ARTIFICIAL SOLUTIONS

Challenges, Solutions and Visions
for the
Interactive Multilingual Digital Single Market

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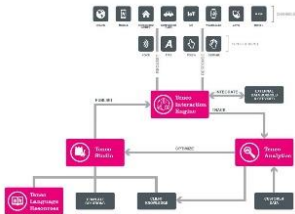# Who are Artificial Solutions?

A multilingual European LT company

since **2001**

Offices
Stockholm   Hamburg
Barcelona   Newbury

Teneo Platform

88 employees speaking **27** languages

100+ conversational systems

Supports **20+** languages

30M dialogs/year

Skruvat.com
Staatsloterij
IKEA
sella.it BANCA ON LINE

vodafone™

Carlson Wagonlit Travel
Kabel Deutschland
Estácio
widiba NO ORDINARY BANK

Deutsche Post DHL

Statens vegvesen
Yello Strom
Shell
TAP PORTUGAL
telenor
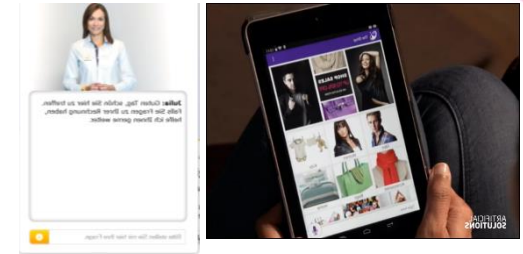The co-operative
CREDIT SUISSE

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Our vision

To make technology understand people…

…in their own language

Natural Language Interaction (NLI)

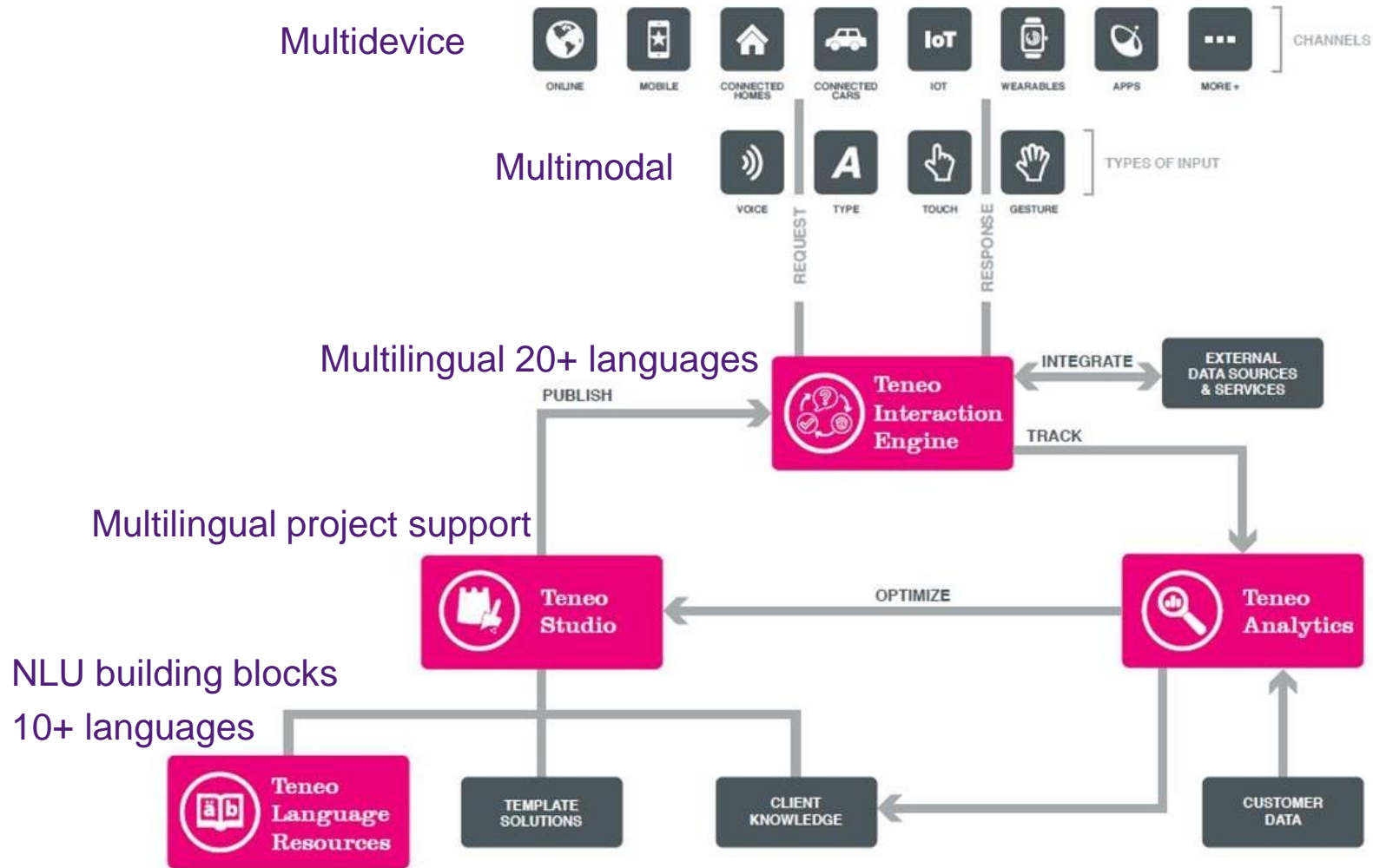Virtual Assistants

Personal Assistants

Robots

Games/Toys

Smart home

Wearables and Connected Devices

Our platform - Teneo

Multidevice

Multimodal

Multilingual 20+ languages

Multilingual project support

NLU building blocks
10+ languages

The Natural Language Interaction Market

Riding on the Siri wave..

- Apple's Siri ignited the IVA and Speech Technology market in Oct, 2011.
  - Huge Media focus.
  - Consumer awareness of technology.
  - Market turbulence: new providers, acquisitions.
- Personal assistant challengers:
  - Microsoft's *Cortana*, Samsung's *S-Voice* (Vlingo), (*GoogleNow*),
  - *Maluuba*, *SpeaktoIt,* Anboto's *Sher.pa*, Nuance's *Dragon Assistant*, *Skyvii*, *Vlingo*, *AskZiggy, Evi*, *Robin*, *Iris* etc.

Indigo – our own PA

- A speech-enabled personal assistant to showcase our **Teneo™** platform.
- Freely available mobile app since 2013.

  http://www.hello-indigo.com/

  - for Android, iOS and Windows phones
- Broad functionality
  - control on-device apps (alarm, calendar, music player, Facebook etc.)
  - calls web services (weather, Wolfram Alpha, search, restaurant etc.)
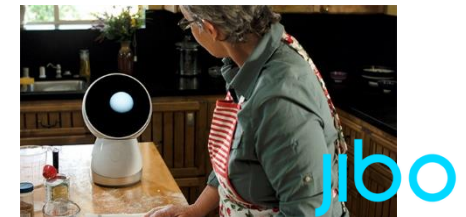 - handles social talk (off-topic talk).

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indigo

Your personal assistant.
Everywhere.

Download now!

Learn more >

indigo reminde
Indigo what can you do.
I can do the following things.
Just click on a category to see
some examples.

Food & Drinks

Where is the nearest café?
I'm hungry
What's the best Tapas bar in

Going conversational...

PAs on new devices

Wit.ai is joining Facebook
05 Jan 2015 news

More big players going conversational
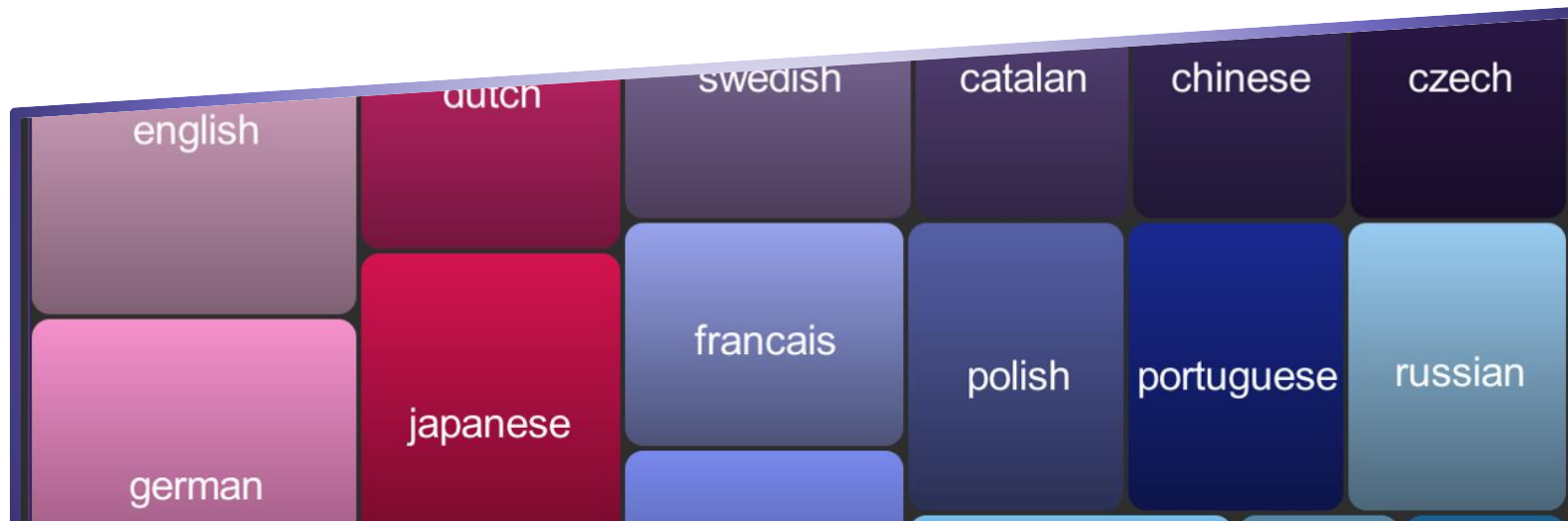

amazon echo

New players & products

Siri – the VA Market's tipping point?

- Intelligent Virtual Assistant (IVA) market to grow
  - In 2012, market valued at $352 million.
  - Forecasted to grow to $2.1 billion by 2019 (Transparency Market Research).
  - Expected CAGR of 39.32% over the period 2013-2019 (Sandler Research).
  - North America has 39.6 % share of the overall market.
  - Asia-Pacific market fastest growing.
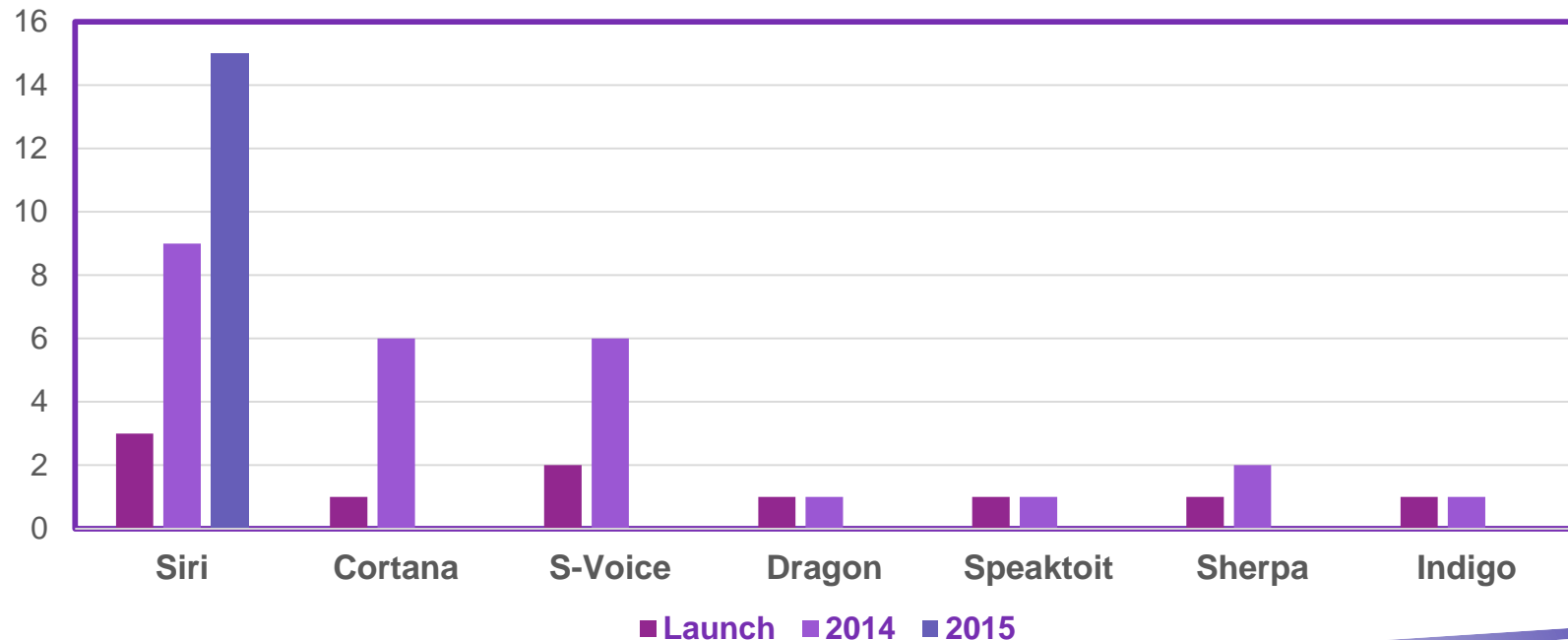
Multilingual Challenges & Natural Language Interaction systems

Multilingual coverage: PAs

Languages the Personal Assistants cover
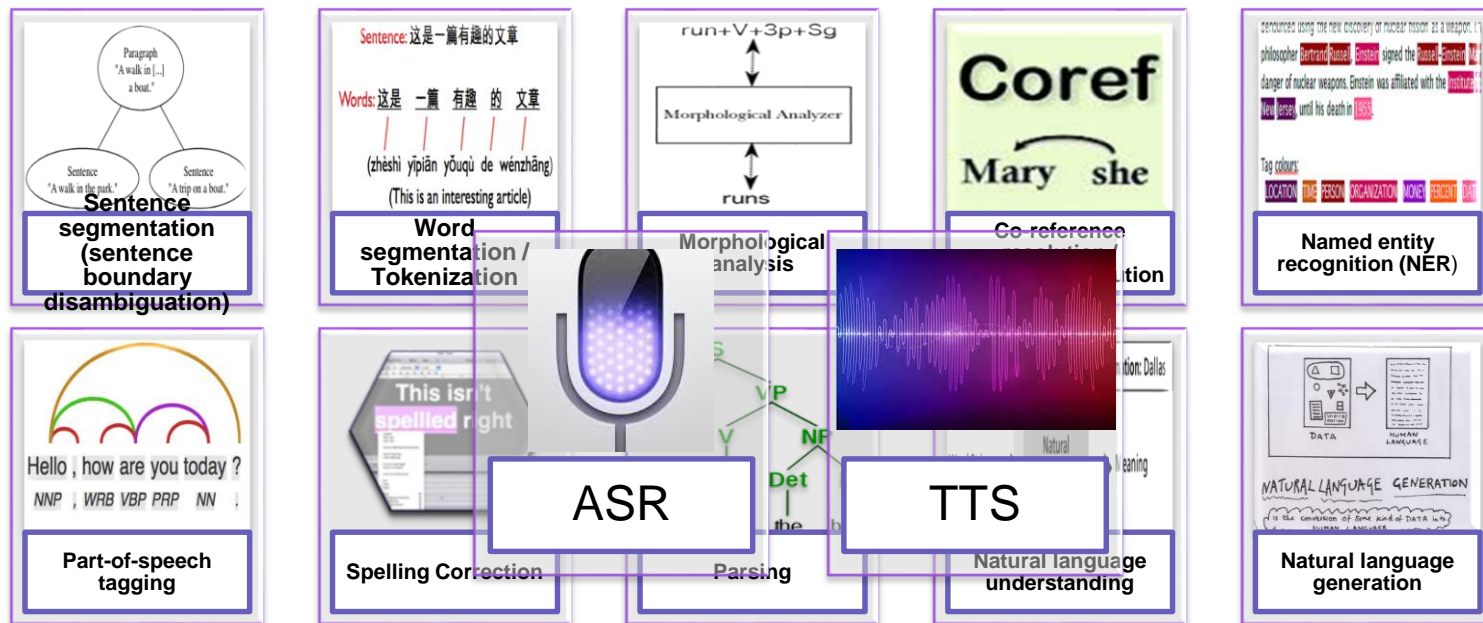

Legend: ■ Launch ■ 2014 ■ 2015

- 3 years after launch, Siri only knew 5 of EUs 24 official languages!
- Since April 2015, Siri handles 9 European languages.
- Most EU citizens do not have access to a PA and its services.

Multilingual coverage: NLI Platform vendors

EU Languages the top 21 providers cover

Language	Value
ENGLISH	21
SPANISH	12
FRENCH	10
GERMAN	10
PORTUGUESE	9
ITALIAN	6
DUTCH	5
BASQUE	3
CATALAN	3
SWEDISH	1
NORWEGIAN	1
DANISH	1
POLISH	2
SLOVENIAN	1
CZECH	1
SLOVAK	1
HUNGARIAN	1
FINNISH	1

Many of EUs languages not covered

Only 4 providers offer 20+ languages

60% of providers offer <5 languages

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Roadblocks for multilingual conversational systems

- A conversational system relies on many different components in order to handle a language properly.

Sentence segmentation (sentence boundary disambiguation)

Word segmentation / Tokenization

Morphological analysis

Co-reference resolution

Named entity recognition (NER)

Part-of-speech tagging

Spelling Correction

Parsing

Natural language understanding

Natural language generation

ASR

TTS

- Costly and timely to develop. Require language expertise.
- Hard for SMEs to acquire: licenses, affordable, right technology stack, lack of basic NLP in many EU languages.

- We need standardized, robust, performant, HQ, configurable and affordable NLP components for EUs languages!

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Multilingual projects

- A Conversational Platform needs to support the development of large multilingual projects
    - Allow for reusability of language-independent content.
    - Allow for local differences, control of localizations.
    - Support collaborative work in big teams.
    - Support a smooth maintenance of all localizations.
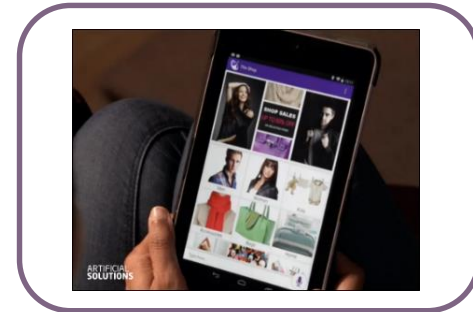   - Help to assure quality and testing.

Conclusions

NLI interfaces are going to be imperative.

Market at a tipping point.

Enterprises want to invest and reach out digitally in the language of their customer.

Overcome multilingual roadblocks!

Otherwise, the majority of EU's citizens will NOT be able to access the digital market using natural language interaction in the languages they master...

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