

QTIP: Quick Technology Intelligence Process

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Outline

- QTIP Model Evolution
- Future Directions

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Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

“QTIP” History

- Tech Intelligence/Forecasting Workshop (2002)
- Collaborate on SBIR proposal to National Science Foundation (Search Technology & Air Products)
- NSF SBIR Phase I Project awarded (Jan-June, 2003)

QTIP Project – Original Model

- Exploit Science & Technology database resources to assess particular emerging technologies
- Analyze search results from
 - 1 research publication abstracts database &
 - 1 patent abstracts database
- Quick (1-day turnaround)
- Standardized outputs
(template of selected tables & charts with interpretive text by researcher)
- Share via intranet
(Georgia Tech “HotTech” model: //tpac.gatech.edu)

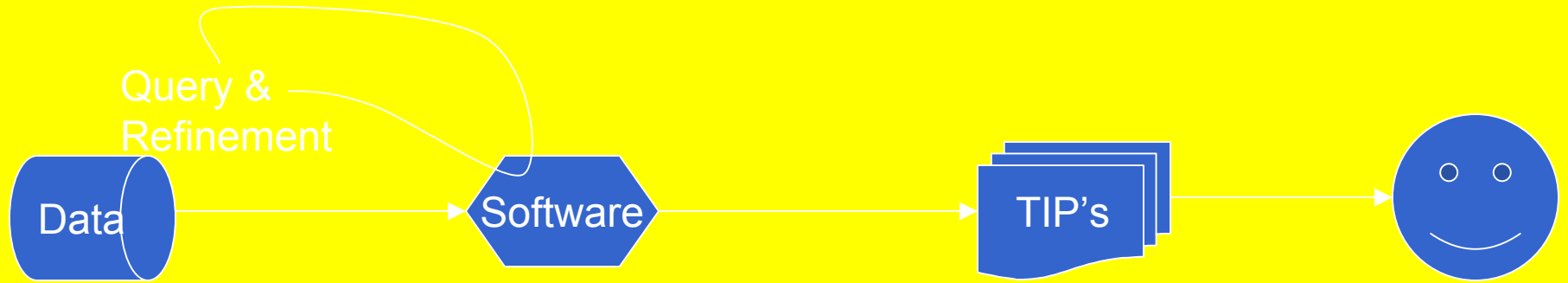
Evolution of a QTIP Model: Where do 'we' want to go?

1) Information Professionals

2) Technology Analysts

3) Researchers

4) Senior Manager
User Community



Technology Intelligence Products (TIPs)

QTIP Project – 1st Iteration Results

- First Round – performed 2 technology analyses
 - Functional polymer additives for coatings
 - Cleaning processes, equipment & materials
- First Round Feedback (April)
 - Researchers want to **interact** with the data
 - Researchers working to resolve **particular** management of technology issues (beyond “general” technology profiling)

QTIP Project – 2nd Iteration

- Second Round – did 5 technology analyses
 - Functional polymer additives for coatings
 - Cleaning processes, equipment & materials
 - Advanced battery materials
 - Nanomaterials
 - Food processes that involve refrigeration
- Second Round Feedback (June)
 - Positive
 - Interesting opportunities: which path to take?

Multiple Perspectives!

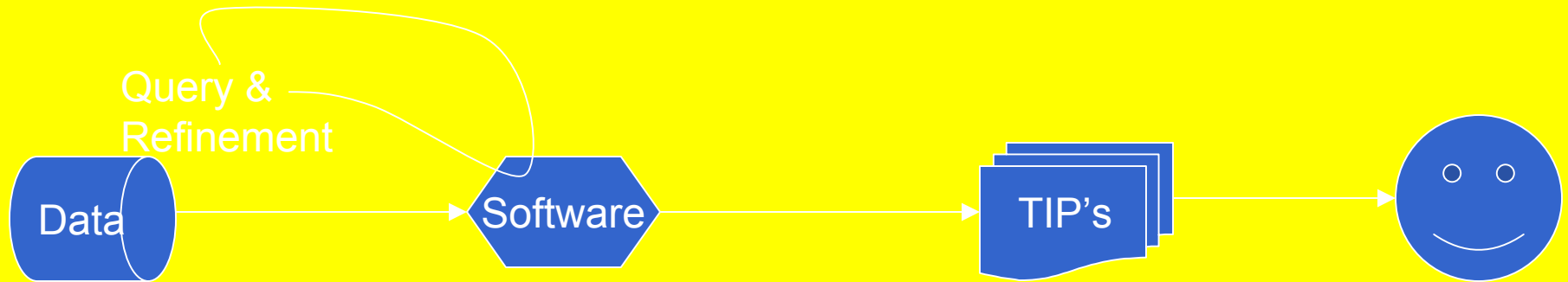
- Information Specialist
- Technology Analyst
- Researcher
- Senior Technology Manager
- Data Considerations
[query, quality, precision, results get read]
- Potent Analyses
[software power & transparency, valid results]
- Do what?!
[~research profiling, screening analyses]
- Decision Support
[credible, comprehensible, timely, to the point]

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2) Technology Analysts

3) **Researchers**

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User Community



User-friendly *VantagePoint-EZ*

with special Wizards to facilitate:

- * Intake: Cleaning
- * Processing: Interactive Analyses
- * Output: TIP's +

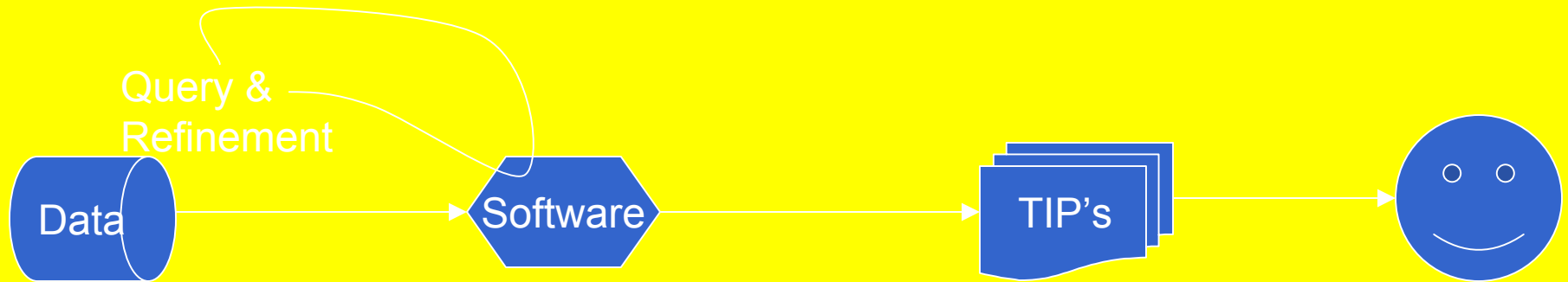
Technology Intelligence Products (TIPs)

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Technology Intelligence Products (TIPs)

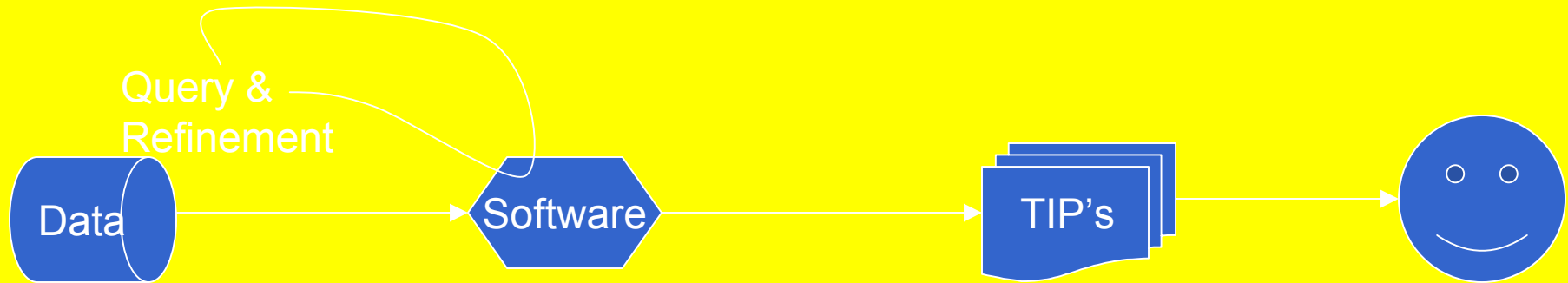
- * **Decision-oriented** repertoire of technology analysis results
- * Adaptable

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Technology Intelligence Products (TIPs)

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Quik-TIP Bottom Line: Shift to the Right

- * Help researchers to do “tech mining”
- * Qualitative change in orientation:
Decision Use Pull >> Data/Tool Push

Current Design Ideas for QTIP

- Easy-to-use *VantagePoint* tool for Researchers
- Wizard-driven
- Information Representation Templates
(adaptable presentations)
- To help Researchers and Technology Analysts --
answer particular technology management questions
[rather than explore gobs of text data records]

QTIP Wizardry

- Multi-level – Use *VantagePoint* plus *MS Office*
 - one-button option (accept defaults)
 - interactive option (tailor)
- Issue Wizards – help one generate a type of output
 - focus on technology (across companies)
 - focus on company (across technologies)
- **Process Wizards** – help you apply a tool for your purposes (general analytical approach + buttonology & automation)

List Wiz

(present to help researcher with a QTIP list)

- Interpret:
 - * This list shows the leading organizations –
 - check for redundancies
 - are you particularly interested in a subset (e.g., American universities? Auto companies?)
- Manipulate:
 - * Searching
 - * Grouping
 - * Creating new data subset for additional analyses
- Output
 - * Would you like this as an Excel column chart?
 - * Do you want a subset of the list? ...

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Example -- Issue Wizards

- 1) What do you want to work on?
 - A) Competitive Technological Intelligence
 - B) **Mergers & Acquisitions** [**** your selection**]
 - C) Technology Marketing
 - D) Technology Recruiting
 - E) General Technology Exploring
- 2) Which M&A Question are you working to answer?
 - A) **Which companies are most heavily involved in Technology T?** [**** your selection**]
 - B) What is a given company's power profile (on Technology T)?

Which Companies are most heavily involved in Technology T?

Welcome to this QTIP **Process** Wiz

- 1) Have you already done your search?
 - * **Yes** [**** your selection**]
 - * No
- 2) Have you imported the search results into Quik-TIP yet?
 - * Yes
 - * **No** [**** your selection**]
- 3) Please identify the search results
 - * **File(s) from EI?** [**** we'll start here**]
 - * File(s) from MicroPatent?
- 4) Would you like Wiz to process these files now?
 - A) **Import the files?** [**** yep**]
 - B) **Apply standard data cleaning?** [**** yep**]

(QTIP Summary Screen)

of Records 145

Source: EI

Source Date: Feb 24, 2003

Source File: c:\...

- These fields are available (# of items each):

Authors	95	Title	95
Organizations	72	Keywords	341
Publication Year	6	Abstract Phrases	2238

- What do you want to do next?
 - * See a sample record? **[**]**
 - * See a list of most frequent keywords to help you refine your search?
 - * Run the standard *Which Companies? Wiz?* **[**]**
 - * See consolidated 'abstract'? **[**]**
 - * Run a tailored *Which Companies? Wiz?*
 - * Explore these fields on your own now?

Sample Record

Author(s) AU: Lewin, Menachem Endo, Makoto

Affiliation AF: Polymer Research Institute Polytechnic University, Brooklyn, NY, United States

Title TI: Catalysis of intumescent flame retardancy of polypropylene by metallic compounds

Journal JN: Polymers for Advanced Technologies

Source SO: Polym. Adv. Technol. v 14 n 1 January 2003 2003 p 3-11

Record Type RT: JA (Journal Article)

Language LA: English

Subject(s) SU: Polypropylenes

 Metallic compounds

 Flame retardants

 Catalysts

 Thermogravimetric
 analysis

 Flame retardancy

Abstract AB: **Divalent and multivalent metallic compounds catalyze the flame retardancy performance of intumescent systems based on ammonium polyphosphate (APP) and pentaerythritol (petol) in poly(propylene) (PP). The catalytic effect is shown by increases in the oxygen index (OI) and UL-94 ratings. The effect is exerted by small concentrations of the metallic compounds in the range of 0.1-2.5 wt% of the compositions. The effect increases with the concentration of the catalyst until a maximum is reached. At higher concentrations of the catalyst a decrease in the flame retardancy parameters is observed, accompanied in several cases by a degradation and discoloration of composition. The catalyst replaces melamine in intumescent systems. Catalytic effectiveness is defined and calculated for a number of compounds. Thermogravimetric parameters, such as initial decomposition temperature, temperature of the transition point and residue-after-transitions (RAT) change in parallel with the catalytic effect of the metal compound concentration. Metal compounds investigated include oxides, acetates, acetyl acetonates, borates and sulfates of Mn, Zn, Mg, Al, Ca, Ba, V, Co, Ni, Cu, Mo, Zr, and Cr. Mechanistic considerations on the activity of the catalysts are presented. 20 Refs.**

Class. Codes CC: 815.1.1 804.2 803 914.2 801

Date Indexed DI: 200303

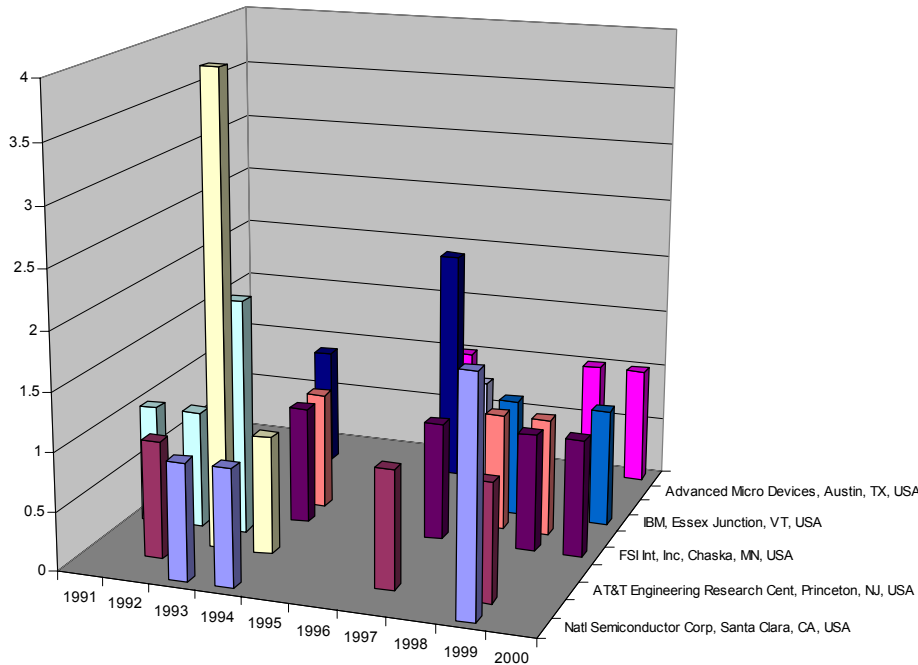
Which Companies Lead in Cleaning Processes?

Leading Patenting Organizations

Organization	#
Applied Materials Inc.	298
Advanced Micro Devices	107
IBM	59
Micron Technology	59
Texas Instruments	49
Taiwan Semiconductor Mfg	42
LAM Research Corp	41
(tied for 17th) Air Products	12

Leading Publishing Organizations

Organization	#
Natl Semiconductor Corp, Santa Clara, CA, USA	6
AT&T Engineering Research Cent, Princeton, NJ, USA	5
Hitachi. Ltd, Jpn	5
Texas Instruments, Inc, Dallas, TX, USA	5
FSI Int, Inc, Chaska, MN, USA	4
IBM, Essex Junction, VT, USA	4
Motorola, Phoenix, AZ, USA	4
Air Products and Chemicals, Inc, Allentown, PA, USA	3
TSI Inc, St. Paul, MN, USA	3



Top 10 Corporations by Thrust Area Publications

Corporation	C	A	C	S	P	A	S	E	
	t	o	o	a	a	u	u	-	
	a	r	m	f	s	r	r	b	
	o	s	C	a	s	P	A	C	
	l	l	n	e	v	l	t	O	
	m							2	
								m	
Natl Semiconductor Corp, Santa Clara, CA, USA	1	0	1	1	0	1	1	0	0
Texas Instruments, Inc, Dallas, TX, USA	0	0	0	0	0	0	0	0	0
AT&T Engineering Research Cent, Princeton, NJ, USA	4	0	2	4	2	0	0	1	0
Hitachi. Ltd, Jpn	0	0	0	0	0	1	0	0	0
FSI Int, Inc, Chaska, MN, USA	1	1	2	0	0	0	0	1	0
Motorola, Phoenix, AZ, USA	1	1	0	0	0	0	0	1	0
IBM, Essex Junction, VT, USA	1	1	1	0	0	0	0	0	0
TSI Inc, St. Paul, MN, USA	1	2	0	0	0	1	0	0	0
Advanced Micro Devices, Austin, TX, USA	1	0	0	0	0	0	1	0	0
Air Products and Chemicals, Inc, Allentown, PA, USA	0	1	0	0	0	3	0	0	0

Which Companies? Wiz Candidate Content

- Top 10 **Patenting** Companies (worldwide; large or small -- or some other cut?) -- all years covered by our MicroPatent data (or recent 10 years? or?)
- Top 10 **Publishing** Companies -- most recent 8 years covered by our EI data (or all years? or?)
- PCA Map -- used to identify "Top N" research thrusts in Technology T based on EI keyword clusters
- Use EI keywords on Patent data to make Matrix of Leading Companies (~Top 10 based mainly on patents, with a look to publications) by Thrust area
- 3-D column plot of top company by year for most recent 8 years (or bubble chart? or longer time period?)
- Cluster Abstract on call to give feel for thrust area [see next slide]
- Which companies' patents are most cited?

Cluster Abstract: Chemical Cleaning

[automatic composite drawn from sentences in abstracts with high relevance]

- Semiconductor processes can use hot-chemical baths for acid-based nitride etching, RCA cleaning, and acid- or solvent-based photoresist stripping.
- Wafer cleaning following chemical-mechanical planarization, especially brush scrubbing, is a critical step in semiconductor device manufacturing that is not adequately understood.
- Assembly & Packaging processes of semiconductor devices such as die attach, wire bonding, and molding can greatly benefit from Plasma Cleaning.
- However, device fabrication requirements are imposing more stringent constraints on factors such as surface roughness and metallic contamination.
- The biggest improvement of this system from the previous model is its projection optics.

Summing Up: QTIP

<u>Type</u>	<u>What</u>	<u>Value</u>
Data	Search results (2500 abstracts)	Lacks meaning
Information	Data file (2500 abstracts in <i>VantagePoint</i> software)	Enables Knowledge Discovery (e.g., Environmental Seals Ltd. has the most IP on flame retardants)
Knowledge	Easy QTIP Process to answer questions	Answer management questions (Don't acquire Environmental Seals Ltd – hire the one inventor with all 25 patents)

Advice?

- QTIP Model on target?
 - 4 communities?
 - Information specialists
 - Technology analysts
 - Researchers
 - Senior technology managers
 - Technology management information targets?
- Future Directions
 - Wizard track?
 - Other suggestions?