

Virtusa Life Sciences Market Brief

FOCUS AREAS

INTRODUCTION TO VLIFE

CASE STUDY SNAPSHOT

We are a leading provider of digital engineering and consulting services

 19 Countries	 50+ Locations	 ~22,000 World Class Professionals	 200+ Active Clients	 \$1.04B * Proforma FY19	VRTU Public (NASDAQ: VRTU)	 21% CAGR For Past 10 Years
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Offices in North America, Europe & Asia

*Note: Annualized revenue based on third quarter 2017 consolidated financial results.

VISION

To apply domain and technology innovation to accelerate business outcomes for our clients

MISSION

- Enable our clients to create a distinctive millennial experience, transform their businesses, and deliver platform efficiencies
- Build a great global firm that attracts, develops, inspires and retains exceptional talent

Awards & Recognition



Leading Healthcare and Life Sciences company rely on Virtusa for their transformation programs

22%+ Growth

Health Plans



40+ Clients

Life Sciences



2,200+

Global healthcare practitioners

Health Software Vendors





Focus Areas

1

Digital Transformation

Turning the challenges into opportunities

While the number of elderly and sick continues to increase globally, the Healthcare and Life Sciences industry faces strong headwinds in its most profitable market



Healthcare Spend 2020

Global - \$8.7T | US - \$4T



Biopharma spend 2020

Global - \$1.4T | US - \$500 Bn

Currently, the US accounts for 35% of total biopharma spend despite accounting for only 4.2% of the global population

Source: 2017 global health care sector outlook, Deloitte; Global Medicines Use in 2020, Iqvia.com
Redefining Innovation-Embracing the 80-80 Rule to Ignite Growth in the Biopharmaceutical Industry, Ruchin Kansal and Jeff Huth, 2018

Headwinds



Limited white spaces for traditional product-focused innovation



Therapies versus cure



Slow transition from old to new technology



Outcome & Value vs. Safety & Efficacy



Commoditization



Consumerism



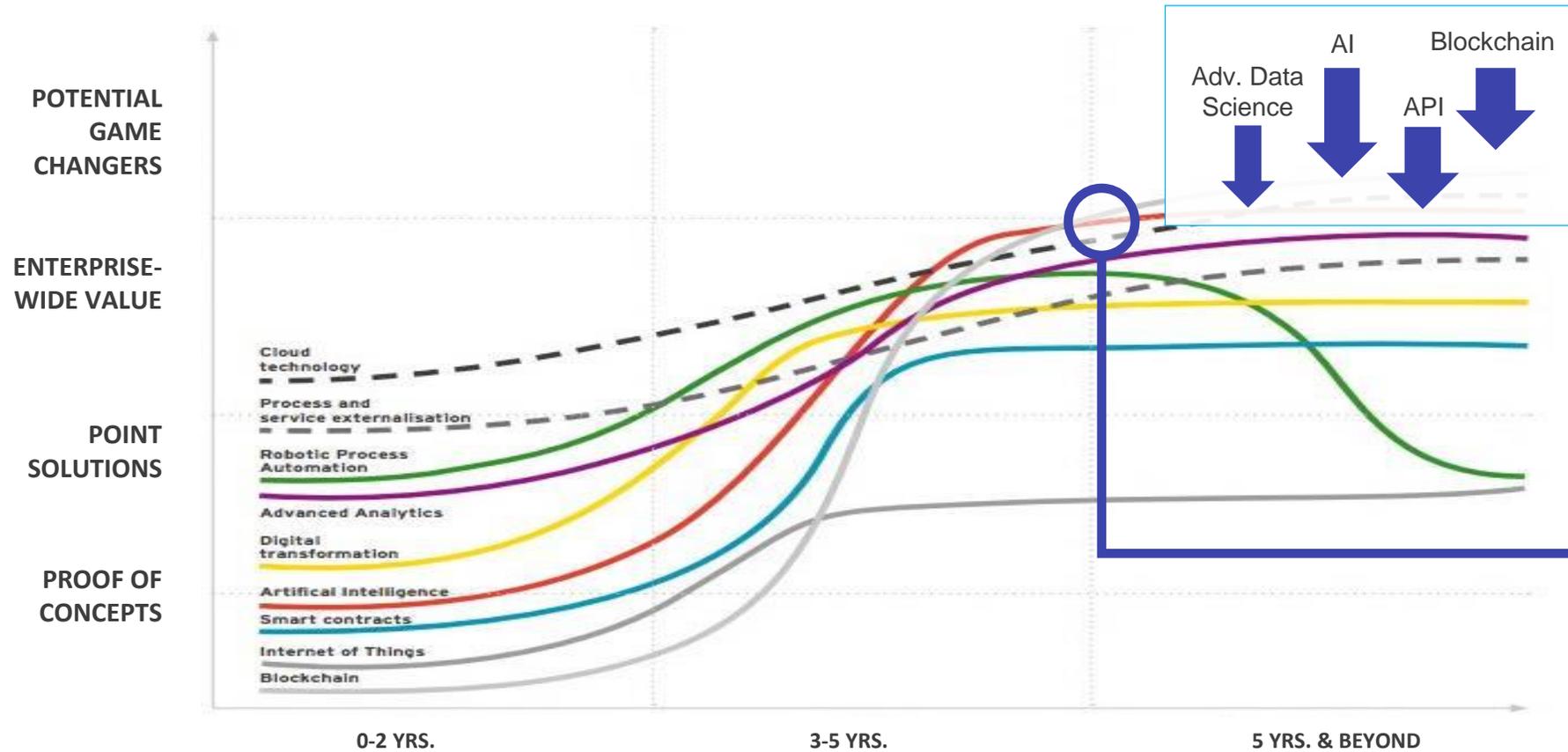
New disruptors



Evolution of Regulatory Policy

2 Enabling Innovation

To cut through these industry headwinds, innovation-driven companies must be able to take advantage of the benefits trajectory that enabling technologies provide



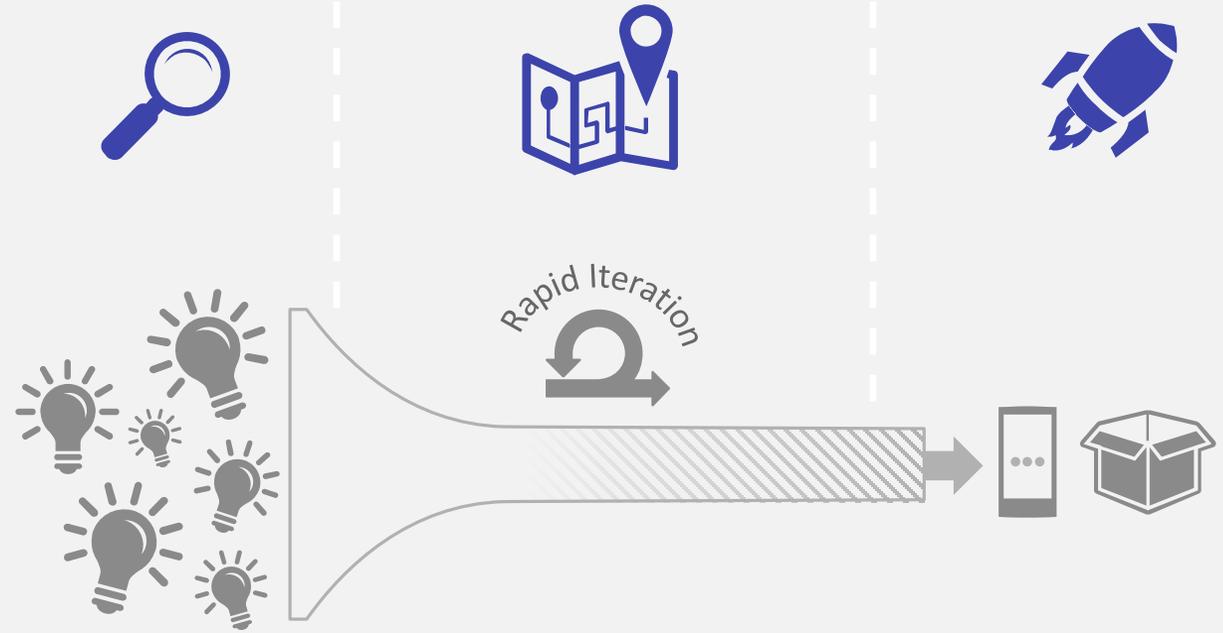
Technologies Virtusa help enable to our clients

Maturity of our capabilities positions us to deliver **game changers** at valley speed

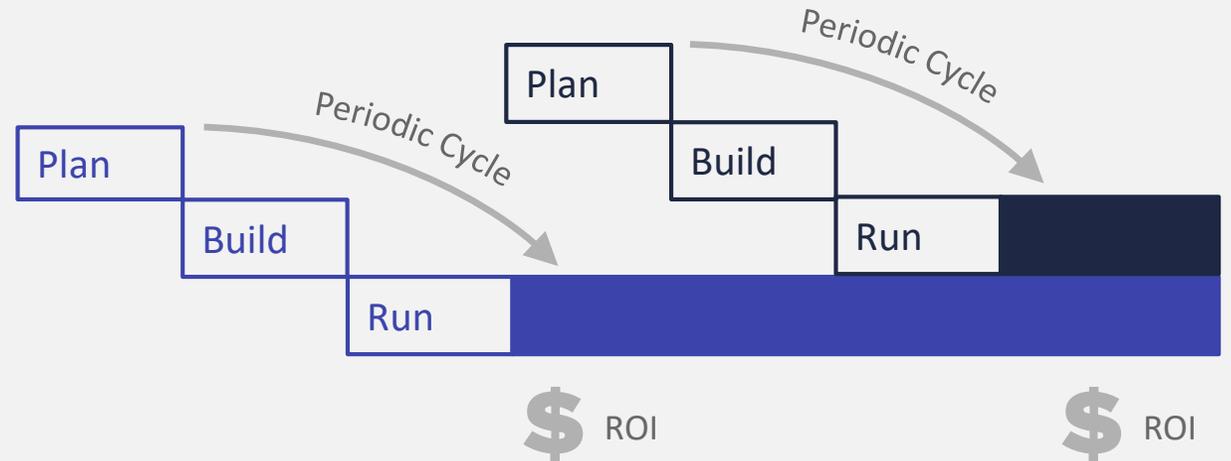
3 Minimize wait times

- Virtusa is making it possible for these companies to get more great ideas into production, faster, through our Open Innovation Platform (OIP)
- Companies often find that innovation cycle-times are out of step with their IT cycles
- Our approach helps companies innovate rapidly, feeding into the enterprise IT development cycle in a virtually frictionless way
- Our OIP allows companies to innovate rapidly on a consistent platform, without having to completely reengineer its IT delivery approach

Valley Speed Innovation



IT Ops Cycle



4 It's all about data

The proliferation of medical devices is growing and the data generated from them are in an explosive phase



7.6 billion

Estimated global population by 2020

30.7 billion devices will be connected to the internet by 2020



2,314 EXABYTES BY 2020 *



HIPAA/GDPR

- Trillions of data points
- Huge global/regional data storage requirements
- High number of transactions due to device monitoring and remote diagnostics
- Several regulatory and compliance constructs

B2C | **CONNECTED CARE**

- Wearables
- Implantable Devices
- Health Apps
- MRI/CT/Ultrasound
- Prosthetics
- Orthopedics
- Surgical Tools
- Blood pressure monitors
- Glucose Monitors



Cognitive, Machine Learning, Blockchain...



Legacy Transformation, Cloud Migrations...

INSIGHTS, PREDICTIVE ANALYTICS, AI, DEEP LEARNING MODELS, AND MICROSERVICES FOR NEXT GENERATION RESEARCH, EFFICACY, ADHERENCE, SWITCHING, COST OF CARE, PATIENT JOURNEYS, INFLUENCE AND REDUCE COST OF CLINICAL TRIALS, EXPLORE PERSONALIZED CARE

* Stanford Medicine 2017 Health Trends Report

Virtusa - vLife™

Open Innovation Platform

Ideate, Experiment and Productionize
Digital Solutions in a Consistent, Cost
Effective Manner

Virtusa's vLife Open Innovation Platform (OIP) is the foundation to accelerate innovation in a practical, affordable and implementable way

What is vLife?

A cloud based platform consisting of a comprehensive HIPAA compliant data lake with multiple data sources, pre-built APIs, AI and ML models

Where is the data from?

Publicly available data sources including MIMIC II and IBM Watson MarketScan as well as real world data sources. vLife can also generate synthetic data

Are there pre-built solutions?

Library of APIs, AI and Machine Learning models with a growing number of pre-built solutions for data access and data visualizations available

How is it used?

Several engagement methods including API level access to data (real world or synthetic), leveraging existing models or building specific scenarios

What is its value?

Instant access to cleansed, contiguous data coupled with the API, AI and ML library for accelerated timelines, reduced effort and further innovation

vLife™ - Leveraging our investment in data to provide insights and solutions

Experimentation, Build MVPs/CVPs & Reference Implementations



CUSTOMER ENGAGEMENT LAYER

Invent and Simplify - prototype Digital Business and Services

Customer Focus - offered through Virtusa's 5 day sprint for ideation, design and build

Think Big - MVPs & CVPs for rapidly launching new services

Build Application / Solution Accelerators that expedite experimentation on Solutions



ACCELERATOR COMPONENTS (27 available)


Intake Submission


Device Connectors


ChatBot Platform


AI/ML Engine


Integration Platform

Library of API endpoints for Life Sciences and Med Device companies. Customers use it as they please.



MICROSERVICES API (300+ available)


Connected Care


Next Generation Research


Digital Pathology


Clinical Trial Optimization


Medication Adherence


IoT Solutions

Continually improved platforms to build Digital Native Applications



PLATFORMS SERVICES


IOT Framework


Image Processing


NLP/NLU


Cognitive AI


Predictive Analytics


Synthetic Data Generator

Integrated Data Lake with 1 Bn+ rows of EMR, Genomics, Trials, Devices, Sensors and Claims data.



LS DATA LAKE


Patient


Provider


Genome


Image


Gov't


Claims


Clinical


Watson


Synthetic

Extreme Engineering: Leveraging Cloud and DevOps to improve productivity with over 20K developer resources



FOUNDATIONAL COMPONENTS


Blockchain


Machine Learning


Cloud Native

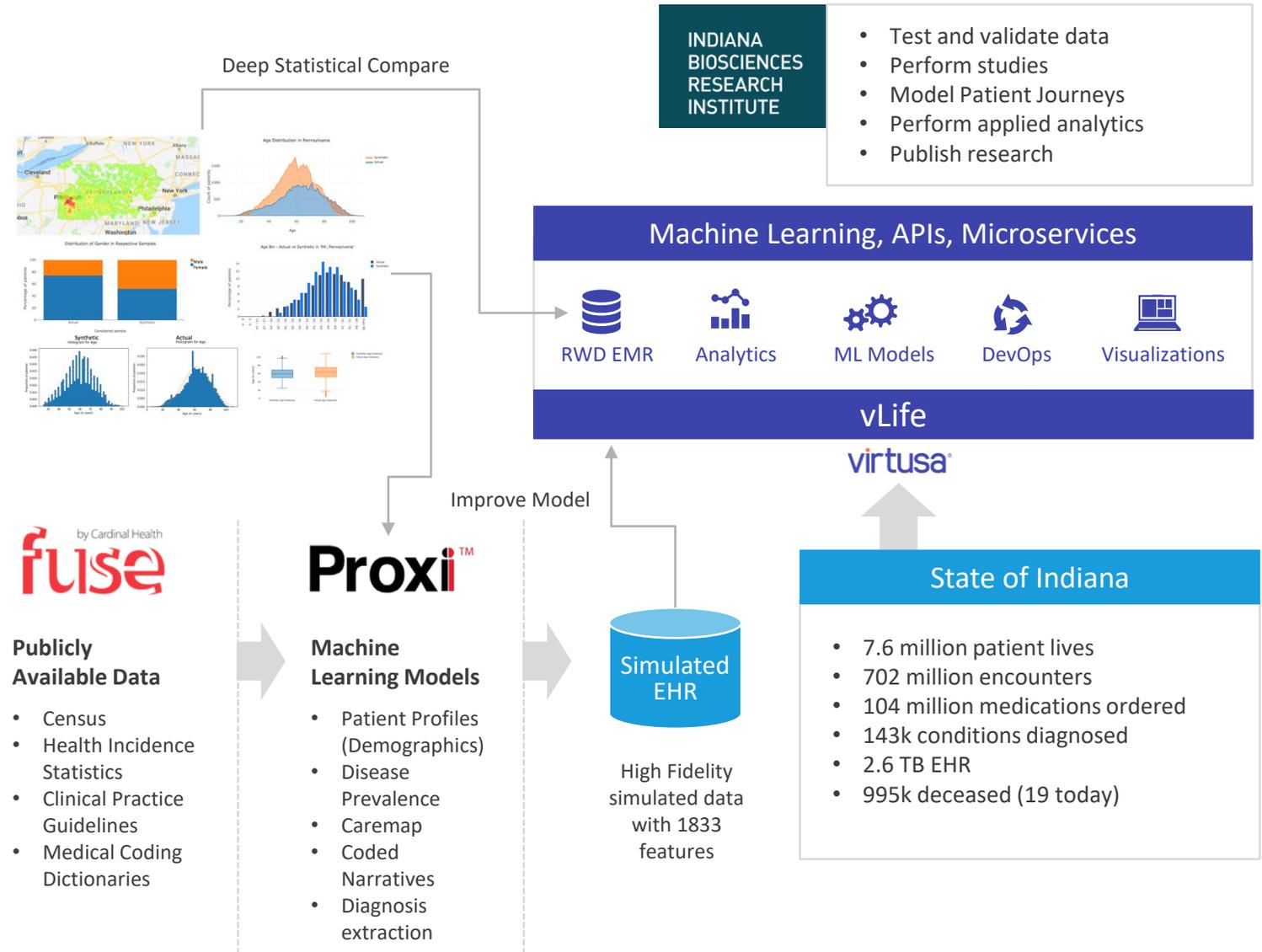

DevOps Accelerators


SDLC Automation

Population Level Prediction for Type 2 Diabetes

Virtusa partnered with Fuse and the Indiana Biosciences Research Institute to measure outcomes for Type 2 Diabetes for the state of Indiana.

- The Indiana Biosciences Research Institute was experiencing data aggregation and completion issues.
- IBRI requests Simulated Data for the state of Indiana
- Fuse and Virtusa generate the data and Virtusa hosts this on Virtusa's vLife cloud platform with available data and visualization APIs
- IBRI requests additional machine learning models which are developed by Virtusa
- IBRI finds the approach to be vital to their own data source (Regenstreif Institute)
- Papers are published to predict renal disease incidence for T2D patients in Indiana.





Solutions Delivered

Selected Cases

Case Studies (and Innovation Focus areas) at a Glance

Next Generation Research on vLife

A collaborative platform with 1Bn+ rows of de-identified clinical data, 300+ Data APIs, pre-built microservices, AI and ML models to accelerate drug development and research. Examine statistical probabilities related to patient journeys offered through advanced visualization, develop risk categories for disease progression and comorbidities and use AI/ML algorithms to observe effects of therapies and outcomes.

Analytics To Action

Based on the core principles of Ingest, Analyze, Visualize and Act. Virtusa's work with IBM Watson Health has yielded several products and engagements to provide value for clients looking to leverage data as a lever for drug discovery, general research, accelerated trials and patient outcome analysis.

IoT Solutions

1. Connected Care 2. Wound Care 3. Point of care ultrasound 4. Neuromodulation Device 5. Renal Care

Supply Chain/Distribution

1. Syntrac/Nutrac –distribution of radiopharmaceuticals. 2. Optifreight – comprehensive transportation and freight management for the largest medical distributor in the world. 3. Device Inventory Management – manage inventory for a medical device manufacturer.

Sales and Marketing

Cross Sell/Upsell, Market Targeting - Virtusa is developing AI and ML algorithms for a leading device manufacturer based on their sales data validated by Virtusa's own investment in Watson MarketScan and Explorys data. These models assist in targeting weaker geographies, hospitals and clinics, identify competitor sales and provide strategic insights.

Genomic Sciences

Virtusa is in discussions with 2 bio-pharmaceutical companies to develop (1) a genomic data lake (2) a platform for genomic sequencing and (3) a secure data capture platform for genomic data analysis



Learn More

virtusa.com/vlife

<https://youtu.be/87lsXK53SdA>