



How Embedding the GS1 System in the Web Could Empower Industry and Consumers

Steve Bratt

Chief Technology Officer

President, Standards Development and EPCglobal
GS1

October 2013





Outline

- GS1's Role in Business
- Growth of Web Commerce
- A Unique and Central Role for GS1
- GTIN+ on the Web
 - What is it?
 - What Problems Will be Solved?
 - What is our Approach?
 - What Do We Need from the Community to Succeed?





GS1's Role in Business





GS1

The Global Language of Business

GS1 is a Global Standards Organisation

- global standards implemented locally
- neutral and not-for-profit
- user-driven and governed
- inclusive and collaborative





Some of the world's best-known companies sit on our Board



... just to
name
a few!



Our Labs



MASSACHUSETTS
INSTITUTE OF
TECHNOLOGY



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zürich



University of St. Gallen



THE UNIVERSITY
OF ADELAIDE
AUSTRALIA

Keio University



UNIVERSITY OF
CAMBRIDGE

KAIST



AUTO-ID LABS

Auto-ID Labs Board of Directors (7 Research Directors)

Prof. John Williams
MIT Lab
USA

Dr. Duncan McFarlane
Cambridge Lab
UK

Prof. Elgar Fleisch
St. Gallen/ETH Lab
Switzerland

Prof. Hao Min
Fudan Lab
China

Prof. Sang Gug Lee
ICU Lab
South Korea

Prof. Peter Cole
Adelaide Lab
Australia

Prof. Jun Murai
Keio Lab
Japan





GS1 standards are used every day, everywhere

**in over 1 million
organisations**

**in multiple
sectors**

**in close to 150
countries**

**~ 5 billion bar
code scans / day**



**by big multi-
national chains**

**by small corner
shops**

**by world-famous
brands**

by doctors

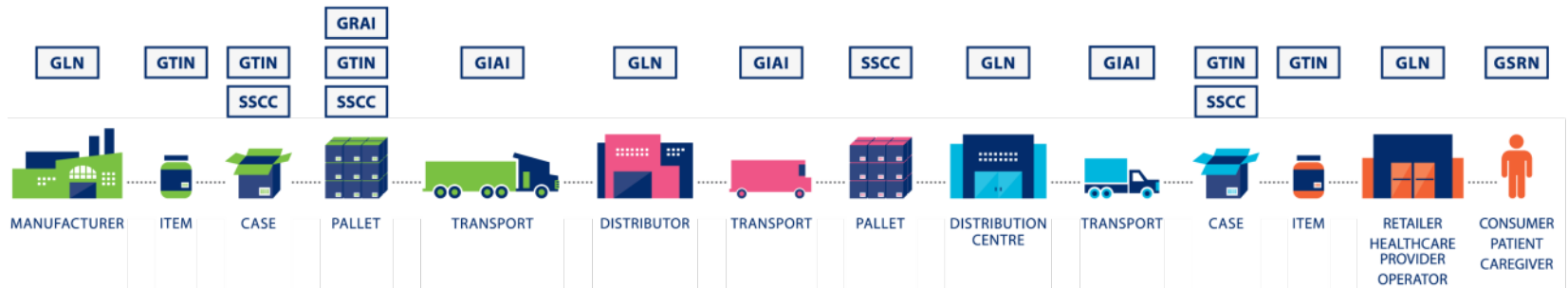
**by individual
craftsmen**



Rich set of existing standards to help companies collaborate

IDENTIFY: GS1 Standards for Identification

GLN Global Location Number **GTIN** Global Trade Item Number **SSCC** Serial Shipping Container Code **GRAI** Global Returnable Asset Identifier **GIAI** Global Individual Asset Identifier **GSRN** Global Service Relation Number



CAPTURE: GS1 Standards for Barcodes & EPC/RFID

GS1 BARCODES

EAN/UPC



GS1-128



ITF-14



GS1 DataBar



GS1 DataMatrix



GS1 QR Code



GS1 Composite Barcode



GS1 EPC/RFID

EPC HF Gen 2



EPC UHF Gen 2



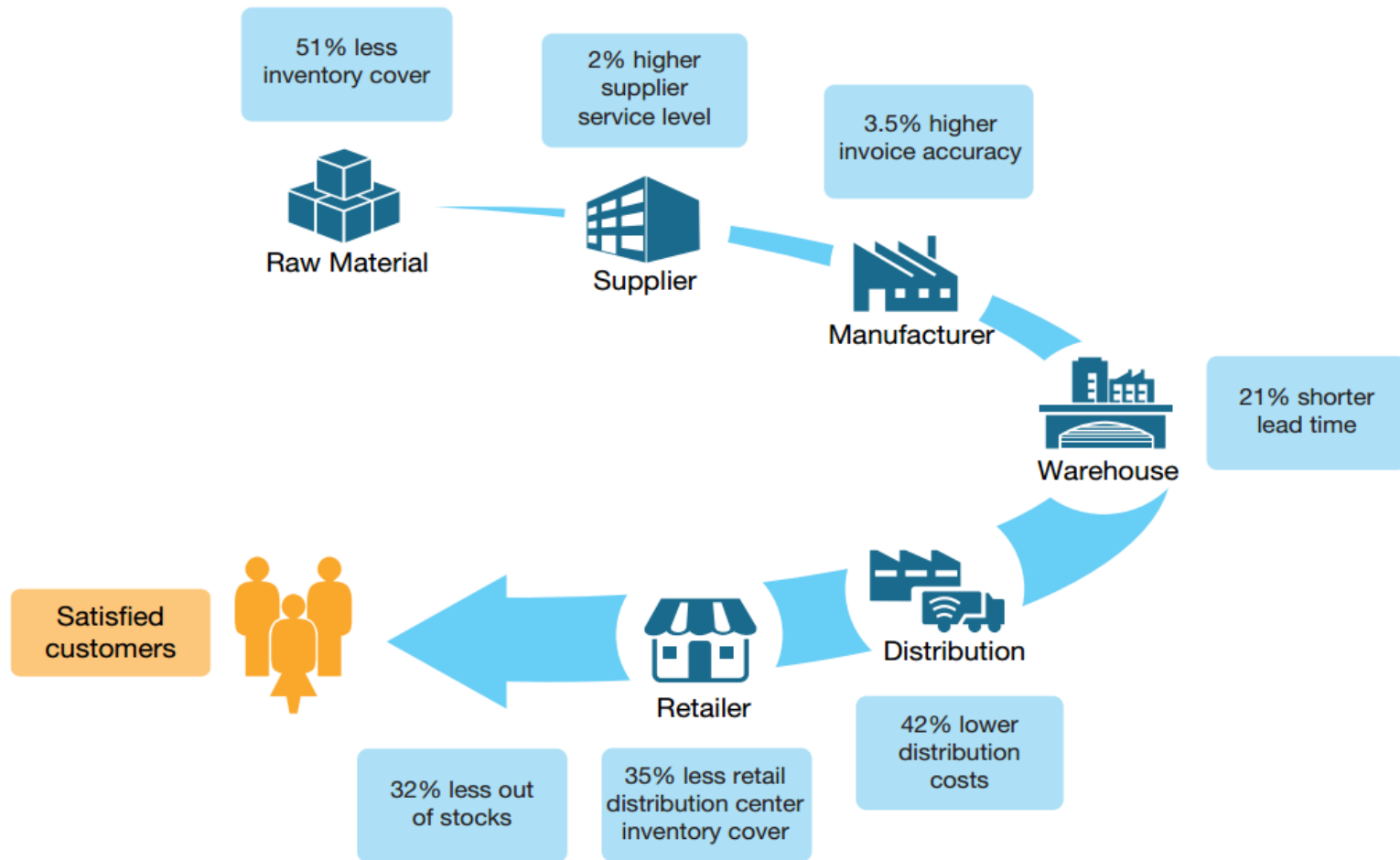
SHARE: GS1 Standards for Data Exchange

MASTER DATA Global Data Synchronisation Network (GDSN) **TRANSACTIONAL DATA** eCom (EDI) **Event Data** EPC Information Services (EPCIS)





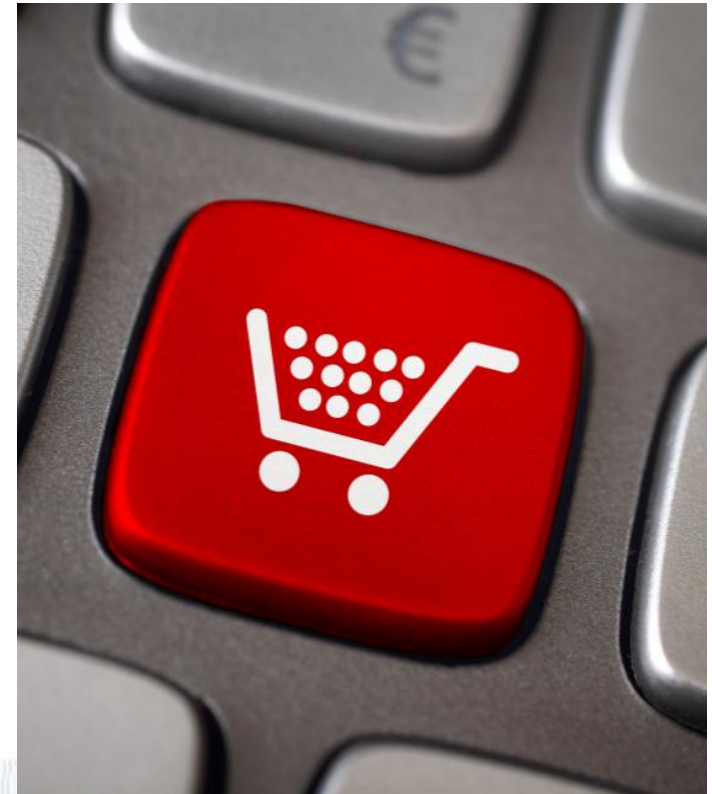
GS1 standards drive supply chain efficiency





GS1 is helping companies be successful in the digital world

- Moving our **unique identification system** to the web
- Allowing companies to **share product information** across web/mobile apps





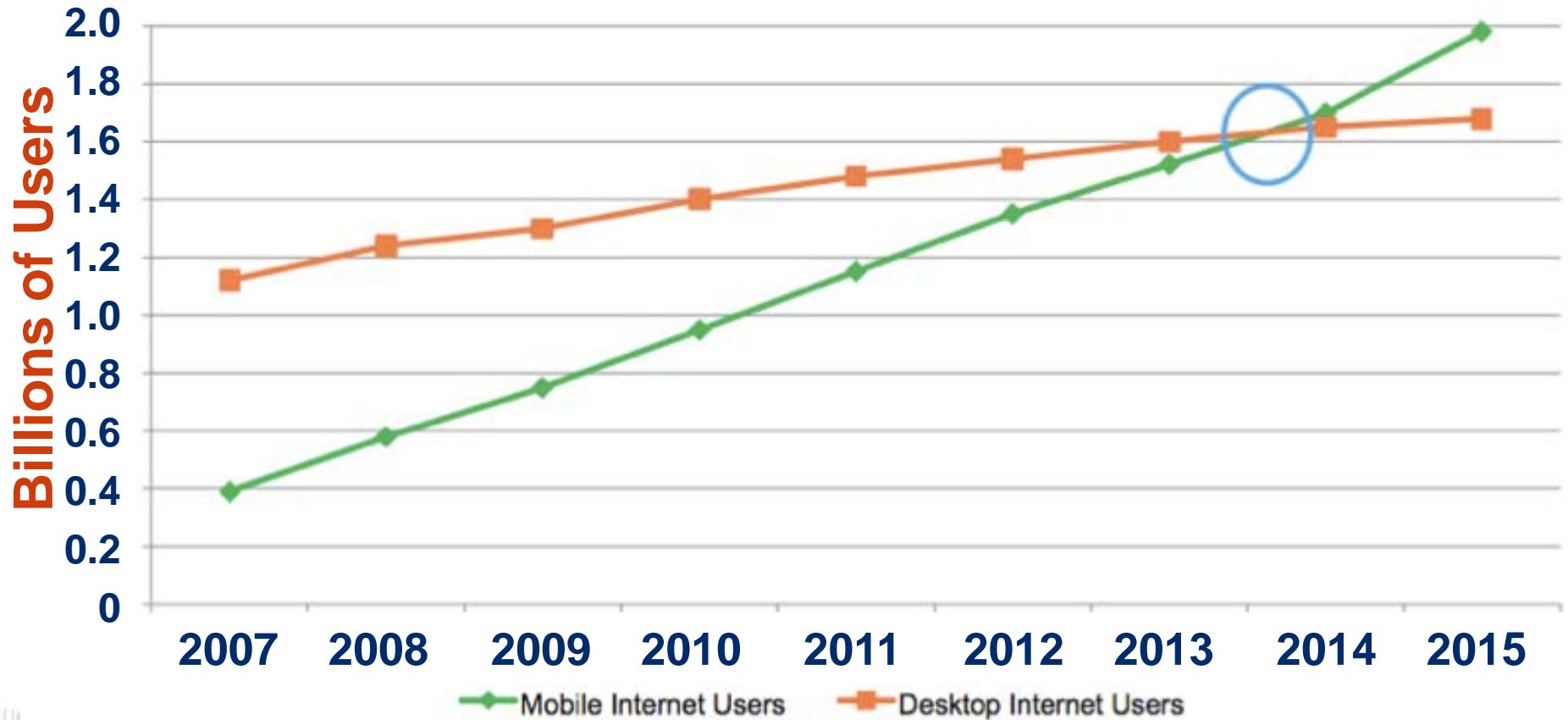
Growth of Web Commerce





Mobile vs. Desktop Web Browsing

Largest future growth will be mobile
and emerging economies



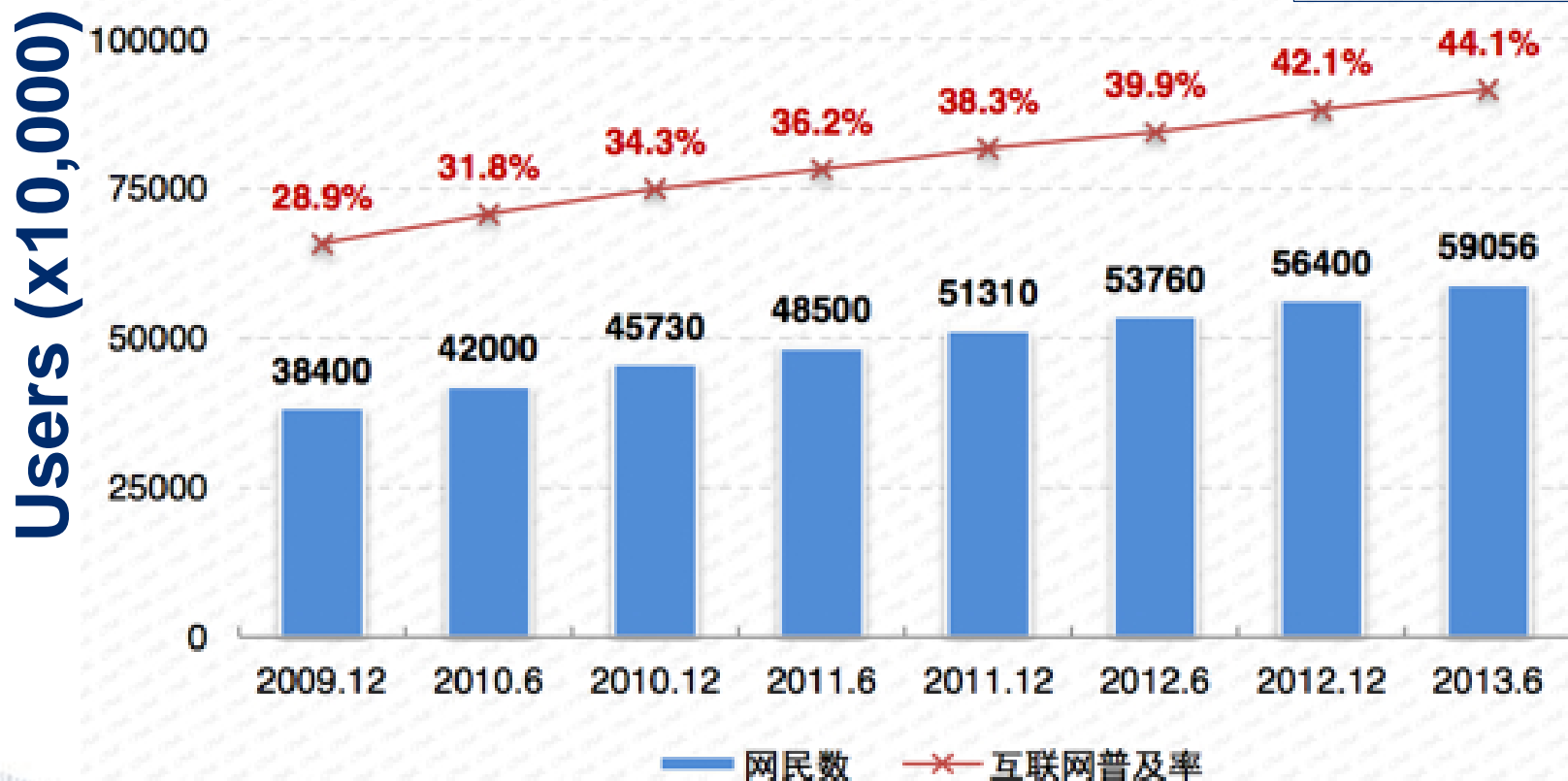
Source: Mary Meeker, Morgan Stanley, April 2010



China (June 2013) ~600 million web users; ~500 million mobile web users

中国网民规模和互联网普及率

> 1 billion mobile
phone subscribers



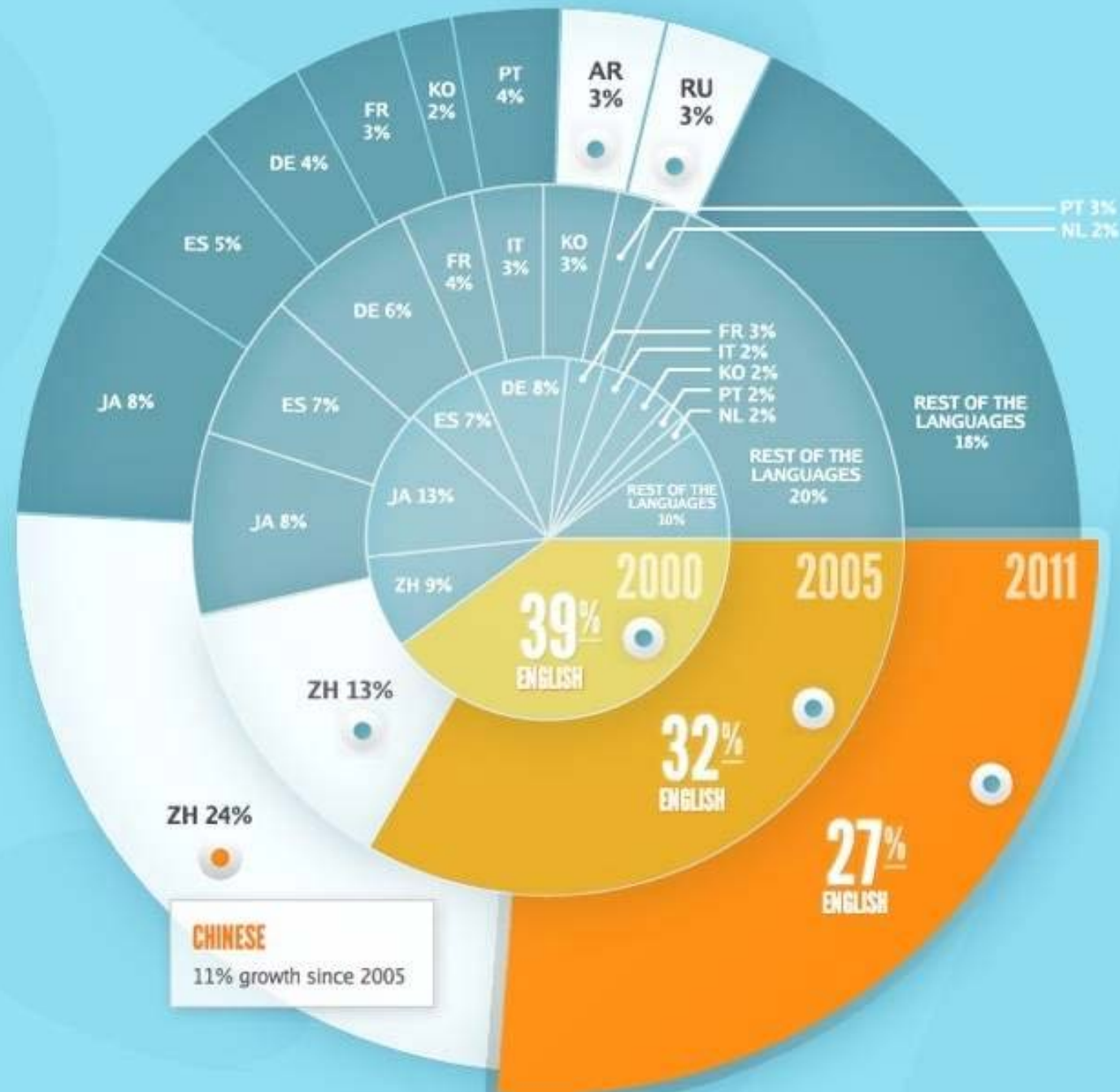
来源：CNNIC 中国互联网络发展状况统计调查

2013.6

<http://www.techinasia.com/cnnic-china-web-mobile-user-data-for2013/>



Internet users by language



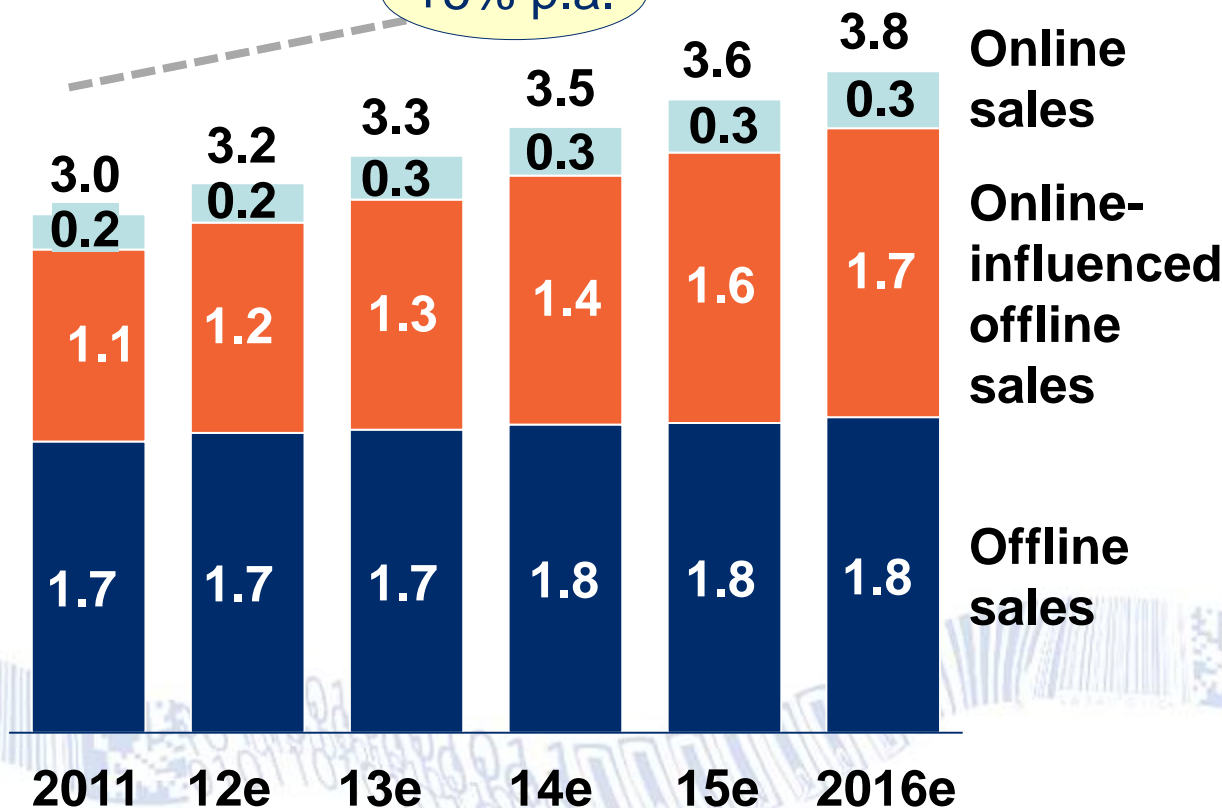


Digital will directly or indirectly influence over 80% of US retail growth in next 4 yrs

Retail sales by influence

USD Trillions

+5% p.a.



CAGR
2011-16
Percent

Percent of
total
11-16 growth

10.1

15

83%

8.5

68

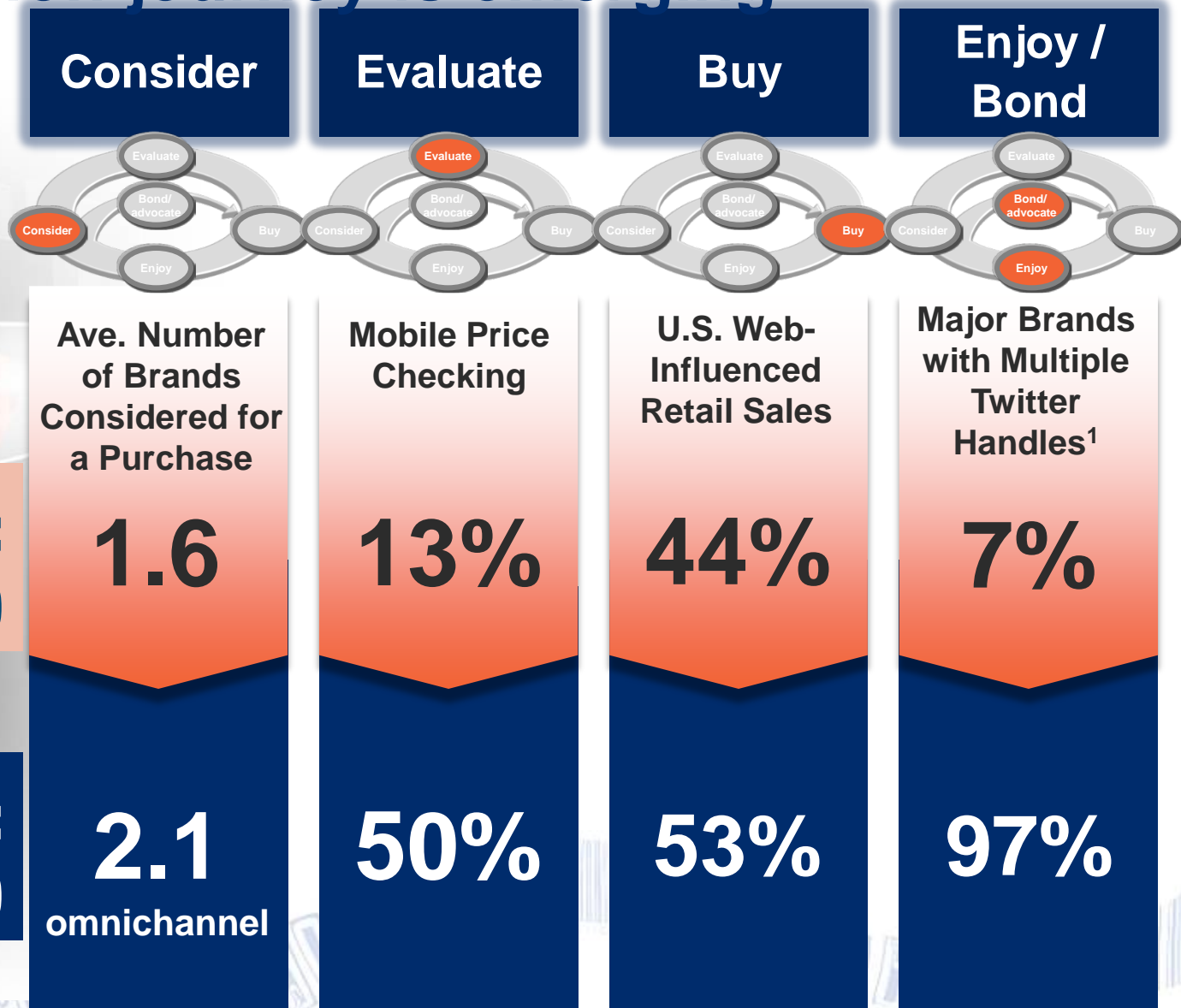
1.6

17

SOURCE: Forrester Research (2011)



A new, digitally driven consumer decision journey is emerging...

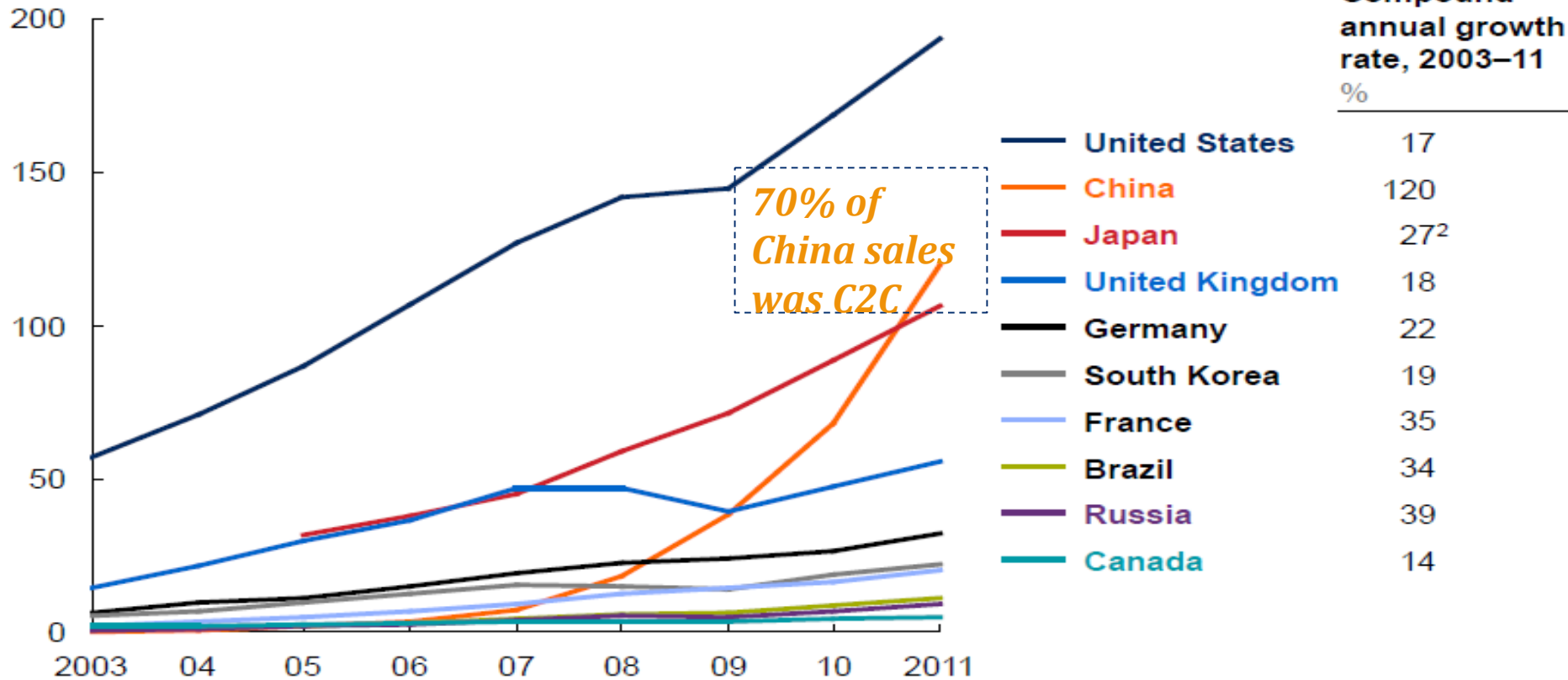


¹ Brandwatch; Major brands selected from sample of 253 top brands primarily in the US and UK. Stats range from 2010 to 2016E



Diverse patterns of growth in Web sales around the world

2003–11 e-tailing market¹
\$ billion



1 Excluding online travel.

2 Japan's CAGR covers 2005–11.

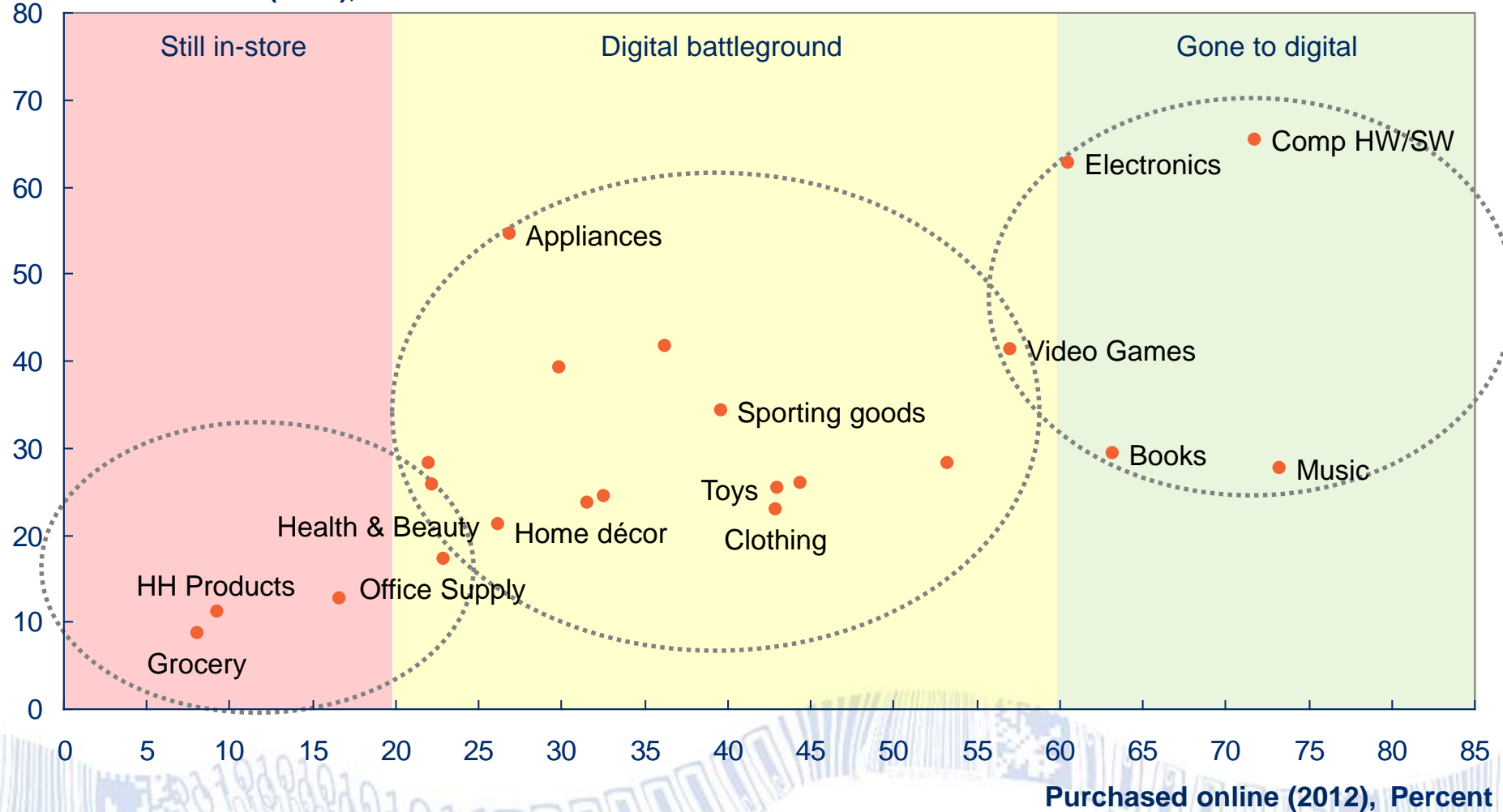
SOURCE: Euromonitor; Forrester; US Census Bureau; Japanese Ministry of Economy, Trade, and Industry; iResearch; McKinsey Global Institute analysis



Migration online is playing out at different rates across categories



Researched online (2012), Percent








































































SOURCE: McKinsey iConsumer survey; team analysis

© 2013 GS1



Electronics and media are generally the first to “go digital”

Level of adoption¹

	 US	 UK	 France	 Russia	 Brazil
Comp H/W					
Electronics					
Books					
Music					
Video games					
Appliances					
Clothing					
Toys					N/A
Home décor					
Health and beauty					
Office supply					
HH products					
Grocery					

¹ Green=“Gone to digital” (>60% of items bought online); Yellow=“Digital battleground” (20-60% of items bought online); Red=“Still in-store” (< 20% of items bought online)

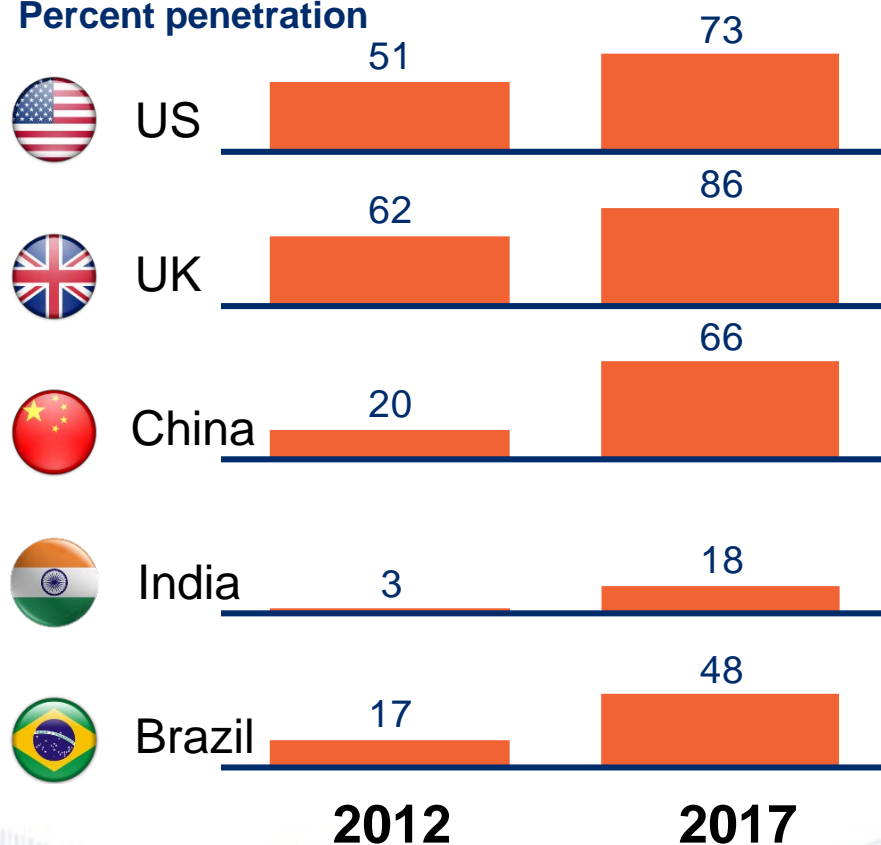
SOURCE: McKinsey iConsumer survey; team analysis



Rapid smartphone penetration

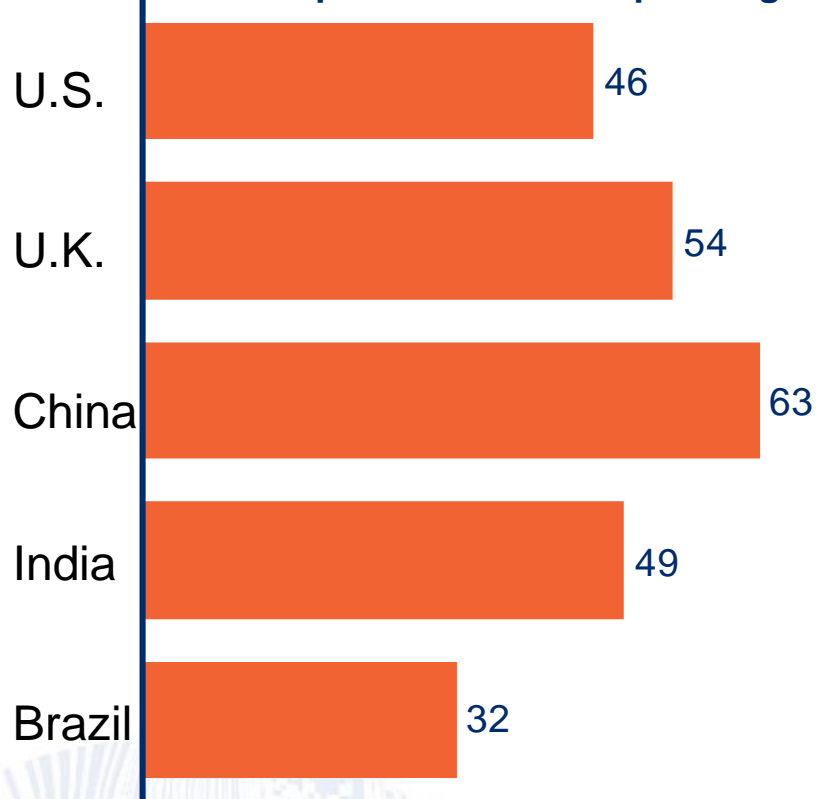
Smartphone adoption

Percent penetration



Smartphone users making purchases on their mobile device²

Percent of smartphone owners responding "Yes"¹



Smartphone users are 3-8 times more likely to research and purchase online

¹ Population-weighted responses ² Includes purchases non made via mobile wallet or at POS (e.g., purchasing product via web browser)

SOURCE: McKinsey Mobile Payments Global Survey; Yankee Group; Strategy Analytics



A Unique and Central Role for GS1





The advent of digital commerce has given rise to many pain points



Valid offerings missing in search results

High cost of generating and displaying detailed product data

Security concerns at point of sale

E-coupon fraud, no online coupon standards

No 360 view of product online

Inaccurate data online leads to confusion for consumer

Lack of transparency in C2C transactions, potential for fraud

Inventory optimization challenging in omnichannel



SOURCE: McKinsey May 2013 Survey; interviews with GS1 stakeholders



Based on existing and potential GS1 vehicles, McKinsey generated 10 use cases to address digital pain points

GS1's First Projects



GTIN on the web



GS1 Source (TSD)



eCoupon standard



eReceipt standard



Inventory visibility



RFID inventory



Category hierarchy



ePayments



Mobile ID



Integration with supply chain



Management Board, AC, Digital Industry Engagement Interest Group and staff identified additional digital opportunities



Update / clarify
ID allocation rules



Updated image
specifications



Authenticity / anti-
counterfeit on the web



Digital products
(music, images, video,
books, games ..)



Reverse logistics /
returns



3D printing



Consumer
privacy



Connection to
social media

What is GTIN+ on the Web?

Leveraging the Web as a new GS1 “share” **technology** for the GS1 System

Will enable the consistent representation of **all GS1 keys** and **attributes** across the Web

Will enable the GS1 System’s benefits in the **demand-chain** across sectors, and **link** the demand and supply chains

“Demand-Chain Story” ...

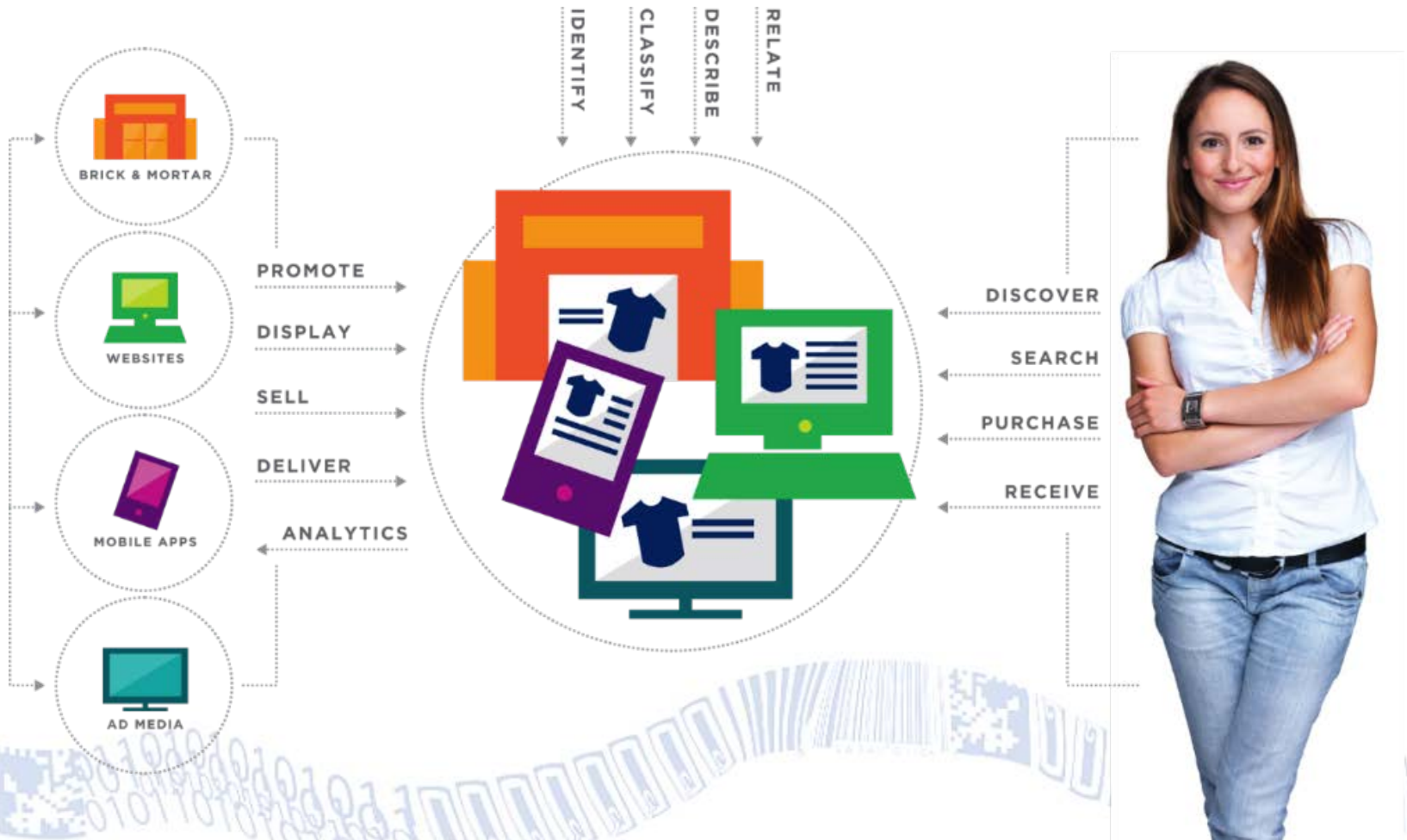




“GTIN on the Web” may be the key to empowering the omnichannel supply / demand chain

GS1 Standardized Product Identification

614141999996





Benefits of GTIN on the Web and GS1 Source

Across the business system...

Consumers

- More **relevant, complete search** results they can **trust** from Brand Owners and Retailers; easier to compare products

Retailers

- Improved accuracy and completeness of online search, resulting in **higher traffic, fewer missed items**, higher conversion rates, **sell more** product, lower SEO costs
- **Better integration** along supply & demand chains based on consistent use of GS1 identifiers, e.g. pooled inventory

Brand owners

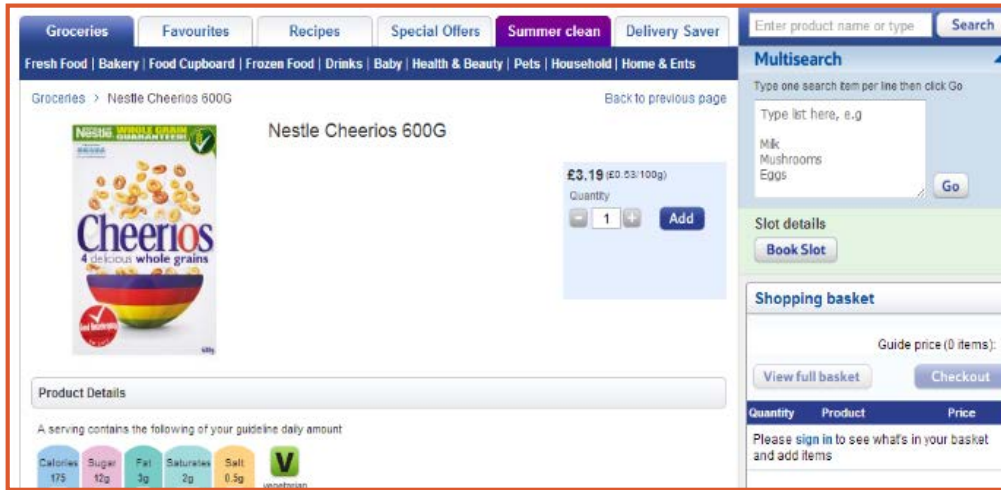
- **Sell more**
- **Improved data quality**, accuracy and brand equity
- Single point of contact for uploading product attributes, reducing **time to shelf and content creation costs**
- **Actionable consumer insights**, better ability to target ads

Search engines

- **Optimize search algorithms** by leveraging structured data model and machine readable content



Global standards for Web page layout = **YES** ... for product data on Web page = **NO**



The web
page
that you
see...

What
computers
see in the
underlying
Web code

```
</div><div style="float:left; width:208px; text-align:center;">  
font-family:arial; font-size:16px; white-space: nowrap; width:  
<li class="ingr"><div><h3>Sugar</h3><p>  
<span class="v">12g</span></div>  
<h3>Fat</h3><p><span class="v">3g</span>
```

Search engines
see global web
standards for
links, fonts,
images, page
layout ...

There are no
global standards
for embedding
product IDs and
attributed are in
the code of a
web page.

Search engines
can only infer
meaning.



Global standards for Web page layout = **YES** ... for product data on Web page = **WHAT IF?**

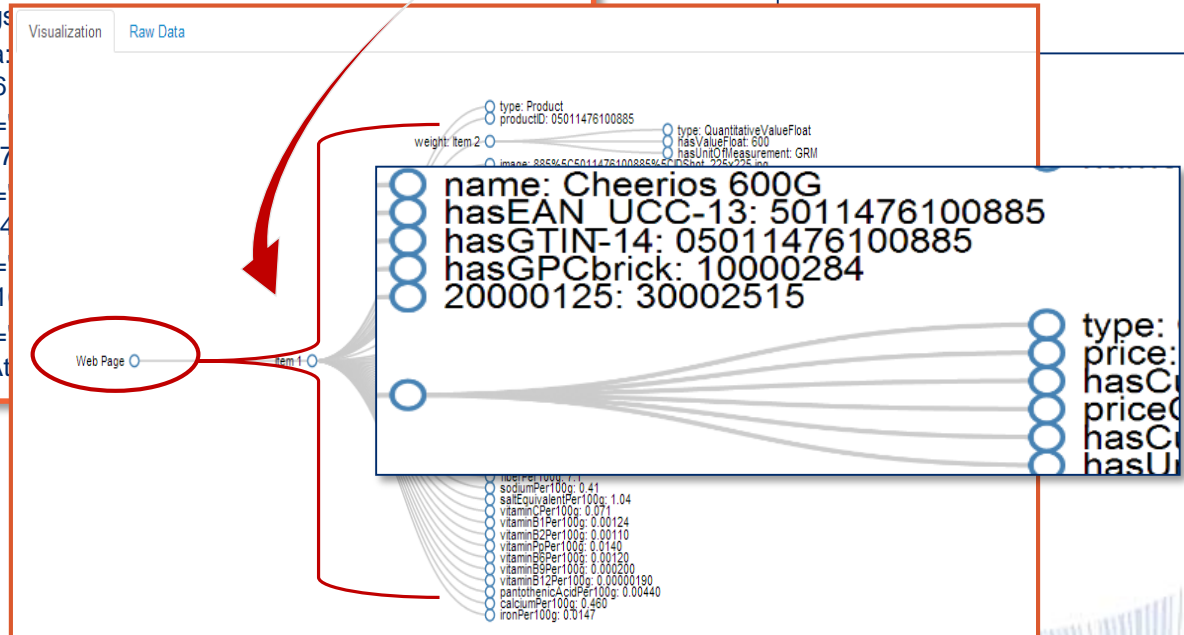


The web page that you see...

What computers see in the underlying Web code

```
</div><div style="float:left; width:208px; text-align:center;">
font-family:arial; font-size:16px; white-space: nowrap; width:
XMLSchema# gtin: http://id.gs1.org/gtin/
gpc: http://gpc.gs1.org/
typeof="schema:gtin:05011476100885"
<span property="gtin" content="5011476100885">
<span property="gtin" content="05011476100885">
<span property="gpc" resource="gpc:10000284">
<span property="gpc" resource="gpc:20000125">
```

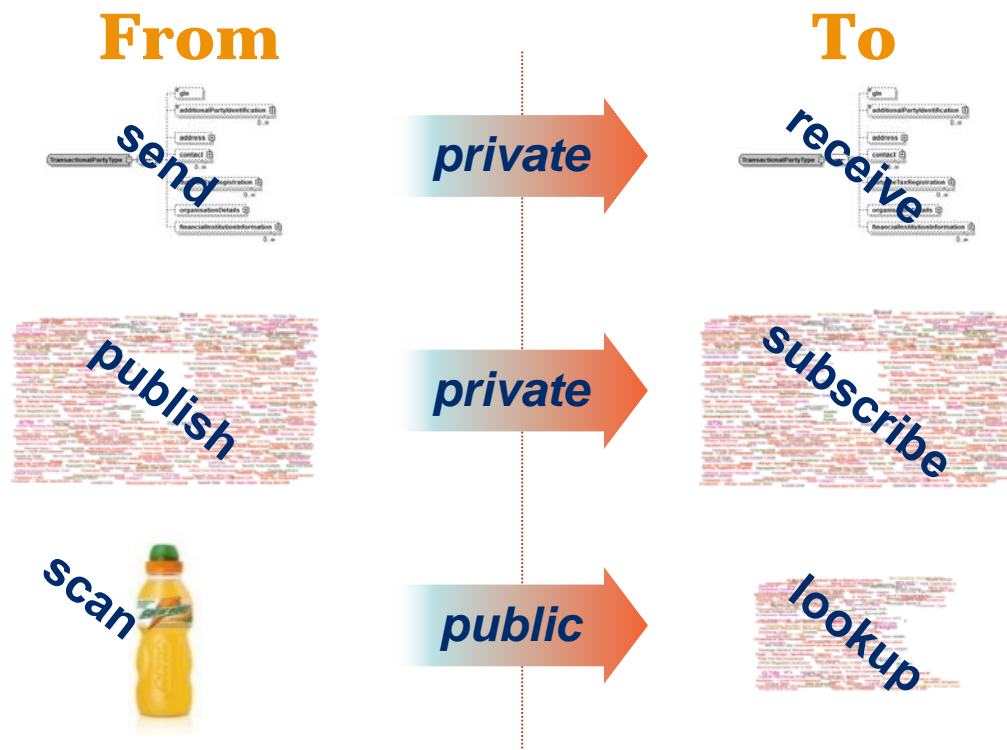
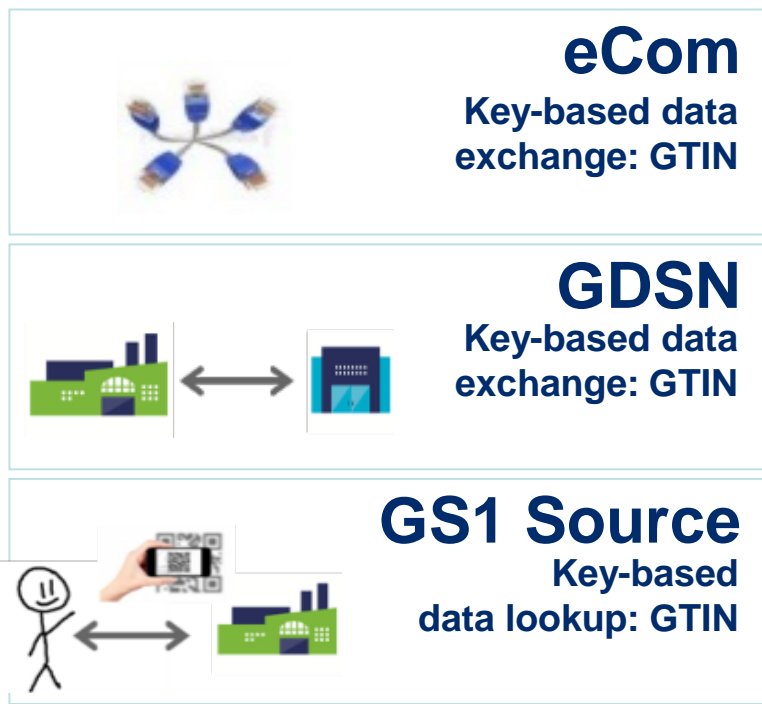
If these were **real** standards, search engines could better understand product data





Relationship of GS1 “Share” technologies

GTIN on the Web is a new “Share” technology





Examples





Online search suffers because standard unique product identifiers are not used globally

Same Dixie item listed as “pack” by retailer 1 and “box” by retailer 2

Retailer	Retailer 1
Product	Dixie combo <u>pack</u> 168
Price	\$12.59

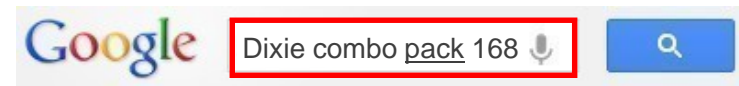


Retailer	Retailer 2
Product	Dixie combo <u>box</u> 168
Price	\$10.21



ACTUAL EXAMPLE

- Without a unique ID, Google cannot tell that “Pack” = “Box”
- Retailer 2 does not appear in the following search...



Retailer :	Retailer 1
Product :	Dixie combo <u>pack</u> 168
Price	: \$12.59





Broad adoption of GTIN on the web could improve search accuracy – illustrative

1

Search engine finds initial search term on 1st retailer's web page



2

Search engine sees GTIN in HTML code

Retailer	Retailer 1
Product	Dixie combo pack 168
Price	\$12.59


```
<html>
<meta name="GTIN"
content="0012345678901">
...
</html>
```

3

Search engine switches from text-based to GTIN-based search, and finds 2nd retailer's webpage

Retailer	Retailer 2
Product	Dixie combo <u>box</u> 168
Price	\$10.21


```
<html>
<meta name="GTIN"
content="0012345678901">
...
</html>
```

4

Search engine returns all results, regardless of initial search term

	Retailer	Retailer 1
Product	Dixie combo <u>pack</u> 168	
Price	\$12.59	

	Retailer	Retailer 2
Product	Dixie combo <u>set</u> 168	
Price	\$10.21	



GTIN usage could allow search engines to aggregate a full view of products on the web

bing

Schick quattro titanium razor

ACTUAL EXAMPLE



Quattro Titanium Trimmer Power Razor

The Technology: - Ergonomic & Portable - Powerful Enough To Deliver The Trimming Functionality Of Larger Battery Powered Trimmers - Operates On One AAA Battery - Very High... [more...](#)

★★★★★ Customer reviews(13)

\$9 and up
(11 stores)

☐ Compare

(Share and Compare)

Google Shopping requires a GTIN from its retailers

Google

Schick quattro titanium razor



Schick Quattro Titanium Trimmer Razor, with Trimmer

Razors - Schick - Mens - Cartridge - Quad Blade

Titanium Trimmer(coated blades). 4 Titanium + 1 edging blade. 1 Cartridge. 1 AAA alkaline battery. Shave: Comfort. Edge: Precision. Trim: Styling ...

★★★★★ 32 reviews

Add to Shortlist

Lower price

\$4

from 50+ stores

◆ 1 special offer
25+ nearby stores

Compare prices

**More
retailers**

More reviews

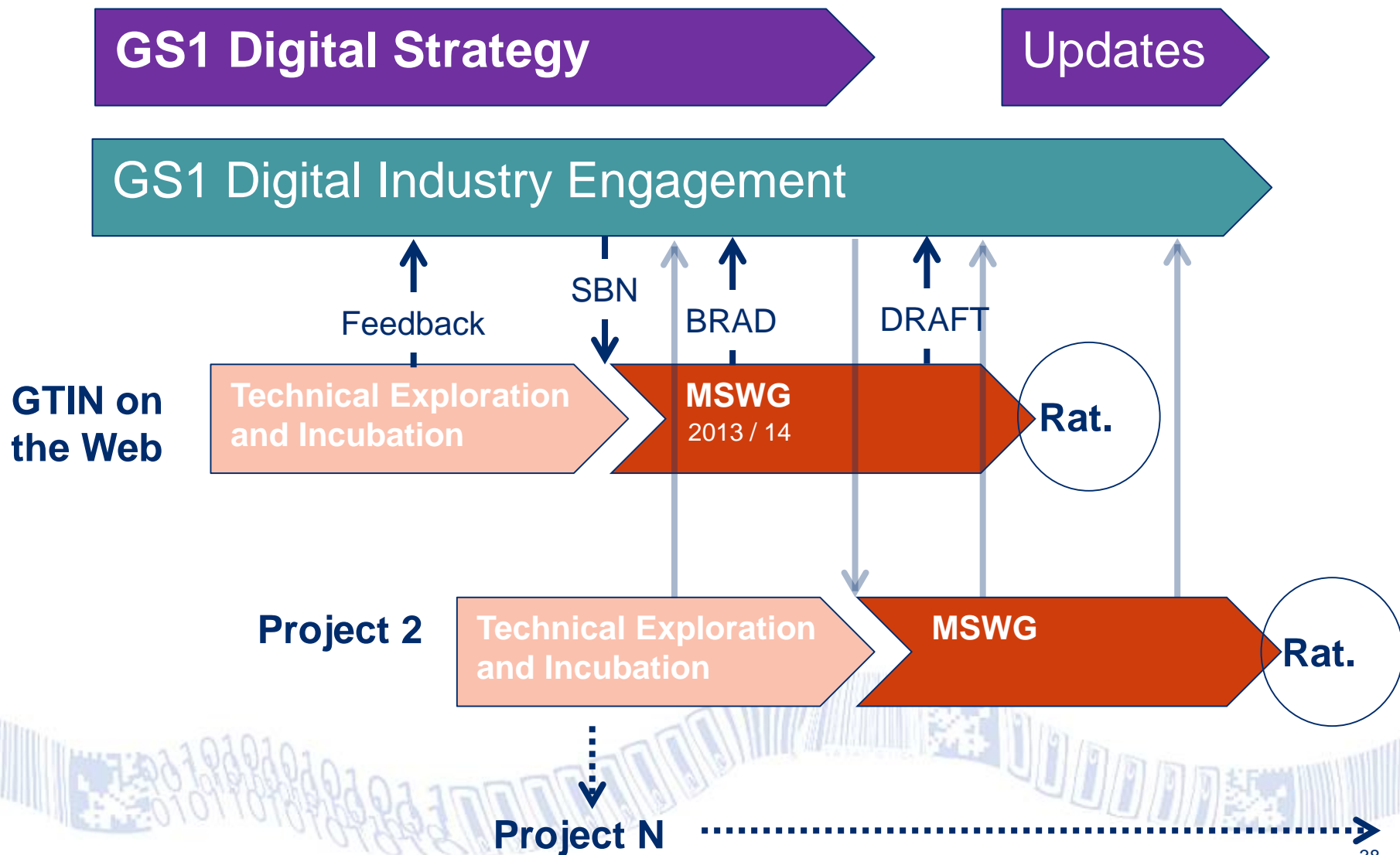


What is our Approach?





Phased approach to a complex domain that is new for GS1





GS1 Digital Project - Initial Participants

(9/2013)

Initial MOs in IE IG and/or Technical TF

- Belgium & Luxembourg
- Canada
- China
- Colombia
- Denmark
- Egypt
- France
- Germany
- Hong Kong
- India
- Japan
- Netherlands
- Poland
- Sweden
- Switzerland
- UK
- US

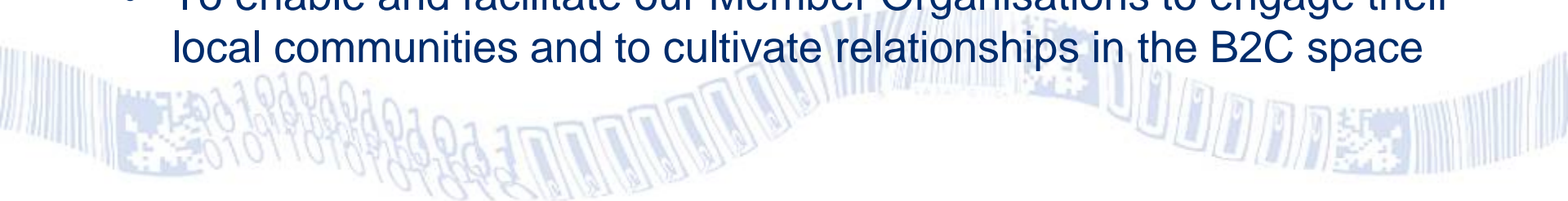
Initial Players Engaged

- Google
- Amazon
- Tesco
- schema.org
- W3C
- Other connections through MOs



Objectives of the GS1 Digital Industry Engagement Interest Group

- To define requirements for the representation of the GS1 System of Standards in online environments
- To analyse business opportunities and needs of our Global base of member companies in the realm of demand-side, consumer-facing functions
- To coordinate and engage globally with a growing community of companies as directed by our Member Organisations, specifically those involved in online commerce and Web search and discovery across geographical boundaries
- To enable and facilitate our Member Organisations to engage their local communities and to cultivate relationships in the B2C space





Technical Task Force Activities

- Research and Development/Education
 - We have been in working with W3C, Google, Auto ID Labs and others to determine best approach for item data on the web
 - Research into current state of practice
 - Review of schema.org and Good Relations
 - Review of best methodologies for standard mark-up
 - Determination of set of attributes to test based on schema.org and available GDSN data.
 - Research how best to represent identifiers including AIs on the web
- Pilot
 - Pilot work has started





The GS1 GOTW Pilot

Step 1

Learn

Step 2

Evaluate

Step 3

Implement

GS1 Internal Testing

- Identify and share relevant product data with GS1
- Compare alternative structured data models for effectiveness
- Develop markup recommendation
- Create value proposition

Brand Owner Testing

- Engage with web developers and brand managers
- Collaborate to markup brand web pages based on recommendations
- Coordinate search engine discovery
- Document and share performance metrics

Standards Development

- Develop proposal for representing GS1 keys and attributes
- Socialize proposal(s) with search engines, community, and other standards groups
- Gain support for open web testing with a broader segment of our community

Sep – Dec 2013

Early 2014



Technical Questions

1. Format (or formats) that should be supported by GS1
2. Comparison of possible transformation methods of item data (accuracy, ease, presentation)
3. Linking strategy (recommendations):
 - a) Who should we link to for further detail on trade items?
 - b) What is relationship between trusted and not trusted data?
4. Data quality rules and enforcement methods
5. Benefits of marked up pages vs. similar pages
6. Best representation (URI or other) for product identification





A web that links data around the world

- Web 1.0 = Web of **Linked Documents**
- Web 2.0 = Web of **Interactive/Dynamic Documents**
- Web 3.0 = Web of **Linked Data** (Semantic Web)



Steve → hasEmailAddress → steve@w3.org

- **Web becomes a global, relational database**
- W3C Semantic Web technologies enable linking, describing, searching, processing, creativity, etc.



Building relationships with web organisations



- Launched in 2011
 - Goal: To “create and support a common set of schemas for structured data markup on web pages”
 - Motivation: To improve product visibility through structured data models and more organized website content
 - Vocabulary includes GLN and GTIN
 - Not an open standard
- The World Wide Web Consortium is responsible for global, open web standards (HTML, XML ...)
 - “Semantic Web” standards intend to transform the existing web into a “web of linked data”
 - Motivation for the Semantic Web: To enable users to find, share, and combine data more easily across web pages around the world.



Who's testing structured data and semantic technologies on the web today?

Walmart



SEARS

kmart

STAPLES

that was easy™

ebay



Microsoft

PRESTASHOP

IMDb



overstock.com

wayfair.com
a zillion things home

Experian
A world of insight

BBC

Lilly

biogen idec

Johnson & Johnson

amdocs
CUSTOMER EXPERIENCE SYSTEMS INNOVATION

O'REILLY



OXFORD
UNIVERSITY PRESS

PRESS
ASSOCIATION



NOVARTIS



MONDECA



Adobe

LIBRARY OF
CONGRESS

mediabistro



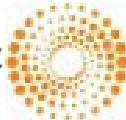
MERCK



Pharma

OCLC
The world's libraries.
Connected.

The
New York
Times



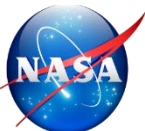
THOMSON REUTERS

FUJITSU

AstraZeneca



Autodesk



IBM

VIACOM

FUJITSU

AstraZeneca



Volkswagen



RENAULT

mozilla
FOUNDATION



U.S. AIR FORCE



BOEING

Raytheon

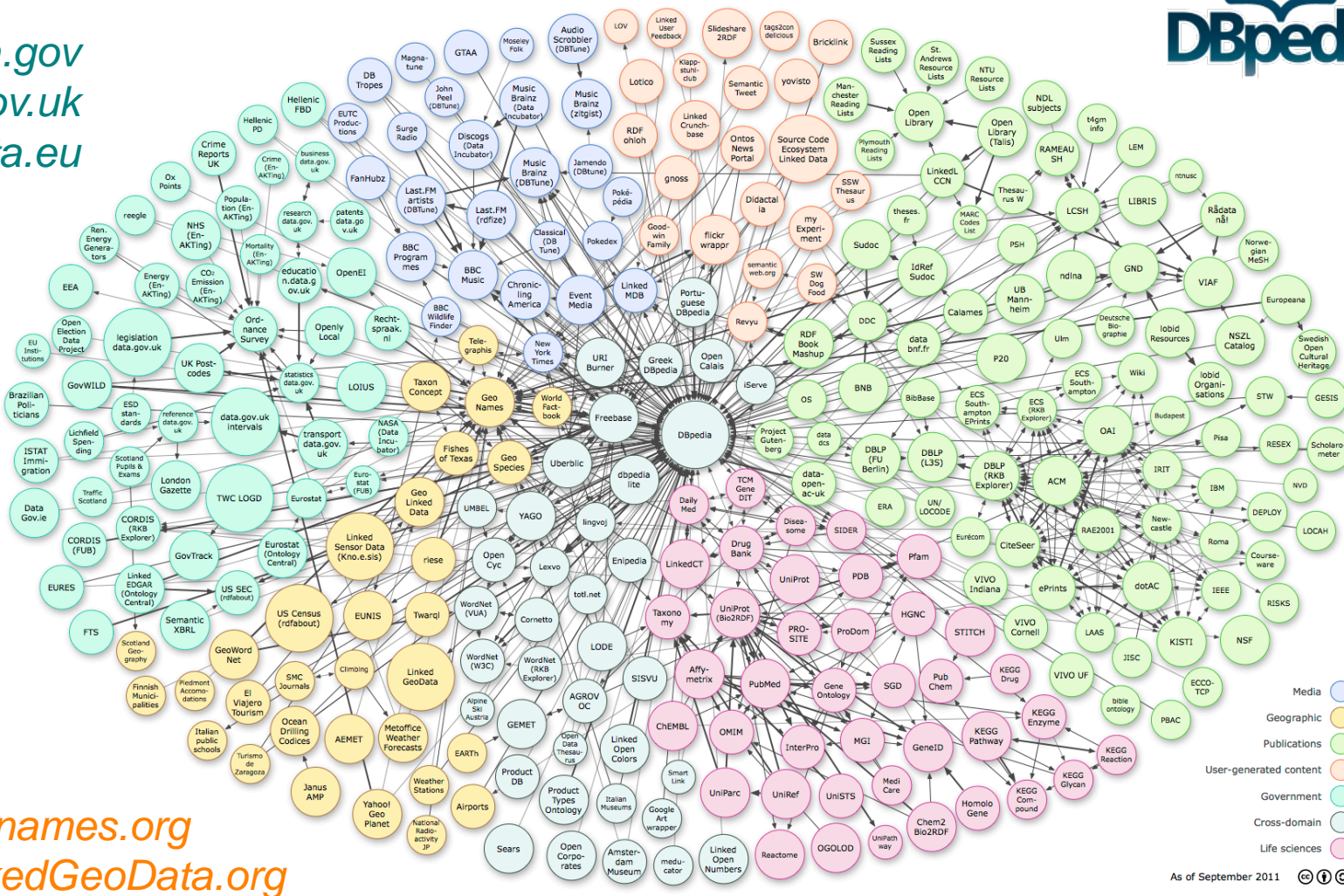
SIEMENS





Linked Open Data

data.gov
data.gov.uk
publicdata.eu



As of September 2011

geonames.org
LinkedGeoData.org

linkedlifedata.com

Richard Cyganiak and Anja Jentzsch. <http://lod-cloud.net>



What Do We Need from the Community to Succeed?

The Ask





Our window of opportunity is narrow - We need a new approach to drive the desired speed & agility

Testing recommendations from GS1 “Best-in-Class Standards

Context: Standards work in the Internet world tends to be more open and faster, with a focus increasingly driven by consumers

Recommendations

1. **Incubate** and test concepts, when necessary, in pilot projects before the start of formal standards work
2. **Open:** Make pilots, standards (even drafts), vocabularies, and classification schemes available to the public in Web formats (will also attract more experts into standards development)
3. **Catalyze:** Make software tools and APIs available to developers to encourage broad innovative use of GS1 technologies



We need your help

Opportunities

- Contact GS1 China!

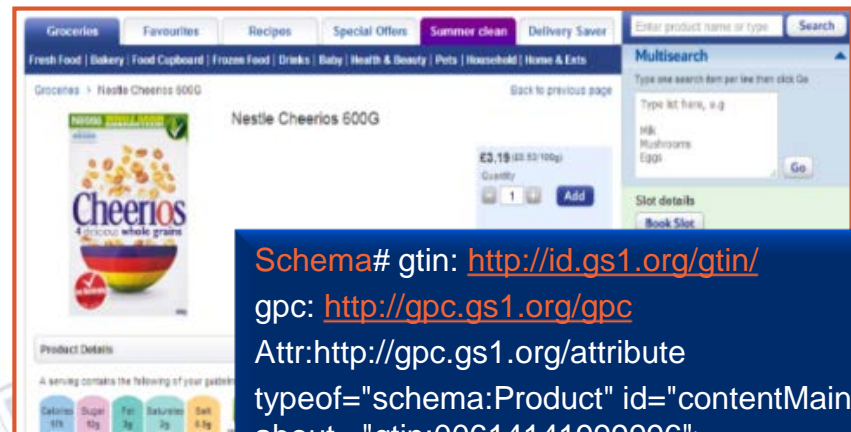
Expertise

- Brands, re-/e-tailers, solution providers, but ..
 - ... this is not supply chain as usual
- Marketing, social media, Web experts





Leverage and extend a proven concept



Schema# gtin: <http://id.gs1.org/gtin/>
gpc: <http://gpc.gs1.org/gpc>
Attr: <http://gpc.gs1.org/attribute>
typeof="schema:Product" id="contentMain"
about="gtin:00614141999996">
<span property="...



Contact Details

Steve Bratt

Chief Technology Officer and
President, Standards Development
and EPCglobal, Inc.

steve.bratt@gs1.org

