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Big Data, Internet of Things, Apps: quali implicazioni per il mondo del farmaco e il settore salute

Data & Cognitive Challenge
Cristina Ingrassia – IBM Italia

Milano, **29 Novembre 2016** ore 14.30-17.30
sala Falck - Assolombarda Confindustria Milano Monza e Brianza

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IBM in the World

Founded
1911

Location
175 Countries

380.000
employees

Revenues 2014
81.7$B

Head Quarter
Armonk, NY
www.ibm.com

*We create business value for enterprise clients
through integrated solutions that
leverage innovative IT and deep business insights*

IBM in Italy

Present since
1927

Presence
13 Locations

6.000
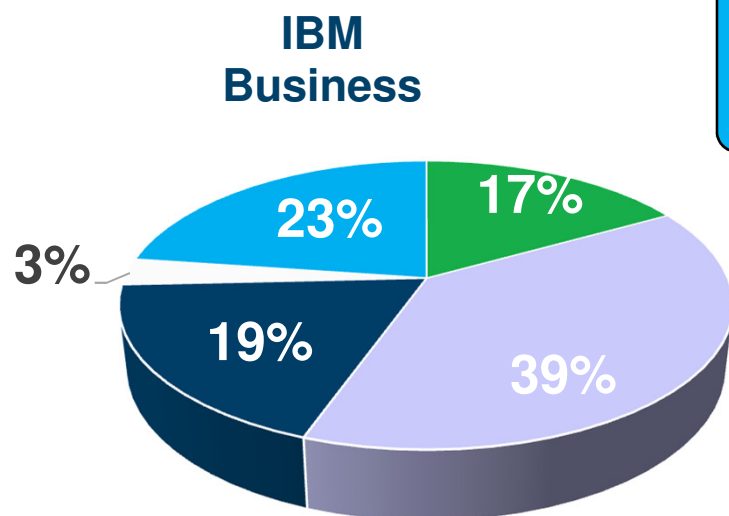employees

Revenue
2015
1.94M€

Head Quarter
Segrate (MI)

www.ibm.com

Innovation in SMEs
Development activities in advanced areas
Campus Data Center
Collaboration with universities
Social and cultural programs through the
IBM Italia Foundation (25 years activity)

IBM ... do you know ...

IBM is one of the the largest services provider

IBM Business

17%
23%
3%
19%
39%

Software Solutions
- Analytics
- Security
- Social
- Mobile
- Cloud

Middleware Sytemes
- Host Tools & Compliers
- Legacy Transaction Processing
- Comm. Servers
- Storage

Operating Systems
Product Lifecycle Management

Global Technology Services
- Strategic Outsourcing
- Business Transformation Outsourcing
- Integrated Technology Services
- Maintenance

Global Business Services
- Strategy and Transformation Services
- Business Analytics and Optimization Services
- Enterprise Applications Services
- Application Services

Systems & Technology
- Servers
- System z
- System i
- System p
- System x
- Storage Technology
- Microelectronics
- Eng & Tech Services

A new era in technology, a new era in business

For the first time in history, the **volume of data and information** we're producing has outpaced our ability to make use of it

This catalyst marks **change** in the technological world, from systems programmed to systems trained to think

this era we refer to is a cognitive one

... Why ???

This is the Man!

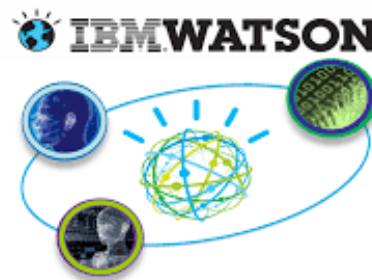Source: http://www.bloomberg.com/video/meet-the-world-s-most-connected-man-Vs~LzkbkR7yhjza~7nji1g.html

IBM's Cognitive Value Proposition

"Watson" is the **brand** for **IBM's cognitive capabilities**. Watson is used by IBM's businesses, offerings, services and solutions that directly build cognitive abilities for business

"Watson" is the most sophisticated **cognitive technology** designed to support a broad range of expertise delivered on an **open** platform by devoting our talent and innovation to enable customer driven growth

Watson: a Cognitive System – What is ?

Is not programmed, it's trained

Understand

Adapt and make sense of all data; "read" text, "see" images and "hear" natural speech with context

can **make sense** of the 88% of **dark data** that exists

Reason

Interpret information, organize it and offer explanations of what it means, with rationale for the conclusions

does not give pre-determined responses but is probabilistic. It generates **hypotheses, reasoned arguments and recommendations**
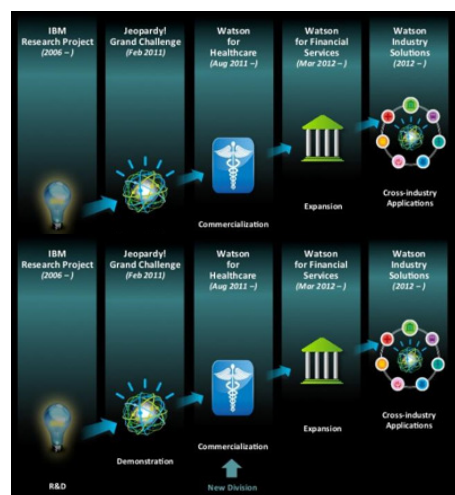
Learn

Accumulate data and derive insight at every interaction, perpetually

learns and reasons from **interactions** with us and from **experiences** with the environment

IBM Watson some insights

2011

Won national TV show **Jeopardy**

2012

first **applications** in Healthcare and Financial Services Sector

2014

launched **IBM Watson Group**: invested $1B, based NYC and San Francisco

started **Watson University** (100 Universities)

2015

launched **Watson Health** division based in Boston

launched **Cognitive Business Solutions Unit**, Global Presence

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More than **1500 active patents** in the cognitive area owned by IBM

IBM is the largest cognitive computing organization: all IBM Watson units employees are **>6.000**

Invested $100M to develop **Watson Ecosystem** (+100 companies)

IBM Watson is available on the market

Applications

Watson Engagement Advisor
Interacts with customers (Q&A)

Watson Knowledge Studio
To understand the market

Watson Discovery Advisor
Cognitive to Research & Development

Watson for Wealth Management
Banking Cognitive Application

Watson Chef
Cooking Cognitive Application

Healthcare / Lifesciences

Watson Clinical Trial Matching
Cognitive to match/coordinate clinical test

Watson Health Utilization Management
To optimize Healthcare costs

Watson for Oncology
For evidence-based analysis on patient and Treatments

Watson Genomics Advisor
Insights on DNA sequence for cancer research

Watson Analysis of Medical Images
From Merge & Truven acquisition

Products

Watson Explorer
To analyze structured and unstructured business contents

Watson Analytics
Predictive analysis with
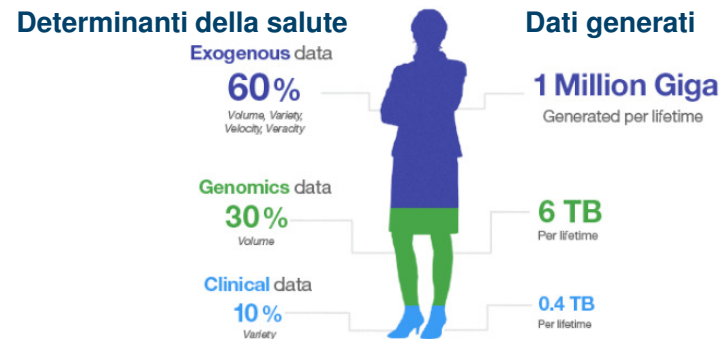**Watson Curator**
To increase answers accuracy

Platform for Ecosystem
Watson Developer Cloud
API to build Apps powered by Watson

Cognitive Computing need on **Healthcare and Lifesciences**

Healtcare informations are increasing faster than the clinical capability to use them

Determinanti della salute · **Dati generati**

Exogenous data
60%
Volume, Variety; Velocity; Veracity

1 Million Giga
Generated per lifetime

Genomics data
30%
Volume

6 TB
Per lifetime

Clinical data
10%
Variety

0.4 TB
Per lifetime

Highest complexity
A doctor will evaluate 100 variables on 2020, 1.000 on 2025
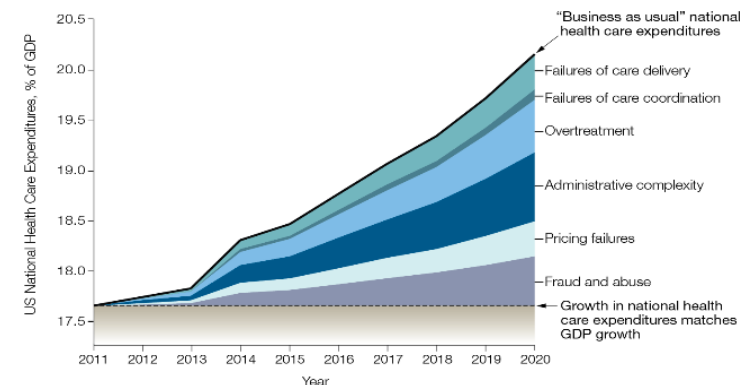
Remedy rarely based on evidence
Less than 50% of health remedy are based on «evidences».
A epidemiologist should study 167 hours a week to be continuosly updated on new discoveries.

Heterogenous unstructured data
80% of health data are unstructured

IBM **Watson Health** // ©2015 International Business Machines Corporation // SOURCES
• Journal of Clinical Oncology, Talk about Health Blog, Sept 2011
• www.economist.com/blogs/babbage/2013/02/computer-aided-medicine
• 2015 Global Health Care Outlook Common Goals, Competing Priorities. Rep. Deloitte, 2015. Web. 16 June 2015.

Current Healthcare System is not economically sustainable

High Gap on accuracy of prescribed remedies
44% of first cancer treatments wil be successively modified

Growing Demand
Healthcare services demand will grow of 42% in 2025 (oncologist lack)

Progressively Ageing Population
In Europe Old-age Dependency Ratio (people>65 yrs vs working population) will move from 30% to almost 50% in 2060

IBM **Watson Health** // ©2015 International Business Machines Corporation // SOURCES
• UN World Population Prospects: The 2012 Revision.
• Roeder, Amy. Reducing Wasteful Health Care Spending Begs the Question, What Is Waste? Harvard
• 2015 Global Health Care Outlook Common Goals, Competing Priorities. Rep. Deloitte, 2015. Web. 16 June 2015.
• "Health Policy Brief: Reducing Waste in Health Care," *Health Affairs,* December 13, 2012.

In the world
30% of 1$ paid
in Healthcare
is wasted

* Roeder, Amy. Reducing Wasteful Health Care Spending Begs the Question, What Is Waste? Harvard, T.H. Chan School of Public Health. Harvard, T.H. Chan School of Public Health. August 2014

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Introduction to Watson Health

Healthcare – The IBM Moonshot

"I'm telling you, our **moonshot** will be the impact we will have on Healthcare. It has already started. We will change and do our part to **change the face of Healthcare**. I am absolutely positive about it. And that, to me, while we do many other things, that will be one of the most important."
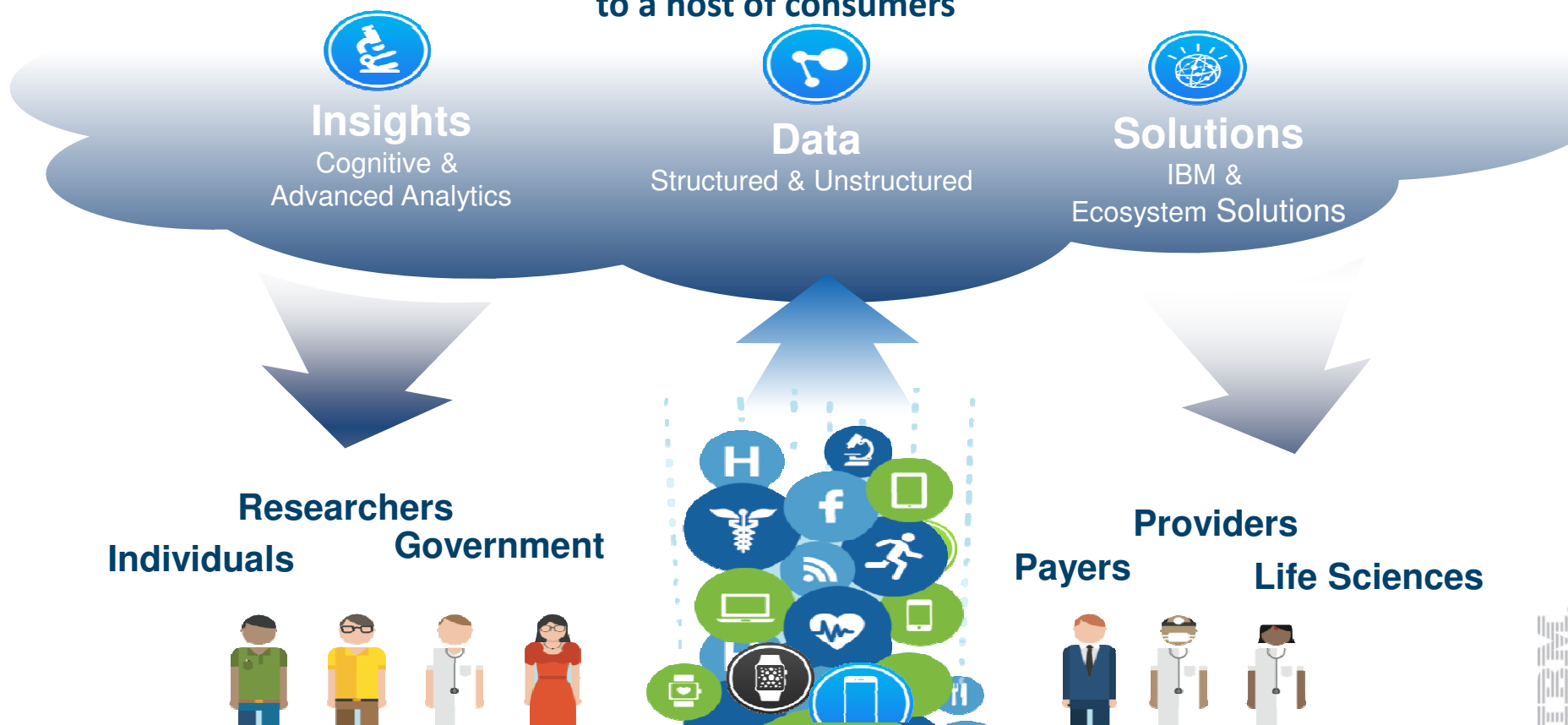
Ginni Rometty

April 16, 2015

https://www.youtube.com/watch?v=yV_6sd32oW0

Watson Health … what is ?

a platform that is HIPAA enabled, standards based and massively scalable to enable insight to a host of consumers

Insights
Cognitive &
Advanced Analytics

Data
Structured & Unstructured

Solutions
IBM &
Ecosystem Solutions

Researchers

Individuals   Government

Providers

Payers   Life Sciences

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IBM investment of **4 mld$** in Watson Health

Acquisition

1 mld$ for MERGE World Healthcare leader in **medical images solutions since more than** 20 yrs for 7.500 medical institutes and most important research centres

Explorys acquisition to progress **analytival skill on healthcare area**: 315 billion of clinical data, 50 millions of patients, 360 hospitals and more than 317.000 doctors.

Phytel acquisition to enpower the **quality and the effctiveness of personal healthcare** through the access to millions of information on different health items of world population.

IBM **Cúram** Child Welfare is a **software for younger protection** which gives you a complete solution for the whole life cysle of organization which takes care of childhood assistance..

2,6 mld $ to buy **Truven,** an analytical company of healthcare area with more **than 8.500 customers among main pharmaceutical companies**, research institutes and government agencies.

Strategic Partnership

IBM & Memorial Sloan Kettering of NY **(Cancer Center most famous in the world) created togehter Watson for Oncology** to build up knowledge and medical understanding to elaborate personalised therapies for breast, lung and colon cancer.

Novo Nordisk and IBM are working together to create **solution against diabetes** on Watson Health Cloud.

NY Genome Center **thanks Watson acceleration on genome knowledge** is trying to fight cancer and other life-threatening diseases with personalized therapies on DNA profile

IBM and IAmerican Heart Association are **developing a solution Watson based to reduce cardiovascular disease** (Workplace Health Achievement Index)

Partnership with Apple to provide a secure platform on cloud and analytics for **HealthKit** and Apple **ResearchKit.**

Johnson & Johnson is working with IBM to create **intelligent coaching systems** , focusing on pre / post - operative patient care on articular prosthesis and spinal surgery .

Innovative experiences

App **Under Armour** Record (4,5m users): **Personal Health Consultant** based on Cognitive Coaching System

Bumrungrad International Hospital: **5 years agreement to use Watson for Oncology**

MD Anderson has a solution powered by Watson **for clinical leukaemia and molecular therapies**

Mayo Clinic is using Watson to manage efficiently the program of **Electronic Health Record**

IBM Watson and **MEDTRONIC**: solution to defeat diabetes and to **foresee hypoglycemia 3 hours in advance**

The chain of drugstores **CVS** is using Watson to **predict chronic disease** based on the reporting of dangerous behaviours

Teva has chosen IBM Watson Health as a global technical **platform to offer solutions to millions of chronic asthma sufferers** , migraine and neurodegenerative diseases..

Al **Baylor College of Medicine** in Texas, Watson studied in 10 days 70.000 scientific articles on p53 and identified 6 potential proteins proteine "indicted" **= 38 years/man**

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