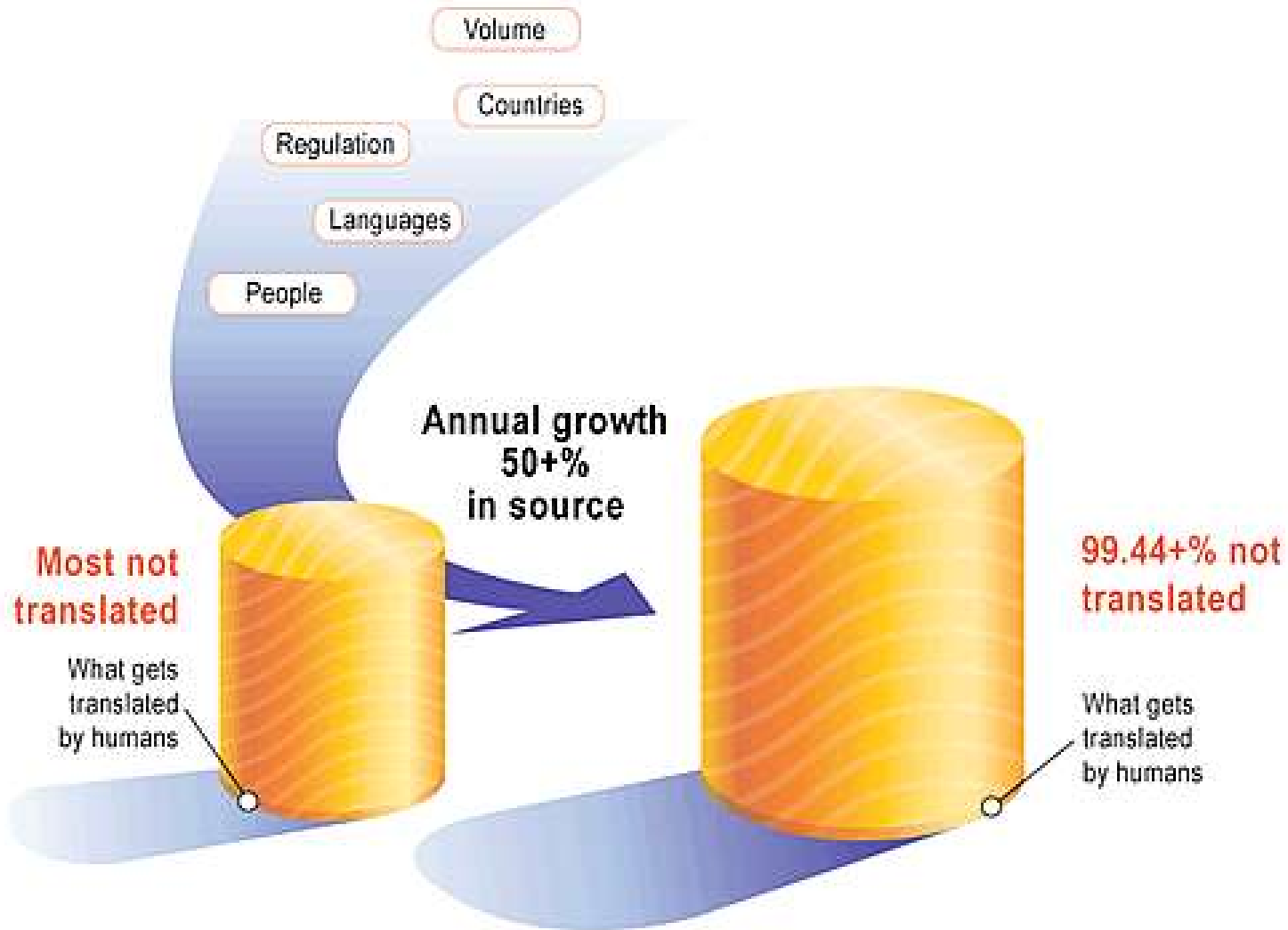# The Business Case for Machine Translation

Outline

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Tutorial description

- In this tutorial, DePalma presents the business drivers, metrics, and best practices associated with successful MT implementations. Based on current research at Common Sense Advisory and interviews with owners of deployed MT applications, he:
  - Analyzes the reasons most frequently advanced for MT usage
  - Categorizes the selection criteria used by practitioners to determine their choice of rules-based or statistical engines
  - Reviews future business-driven extensions of MT strategies intended to increase the return on MT investment
- Attendees will learn what they need in order to build a business case for introducing MT to their organizations, whether they choose to implement it behind the firewall or work with translation agencies and other language service providers.

Market demand for local language

Drivers for more translation

More!	Drivers for More Translation
Content Volume	Data storage system vendors tell us that corporate data volume grows 50 to 70 percent year over year, visibly increasing the pool of potentially valuable content. In 1995 the average corporation managed 4.5 terabytes of data, but by 2006 that number ballooned to 25 terabytes. In 1997 there were 200 million pages on the web, a small fraction of the estimated 11.5 billion pages online today.
Market Demands	Consumers and business buyers demand more information in their own language, so manufacturers struggle to sim-ship (that is, simultaneously ship) products to multiple markets (see "Developing Products for Global Markets," Jun06). Corporate systems of records – customer relationship management, transaction processing, and customer support – increase the demand for materials adapted to market requirements in real time.
Regulations	National legislatures and industries add legal requirements such as country-specific labeling and packaging, research trials, and website disclosures. Government and regional regulation such as Conformité Européene (CE) compliance require increasing amounts of content to be translated for their target markets.
Globalization	International trade has swelled over the last decade, filling North Atlantic retail and clothing stores with goods manufactured in low-wage countries. In turn, developing countries have been investing in infrastructure and high-tech components from their trading partners. This two-way flow means supplying business partners and consumers with information they can act on. On the government side, post-9/11 remediation broadened the array of countries in which intelligence agencies have an interest.

Choice: Human, machine, or zero translation

- Challenge: Budgets, staffing, time, and a variety of other factors will always make organizations shy away from translating even a small fraction of the information they have at hand.

- Result: Most information will never be translated into even one language, much less into many languages.

- Better response: Many companies and government agencies will consider MT as a way to maximize the amount of information available to customers and constituencies who speak other languages.
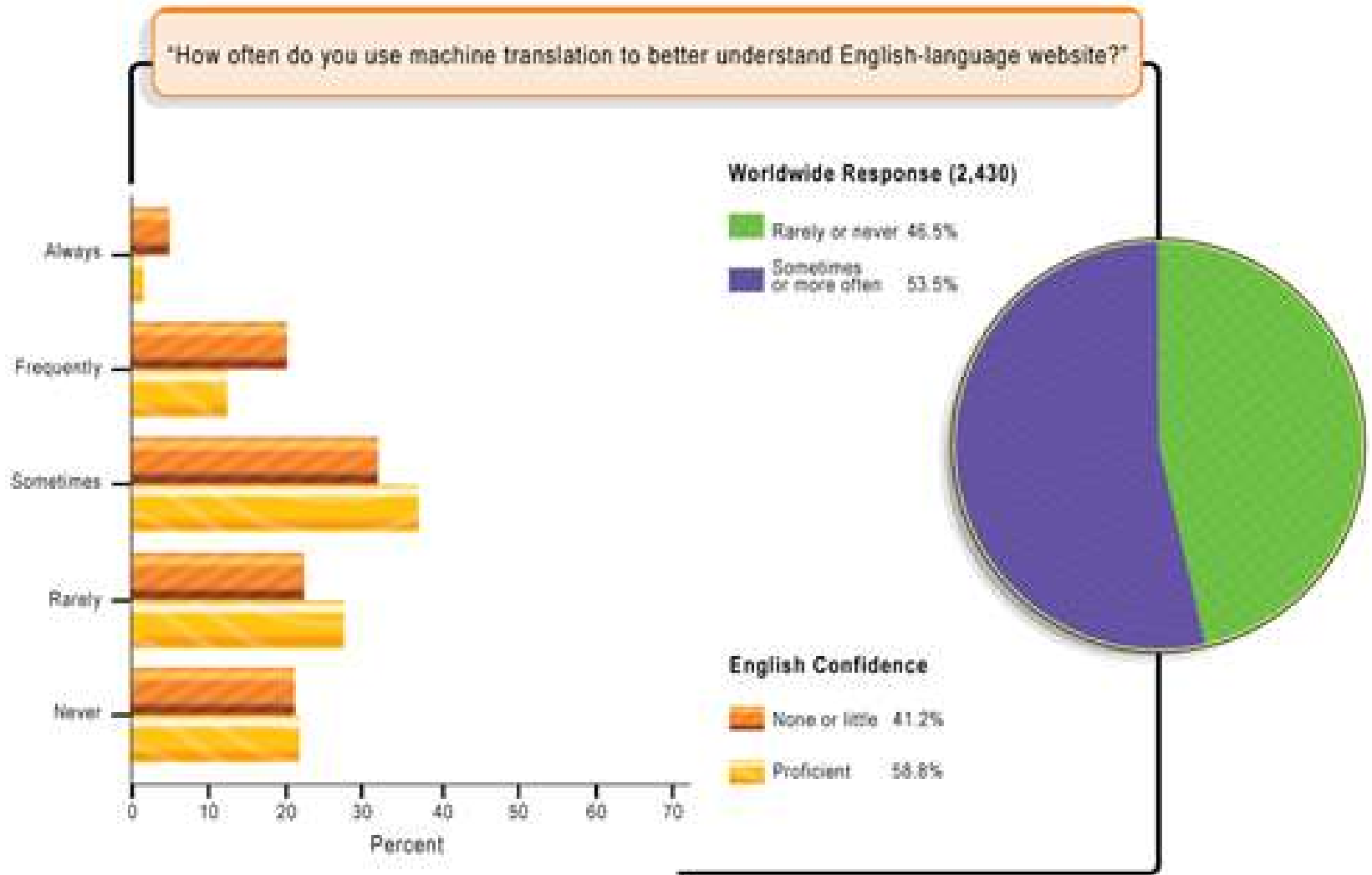
The big "Aha!" of MT

- At its core, MT provides access to otherwise inaccessible material.

- Does the Korean text on the web page look like a bunch of squiggles to you?

- Quickly determine whether the topic at hand is kimchee or ketones.

- Over half of the non-Anglophone consumers that we surveyed said they use machine translation when they visit English-language sites

Whether you offer it or not, customers will – that has an impact on your brand or offer

"How often do you use machine translation to better understand English-language website?"

Worldwide Response (2,430)
- Rarely or never 46.5%
- Sometimes or more often 53.5%

English Confidence
- None or little 41.2%
- Proficient 58.8%

Observation: There's more pull than push MT

- Users actively pull OLMT content
- An increasing number of organizations push machine-translated content to information consumers for support, documentation, and even some elementary marketing

How good does MT have to be?

DARPA suggests that evaluators focus on three factors:

2. "Adequacy" measures how much of the original meaning comes through in the translation

3. "Informativeness" is the degree to which information consumers can find what they're looking for and act on what they find

4. "Fluency" gauges linguistic factors such as spelling and word usage, along with the localization to a given country or market.

How good does MT have to be?

"Good" depends on who is evaluating the output:

- Access is the top priority for information consumers. Adequacy and informativeness contribute to **consumability**, the biggest issue for anyone voluntarily using MT to understand foreign-language content.

- Information publishers face a tougher judge on quality. Anyone publishing MT content will be judged on the informational accuracy, linguistic quality, and actionability of the machine-translated content.

How and where organizations deploy MT

Human		Purpose / Content Difficulty		Machine

Human ⟷ Machine

| Human	Dimension	Machine
Quality matters	**Purpose**	Access is critical
Complex	**Content Difficulty**	Simple
Any including "hostile"	**Friendliness of Reader**	Friendly or tolerant
Any	**Knowledge Domain**	Predictable
Scheduled	**Timeframe**	Immediate
Budget for just a few	**Languages Needed**	Less budget constraint

Where you can find MT in active use

- Individuals cut, paste, and evaluate to get the gist
- Some companies and government agencies push raw MT through their websites
- Some LSPs have built practices around it
- Some hardware and software developers use it to translate externalized strings, product codes, etc.
- Several companies offer customer-facing MT'ed support
- Increasing use of MT for documentation and even for marketing materials on website

More ambitious applications assume friendly users
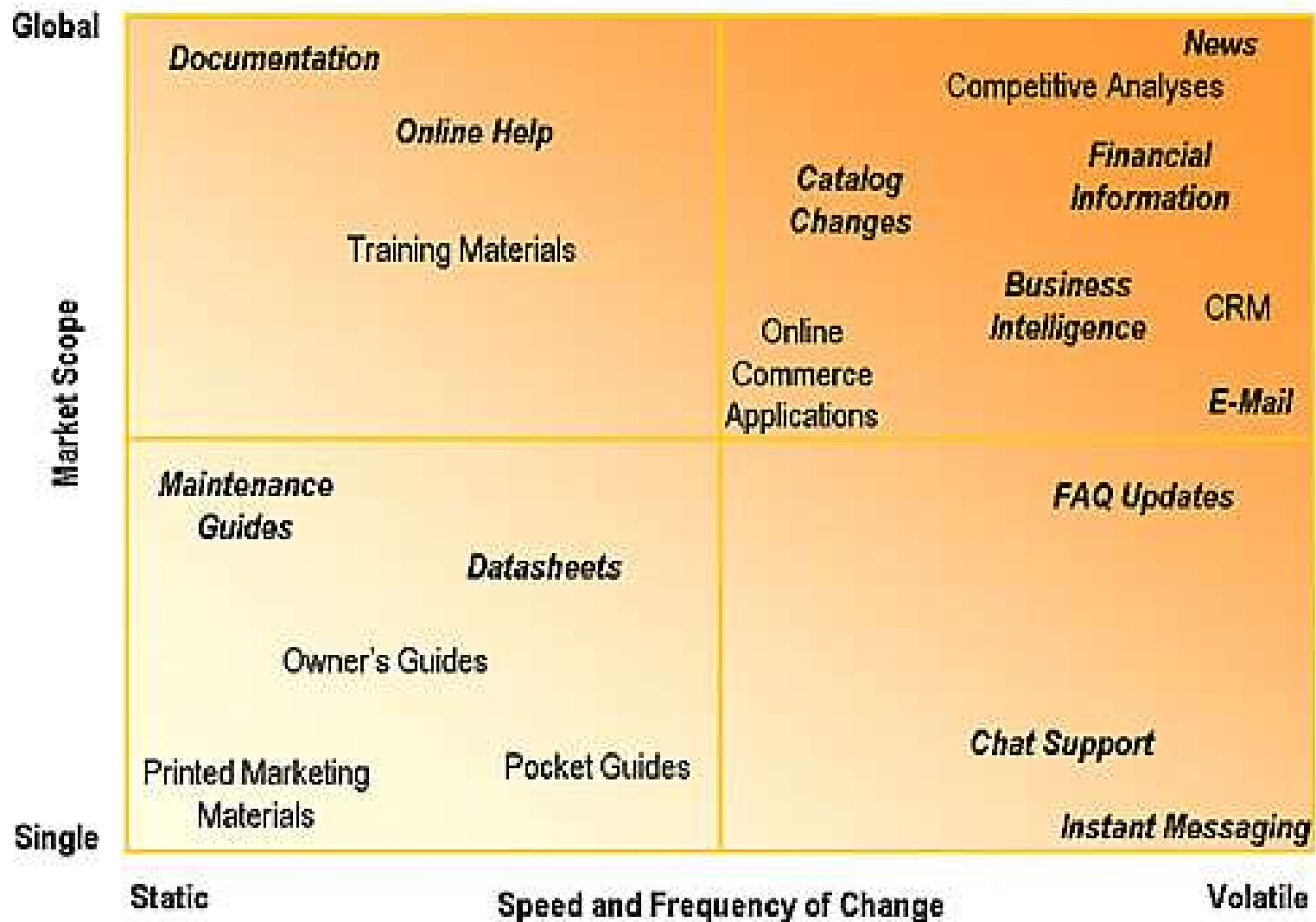
The business of machine translation

- Commercial solutions available today
- Future solutions
- Open-source
- Integrators
- LSP offerings

SWOT analysis of MT offerings

Strengths

- Alternative to zero translation
- Faster, cheaper, more volume
- Ready for action – in both popular mindset and among techies

Weaknesses:

- No one-stop shopping
- Heavy upfront cost
- Small suppliers
- Fiefdoms
- GIGO
- "Click-to-translate" phenomenon

SWOT analysis of MT offerings

Opportunities:

- Information discovery
- Translator productivity improvements
- Integration with XML strategies
- Web service nexus
- Languages of limited demand

Threats:

- Zero translation
- Pervasive concerns with quality
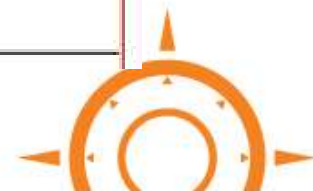- Human translator resistance

Techno-religious debate

- Rules, statistics, or none of the above
- Definition of different MT types
- Hybridization
- Discussion of market offerings

Content suitability for machine translation

Issue	To MT or Not to MT? Prepare for Trade-offs
Subject Matter	What do you need to translate? The best candidates for MT will be literal – software manuals, weather reports, manufacturing details, and templated forms. Forget *belles lettres*, rhetorical text, metaphysics, and anything figurative.
Volume	How much information do you need translated? MT pays off if you have a large volume of material to be translated. Turnaround time favors MT, unless there is heavy post editing. Large quantities of frequently changing text will otherwise fall into the zero-translation category.
Volatility & Velocity	How frequently does content change? How quickly do you need it? Time drives MT. Understandable gists come quickly, but no one should expect perfect, instantaneous translations. You will have to balance lag time and accessibility against quality.
Source Quality	How good is the source? "Garbage in, garbage out" holds true for MT. Here are some rules of thumb: Use shorter sentences; avoid pronouns like "it"; look out for relative terms such as "there" requiring apposition; and stay away from ambiguous constructions, metaphors, typos, and informal grammar. Good source takes time and money. That said, quickly written texts like e-mails can have passable MT consumability – as long as the writers use complete sentences and correct spellings.

Content suitability for machine translation (cont'd)

Domain Specificity	How domain-specific is it? Do you have translation memories and a terminology base? TMs will reduce the MT load and improve the quality of output. Extensive term bases with source-target lists give users a head start with customization, the larger the better.
Output Quality	How good does the output have to be? Don't expect perfection. Remember the value of gisting – for many users, it's better to get a crude – but semantically correct – translation than nothing. Remember that there will always be a trade-off between accessibility and high-quality.
Metrics for Success	How will you measure success? Do you want perfect translations or quick access? Enlist the aid of information consumers to create tests and conduct evaluations of MT solutions.

Technology probe: pros and cons

- Rules-based
- Statistical
- Hybrid
- Context-based
- Knowledge-based

Evaluating MT systems

- Ask potential suppliers to produce sample translations of representative samples of the materials you expect to feed into their MT engines

- Bring in human evaluators to determine whether the translation quality meets your application requirements

- Use industry metrics:
  - BLEU
  - NIST
  - F-Measure

Software license or service costs

- Free to the consumer on the web
- Subscriptions and per-job pricing
- Desktop client
- Server
- As a service

The decision matrix

- Language choice
- Platform – server or service
- Integration with technology stack
- Integration with content life cycle
- Level of required quality
- Performance

MT desiderata

Feature	Desiderata	Yes, No, or Not Applicable
Platform	Operating system: Windows, Linux, UNIX, Macintosh, or other proprietary platform?	
	Architecture: Standalone desktop, client/server, or web server	
	Performance: Multi-server support for high-speed or quick-turn translation	
	Availability of professional services for integration, implementation, and customization	
Language	Support for required language pairs	
Integration	Compliance with enterprise specifications (e.g., XML, SOAP, .Net; DITA, S1000D; SQL)	
	Documented and supported interfaces for integrating with content management, translation management, workflow, translation memory, and terminology management	
	Built-in integration with productivity tools	
	Support for required file types (.doc, .pdf, etc.)	
	Compliance with globalization standards (e.g., Unicode, TMX, TBX, XLIFF)	

MT desiderata (cont'd)

Customization	Manage and update dictionary: harvest and tag relevant domains terms	
	Add company- and domain-specific dictionaries	
	Normalize pre-translated texts (spelling, grammar, style guide, etc.)	
	Train system: Large bilingual corpora for learning (statistical and example-based)	
	Authoring support	
	Post-editing support	

Building the business case for machine translation – an exercise in business rationales

Thank you.

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