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Digital Genomic Alliance To Explore New Market For Acceleration

GEN.ERA

diGital gENomic Alliance to Explore new maRket for Acceleration

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1 Introduction

1.1 Purpose of this document

The report considers the present scenario of the digital genome market and its market dynamics for the period 2022-2030. It covers a detailed overview of the various market growth enablers, restraints, and trends, based on data on the Europe digital genome market based on product, end-user, and country, classified per market size of each segment. Our document aims to provide to the reader:

- A comprehensive information about factors that affect market dynamics
- An overview of market opportunities & trends for participants and stakeholders by identifying high growth sectors in the digital genome market
- An anticipation on the size of the digital genome market in Europe
- A profile analysis of leading players that operate in the digital genome market is provided in the report to examine the competitive scenario and landscape.

1.2 Methodology

This report has been developed in line with D2.1 (Template Cluster profile identification) and includes some key characteristics specific to our clusters and the GEN.ERA partnership. Structured as the studies that will focus on international markets, presenting an overview of the economic characteristics applied to genomics for each of the targeted markets as to facilitate their understanding. This study is intended to be considered in relation to the genomic value chain constituted by the GEN.ERA partnership, and thus supplements D2.1 and D2.2, enabling us to position our institutions among the European genomic market.

To prepare this report, GEN.ERA partnership relies on data collected from a variety of private and public, international, European, and national studies, such as:

- *"Europe Digital Genome Market" by Inkwood Research (2021)*
- *"Europe Genomics Market Research Report" by Market Data Forecast (2021)*
- *"Digital Genome Market Report, 2027" by Global Market Report (2020)*
- *"Filière Génomique Numérique" by D&C consultants (2019)*
- *"Plan France Médecine Génomique 2025" by Aviesan (2018)*

(Figures are in US dollars, a currency widely used in an international perspective.)

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1.3 Structuration of the report

This report has been structured to provide a comprehensive overview of the state of the genomics industry in Europe. It is therefore organized in Four parts:

- Introduction on the general trends of the field
- Data on the current state of the industry in 2021 (Product, End users, country)
- Data on the Perspective for 2030 (Product, End users, country)
- Focus on GEN.ERA partnership countries **France** and **Italy**, and "others", due to a lack of available data, we performed a global approach including but not limited to **Netherland**, **Finland** and **Estonia**.

Each section is designed in the same way and includes the specifics of the GEN.ERA partnership to give an understanding of the positioning of the proposed value chain in relation with the European market. A classification per Product and Application, allowing us to match the data with the elements presented we have established in D2.1.

2 Report

2.1 European Genomics market overview

2.1.1 Introduction

In 2021, Digital Genome Market for Europe was valued at $3220.9 million and is expected to generate a revenue of $7056.5million by 2030, growing with an anticipated CAGR of 9.07% during the forecast period.

The growth of this market is primarily driven by increasing partnerships and collaborative research, growing investments for precision medicine, and the presence of major market players. Thus, increasing preference for personalized medicine, product developments, and approvals of the digital genome is likely to fuel market growth.

In January 2020, after the first cases of suspected COVID-19 were identified, the first genome sequence of the virus was sharedpublicly. Since then, tens of thousands of samples have been sequenced. Genomics, which is concerned with the genetic material of an organism, is one of the most promising areas of research for COVID-19. Thereafter many research institutes have initiated the genomic sequences of the COVID-19 virus.

2.1.2 Definition and Scope of the study

A digital genome is a comprehensive digital set of genetic material that occurs in a cell or an organism. It is the application of computational approaches to overcome these challenges through modeling and optimization of genome engineering applications. Digital genomics deals with genes & their functions and assists in finding causes behind chronic disorders and resolving them. This technology has sparked a revolt in invention-centered research & systems biology to expedite insight into the most complex genetic systems. Moreover, the technology is

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used by professionals to get a closer look at genetically composed diseases, such as cancer. It acts as a supporter that enables instant access to trait combinations to solve endless custom queries.
The study covers the European Union plus the United Kingdom. Our approach is global; however, a geographical division has been made and the biggest national markets have been listed such as Germany, France, Italy or Belgium. Consequently, we did not collect detailed data on countries from which three of GEN.ERA's partners, Turku, Oost NL and Tartù, operate, which are thus reverted under ''rest of Europe''.

2.1.3 Key Market Dynamics

2.1.3.1 Drivers

- *INCREASE IN FUNDING BY MANUFACTURERS AND GOVERNMENT IN GENOMICS*

Five years ago, genomic sequencing was restricted to the research environment. Now, it is increasingly used in clinical practice, and over the next five years, genomic data from over 60 million patients are expected to be generated within healthcare. Genomic sequencing is rapidly transitioning into clinical practice, and implementation into healthcare systems has been supported by substantial government investment, totaling over $ 4 billion in at least 14 countries. These national genomic-medicine initiatives drive transformative change under real-life conditions while simultaneously addressing barriers to implementation and gathering evidence for broader adoption, thereby driving the market growth. For instance, “Plan France Medecine Genomique 2025” will represent a public/private investment of 800M€ and the « 1+ Million Genomes' (1+MG) » initiative which bring together 22 EU countries, the UK and Norway with a goal to have at least 1 million sequenced genomes accessible in the EU by 2022.

- *ADVANCEMENTS IN TECHNOLOGY*

The digital revolution in biology, driven by DNA sequencing, enables researchers to read the genomes of the myriads of microbes and multicellular organisms that populate the world. Presently, the DNA sequences of over 200,000 microbial genomes are deposited in digital genome databases and have exponentially increased the understanding of how DNA programs living systems. Genome engineering has excellent potential but faces many challenges before it can be effectivelyapplied in all contexts. By using digital approaches, such as machine learning and modeling, overcoming these obstacles canbe possible.

- SURGING PREVALENCE OF CHRONIC DISEASE

Most older adults (>60%) suffer from two or more chronic conditions. Twin studies have long established that genes contribute to chronic conditions such as cardiovascular disease, diabetes, obesity, RA, Alzheimer’s disease (AD), and depression. Recently, however, it has become possible to measure individual-level risks for these chronic diseases using

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molecular genetic data from genome-wide association studies (GWAS). Therefore, genetic sequencing makes them desirablefor the screening of chronic diseases. Besides, according to the World Health Organization (WHO), in 2005, almost 488,00people died in the United Kingdom due to chronic disease.

Cardiovascular diseases (CVDs) such as atherosclerosis, angina pectoris, and acute myocardial infarction are significant causes of mortality owing to the hectic present-day lifestyle. According to the European Chronic Disease Alliance (ECDA), each year, cardiovascular disease (CVD) causes 3.9 million deaths in Europe and over 1.8 million deaths in the EU. CVD accounts for 45% of all deaths in Europe and 37% of all deaths in the EU. In 2015, more than 85 million people in Europe were living with CVD, and almost 49 million people were living with CVD in the EU.

Diabetes is a life-threatening chronic disease with no functional cure. Diabetes of all types can lead to various complications in different parts of the body and increase the overall risk of premature death. Heart attack, stroke, kidney failure, leg amputation, vision loss, and nerve damage are the major complications associated with diabetes. As there is a significant increase in diabetes cases, it results in life-changing complications among the population.

For instance, in China, since 2000, the rate of diabetes has increased more rapidly due to changing lifestyles. National diabetes rates increased by more than 50%, from 4,206 prevalent cases per 100,000 in 2000 to 6,336 prevalent cases in 2017 in china. Anestimated 6.3% of the population now has diabetes. This equates to about 90 million people. Furthermore, in Taiwan, more than one in ten people have diabetes. Also, according to WHO, there are about 60 million people with diabetes in Europe, including about 10.3% of men and 9.6% of women aged 25 years and over.

Owing to the overall scenario of the high prevalence rate of chronic diseases and the aforementioned factors, the market studied is expected to grow over the forecast period.

- INCREASING DEMAND FOR PERSONALIZED MEDICINES

According to the World Health Organization (WHO), cancer is one of the leading causes of morbidity and mortality. As perWHO, Europe has around one-quarter of the global cancer cases, with some 3.7 million new patients per year. The WHO alsosuggests that 30–50% of deaths caused due to cancer can be prevented by adequate treatment in the early stages. In this scenario, personalized medicine (PM) offers the most promising approaches to tackle diseases that far elude effective treatments or cures. The EU is developing policies to move toward PM. This is underpinned by a sustained and significant investment starting in2010. So far, a total of €3.2 billion has been invested in PM research across the medical innovation cycle 'from bench to bedside.' This investment has come from the research framework programs FP7 and Horizon 2020.

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As per a study published by PMC, personalized medicines accounted for only 5% of the new FDA-approved molecular entities in 2005, whereas in 2016, they accounted for more than 25%. Additionally, 42% of all compounds and 73% of oncology compounds in the pipeline have the potential to be personalized medicines. Moreover, biopharmaceutical companies nearlydoubled their R&D investment in personalized drugs over the past five years and expect to increase their investment by 33% in the next five years. Biopharmaceutical researchers also predict a 69% increase in the number of personalized medicines in development over the coming five years.

The increasing adoption of personalized medicines for disease treatments using the patient's genetic information is expectedto aid in offering targeted treatment. This, in turn, is expected to create lucrative growth opportunities for the digital genomemarket in the near future.

2.1.3.2 Restraints

- RISKS ASSOCIATED WITH SECURITY ISSUE OF DIGITAL GENOME

There are several risks associated with the security and confidentiality of patient data. According to genetic testing authorityAdam Tanner in his 2016 article, "The Promise & Perils of Sharing DNA," anonymized or de-identified genetic sequences and shared genomic information both have many benefits, but they also present some serious security risks or, at least, potentialfuture security risks. Risks are associated with it since the Health Insurance Portability and Accountability Act (HIPAA) doesnot cover anonymized data, the firms involved in genetic testing and genealogical research are free to institute their own rules governing protections.

Additionally, although customers are told that their de-identified genetic information can be shared with third parties, they are also encouraged to share it on a wider scale voluntarily. Therefore, risks associated with the security issue of the digitalgenome are likely to restrict the market growth during the forecast period.

- LACK OF PROFESSIONALS WITH ADEQUATE KNOWLEDGE ABOUT GENOMIC TECHNOLOGY

The lack of skilled and trained professionals can be considered as one of the major restraints for the market. The number oftrained professionals has currently decreased, due to which it is difficult to find a solution to minor errors occurring during thesequencing. The critical steps of sequencing, such as sample and library preparation, and analysis, need expertise.

Also, library preparation relies on practice as it is a relatively manual process, and data analysis involves enormous volumesof complex raw data to interpret. Hence, the lack of professionals with adequate knowledge about the technology and protocols for sample processing is a major hindrance faced by the industry.

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2.1.4 State of the Market

2.1.4.1 By Product

Genomics is a discipline which analyses the function and structure of genomes (the complete set of DNA within a single cell of an organism).
The genomics value chain describes the process by which genomic samples are transformed into useable information to guide and develop treatments or improve patient care. We have divided this process into 5 steps, presented in D2.1 (Template Cluster profile identification): **Sampling, Sequencing, Exploration, Interpretation, Application.** Value chains emerge out of strategic choices by economic actors for specialization, diversification or integration, consequently each step of the process matches because requires specific products to be executed.

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Value Chain links	Links description	Product	Product Description
SAMPLING	The process of extracting, cleansing, and transporting DNA (e.g., blood or saliva samples). Overall, it is considered a low-value area since it does not necessarily require clinicians to complete it. Although this is where all the DNA data is derived from.	SAMPLE PREP INSTRUMENTS	Used only to get a sample ready for analysis on another platform, orautomated sample preparation, integrated with an analytical platform so that the sample is loaded, prepared, and analyzed in one device.
SEQUENCING	The process of decoding the order of the nucleotides in a genome is called sequencing. The sequencing process has been made more efficient in the last few years by the development and use of high-tech machinery. The ability to sequence the genome on a large scale is the reason for the rapidly decreasing costs.	DNA/RNA ANALYSIS	Extraction of DNA and RNA is the fundamental method for numerous downstream molecular biology applications and can be easily performed using commercially available DNA extraction kits. DNA and RNA extraction kits yield high-quality genomic, viral, and plasmid DNA as well as RNA from blood, tissues including biopsies and cell culture materials for standard downstream processes as well as for contamination control.
EXPLORATION	This stage enables us to understand whether the sequence of nucleotides reveals any variation when compared to other genomes. Once DNA has been sequenced it can hold a variety of data forms. By performing analysis using software and other methods, this information can be standardised, compared, and areas for investigation can be identified.	SEQUENCING AND ANALYZER INSTRUMENTS	Companies arefocusing on supplying superior quality instruments to research centers and pharmaceutical companies involved in developing therapies for genetic diseases.
INTERPRETATIO N	Interpretation is the process of translating analyzed genomic information into insights for clinicians and pharmaceutical companies. Clinicians should be able to make treatment decisions based on this interpretation. It is currently the smallest of the sub-segments.	ANALYSIS SOFTWARE	Analytical software can be utilized to analyze virtually every single experiment, ranging from gene sequence analysis to protein/protein interactions. With the vast amount of biochemical data generated from experiments conducted by research laboratories, there is a strong demand for software to analyze and manage the data effectively.
APPLICATION	Genomic information is used to provide diagnostic treatments, targeted therapies or drug development. This section will require significant data volumes and sufficient skilled workers to develop to the attainable level.	NO SPECIFIC PRODUCTS	Practicians, scientists, clinicians

Table 1: Value chain representing application and corresponding product (US M$)

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Product	2018	2019	2020	2021
Sequencing and Analyzer Instruments	1157.9	1261.1	1374.8	1499.9
DNA/RNA Extraction	847.8	927.2	1015.1	1112.1
Sequencing and Analysis Software	310.4	336.7	365.7	397.4
Sample Prep Instruments	166.5	180.1	195.1	211.5
Total	2482.6	2705.1	2950.6	3220.9

Table 2: Market distribution per product (US M$)

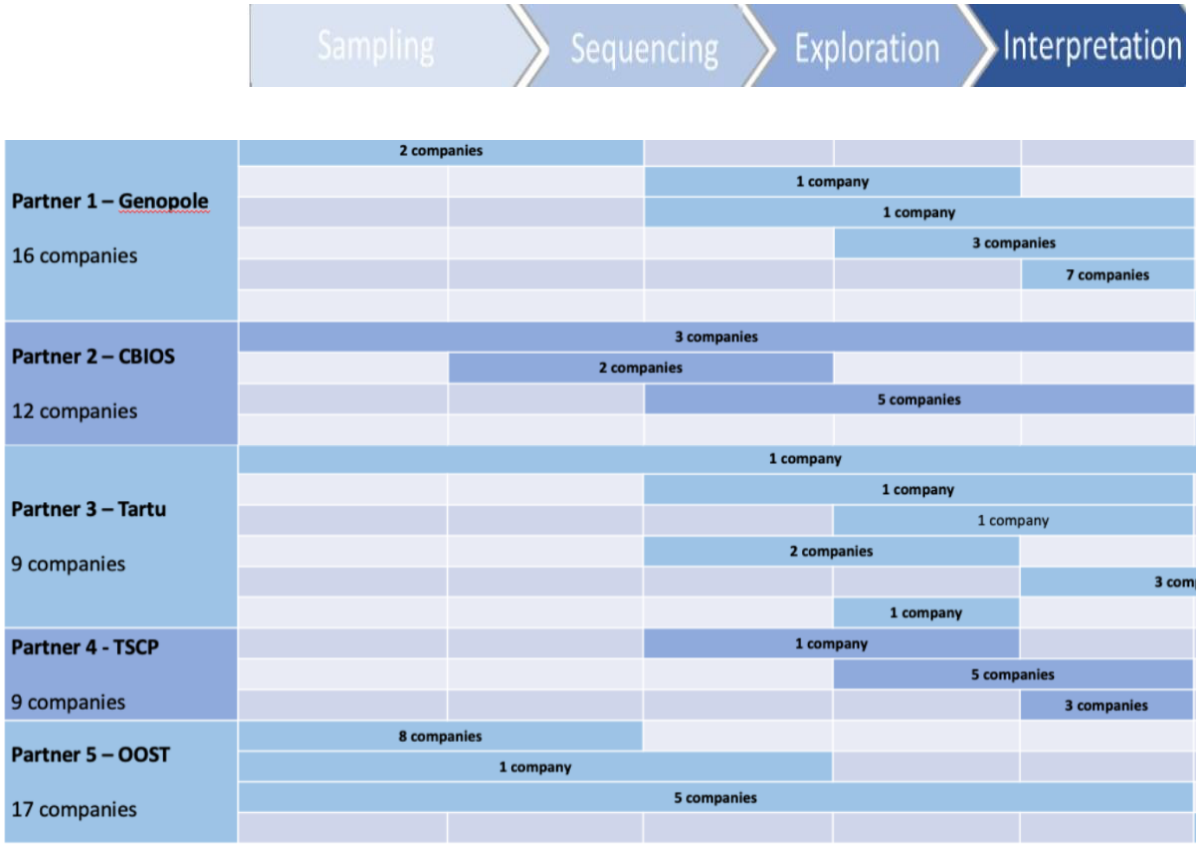

Figure 1: Digital genomic GEN.ERA partnership value chain

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2.1.4.2 By End-users

The domain plurisectoral and integrate hospitals, academics, and industry at various stages in a complementary cycle. At each step of the cycle, a specialized actor will contribute to create data-based value. From the extraction of DNA, its sequencing to allow the generation, the transmission, analysis, and exploitation of the data. The cycle integrates different types of structures, with a variety of missions: Public (research laboratories, academic service platforms in bioinformatics and/or genomics, the health sector: hospitals, cancer centers, foundations, health, and health security agencies.), Private (Companies (Start-up, SMEs, corporations) in the biomedical, pharmaceutical, biotechnological, other digital fields.)

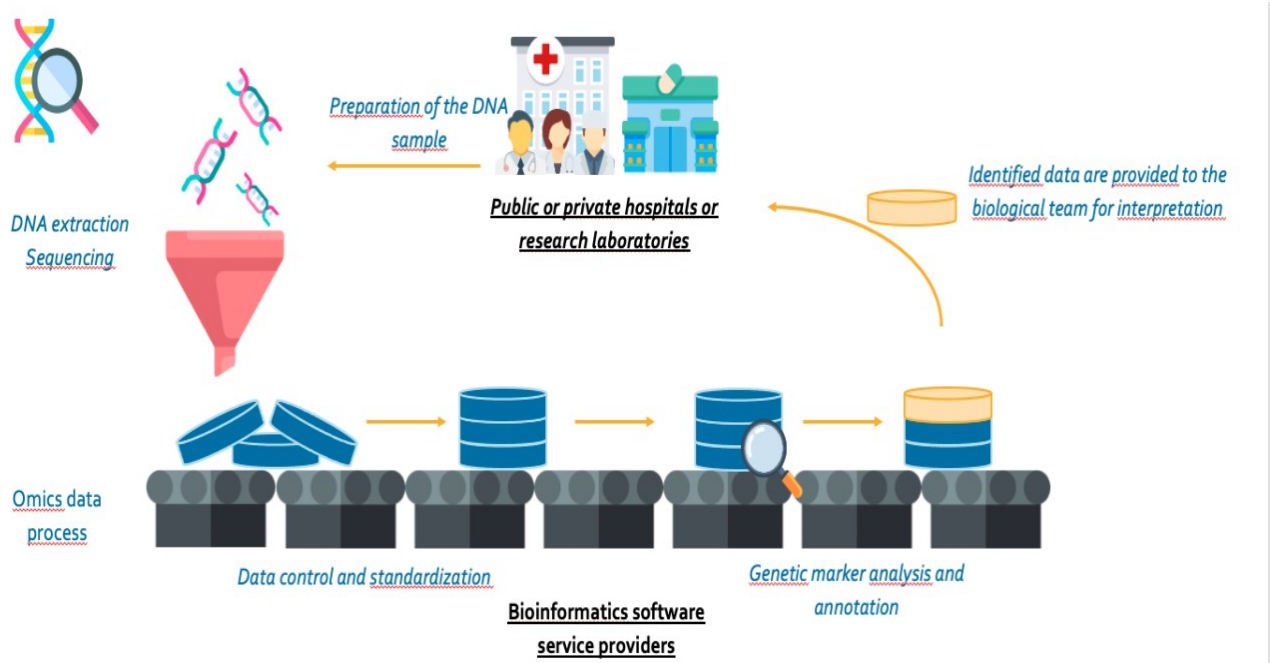

Figure 2: Genomics Interaction cycle between production and end-users

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2.1.3.3 Per Country

Europe	2018	2019	2020	2021
Germany	609.8	665.5	727.1	**795.0**
United Kingdom	429.7	468.6	511.6	**558.9**
France	342.4	374.8	410.6	**450.2**
Italy	232.3	252.8	275.3	**300.2**
Belgium	73.0	79.1	85.7	**93.0**
Poland	52.4	57.3	62.7	**68.8**
Rest of Europe	541.1	586.1	635.4	**689.4**
Total	2280,8	2484,2	2708,5	**2955,4**

Table 3: Market per country (US M$)

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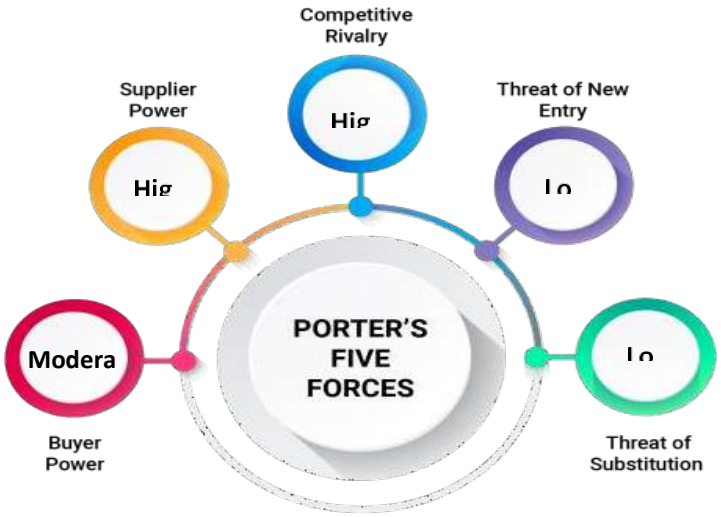
2.2 Digital Genomics Perspective (2030)

2.2.1 Porter's five forces analysis: Industry Structure

The model of the Five Competitive Forces was developed by Michael E. Porter in 1980. Since that time, it has become an important tool for analyzing an organization's industry structure in strategic processes. Porter's model is based on the insight that a corporate strategy should meet the opportunities and threats in the organization's external environment. Especially, competitive strategy should be based on the understanding of industry structures and the way they change. Porter has identified five competitive forces that shape every industry and every market. These forces determine the intensity of competition and hence the profitability and attractiveness of an industry.



NEW ENTRANTS: Digital technology is growing due to continuous innovations. The major players such as Illumina and Roche Diagnostics contribute a significant share to the market as they update their technology according to the innovations in the market, thussatisfying all needs and requirements of their customers. Due to the continuous advancements, they hold a strong relationship with their customers and pose a threat to any new player to establish itself in the pre-existing market of dominant players.However, the entry barrier is high in this market, as it deals with complex technologies. Thus, it can be said that there is lessthreat from new entrants.

SUBSTITUTION: There are no other ways to sequence genomes, get genomic information, or analyze and interpret sequencing results. However, there are some indirect substitutes such as biopsy, MRA, etc., which can also be interpreted in a wet lab and compared withexisting results. Hence, the threat of substitution is low.

BUYERS POWER: As the demand for digital genome products grows due to the rise in cases of chronic and non-chronic ailments, many smallcompanies are pricing their products

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competitively. Digital genome products are mainly sought by research institutions and hospitals. Buyers can choose from a range of options. This is mainly because the established companies provide new products that offer new or better solutions to various ailments. Much collaboration occurs between corporates and research centers to provide cutting-edge technology tailored to the specific requirements of the consumers. Hence, the bargaining power of thebuyer is moderate.

SUPPLIERS POWER: The suppliers of the market include instruments, reagents, and consumables manufacturers. The suppliers have strong distribution channels across the world. Lower switching costs benefit the suppliers. Supplier concentration is higher than the buyer concentration. Thus, the bargaining power of suppliers is high.

INDUSTRY RIVALRY: The demand for the digital genome is rising because of increasing chronic diseases, which has led to many pharmaceutical companies getting into this industry for the purpose of R&D. Multinational as well as domestic companies are trying to introduce technologically advanced products in the market in order to attract more and more customers, and thus, improve the bottom line of the company. The threat of competitive rivalry is high.

		DIGITAL GENOME		
Geographical area	**2018 (Historical)**	**2021 (Actual)**	**2030 (Forecast)**	**Growth Rate (%)**
Europe	2482.6	3220.9	7056.5	9.07%
		SEGMENTATION ANALYSIS		
Product	**2018 (Historical)**	**2021 (Actual)**	**2030 (Forecast)**	**Growth Rate (%)**
Sequencing Analyzer/ Instruments	1157.9	1499.9	3270.7	9.00%
DNA/RNA Analysis	847.8	1112.1	2516.8	9.46%
Sequencing Analysis Software	310.4	397.4	835.3	8.57%
Sample Prep Instruments	166.5	211.5	433.7	8.27%

Table 4: Market Snapshot – Digital Genome (US M$)

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2.2.2 Evolution perspectives (2030)

2.2.2.1 Per Nature

- **By Product**

Product	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	CAGR 2022-2030
Sequencing and Analyzer Instruments	1499,7	1639,8	1795,1	1964,5	2146,1	2337,5	2544,4	2767,7	3009,4	3270.7	9.00%
DNA/RNA Analysis	1112.1	1220.8	1342.1	1474.8	1617.9	1769.5	1934.1	2112.4	2306.3	2516.8	9.46%
Sequencing and Analysis Software	397.4	432.7	471.8	514.2	559.5	606.9	658.0	712.8	771.8	835.3	8.57%
Sample Prep instruments	211,5	229,7	249,8	271,5	294,6	318,7	344,6	372,2	401,9	433,7	8,27%
Total	**3220,9**	**3522,9**	**3858,8**	**4225**	**4618,2**	**5032,6**	**5481**	**5965,1**	**6489,4**	**7056,5**	**9,07%**

Table 5: Market per Product – Digital Genome (US M$)

2.2.2.2 By End Users

End-User	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	CAGR 2022-2030
Diagnostics and Forensic Labs	858.3	933.3	1016.3	1106.2	1202.0	1302.1	1409.6	1524.8	1648.8	1781.9	8.42%
Academic Research Institutes	680.5	750.5	828.9	914.9	1008.2	1107.5	1215.9	1333.7	1462.4	1602.6	9.95%
Hospitals	510.3	560.3	616.2	677.4	743.4	813.3	889.2	971.6	1061.1	1158.3	9.50%
Other End-Users	1171.8	1278.7	1397.3	1526.4	1664.5	1809.7	1966.3	2134.9	2317.1	2513.7	8.82%
Total	3220.9	3522.9	3858.8	4225.0	4618.2	5032.6	5481.0	5965.1	6489.4	7056.5	9.07%

Table 6: European digital genome market per end users – (US M$)

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2.2.3 Overall Geographical repartition

Europe	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	CAGR 2022-2030
Germany	795.0	871.0	955.5	1047.9	1147.3	1252.2	1366.0	1489.0	1622.5	1767.1	9.25%
United Kingdom	558.9	611.8	670.6	734.8	803.9	876.7	955.6	1040.8	1133.1	1233.1	9.16%
France	450.2	494.6	544.2	598.4	657.0	719.1	786.5	859.7	939.2	1025.7	9.54%
Italy	300.2	327.9	358.7	392.2	428.1	465.9	506.7	550.7	598.3	649.8	8.93%
Belgium	93.0	101.1	110.1	119.8	130.1	140.9	152.5	164.9	178.3	192.6	8.39%
Poland	68.8	75.5	83.0	91.3	100.1	109.5	119.8	130.8	142.9	155.9	9.49%
Rest of Europe	689.4	749.4	815.7	887.6	964.1	1044.0	1129.8	1221.8	1320.6	1426.8	8.38%
Total	2955,4	3231,2	3537,8	3872	4230,6	4607,8	5016,9	5457,8	5935	6451	9.01%

ble 7: European digital genome European market repartition (US M$)

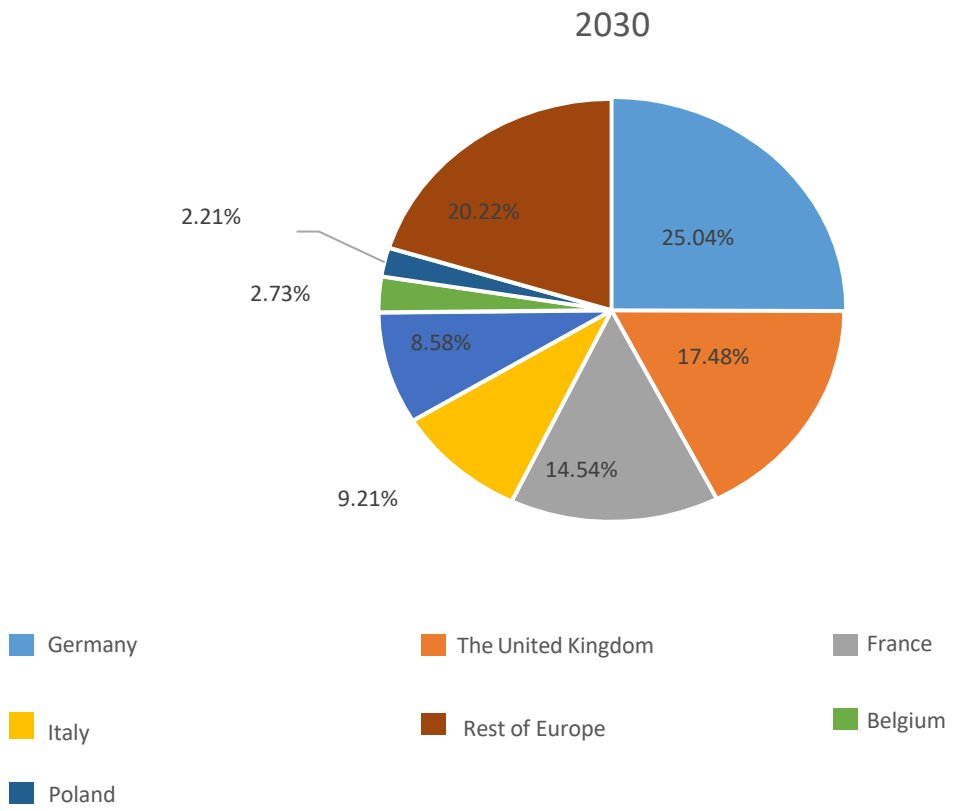

Figure 3: Diagram representing the forecast geographical distribution of digital genome markets by size (2030)

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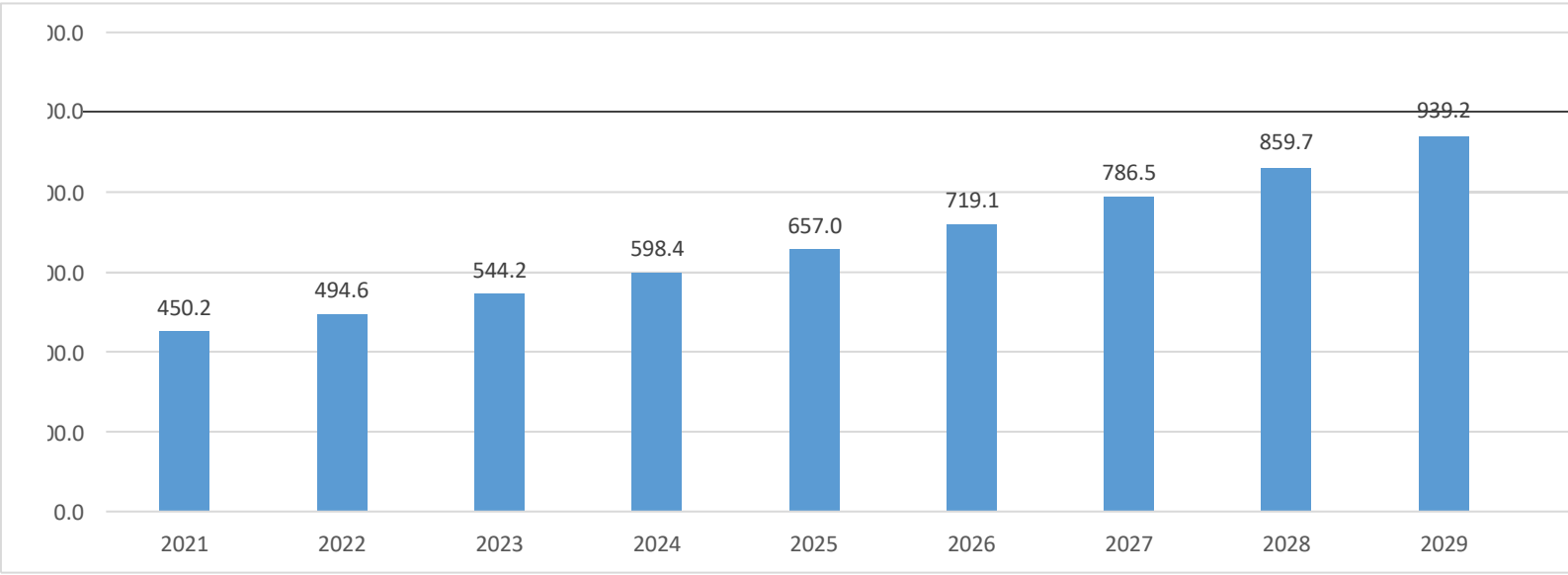
In absolute numbers, the European market remains very fragmented, and we expect Germany to have the largest market size, followed by the United Kingdom, France, and Italy. On the other hand, it is in France that the growth is expected to be the most significant (9.54 CAGR) followed closely by Poland and Germany. But European growth remains relatively homogeneous at 9%.

2.2.4 Focus on GEN.ERA partnership country market

2.2.4.1 France

In 2021, Digital Genome Market for France was valued at $450.2 million and is expected to generate a revenue of $1025.7 million by 2030, growing with an anticipated Compounded annual growth rate(CAGR) of 9.54% during the forecast period.

FRANCE DIGITAL GENOME MARKET, 2022-2030 (IN $ MILLION)



The government of France in June 2016 invested approximately 670 million euros for genomics and personalized medicine programs. The programs were meant to improve the diagnosis and prevention of diseases, by establishing 12 sequencing platforms across the country. The top three areas that the French biotechnology companies are targeting in terms of medicines and therapeutics include infectious diseases, oncology, and neurology.

Moreover, the collaborations and partnerships in the country are also expected to bring about fruitful solutions for clinical research and the development of biological therapeutics. For instance, in January 2018, IntegraGen, based in Genopole, is a company that specializes in decoding the human genome, partnered with Twist Bioscience, and selected an improved next- generation sequencing exome enrichment solution to target sequencing workflow for clinical research. Thus, collaborative efforts are expected to provide a beneficial scenario for

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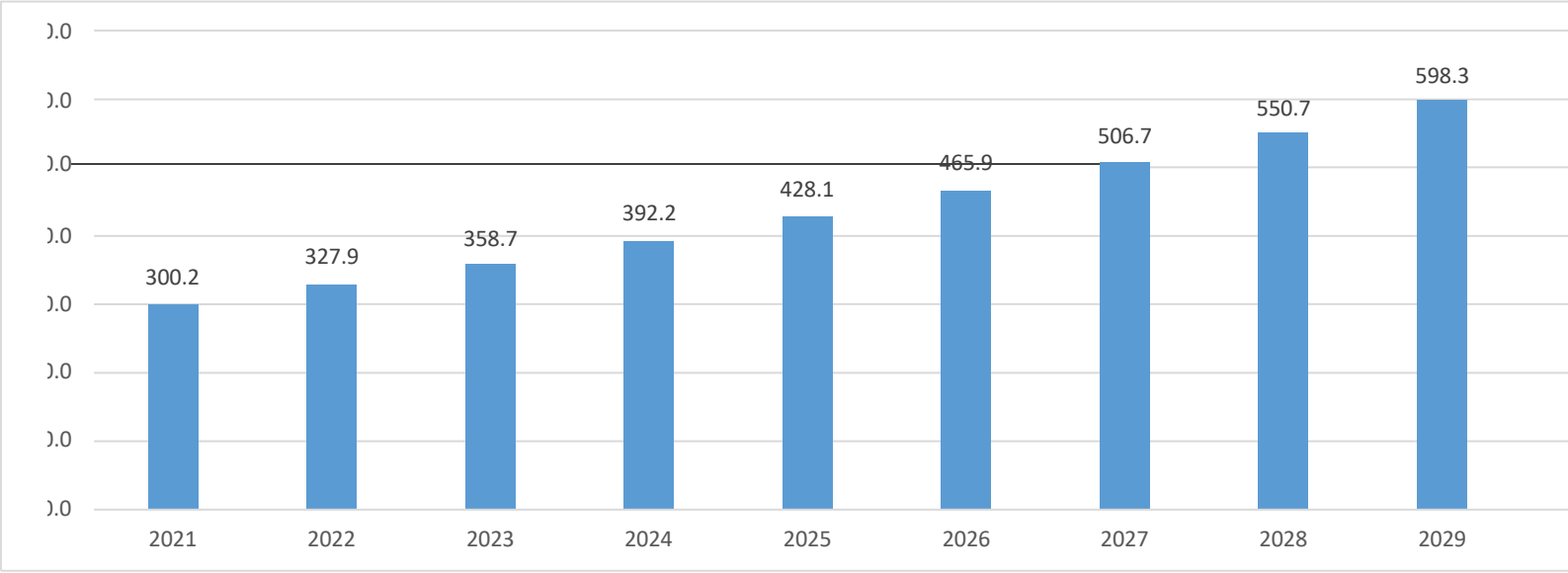
developing genomics research in France.

Additionally, national genomic organizations are taking efforts to improve genomics and bioinformatics platforms in France.For instance, France Genomique aims to maintain French researchat the highest level of performance in the production and analysis of genomics data. It offers the highest level of expertise, skills, support to the public and private, scientific community. The International Symposium on Human Genomics was conducted in February 2020 to share the scientific experiences carriedout by some of the best French teams in genomics.

2.2.4.2 Italy

In 2021, Digital Genome Market for Italy was valued at $300.2 million and is expected to generate a revenue of $649.8 million by 2030, growing with an anticipated CAGR of 8.93% during the forecast period.

ITALY DIGITAL GENOME MARKET, 2022-2030 (IN $ MILLION)



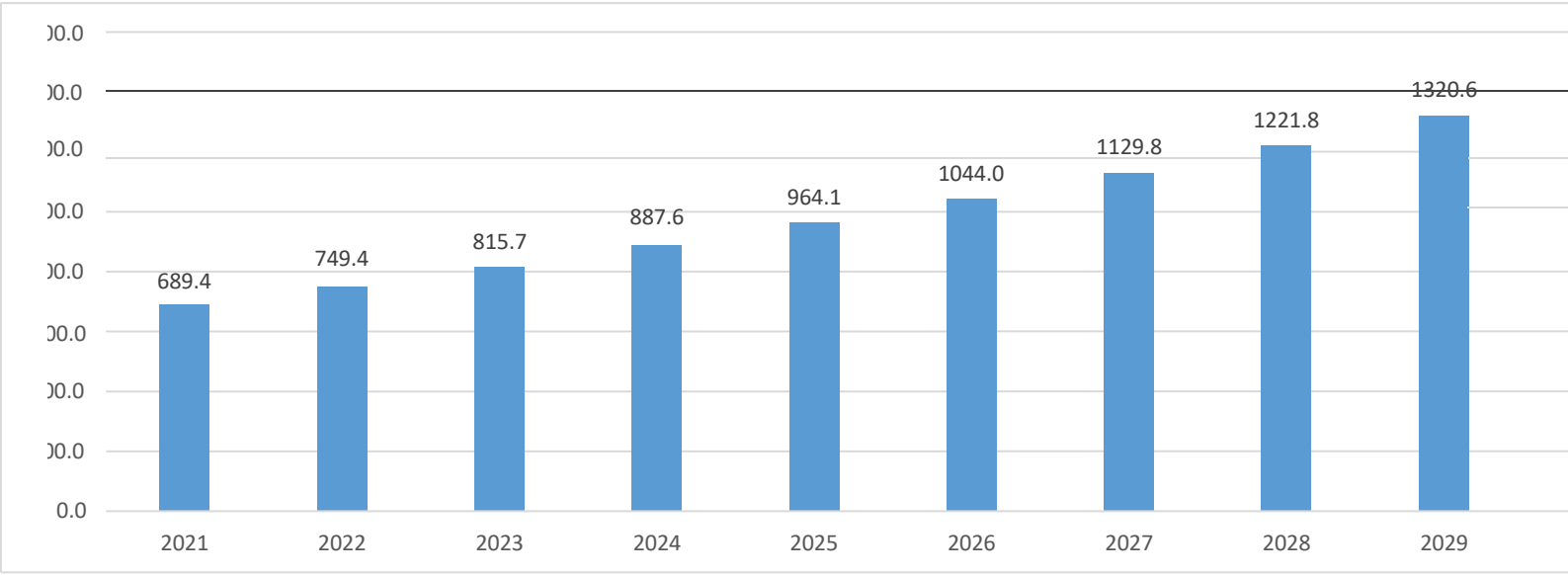
Excellence institution, the network for Italian Genomes (NIG) carries out genetics and genomics research in an Italian population. Itaims to define Italian Reference Genome to identify genes responsible for genetic diseases and susceptibility genes for complexdiseases. It also conducts research on genetic variants, which causes differences in drug response in the Italian population. Thus, such robust genome research in humans is likely to drive market growth in Italy.

2.2.4.3 Rest of Europe (including Estonia, Finland, and Netherland)

This project was funded by the European Union's COSME Programme.

In 2021, Digital Genome Market for Rest of Europe was valued at $689.4 million and is expected to generate a revenue of $1426.8 million by 2030, growing with an anticipated CAGR of 8.38% during the forecast period.

REST OF EUROPE DIGITAL GENOME MARKET, 2022-2030 (IN $ MILLION)



The rest of Europe includes Spain, the Netherlands, Denmark, Finland, Sweden and Estonia. Most of the genome research in the Rest of Europe countries is carried out at public institutions (at college and university levels). Private companies (CRO's, Biotechnology, Biopharmaceutical, and pharmaceutical companies) collaborate with public institutions for research. Hence, the impending genomic research is projected to drive the market in these countries.

Among those listed countries, Spain is becoming a key player in the field, since January 2019, Centro Nacional de Análisis Genómico (CNAG-CRG) collaborated with Atos for its supercomputers. Atos supercomputer supports large-scale DNA sequencing and analysis. CNAG-CRG worked with Atos to develop a custom-made analytics platform, which helps drive new insights ten times faster than its previous systems. Estonia is also one of the European innovative leaders in the field, thanks to the Estonian genome national project founded in 2000, with the aim of collecting the data of the whole population. This program establishes Estonia as a prime location for investment as it has highly technological infrastructure such as the Estonian genome center located in Tartu.

This project was funded by the European Union's COSME Programme.