functions, including GPT-4, DELL E2, Python Imaging Library, D3.js, React, HTML, CSS, FlaskAPI.	Dhewanto, et al. [43]; Sunday, et al. [44]; Marinelli, et al. [45]; Ferreira, et al. [46]; Hannigan, et al. [40] and Roundy [41]
Data	Resources that arise in the business process from start to finish.	Dhewanto, et al. [43]; Sunday, et al. [44]; Marinelli, et al. [45]; Ferreira, et al. [46]; Hannigan, et al. [40] and Roundy [41]
Database	Databases used to develop each model, such as Mongo DB, MySQL and PostgreSQL	Dhewanto, et al. [43]; Sunday, et al. [44]; Marinelli, et al. [45]; Ferreira, et al. [46]; Hannigan, et al. [40] and Roundy [41]
Environment	Environments consist of gateway API (HTTP), Cloud Server	Dhewanto, et al. [43]; Sunday, et al. [44]; Marinelli, et al. [45]; Ferreira, et al. [46]; Hannigan, et al. [40] and Roundy [41]; Jung, et al. [48]; Liao, et al. [49] and Sharma, et al. [50]

From Table 1 Analysis of the elements of the digital ecosystem found in documents and research. The elements are 6 as follows: 1. The individual concerned are entrepreneur students, start-up entrepreneurs, and individuals interested in doing business. 2. Hardware consists of a Stand-alone PCs, Mobile apps, and desktop apps that is used to process the operation of the algorithm. 3. Software consists of programs used to improve the work, such as GPT-4, DELL E2, Python Imaging Library, React, HTML, CSS, and FlaskAPI 4. Data consists of resources that occurs in the business process from start to finish. 5. The database used to develop each model is Mongo DB, MySQL and PostgreSQL and 6. Environment consist of gateway API (HTTP), Cloud Server

4. Materials and Method

Architecture of AI-Driven business model on a digital ecosystem promote the potential of AI **e**ntrepreneurs through research and development**.** The researcher has divided the research method into different stages that are in line with the objectives of the research**.** The purpose of the research can be divided into 2 stages as follows:
Step 1: Development of architecture of AI-Driven business model on a digital ecosystem
Step 2: Evaluation of architecture of AI-Driven business model on a digital ecosystem

5. Results and Discussion

Step 1: Development of architecture of AI-Driven business model on a digital ecosystem. The design is based on the systematic method shown in Figure 8.

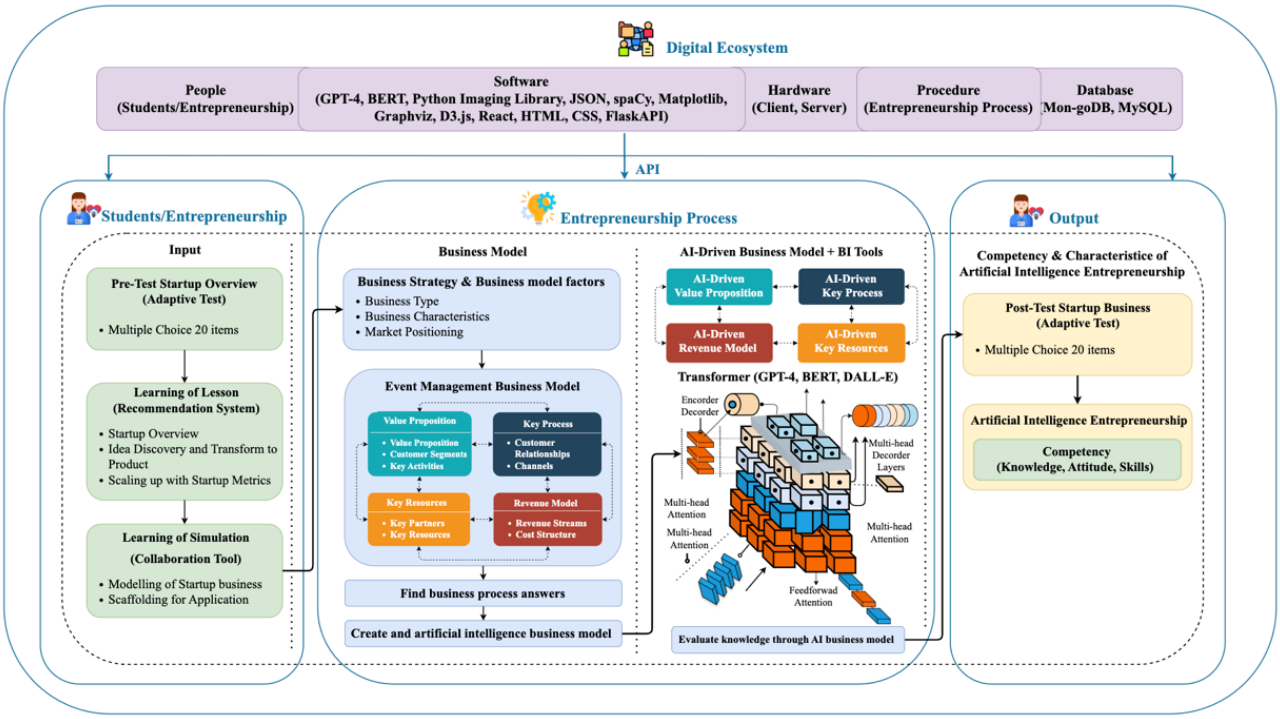

Figure 8.
Architecture of AI-Driven Business Model on a Digital Ecosystem.

From Figure 8, it can be seen that the AI-driven business model on a digital ecosystem.

1. Import factors are the import of information about start-up business operations, including: 3 The sub-steps are: (1) Taking a test before learning. (2) The lessons include: Content related to a startup business overview, concept discovery and product conversion, and scaling with startup metrics. (3) Learn about business through business models using the recommended system (Recommendation System) using modelling and scaffolding. Analyze behavior and learning progress to tailor the content to the individual's level of understanding and reinforce the case studies (Case Study). Employ a genuine business scenario to help learners comprehend the concept of leadership, enabling them to apply it in a broader range of business scenarios.

2. The entrepreneurial process involves entrepreneurs or students inputting information through the system, including: 5 The sub-steps are: 1.Determine business model factors, 2.Business planning with AI business models, 3.Finding business answers, 4.AI business model creation, and 5. Evaluating knowledge creation through AI business models with collaborative tools (Collaboration Tools), to enable learners to exchange ideas and collaborate in developing business models such as ChatGPT.

3. AI-Driven business model involves the use of business strategy data. The main sequence of operations of the business management model and business process are as follows: the user inputs data to the encoder, the data is transformed and the context is preserved. The data from the encoder is then passed to the decoder. The decoder uses this data to produce the results, word by word, until a complete result (such as a new sentence or translation) is obtained:

3.1. Encoder Block (left): Input Embeddings: Input data (text or other data) is converted into numerical vectors through the embedding process. Positional Encoding: Information about the position of each word in the input is added so that the model knows the order of the words. Multi-Head Attention: This is an attention mechanism that allows the model to focus on different parts of the input in multiple dimensions at the same time. Feedforward Network: After attention, the data is transmitted through a fully connected network to convert the data into the appropriate format. Add & Norm: The results are combined and finalized. Normalization for data stabilization: this process is repeated several times in each encoder layer.

3.2. The Decoder Block (right) receives data from the encoder and uses it as context to generate the result. Masked Multi-Head Attention: An attention mechanism that only looks at the previous data in the sequence to prevent future data from being used. Multi-Head Attention: Uses data from the encoder to help generate more accurate results. Feedforward Network: Just like in the encoder, the data is over a fully connected network. Add & Norm: Aggregates the results and normalizes them. Each decoder layer repeats the process multiple times.

3.3. Output Layer: After passing through the decoder, the data is sent to the softmax layer to convert it into a probability value and select the most suitable word for the final result.

3.4. Practice business modeling skills with BI Tool.

4. The evaluation of the performance of AI entrepreneurs is as follows: Follow-up occurs through the dashboard to allow instructors to be able to track the development of learners in real time. This allows for personalized feedback and the optimization of teaching approaches. The pre-test and post- tests are in the form of adaptive tests. Analyze and adjust the difficulty level of the questions to suit each individual for a more accurate assessment.

5. The digital ecosystem is used to support an individual (entrepreneur or student), software (the transformers model is designed to process sequence data such as text, language, or even time-series data, especially in work that requires understanding long-term contexts such as machine translation, text generation, text summarization, sentiment analysis, question answering, hardware (Stand-alone PCs, Mobile apps, and desktop apps), artificial intelligence model workflows, databases (Mon-goDB , MySQL, PostgreSQL) and 6. Environment (Cloud Server, gateway AP),

Step 2: Evaluation of architecture of AI-Driven business model on a digital ecosystem.

The population consists of experts in artificial intelligence. They have worked in information technology for communication education and organization management, with at least five years of work experience, with a minimum of five years each. The sample comprises three experts in information technology for education, five in communication and one in corporate executives. Each has at least five years of work experience. The results of the assessment of the architecture by nine experts are presented in Table 2.

Table 2.
Results of the evaluation of architecture of AI-Driven business model on a digital ecosystem.

Assessment List	Mean	S.D.	Opinion
1. Input			
1.1 Taking a pre-test	4.89	0.33	very good
1.2 Lessons	4.78	0.44	very good
1.3 Learn business through business models using modelling and scaffolding	4.67	0.50	very good
Total	4.78	0.29	very good
2. Entrepreneurship Process			
2.1 Define business strategy	4.67	0.50	very good
2.2 Business planning with AI-driven businesses models	4.67	0.50	very good
2.3 Find business answers with AI-driven businesses models	4.89	0.33	very good
2.4 Create a business model with AI-driven businesses models	4.67	0.50	very good
2.5 Evaluate knowledge generation with AI-driven businesses models	4.56	0.53	very good
Total	4.69	0.28	very good
3. AI-driven business model			
3.1 Encoder Block	5.00	0.00	very good
3.2 Decoder Block	4.89	0.33	very good
3.3 Output Layer	5.00	0.00	very good
Total	4.96	0.11	very good
4. Evaluating competencies of AI entrepreneurs			
4.1 Take the post-test	4.89	0.33	very good
4.2 Results of business modeling	5.00	0.00	very good
Total	4.94	0.17	very good
5. Digital Ecosystem			
5.1 Persons, such as entrepreneurs. students	4.78	0.44	very good
5.2 Transformers: GPT-4, DELL E2)	4.89	0.33	very good
5.3 Hardware (Stand-alone PCs, Mobile apps, and desktop apps)	4.78	0.44	very good
5.4 Artificial Intelligence Platform Procedure	4.89	0.33	very good
5.5 Databases (Mon-goDB and MySQL)	5.00	0.00	very good
5.6 Environment (gateway API, Cloud Server)	4.89	0.33	very good
Total	4.87	0.22	very good
Overview	4.83	0.15	very good

From Table 2, the results of the evaluation of the architecture of AI-Driven business model on a digital ecosystem relate to 5 modules, all of which are deemed to be at a very good level overall (Mean = 4.83, S.D. = 0.15).

Module 1: Input Factors: The overall picture is very good (Mean = 4.78, S.D. = 0.29). The pre-class test was at a very good level (Mean = 4.89, S.D. = 0.33) as was the lesson (Mean = 4.78, S.D. = 0.44), and the business learning through business models using modelling and scaffolding (Mean = 4.67, S.D. = 0.50) respectively.

Module 2: Entrepreneurship Process: The overall picture is very good (Mean = 4.69, S.D. = 0.28) This consisted of: Finding business answers using AI-driven businesses models was deemed to be at a very good level (Mean =4.89, S.D.= 0.33) , as was formulating business strategies, planning businesses with AI-driven businesses models, and creating business models with AI-driven businesses models (Mean =4.67, S.D. = 0.50). It was also assessed that knowledge generation with AI-driven businesses models was very good (Mean =4.56, S.D. = 0.53).

Module 3: AI-driven businesses models: The overall picture is very good (Mean = 4.96, S.D. = 0.11) , consisting of the Encoder Block and Output Layer at a very good level (Mean = 5.00, S.D. = 0.00) and the Decoder Block also at a very good level (Mean = 4.89, S.D. = 0.33).

Module 4: Evaluating the Competency of Artificial Intelligence Entrepreneurship. The overall score was very good (Mean = 4.94, S.D. =0.17), including the results of business modelling at a very good level (Mean = 5.00, S.D. = 0.00) and the post-class test also at a very good level (Mean = 4.89, S.D. = 0.33).

Module 5: Digital Ecosystem: The overall picture is very good (Mean = 4.87, S.D. = 0.15). The software (Transformers: GPT-4, DELL E2) and Procedure were deemed to be very good (Mean = 4.89, S.D. = 0.33), as was the hardware used (Cloud Server) (Mean = 4.78, S.D. = 0.44).

6. Conclusion and Discussion

Based on the results of this research, it has been evaluated that the AI architecture drives business models on digital ecosystems The architecture was evaluated by 9 experts. These experts said that the overall standard was excellent. This observation is consistent with the findings of many scholars who stated that Intelligent Business Recommendation Systems, Adaptive Testing System Collaboration tools and business intelligence tools can facilitate learning and create business plans for entrepreneurs. Students and graduates in higher education institutions have been greatly affected. However, stakeholders must improve their awareness and understanding of the capabilities of these systems in order to take full advantage of their strengths by supporting the use of this architecture. As a result, the supervision of strong entrepreneurial development within higher education institutions and the optimization of entrepreneurial development in the assessment of entrepreneurial competencies will lead to good practices in the effective use of AI tools and create a more sustainable and innovative educational environment [21]. The challenge facing higher education is that it is both important and complex, and responsible action is essentialto ensure positive change in higher education [13]. At the same time, there is a need to address challenges and ensure responsible use to continue to develop. Stakeholders in higher education need to be informed, act collaboratively and responsibly, and adapt to the changing landscape of a change-driven environment in higher education. There is great potential for quality improvement which would be beneficial to students, faculty, and institutions. The researchers aspire to combine the findings of the use of this platform with the principles of good governance that apply to universities to ensure that the development of entrepreneurs is still in line with the university's governance standards.

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