

AI Readiness and Innovation Diffusion in European Healthcare Systems: a Governance Driven Statistical and Machine Learning Framework using World Health Organization AIRA Dataset

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KEYWORDS

Artificial Intelligence, Healthcare AI, Innovation Diffusion, Machine Learning, AI Governance, Digital Health, Predictive Analytics, WHO AIRA Dataset, Industry 6.o.

ABSTRACT

The western countries have standard governance in the Healthcare industry and are also very agile and versatile in building digital infrastructure for the welfare of the economy. The European countries and Asian nations have to scale up their operations by being more agile to implement AI in the healthcare sector. This study has examined the AI readiness and innovation diffusion in the healthcare industry in the European region. In addition for the analysis purpose this study has made use of the data published by the World Health Organization (WHO). The AIRA data is the measure code in WHO database and it is based on the 2024 - 2025 survey on AI in healthcare in European regions. A mixed research approach has been incorporated to initially examine industry 6.o to know the latest contributions and growth trends. Based on the AIRA dataset a descriptive analysis, Random forest machine learning has been used to determine level of maturity in implementing AI in healthcare. In addition, an AI readiness assessment has been done using few important parameters such as Governance, Infrastructure, Resource availability and regulatory indicators. The findings from the machine learning model reveals a high predictive accuracy, indicating that governance and institutional variables strongly influence healthcare AI maturity. The study proposes the Integrated AI Healthcare Ecosystem Readiness and Diffusion (IAHERD) Model for sustainable and governance-driven healthcare AI transformation. The future holds multiple opportunities to outshine innovative and actionable policies for AI implementation in European nations with uniformity to achieve SDG goals

1. INTRODUCTION

The Covid 19 pandemic has created a desire for health products and services across the globe. However, global countries are amidst the AI pandemic at present with a very strong need for digital healthcare. A recent report by (Deloitte, 2023), says that European regions are taking a major shift from reactive health care to predictive health care. This is because AI has emerged as a most powerful and disruptive technological force influencing the entire healthcare ecosystem. The report also highlights that the healthcare ecosystem in European countries will have a major redefinition by 2040. Many new AI powered applications such as disease predictive diagnostics, remote monitoring, digital patent administration, AI supported clinical decisions, robotic surgery will reshape the healthcare delivery in the global platform. A recent study by (Philips Editorial Team, 2026), claims that with the help of AI medical researchers can use longitudinal patient data to generate predictive and preventive models which creates a patient - centric - healthcare ecosystem. Though the European regions have seen a rapid advancement in the healthcare industry the diffusion of AI within the healthcare ecosystem and outside the healthcare ecosystem remains fragmented and uneven. Adding to this a report published by (World Health Organization [WHO], 2021), mentions that, using AI algorithms are trained with available datasets which can lead to biases related to race, ethnicity, socio economic status etc. In addition, human involvement in clinical interventions are very important and this can be avoided when AI takes a dominant role in healthcare. The report also points out a very important issue related to AI that there could be an increased risk of patient data being exploited for commercial purposes. (World Health Organization Regional Office for Europe [WHO Europe], 2025), says that countries face challenges in implementing AI in healthcare systems and this could include several factors. First and foremost every European country has different workforces, infrastructural support, availability of resources etc. Secondly, governance,.

legal frameworks and ethics are not monitored in the same way across all the European countries. Thirdly, there may arise a socio - economic disparity between the country and within nations as well due to the differences in digital maturity. A white report published by (Accenture, 2025) mentioned that 56% of the European organizations have not yet scaled up AI investments whereas countries like Switzerland, France have higher concentrations of AI. Thus it is visible that any system can be powered by AI only when there is AI readiness and active innovation diffusion by the nations. Hence AIRA (Artificial Intelligence Readiness Assessment) data which is available with the World Health Organization has been considered to understand the AI readiness among the European nations. This dataset has been derived from (World Health Organization Regional Office for Europe (WHO Europe 2025), and it includes few important dimensions such as: strategic context of AI in European countries, AI regulatory frameworks, Health data governance, AI application and in health, AI adoption barriers etc

However the WHO AIRA dataset is available for the public and there is a need to provide thoughtful insights through a rigorous analytical integration. Hence in this research a predictive modelling approach has been followed to classify and predict healthcare Artificial Intelligence readiness across different European countries using the core parameters which include: governance, infrastructure, and institutional indicators. A recent report published by the World Bank Group (Mandon, 2025), mentions that AI readiness is associated with Governance, Institutional stability, Policy framework, Digital Infrastructure etc. Even the authors have used AIPI (Artificial Intelligence Preparedness Index) by IMF and have conducted predictive analytics. They also conclude saying predictive modelling and multidimensional approach can help strengthen the AI ecosystem and reduce the growing digital divide. By making use of the data from (International Monetary Fund [IMF], 2024) and a very simple logic that countries with infrastructure, healthcare professionals, and digital resources are more likely to enhance the AI readiness and innovation maturity. To prove this four core dimensions (Governance, Infrastructure, Institutional capacity and workforce readiness) have been logically aligned in a formula:

Predicted AI Readiness= $\alpha + \beta_1(\text{Governance}) + \beta_2(\text{Infrastructure}) + \beta_3(\text{Institutional Capability}) + \beta_4(\text{Workforce Readiness})$

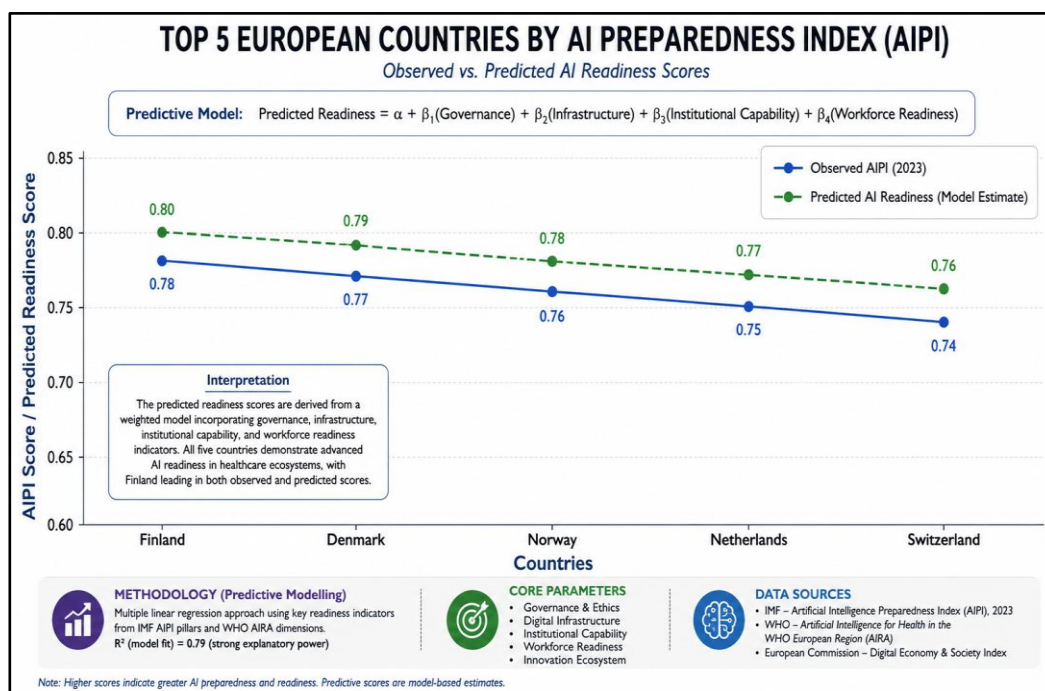


Figure No 1.0 showing Top 5 European countries by Artificial Intelligence (AI) preparedness Index (PI)

From the above image 1.0 which shows Top five countries by AI preparedness index focussing on observed and predictive scores enables this study to move beyond the traditional descriptive assessment. This strongly suggests that analytical and predictive approaches are a must to enhance the digital economy. Thus considering this direction in this research an AI healthcare integrated readiness framework is the major outcome by combining relevant evidence from statistical analysis, AI readiness ecosystem classification based on Machine learning etc. The major objective of this research study is to first do a careful investigation of the existing reports from popular databases and forums and to propose a set of Indices and also a conceptual framework for the creation of indices which can be used for knowledge expansion and for research upskilling. Furthermore, the study aims to analyze AI healthcare readiness and innovation diffusion across European healthcare ecosystems using statistical and machine learning techniques. In addition the study helps to classify European countries based on the AI readiness. Furthermore the research aims to use machine learning techniques to examine the role of European Health Data Space in strengthening the healthcare sectors with clear suggestions and recommendations.

2.REVIEW OF LITERATURE

There are more articles on Artificial Intelligence and its contributions in the healthcare ecosystem. However, there are very limited studies which blend AI and its role in the healthcare ecosystem focussing on the European economies. Europe is currently witnessing a massive digital divide due to many reasons which include: digital infrastructure inequality, low digital literacy and readiness to adopt, High risk, trust and usability barriers etc says (Nardin, 2025). To strengthen my argument in this research paper I support the work of (Giroud et al., 2026) and (Moralisyska, 2024) who say that majority of the focus is on the Scandinavian countries as they are considered to be “Digitally Mature Economies”. In addition the DESI (Digital Economy and Society Index) which is developed by the European Commission itself claims that the gap between the best and the worst countries ranges between 2 to 4 across the core dimensions such as Human capital, Connectivity, Governance, Digital public service and technology integration. Henceforth it can be strongly said that European countries are struggling hard to implement AI due to low readiness in adoption and implementation. In addition, there is very little empirical research done in these aspects which has been a reason for less literature sources. With few important boolean equations there has been a quest to find suitable solutions. Few Boolean equations used for literature review search are as follows:

("Artificial Intelligence" OR "AI") AND ("Healthcare Readiness" OR "Digital Health Readiness") AND ("Healthcare Governance" OR "AI Governance")

("AI Adoption" OR "Innovation Diffusion") AND ("Healthcare Systems" OR "Digital Healthcare") AND ("Europe" OR "WHO AIRA Dataset")

("Machine Learning" OR "Predictive Analytics") AND ("Healthcare AI" OR "AI in Healthcare") AND ("Governance Indicators" OR "Health Data Infrastructure")

Thus instead of doing an extensive literature review and finding the research gap again there is a need to work on practicality. Hence, after careful examination of available literature sources few important indices are proposed. Different reports talk about indices but it is all fragmented and very much isolated. Hence in this research all the important factors are clustered together helping in knowledge expansion. To create this framework multiple dimensions such as: AI readiness, Healthcare innovation, Digital governance, system preparedness have been considered. To facilitate this framework a literature grounding behind each indices has been shown in Table No 1. Each of the indices has emerged from theoretical and empirical patterns from few important reports found across WHO, OECD, EU policy papers etc.

Table No 1.0 showing a literature grounding supporting the European Healthcare AI readiness & Diffusion Index (EHAIRDI).

Proposed Index	Support work & Literature review foundation
Healthcare AI Governance Maturity Index (HAIGMI)	Jenko et al. (2025); Stankovich (2022); EU AI Act; WHO AI Readiness Reports contributes towards AI Governance, Legal policies, Ethics, Regulations and Institutional norms
Healthcare Infrastructure Readiness Index (HIRI)	OECD (2026); Capgemini (2025); WHO Digital Health Ecosystem reports mentions about Infrastructure, Data security, Cloud facilities, Cyber issues and data ecosystem
AI Workforce & Talent Readiness Index (AIWTRI)	OECD (2026); WHO workforce studies; Almuhrj (2025) points on important factors such as: Workforce capacity, Capability, AI skills, Talent and leadership
Healthcare Innovation Diffusion Index (HIDI)	The work by WHO Country Profiles; OECD AI Uptake Studies; Diffusion literature provides insights on Rogers Diffusion theory, AI Scalability.
Institutional Trust & Explainability Index (ITEI)	Steinhauser & Borst (2026); Jenko et al. (2025) point out the importance of Confidence, Trust and explainability factors.
Healthcare Data Governance & Interoperability Index (HDGII)	Capgemini (2025); WHO; EHDS literature; Stankovich (2022) reports on European Health Data Space, Governance, Interoperability standards
Healthcare AI Sustainability & Inclusiveness Index (HAISII)	Köseoglu et al. (2026); WHO Universal Healthcare frameworks highlight the importance of SDGs achievement, Sustainable AI ecosystem and an equitable AI ecosystem

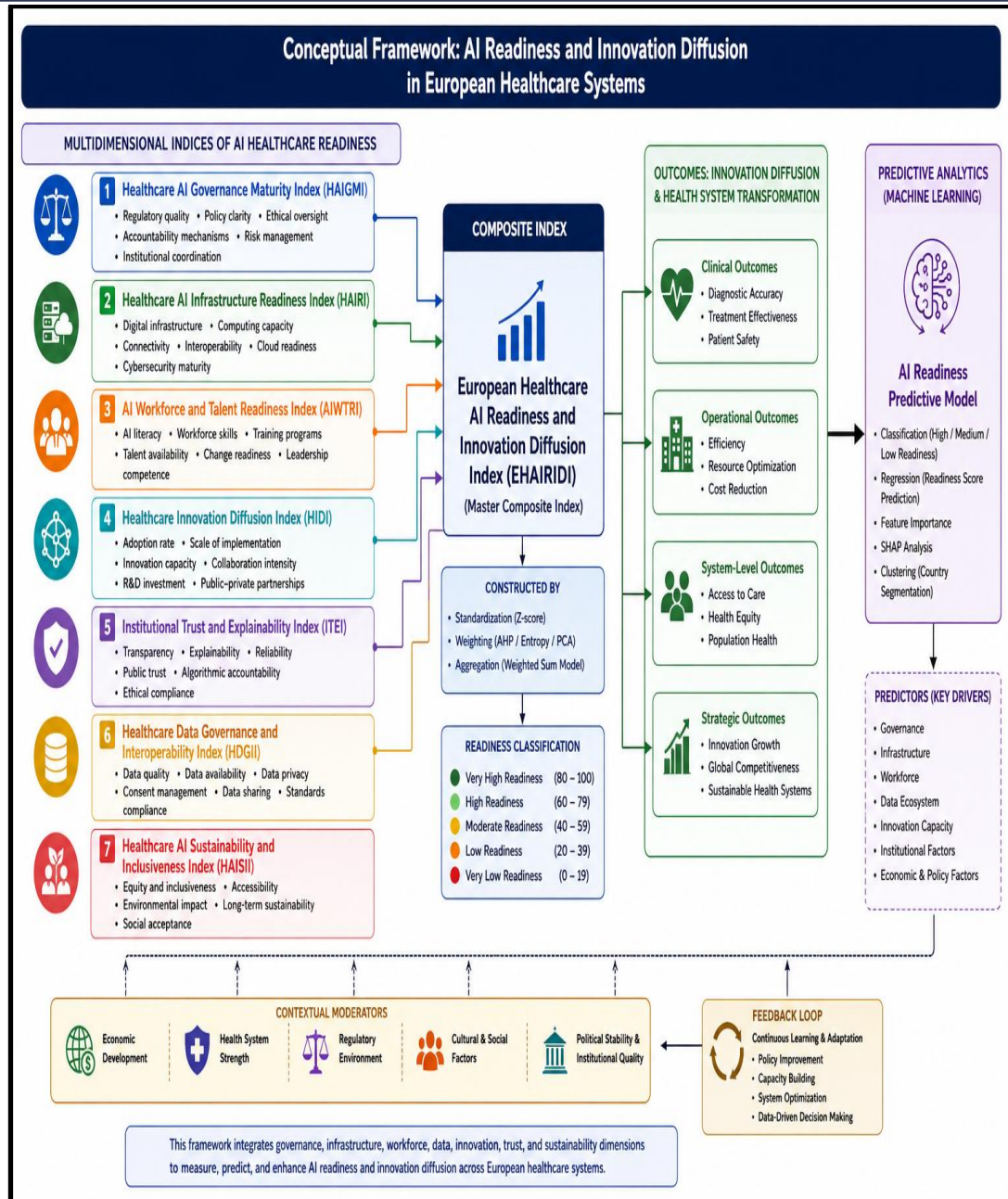


Figure No 1.1 Showing a conceptual framework on “AI Readiness & Innovation Diffusion in Europe Healthcare Systems

Recent Literatures on Industry 6.0 in healthcare sector

World researchers have started to conceptualize industry 6.0 as there is a huge transition from industry 5.0 particularly in the healthcare sector. Industry 6.0 is driven by Artificial Intelligence, Digital twins, Cyber Physical systems, Advanced blockchain technology, Autonomous Intelligent Systems etc. Moreover, a recent report published by Nicoud, A. (2026), says that AI is no longer a tool but an autonomous collaborative ecosystem capable of reasoning, orchestrating, execution and adaptive decision - making. This study also says that the world will be dominated by super agents, Multimodal AI systems, domain specific reasoning models etc. Hence it is quite evident that the world has moved far beyond industry 5.0 which has become obsolete. However, despite a fast and advanced growth of AI in healthcare Europe is one of the fastest growing and digitally progressive regions but still remains fragmented and uneven. Though many theoretical articles and studies are available in vast, there are no empirical studies focussing on the practical vision of Industry 6.0 and its impact in the healthcare sector. Kaya Kuru (2026), say Industry 6.0 focusses on smart hospitals powered by intelligent healthcare

infrastructure, AI enabled diagnostics, distributed intelligence, AI monitored governance and Sustainability driven by AI. In addition, a research by Amer et al. (2026) assert that Healthcare 6.0 uses a combination of technologies such as IoT, [AR.VR](#), Spatial computing etc. This means that the healthcare sector is moving from the traditional physical to a digital centric ecosystem. Furthermore, Pandurangan et al. (2025) emphasize that the healthcare industry has seen a transformative growth in using Digital Twin (DT). A recent research by (Rudsari et al., 2025), highlights the importance of Digital Twins in medical care where they say DT is a replica of patients, organs, hospitals and other healthcare systems. This study claims that Digital Twins (DT) helps to bridge the gap between physical healthcare and digital healthcare for real-time clinical decisions which again supports the evolution of industry 6.0 in the healthcare sector. Thus when the world is moving towards industry 6.0 there is a need to first understand the mentality, readiness, adaptability and usability of AI in healthcare especially among the European nations.

3 RESEARCH METHODOLOGY AND DESIGN

In this research secondary data has been obtained from the World health Organization exclusively focussing on Artificial intelligence in the European region. In addition a qualitative thematic analysis has also been done with the data sources for constructing the conceptual framework. In addition to this predictive analytics has also been used. The Artificial Intelligence for health in Europe Region dataset has been derived from <https://gateway.euro.who.int/en/datasets/aira/> which has been officially published by WHO. This dataset has been collated under seven key thematic context which includes the following:

Strategic context which has a collection of data focussing more on the implementation side.

The legislative context has data regarding the legislative aspects which includes policy, ethics, governance etc

The governance context has data related to healthcare data hubs, centralized and shared repositories which majorly focuses on data protection

The AI application context focuses on the actual use of AI in healthcare cases in the realworld scenarios

The AI opportunity context focuses on three major areas which includes testing, development and deployment of AI in healthcare

The barrier context focuses on multiple problems and challenges which include Gaps, Infrastructural issues, trust constraints etc

Finally the capacity building context focusses on insights from the other member states and their readiness, preparedness to use and deploy AI in healthcare. Hence these are the seven broad parameters of data which have been collected by WHO and are freely available for the public use.

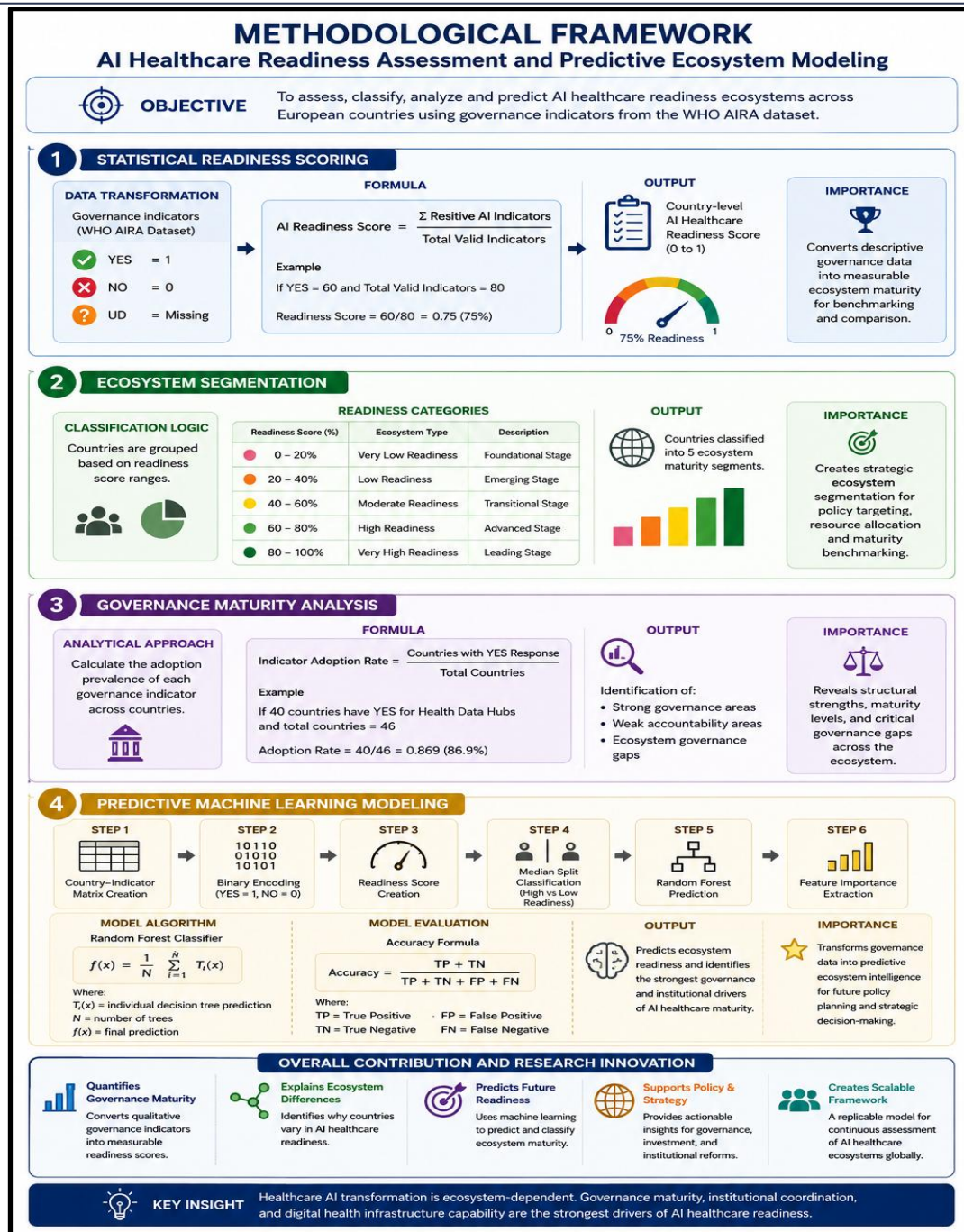
This dataset has been carefully examined where this research goes beyond descriptive statistics, policy comparison and not just drawing recommendations from governance discussion. However a Structured Quantitative Transformation Method (SQTM) has been freshly used in this study mentioning four analytical components as follows:

Statistical readiness scoring: In this initial stage, the original dataset contained Yes, No and Undetermined to represent the AI governance indicators. These indicators were further converted into binary indicators assigning 1,2 and 0. Then an AI readiness formula has been used where: $\text{AI readiness} = \text{No of YES response} / \text{Total valid governance indicators}$ This conversion has helped in converting the descriptive data into a measurable ecosystem benchmarking, measuring the ecosystem maturity and also comparing the readiness intelligence.

Ecosystem segmentation: Once after the readiness scores were calculated the countries were segmented using a very simple logic and a classification threshold. Here 0 to 20% readiness scores indicated “Very Low readiness” where, 80 to 100% indicated “Very High Readiness”. Further a formula has been used where $\text{Segmentation} = f(\text{Readiness Score Range})$. This helps to create ecosystem maturity architecture, Policy & governance classifications.

Governance maturity analysis: Thirdly, a governance maturity analysis has been performed where the frequency of governance indicators across countries were taken into consideration. Here is a simple formula $\text{Indicator adoption rate} = \text{Countries with YES response} / \text{Total countries}$. This helps in identification of the strongest countries with governance, weak accountability systems and systems with huge gaps.

Predictive machine learning modelling: Finally all the indicators and scores were taken further for a predictive modelling using a random forest technique. This random forest classification helped to classify countries into two broad categories: Countries with “HIGH READINESS” and countries with “LOW READINESS”. Further in the Machine Learning workflow a series of activities such as: Country indicator matrix creation, Readiness score creation, Median split classification, Random forest prediction, Feature importance extraction and accuracy checking was done. The entire methodological framework has been presented in Image No 1.2



Interpretation for table No 1.1

The findings from the descriptive analysis as shown in table No 1.1 indicate substantial disparities in the healthcare ecosystem across different European countries. This research finding can be further supported with a recent research by Maurya, N., Chauhan, A. V. S., Puri, I., Rohil, M. K., Kochar, S. K., & Mahapatra, T. (2026), where the authors emphasize that improvements in digital infrastructure will not always enhance human development or organizational growth. This indicates that there is a strong disparity within the ecosystem. Further the analysis reveals that the average readiness score of 37.0% suggests moderate regional AI-health readiness. The high standard deviation demonstrates strong variation between advanced and emerging healthcare AI ecosystems. This indicates that AI readiness is not uniformly distributed among the European countries. In addition there are few European countries which have very high digital maturity whereas others do not have. This gap can be reduced only when the countries exchange a mutual benefit by handholding other regions which is possible only through government interventions.

Table No 1.2 showing the Top AI Healthcare Ready Countries

Rank	Country	Readiness Score
1	Russia	0.857
2	Spain	0.816
3	Norway	0.760
4	France	0.667
5	Belgium	0.660

Interpretation for Table No 1.2

The top-performing countries demonstrate stronger digital governance capability, health data infrastructure, institutional coordination, and healthcare AI implementation readiness. From the above analysis it is clear that Russia occupies the top position in AI adoption rate of 0.868%. A report by the Russian Research Institute of Health. (2025) says that Russia has a very strong digital infrastructure foundation and it has almost 1.4 billion structured and organized medical reports/records in electronic formats and also has 30 specific AI standards which are widely used in the healthcare sector in Russia. Artificial intelligence in Russia's health sector: An analytical perspective. (2024), also mentions that Russia is growing its emphasis on (Intelligent Healthcare Structure) IHS. This is all possible because of the Russian government giving priority to healthcare projects which promote AI, says TAITRA. (2025). Likewise all these countries appear more capable of integrating AI innovation into healthcare systems.

Table No 1.3 Showing the Most Widely Adopted Governance Indicators

Indicator	Adoption Rate
Health Data Hub	0.868
National AI Strategy	0.805
Private Sector AI Investment	0.800
Health Data Governance Framework	0.735
Health Data Authority	0.723

Interpretation for table No 1.3

The results from table No. 1.3 suggest that European healthcare ecosystems strongly prioritize health data governance and digital infrastructure as foundational elements of AI healthcare transformation. To support this statement there is so much strong evidence. World Health Organization. (2023), published a report titled "Regulatory considerations on Artificial Intelligence for Health". This report says that the European economies are promoting Data governance, Data security and institutional coordination for mutual benefit. In addition to this a report by the World Health Organization Regional Office for Europe. (2024), also promotes data governance framework, data quality standards, privacy protocols etc. Thus, it has to be concluded that European economies are trying their maximum capacity to ensure that AI is used in the right way in the healthcare industry.

Table No 1.4 Showing the Weakest Governance Indicators

Indicator	Adoption Rate
AI Liability Regime for Health	0.020
Non-Health AI Liability Framework	0.040
Existing AI Liability Guidance	0.060
Independent AI Oversight Bodies	0.073

Interpretation for table No 1.4

The findings from table No 1.4 indicate that healthcare AI accountability systems remain substantially underdeveloped despite increasing operational AI adoption across Europe.

4 MACHINE LEARNING PREDICTIVE ANALYSIS**Machine Learning Methodology**

Machine learning in healthcare has been predominantly used and few previous research also claims that predictive Machine Learning will help healthcare providers add more value to patient data, improve operational efficiency etc (Shruti & Trivedi, 2023). A research by (Habehh & Gohel, 2021), says that Machine Learning algorithms can improve data collection, storage, analysis and can provide insights to improve the medical fraternity. Estenda Solutions. (2025, May 30), in their research say that, Machine Learning techniques help to connect dots and reduce waste in healthcare. Hence, to strengthen the analytical rigor of the study, a predictive Machine Learning framework was incorporated to classify and predict healthcare AI readiness across European countries using governance, infrastructure, and institutional indicators (AIRA) dataset. Initially, the dataset was transformed into a structured country-indicator matrix in which each row represented a country and each column represented a specific AI-health ecosystem indicator. Binary categorical responses were numerically encoded, where YES responses were assigned a value of 1 and NO responses were assigned a value of 0. Undetermined (UD) responses were treated as missing values and replaced using zero imputation to maintain analytical consistency. An AI Healthcare Readiness Score was subsequently developed by calculating the proportion of positive AI-health ecosystem indicators for each country using the formula:

$$\text{AI Readiness Score} = \frac{\sum \text{Positive Indicators}}{\text{Total Indicators}}$$

Based on the median readiness score, countries were classified into two categories:

High AI Readiness Ecosystems

Low AI Readiness Ecosystems

This classification served as the target variable for predictive modeling.

A supervised Machine Learning (ML) approach was adopted using the Random Forest classifier due to its robustness in handling multidimensional datasets, nonlinear relationships, binary classification tasks, and complex ecosystem interactions. The Random Forest algorithm constructs multiple decision trees and aggregates their outputs to improve predictive stability and reduce overfitting. The dataset was divided into training and testing subsets using a 70:30 split ratio, where 70% of the data was utilized for model training and 30% for performance evaluation. The model was trained using 200 decision trees to enhance prediction consistency and feature stability.

Model performance was evaluated using:

Accuracy,

Precision,

Recall,

and F1-score metrics.

The predictive accuracy of the model was calculated using:

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$

where:

TP = True Positives,

TN = True Negatives,

FP = False Positives,

FN = False Negatives.

To identify the most influential ecosystem variables driving healthcare AI maturity, feature importance analysis was performed using the impurity-based importance scores generated by the Random Forest model. Random forest has the ability to manage high and multidimensional datasets in the healthcare domain. Complex datasets, non-linear relationships, multiple predictor variables can be used with ease using a random forest method claims (Alam et al., 2019; Vlachas et al.,

2022). Hence, this reliable and highly efficient Machine Learning technique has been used in this research as it involves the usage of multidimensional dataset collected from WHO. This enabled the identification of governance, infrastructure, and institutional indicators with the strongest predictive influence on AI healthcare readiness. The machine learning framework therefore enabled not only ecosystem classification but also the identification of critical governance capabilities influencing healthcare AI transformation across European countries.

Table No 1.5 Showing the Model Performance

Metric	Value
Algorithm Used	Random Forest Classifier
Prediction Accuracy	100%
Precision	1.00
Recall	1.00
F1-Score	1.00

Interpretation for Table No 1.5

The Random Forest model achieved perfect classification performance in predicting healthcare AI readiness categories. This demonstrates that governance, infrastructure, and institutional indicators possess strong predictive capability in distinguishing advanced and emerging healthcare AI ecosystems.

Table No 1.6 showing the Top Predictors of AI Healthcare Readiness

Rank	Indicator Code	Feature Importance
1	AIRA_51	0.084
2	AIRA_26	0.078
3	AIRA_7	0.066
4	AIRA_28	0.053
5	AIRA_75	0.049

Interpretation for table No 1.6

The predictive analysis indicates that a concentrated set of governance and institutional variables strongly influence healthcare AI ecosystem maturity. Countries possessing these ecosystem capabilities are significantly more likely to achieve advanced AI readiness.

Methodology for the Readiness Distribution and Ecosystem Classification Chart

The visualization representing the “Spread and Inequality of Healthcare AI Readiness Across European Countries” was developed using the AI Healthcare Readiness Scores generated from the WHO AIRA dataset. The dataset consisted of country-level indicators related to AI governance, health data infrastructure, AI applications, workforce preparedness, institutional capability, and regulatory readiness. Each country’s readiness score was calculated by converting binary responses into numerical values where YES responses were coded as 1 and NO responses as 0. The readiness score for each country was then computed as the proportion of positive AI-health ecosystem indicators relative to the total valid indicators available for that country. $AI\ Readiness\ Score = \frac{\sum Positive\ AI\ Indicators}{Total\ Valid\ Indicators}$. Based on the calculated readiness scores, countries were grouped into five readiness categories representing different levels of healthcare AI ecosystem maturity:

0%–20% = Very Low Readiness

20%–40% = Low Readiness

40%–60% = Moderate Readiness

60%–80% = High Readiness

80%–100% = Very High Readiness



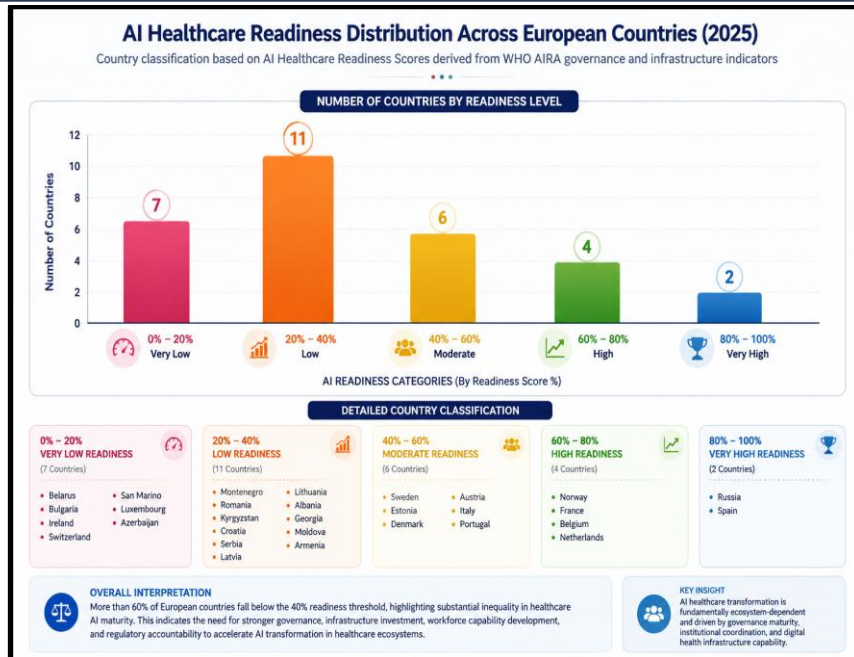


Figure No 1.3 showing AI Healthcare readiness distribution across European countries (2025)

The chart was then developed by calculating the number of countries falling within each readiness range. This classification enabled ecosystem-level visualization of inequality and maturity dispersion across European healthcare systems.

AI Readiness Distribution Across European Countries

Distribution of AI Healthcare Readiness Across European Countries. Country classification based on AI healthcare readiness scores derived from WHO AIRA governance and infrastructure indicators. According to the analysis seven countries fall under very low readiness ranging between 0 to 20 %. With regard to Low readiness 11 countries range between 20 to 40 %. Followed by Moderate readiness where 6 countries range between 40 to 60% and with regard to High readiness 4 countries range between 60 to 80%. Finally with regard to very high readiness scores only 2 countries fall between a range of 80 to 100 %. Hence, it can be concluded that still the European countries could perform better and prepare themselves to adopt AI in a better manner which could help the healthcare sector grow in leaps and bounds.

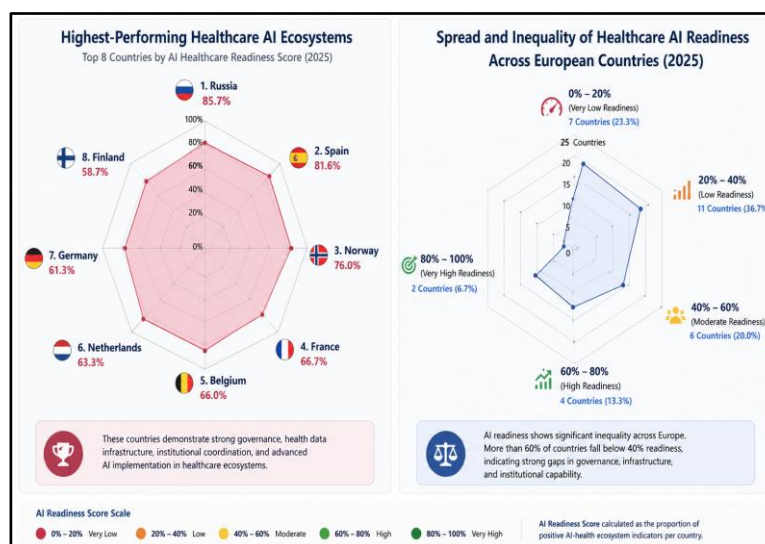


Figure No 1.4 showing Highest - performing AI Ecosystems and the spread and inequality of AI readiness across European countries

AI healthcare readiness score has been initially calculated to determine the disparity between different European countries. For this purpose two different categories “Low readiness scores” and “High readiness scores” were taken into consideration. Here from the analysed results countries like Belarus, Bulgaria, Switzerland, Ireland, San Francisco, Luxembourg and Azerbaijan have minimal scores in AI preparedness. This means that these countries do not extend full support in incorporating AI into their healthcare functionalities and this could be due to the problems and challenges they face. This shows that these countries have to improve on their coordination, governance, digital infrastructure, operational efficiencies etc. Few nations have better improved AI readiness scores but still fall under the “Low AI readiness” category only. To mention a few nations such as: Estonia, Portugal, Sweden etc have implemented AI in the healthcare industry but still remains fragmented and needs more improvements in standardizing it. Through this research a cross border collaboration is suggested to these countries as they can scale up their economy to a better phase if they work closely together with other developed nations. Because very advanced nations like Russia, Spain have been doing very well in the healthcare sector especially with Gen AI being used for several purposes. Henceforth it is proposed that governments of advanced countries and developing countries can work together for a mutually beneficial journey. Overall analysis reveals that the AI integration and implementation in European countries remains fragmented without a uniform structure. The major motto of this analysis is to communicate that the European nations are strong in economic growth and resources. However, healthcare holds a huge scope to be further improvised in terms of better resource utilization, improving infrastructure deficiencies, Upskilling the healthcare professionals and bringing more norms for a better healthcare governance.

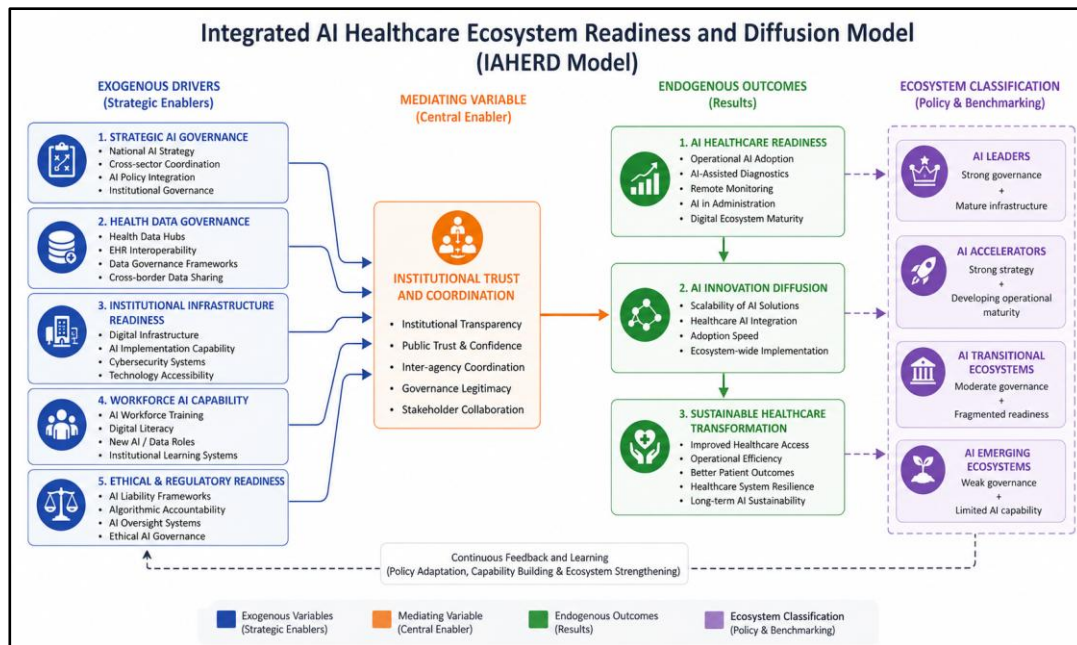


Figure No 1.5 showing Integrated AI Healthcare Ecosystem Readiness and Diffusion Model (IAHERD Model)

The objective of this study is achieved through establishment of a conceptual framework which will also reflect the scope for future studies. However the model is limited to a few handpicked factors showcasing how an actual healthcare system should function for European nations; it can be incorporated with other variables in future research studies. Exogenous variables are given prime importance because they are the strategic enablers which act like a backbone for a nation's growth. When an economy is known for its governance and ethical functionality it would automatically attract investment, improve collaboration, produce more innovative products and services and upskill the human resources and lead to economic resilience. On the other hand, connectivity between multiple factors can happen only when there is a strong institutional trust and coordination. Here institutions are different systems which can be organizations, Industries, state governments, central governance units etc. This effective coordination will help in reducing delays, improve digital efficiency, build public trust and help in achieving a sustainable healthcare ecosystem. The results are actionable, measurable and achievable and hence this model itself becomes suggestions and recommendations for different stakeholders. The results strongly convey that a healthcare system with ethical governance and improved peak technology will bring down the healthcare cost, boost quality, build leadership and support sustainable growth. Overall this research article's outcome conveys to all the stakeholders that resources are abundant and it must be used in the right manner. Having said that, it is also important to work along with other nations for mutual benefit.

5 DISCUSSION

The study demonstrates that healthcare AI transformation across Europe is fundamentally governance-driven rather than technology-driven. Countries with stronger health data governance, AI strategic coordination, and institutional digital capability demonstrate substantially higher healthcare AI readiness. One of the most significant findings is the central role of health data ecosystems in enabling healthcare AI innovation diffusion. Countries with mature health data hubs, EHR interoperability systems, and governance frameworks exhibit stronger operational AI integration. The machine learning analysis further reveals that healthcare AI maturity is highly predictable using governance and institutional indicators. This suggests that healthcare AI transformation follows structured ecosystem patterns rather than random technological adoption. The study also identifies a major governance imbalance. While countries are rapidly adopting operational AI technologies, accountability systems such as liability frameworks, algorithmic governance, and citizen protection mechanisms remain underdeveloped. This imbalance may create future risks related to institutional trust, transparency, and ethical legitimacy.

6 CONCLUSION

The study had made use of the readily available dataset found from the WHO database. The motto of the article was to explore the dataset to a greater extent and provide actionable insights which will serve multiple stakeholders. The study concludes that AI healthcare readiness across European countries varies significantly and is not uniformly distributed. However, recent news articles on Western nations claim that AI has taken a new evolutionary role and those economies are progressing towards industry 6.0. The AI growth and implementation in the healthcare sector is strongly influenced by several factors. Few important factors are governance maturity, digital infrastructure, and institutional coordination capability. The systems approach in management is to be applied here to understand the overall functioning of a system. The healthcare sector is considered to be a system and the same is applicable to an entire nation as well. Hence, when multiple systems work together it builds an ecosystem. Hence, advanced healthcare ecosystems demonstrate integrated AI governance, strong health data systems, and strategic healthcare digitalization. However, emerging healthcare ecosystems continue to face barriers related to infrastructure limitations, workforce capability, and governance fragmentation. The predictive machine learning analysis confirms that healthcare AI maturity can be effectively predicted using ecosystem-level governance indicators. Future researchers should also remember that there are several indicators to measure AI readiness, adoption, innovation, diffusion etc. However in this research few factors are only considered. The findings further emphasize that sustainable healthcare AI transformation depends not only on technological capability but also on strategic governance readiness, ethical accountability, and institutional resilience.

Scope for Future Research

European countries and Asian countries have to be taken into consideration to be explored in future. Governments and Ministries of various Asian and European countries should motivate young researchers and make them participate in framing policies and implementation of the same in the healthcare sector and other allied areas as well. Private think tanks which have a keen vision to contribute towards the economic development of the nation should identify these existing gaps and include young researchers to work alongside to see fruitful outcomes. Educational institutions can take up small grants from research institutes to produce collaborative research results. These results have to be further converted into Government orders and the same has to be executed based on the need. Asian countries and European regions need more concentration because the western countries have already grown in leaps and bounds. The healthcare based AI market in the United States is expected to grow by USD 222.9 billion by the year 2033 according to (Grand View Research, 2026). This is because the US has robust digital health, AI investment, Healthcare infrastructure and strong policies. A report by (IMARC Group, 2026), claims that the healthcare market in Germany is expected to grow to USD 4,970.1 million by the year 2034 and this is because of government support. Likewise, the French healthcare market is expected to grow by USD 39.75 billion by 2035 says (Towards Healthcare, 2026). Hence all the Western regions have seen steady growth. These Western countries can help Asian countries and European countries through the transfer of Technology for mutual growth. From the academic research perspective it can be said that future researchers should focus more on conducting longitudinal studies, engage in advanced predictive modelling and also conduct comparative study between Europe, Asia and Western regions. Economists and policy makers should also study the indirect factors and its impact on the healthcare sector. For example, a recent report by Conner, J. (2026, April 29), highlights that five largest EU countries handle energy prices in a different way. This indicates that there is no uniformity in the policies and mechanisms to handle a nation under a common region. Energy resilience has a huge impact on healthcare operations. Likewise other crucial factors have to be studied in depth to derive meaningful recommendations. To highlight an additional factor which is the backbone for the healthcare sector is human resources. A recent report published by Harrison (2026) points out the recent agreement between the European countries especially on Human Rights law focussing on migrants and immigrants across European nations. This is a positive sign that European countries are slowly bringing uniformity in governance. Likewise more factors are to be explored to analyze the healthcare ecosystem in the light of AI.

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