Innovation

Startup Strategies

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Outline

- Technological innovation
- Startup stories
- Innovation at LeanXcale
- Hints to promote innovation
Technological Innovation
Technological Innovation

• **Definition:** innovation driven by technology
  • Note that innovation (in general) can also be driven by new business models, e.g. two-sided networks (Uber, Airbnb, LeBoncoin, Doctolib, ...)

• **Strategies to promote innovation**
  • Within an organization, one can have a formal process, driven by *managers* who follow the (known) company strategy
  • Within a startup, it is hard to formalize (and manage) as the context may be unknown or quickly changing, hence the need for *leaders*
Technological Innovation Process

Context
- User behavior

Inventions
- New methods

Timing
- Market readiness
Invention versus Innovation

• An invention is a new “thing” (method, process, machine), e.g. writing, printing, smartphone
  • Can combine several inventions, e.g. the smartphone is a computer, a mobile phone, an appdev, etc.

• An innovation is an invention that causes change in user behavior or business
  • Innovation is hard: only a few inventions lead to real innovation
  • Innovation can be genius, e.g. Web, or accidental, e.g. pacemaker
  • Innovation can take time, e.g. the “airplane” was invented by Leonardo da Vinci in the 16th century
Patents

- Documenting, protecting, and leveraging inventions is critical for innovation.
- Patents are evidence of inventions with:
  - Legal protection of intellectual property
  - Documentation of the invention, so that others can improve on.
- Some (heavily cited) patents yield innovations while many do not:
The Nose Pick Patent

United States Patent [19]
Willard

[54] NOSE PICK

[76] Inventor: Charles E. Willard, 453 W. Mechanic St., Shelbyville, Ind. 46176

[**] Term: 14 Years

[21] Appl. No.: 29/097,842


[51] LOC (7) Cl. ........................................... 24-02

[52] U.S. Cl. .............................. D24/147; D11/157; D11/160; D24/133

[58] Field of Search ......................... D24/133, 146, D24/147, 155; 606/162, 161; D11/157, 160; D21/811, 812; D1/109; D32/40, 48, 56

[56] References Cited
U.S. PATENT DOCUMENTS

D. 353,239 12/1994 Briscoe ............................. D32/43

[45] Date of Patent: ** Sep. 12, 2000


Primary Examiner—Ian Simmons
Attorney, Agent, or Firm—Woodard, Emhardt, Naughton Moriarty & McNett

[57] CLAIM

The ornamental design for a nose pick, as shown and described.

DESCRIPTION

FIG. 1 is a plan view of a nose pick, showing my new design;
FIG. 2 is a side view thereof with the opposite side view being a mirror image thereof.
FIG. 3 is a bottom view thereof; and,
FIG. 4 is an end view with the opposite end view being a mirror image thereof.

1 Claim, 1 Drawing Sheet
The Magnetic-core Memory Patent

- **U.S. Patent 2,736,880: Multicoordinate digital information storage device (coincident-core memory)**
  - Jay Forrester (MIT): filed May 1951, issued Feb. 1956
  - 10 pages, highly technical

- **Context: Whirlwind computer project at MIT in 1950**
  - Required a fast memory for real-time aircraft tracking
  - MIT computer scientist Jay Forrester invents the coincident-core memory that enables the 3D storage of information

- **Impact**
  - 9 other patents from other inventors
  - Used by all mainframe computers from 1955 to 1975
    - Big $ patent royalties for MIT
Some Startup Stories
once a startup

**Context: the beginning of relational DBMSs**
- Seminal article: A Relational Model of Data for Large Shared Data Banks, by Edgar F. Codd, CACM, 1970
- Ingres project at UC Berkeley (1975-1980)
- System R project at IBM Research (1975-1980)
  - Invention of the SQL language

**Innovations in Oracle 2.0 (1980)**
- Implementation of the SQL language
  - With known techniques (published in research papers) from System R and Ingres
- Accidental incompatibility with IBM System R
  - Thanks to IBM that kept its error codes secret
- Support of UNIX and other OSs
• **Context:** Digital Library project at Stanford U.

• **Invention in 1996 of the PageRank algorithm by Page & Brin (then PhD students)**
  

• **Basis for Google’s search engine in 1998**
  
  • Straightforward implementation on a cluster of commodity servers
Bitcoin & Blockchain

• **Invention**
  - Cryptocurrency and payment system, with blockchain as the infrastructure

• **Innovation**
  - Combines well-known techniques (P2P, data replication, consensus protocols and cryptography), yet in a clever way
  - The first solution to the double-spending problem of previous cryptocurrencies
Internet price comparator

- **Context:** Dyade, a joint venture between Bull and Inria (1996-2001)

- **Inventions**
  - Distributed Information Search COmponent (DISCO)
  - Wrapper development toolkit
    - Combines state-of-the-art software engineering techniques

- **Innovation**
  - Fast access to Internet data sources with DISCO
  - Automated data source connection with wrapper development toolkit
• Largest IPO at Nasdaq ever (09/2020)
• Cloud support
  • AWS, Azure, Google Cloud
• Innovation
  • Independent levels
    1. Cloud services
    2. SQL query processing on virtual DWs
    3. Database
  • Separate provisioning and invoicing

Cloud data warehouse

Cloud services
  Security, infrastructure, etc.

Query processing
  Virtual DW

Database
THE DATABASE FOR FAST-GROWING COMPANIES

LeanXcale is a scalable SQL database with fast NoSQL data ingestion and GIS capabilities.

TRY IT!  FREE FOR STARTUPS
HTAP: blending OLTP & OLAP

Analytical queries on operational data

- Advantages of Hybrid Transactional Analytical Processing*
  - Cutting cost of business analytics by up to 75%
  - Simpler architecture: no more ETLs/ELTs
  - Real-time analytical queries on current data

*Gartner, 2015
The Company

- **Created in Madrid in 2015**
- **CEO and founder: Professor Ricardo Jimenez-Peris**
  - Expert in distributed data management, with +100 research publications and +10 patents
- **Business advisor: Glenn Osaka**
  - Former President of Reactivity (acquired by Cisco), former VP at HP, Cisco & Juniper Networks, advisor for Paypal
- **Scientific advisor: Patrick Valduriez**
  - Expert in distributed data management, co-author of the standard textbook
- **Strong team of engineers**
  - MS and PhD degrees
More than 10 Innovations!

**Ultra-Scalable OLTP**
- SQL Fully ACID DB

**Polyglot**
- Queries across SQL, HBase, Neo4J, MongoDB, & Hadoop data lakes
- Integration with Data Streaming

**OLAP over Operational Data**
- Real-Time Big Data

**Elastic & Ultra-Efficient**
- Non-disruptive data migration, continuous load balancing and

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*Image Source: Principles of Distributed Database Systems*
Ultra Scalable Transaction Processing*

Traditional approach

Single-node bottleneck

Processes & commits transactions in parallel

Provides a consistent view

LeanXcale Innovation Strategy

- Capitalize on leaders’ knowledge and experience to understand the huge state-of-the-art
  - Encourage employees’ education and training
- Stay in touch with the research ecosystem to promote and confront ideas
  - Talks in top conferences (BigData, SIGMOD, ...), top universities (UC Berkeley, U. Waterloo, ...) and high-tech companies (Facebook, Tweeter, ...)
- Encourage “cerebration” (group thinking and collaboration)
  - To promote innovation beyond invention
- Select ideas based on customers’ feedback and cost-benefit analysis
  - Priority to product features that have more business potential with least effort
  - 2 or 3 patents a year
Promoting Innovation
Some Hints

- Attract (or work with) creative people
  - Universities, research labs, startups
- Promote cerebration by creating a general sense of permissiveness
  - Avoid simplified PKIs and easy metrics
- Encourage creative employees to share their ideas, even preliminary
  - Avoid self-censorship
- Leverage leaders’ years of experience and knowledge
  - Educate employees and help push ideas
- Work with key customers to select ideas
  - Turn them into innovations