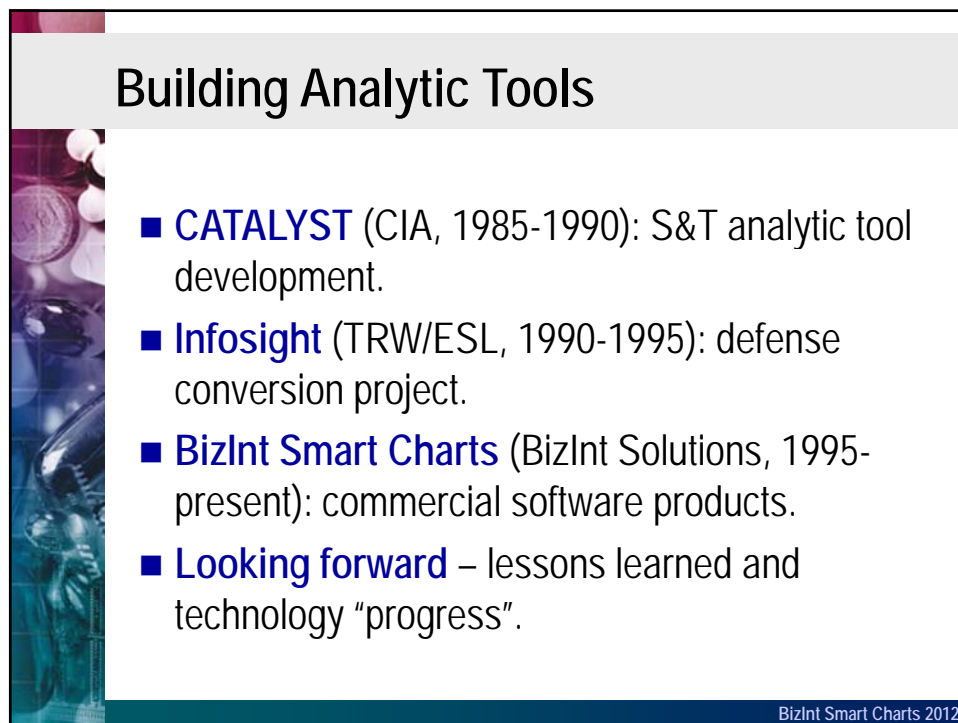

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CATALYST Revisited
*Challenges to Creating Advanced
Analytic Environments*

Diane Webb, President, BizInt Solutions
July 2012

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Building Analytic Tools

- **CATALYST** (CIA, 1985-1990): S&T analytic tool development.
- **Infosight** (TRW/ESL, 1990-1995): defense conversion project.
- **BizInt Smart Charts** (BizInt Solutions, 1995-present): commercial software products.
- **Looking forward** – lessons learned and technology “progress”.

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CATALYST Vision

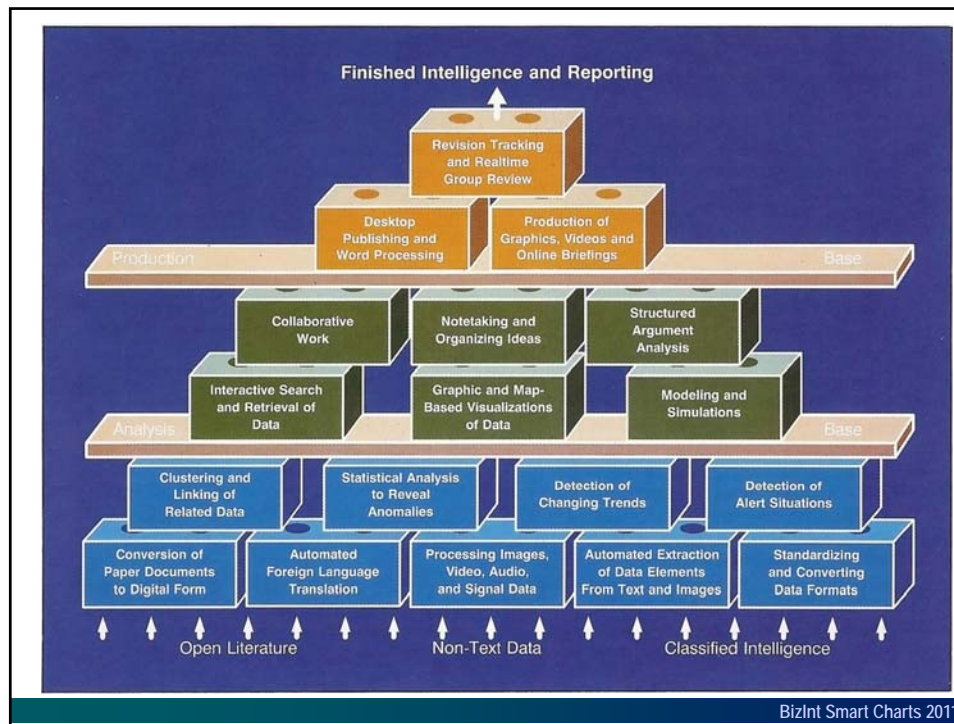
- **CATALYST** (Computer-Aided Tools for Analysis of Science and Technology) – 1989 paper.
- *“functional specification for an analytic computing environment that we believe will be needed.”*
- *“We propose a set of automated tools managed by the analyst to process both incoming and historical data...with sufficient built-in knowledge to operate on large amounts of data automatically.”*

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CATALYST Vision

- *“...we can best understand the CATALYST environment as a computer-assisted analysis pyramid in which interconnected computer tools are available at every step of the analysis pyramid.”*

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CATALYST tools

- **Pinnacle**: OCR, full text search & retrieval.
- **ALERT**: new cable traffic system, NLP.
- **HYPERION**: hypermedia notetaking.
- **BEACON**: clustering, landscapes.
- **ATLAS**: NLP, visualization.
- Tools delivered to a few dozen OSWR analysts on Sun and NeXT workstations.

Lessons Learned: What worked?

- Conceived and managed by analysts and former analysts
- Development team closely tied to users.
- Problem-driven rather than technology-driven.
- Enthusiastic and motivated team.
- Useful guiding vision.

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Lessons Learned: What didn't work?

- Within 5 years, the program was dead and the tools were no longer being used.
- Team members moved on to other challenges.
- Workstation technology replaced by new generation of Windows PCs.
- Technology challenges too great for a small program – workstations, basic tools, sophisticated analytic tools.

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Infosight Vision

- **Infosight** – defense conversion project at TRW/ESL (1990-1995).
- *“...new initiative to develop and market software products for real-world intelligence.”*
- Apply ESL IC expertise in artificial intelligence and data fusion to the corporate world.
- *“The Infosight business goal is to be the “Microsoft” of real-world intelligence in the next century...a multi-billion dollar software company.”*

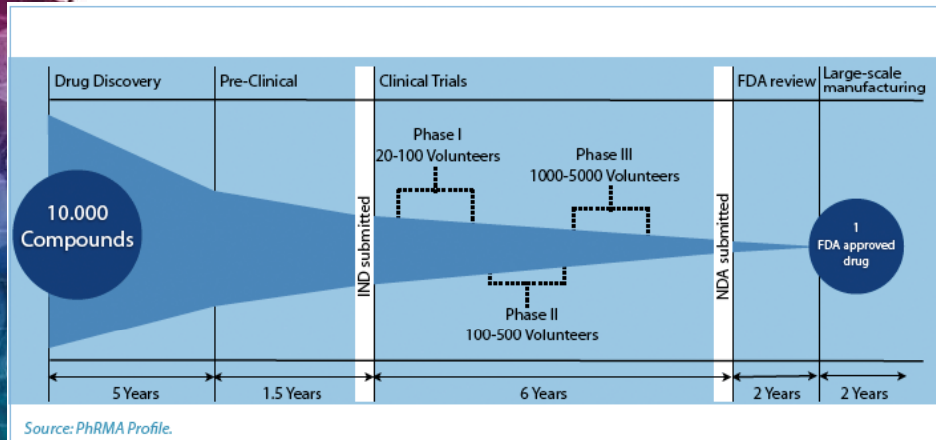
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Infosight program

- Brought in Silicon Valley venture capital and marketing expertise.
- **Took the basic technology from ATLAS and applied to a problem faced by “analysts” in pharmaceutical companies.**
- Released TRW Smart Charts in late 1994 with sales to pharmaceutical companies.
- Team of 22 developers, marketing, sales, etc.

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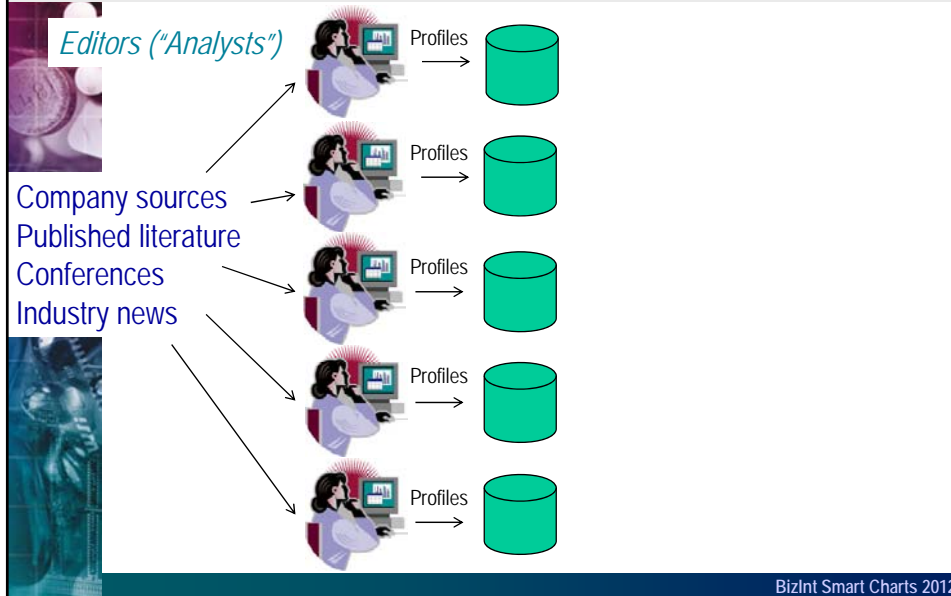
Analytic tools for Pharma – drug pipeline




At each stage of the pipeline, companies need information on drugs in development to make both business and research decisions.

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Analytic tools for Pharma – pipeline DB's



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Silibinin - Rottapharm|Madaus (Legalon?)

Last Update: 2011-12-07
Adis R&D Insight accession number: 800031705

Indications: Hepatitis C; Hepatitis C (Prevention)
Therapeutic Class (WHO): Other antivirals (J05A-X)
Therapeutic Class (EphMRA): Viral hepatitis products (J5B1)

Originator: Rottapharm Madaus (Originator)
Other Companies: Rottapharm Madaus (Owner)
Last Update: 2011-12-07
Accession Number: 800031705
Confidence Rating: Low

Highest Phase: Phase III
Drug Development Phase (Extended)

| Indication | Phase | Route | Country |
|--------------------------|-----------|-------|---------|
| Hepatitis C (Prevention) | Phase III | PO | Italy |
| Hepatitis C | Phase I | PO | Italy |

Last Phase Change: 2010-02-25

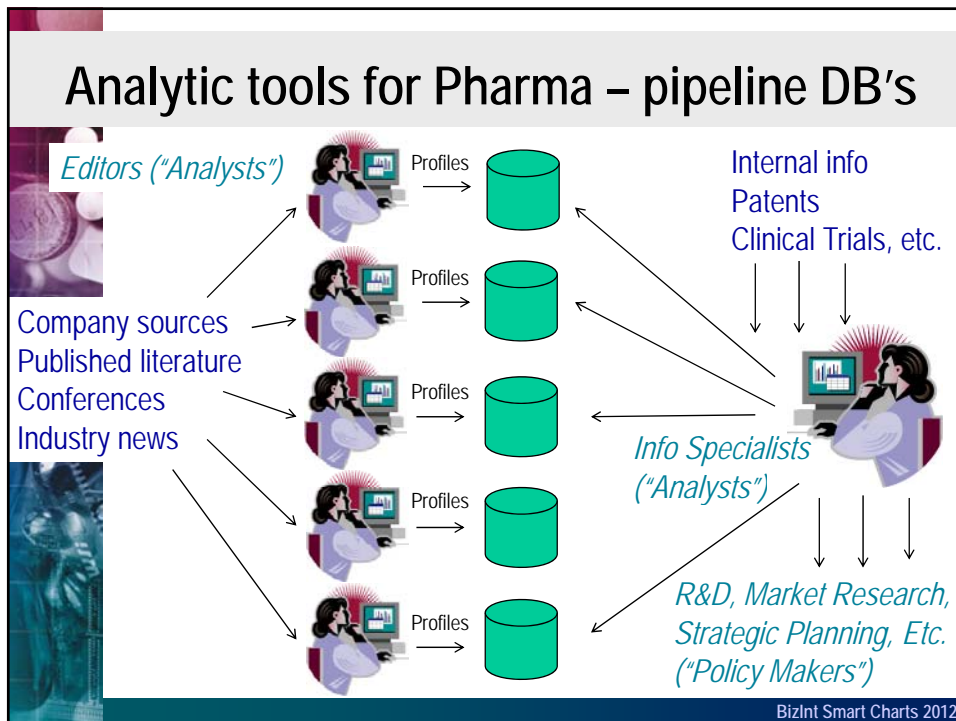
Properties
Mechanism Of Action: DNA-directed RNA polymerase inhibitors
Route of Administration: PO

Commercial Introduction
Rottapharm|Madaus is developing its Silibinin product (marketed as Legalon? in Germany and Italy) for both the treatment and prevention of hepatitis C virus (HCV) infections. Silibinin is one of the main components of the flavonoginans in sylimarin, which is the active ingredient in Legalon?. Two formulations are in development; an oral formulation is in phase I trials for the treatment of HCV infections, and an intravenous (IV) formulation is in phase III trials for the prevention of HCV recurrence after liver transplantation. The compound has recently been demonstrated to inhibit HCV RNA polymerase, and to have potent anti-viral effects in patients with HCV who were previously non-responders to standard anti-viral therapies. Clinical development is ongoing in Italy.

In June 2007, Rottapharm acquired full ownership of Madaus Pharma<REF

“Drug Profile”

arts 2012

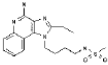

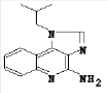


BizInt Smart Charts software helps you create, customize and distribute tabular reports combining information from the leading drug pipeline, patents, clinical trials, and gene sequence databases.

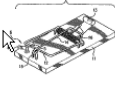
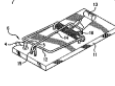
Many records matching search or alert

Easy-to-read summary table

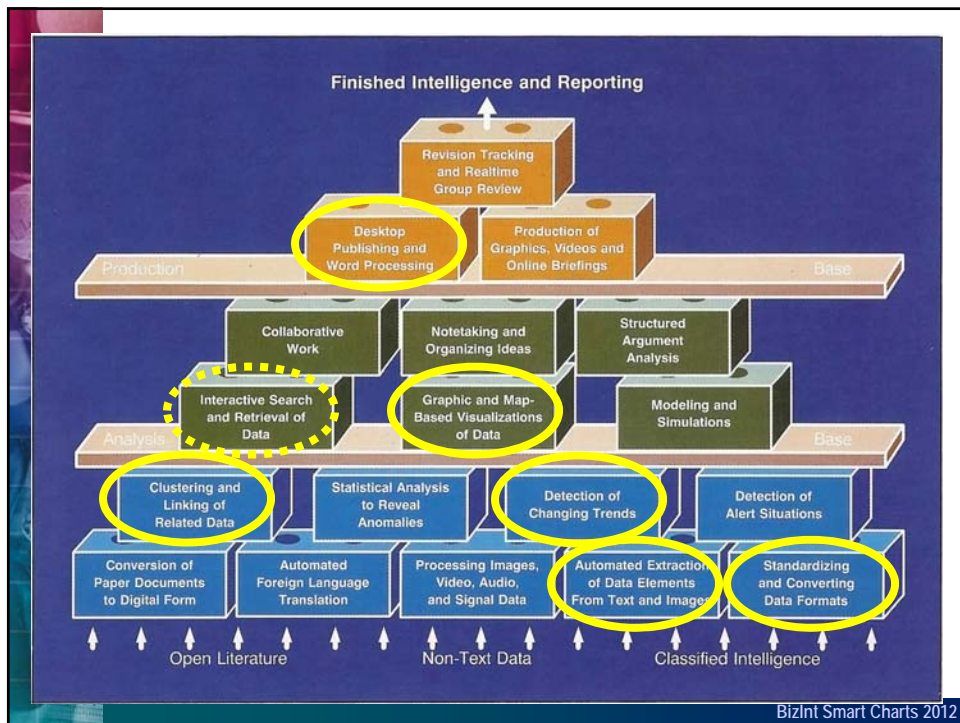
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| HepatitisC_RDI_CP_Int_2012May | | | | | | |
|-------------------------------|-------------|---------------------------------|---|---------------|---|---|
| | Product | Originator | Structure | Highest Phase | Indications | Commercial Intro |
| 77 | PF-04878691 | 3M Pharmaceuticals |  | Discontinued | Hematologic/blood cancer Hepatitis C (HCV) Immunological Disorders Melanoma | Originated by 3M Pharmaceuticals, S-32865 is an imidazoquinoline toll-like receptor 7 (TLR7) agonist that acts as an immune response modifier. 3M had been developing the compound in phase II clinical trials in a subcutaneous formulation for the oral treatment of melanoma and hematologic malignancies. Pfizer had also been developing the compound for the treatment of hepatitis C; however in 2009 the company discontinued this research [CONT.] |
| 78 | Resiquimod | 3M Pharmaceuticals |  | Phase III | Cutaneous T-cell lymphoma Hepatitis B (HBV) Hepatitis C (HCV) Herpes genitalis Immunological Disorders | Resiquimod is an immune modulating topical gel in early clinical trials at the University of Pennsylvania for the treatment of early stage cutaneous T-cell lymphoma. The Mayo Clinic and the University of British Columbia had been developing resiquimod for the treatment of cancer and for the enhancement of the protective response to hepatitis B vaccine; however, no recent development has been reported for this research [CONT.] |
| 79 | Imiquimod | 3M Pharmaceuticals (Originator) |  | Marketed | Actinic keratosis Basal cell cancer Hepatitis B Hepatitis C Herpes simplex virus infections HIV infections Human papillomavirus infections Molluscum contagiosum Photodamage Tinea pedis Vulvar intraepithelial neoplasia | Imiquimod belongs to a class of immune response modifiers known as imidazoquinolines, which was originally developed by 3M Pharmaceuticals for a variety of skin disorders and viral infections. Meda and Medicis now own the rights to imiquimod. Imiquimod is active both orally as well as topically in gel and cream preparations, and it induces high levels of circulating interferon-alpha and interleukin-1 [CONT.] |

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| Combined: Mousetraps 2008 – PatBase, MicroPatent, DWPI | | | | | | | | |
|--|---|---------------|-----------------------------|---|--|--------------------|--|--|
| | Title | Common Family | Database | Image | Patent Family | | | Abstract |
| | | | | | Patent | Kind | Date | |
| 1 | Safety disposable mouse trap | WO 2006036767 | PatBase |  | US 2006064922 US 2007151140 WO 06036767 WO 06036767 | A A A2 A3 | 2006-03-30 2007-07-05 2006-04-06 2006-09-14 | Source: US2006064922A1 designed to provide a disposable spring-loaded mouse trap arm to prevent accidental discharge of a spring-loaded mouse trap. The trap arm is a lever screw attachment and other conventional spring trap elements. [CONT.] |
| 2 | Animal e.g. mouse, trap for use in e.g. house, has safety arm attached to top portion of screw attachment and maneuvered over bow, where safety arm is rotated by user with use of lever. | WO 2006036767 | Derwent World Patents Index |  | US 2006064922 WO 2006036767 | A1 A2 | 20060330 20060406 | US2006064922 A UPAB: 2 NOVELTY: The trap has a safety arm attached to the top portion of a screw attachment and is maneuvered over the bow (12). The safety arm is rotated with the use of the lever. The lever attachment is anchored to the top portion of the bow so that the lever is located outside the path of the bow. [CONT.] |
| 3 | Safety disposable mouse trap | WO 2006036767 | MicroPatent | | US 20060064922 | A1 | 2006-03-30 | This product is designed to provide a disposable spring-loaded mouse trap arm to prevent accidental discharge of the bow of a disposable mouse trap. The safety disposable mouse trap consists of a lever, screw attachment, safety arm, and other conventional spring-loaded mouse trap elements. [CONT.] |

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BizInt Smart Charts (1995-present)

- Bought the remnants of the TRW Smart Charts business in late 1995 and re-started as BizInt Smart Charts.
- **Software used by hundreds of information specialists in pharmaceutical, chemical, and other high-tech companies worldwide.**
- Works with dozens of commercial databases.
- ~ \$1M business; ~\$5M technology investment over 15 years.

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BizInt Smart Charts – lessons learned

- Corporate information specialists very similar to intelligence analysts.
- *But the “sales” process is very different.*
- Key to success is applying simple, mature technology to specific problems within the user’s environment.
- **Result is tools that offer dramatic new capabilities and are actually used!**
- *But it’s not a multi-billion dollar business.*

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Looking forward...

In some ways, desktop technologies have exploded since 1989.

- The Web
- Google and similar searching tools
- Microsoft Office (Word, Excel, PowerPoint)
- Laptops, cell phones, mobile devices
- Powerful, cheap desktop computers
- Desktop mapping and imagery (e.g. Google Maps)

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Looking forward...

But we've essentially "lost" some technologies critical to analytic tool development.

- UNIX
- Collaborative and notetaking environments (e.g. Lotus Notes, Xerox Notecards, etc.)
- New generation of software development and prototyping tools.

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Looking forward...

And there has been surprisingly little progress in key elements of the CATALYST pyramid...

- **Getting information online** in a format that supports further processing and analysis.
- **Automated analysis tools** – still requires lots of manual work for every specific case.
- **Intuitive software development & prototyping tools**
- **Collaborative and notetaking tools**
- **Meaningful data visualization**
- **Presentation** (beyond PowerPoint)

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