The Next Digital Revolution
How Big Data/IOTs, Social Media, and New Informatics Competencies will Impact Humanity Future

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What it Means to be "Connected"

- Interconnectedness promotes a shared, distributed economy, creating new business ideas & models:

The Internet of Things (IoTs)

What it Means to be "Connected"

- Interconnectedness => Additional flows of data between what have historically been "data islands"

- IOTs has/will allow(ed) devices to "speak to each other":
  - Thermostats can be regulated remotely (Nest);
  - Reorder products by just clicking a button (Amazon Dash);
  - Helmet sensors can measure the effect of head impact (Shockbox).

- So many possibilities of commercialization but "how" can one innovate with IOTs?

Commercialization (via IoTs)

Vision = Efficient, cost-effective IoTs commercialization
Strategy = Changing Users' thinking/engagement with IoTs:

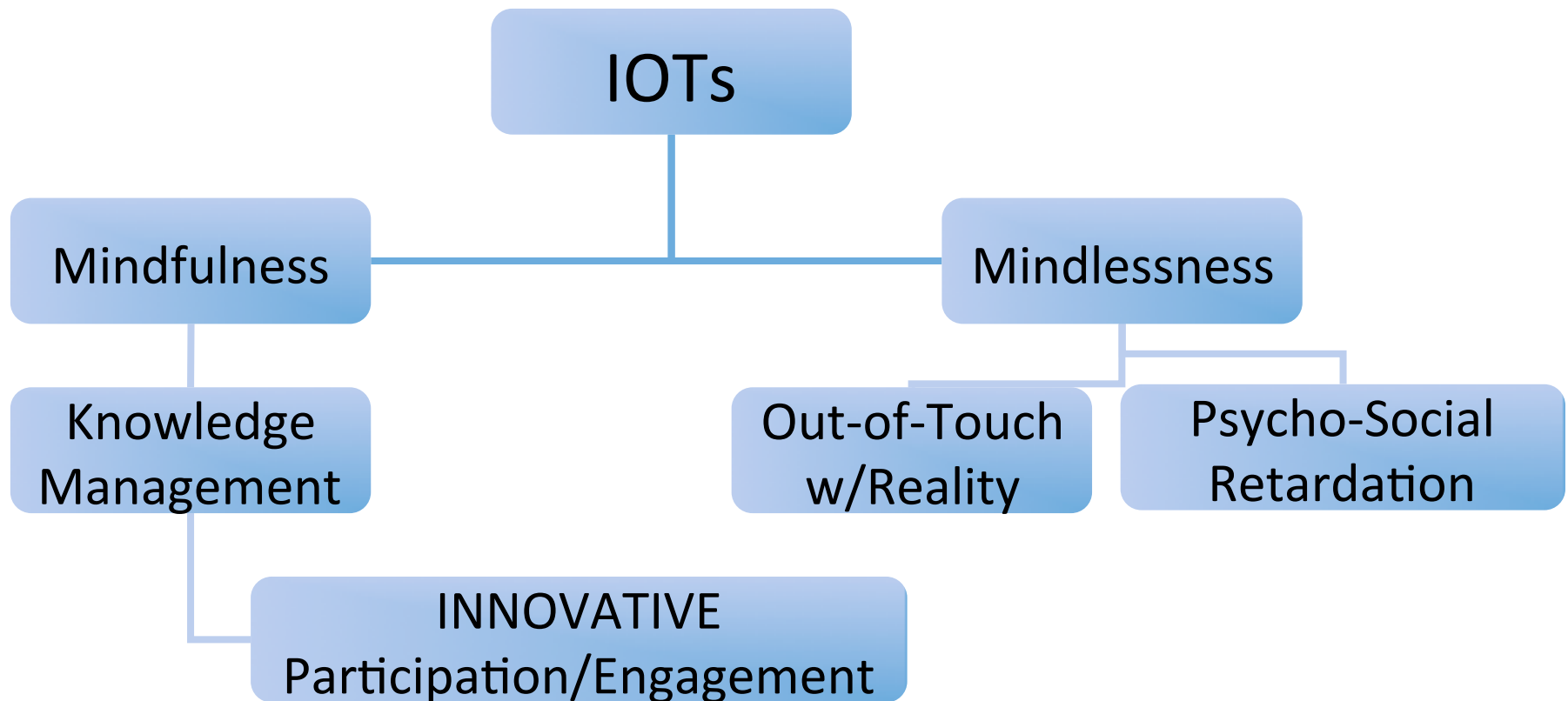| Beliefs | → | Attitudes | → | Adoption | → | Engagement |
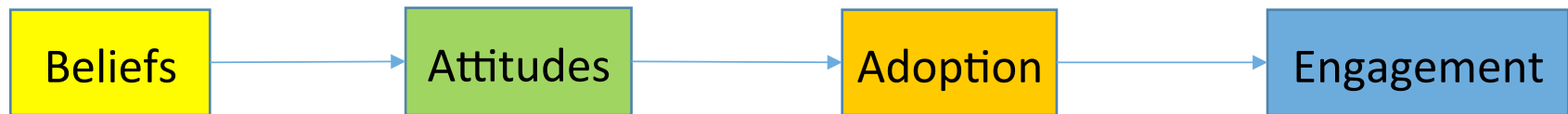
VP-1: Does using IOTs improve Knowledge Translation?

VP-2: How do business achieve/sustain a Competitive Advantage via IOTs w/end-users thrilled about knowledge sharing/absorption?

How IOTs can sustain a CA

- IOTs serving as *Alert &/or Smart (Intelligent) Agents for populations, groups and individuals*

- IOTs providing *personalized e-learning; real-time monitoring-care; and guided behavioral changes*

- IOTs aiding in *automated diagnostics; analytics; disaster recoveries & predictive prognosis*

IOTs may also become a Two-Edged Sword


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                          IOTs

   Mindfulness                        Mindlessness

   Knowledge                    Out-of-Touch      Psycho-Social
   Management                   w/Reality         Retardation

        INNOVATIVE
        Participation/Engagement
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Social Media:
A Zika BigData Analytics

What it Means to be "Connected"

- Interconnectedness means people are more connected to each other than ever before

- This can threaten societal well-being & hasten epidemic outbreaks:
  - SARS spread from China to 73 countries (WHO 2003);
  - H1N1 extended to 213 countries (Fraser et al. 2009);
  - Ebola plagued Western Africa & threatened societies worldwide (Dixon et al. 2014)
  - In 2015, the Zika virus started in Brazil; by February 2016, WHO declared it an epidemic

Social Media (Twitter)

How does social media, eg. Twitter, impact the awareness of, and preparedness for Zika via Big Zika Spreads-Data Tracking?
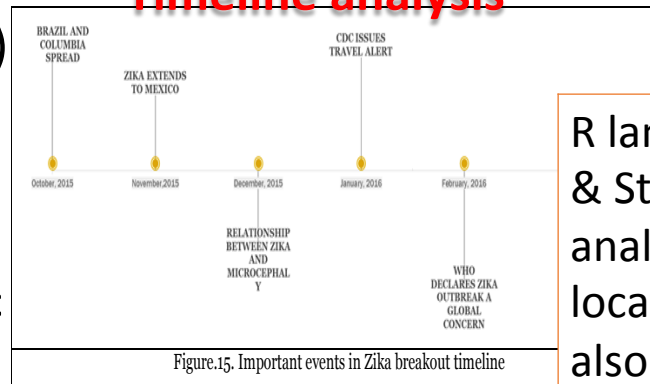
Zika Data Trends

Big Zika data have trended on social media (eg.,FB) with ≈ 50 tweets/min. from >100,000 users discussing the topic recently (The Economic Times 2016)

Big Zika Data Analytics

Month	Tweets
Feb 2016	25,000 WHO
Jan 2016	31,000 CDC
Dec 2015	6,700 Z-Myp
Nov 2015	2,400 Mex
Oct 2015	2,200 B/Col

Timeline analysis

Figure.15. Important events in Zika breakout timeline

Zika Data Sourcing

• Tweets collected in *English, Spanish & Portuguese*

• Hashtags, #zika & #zikavirus... to source twitter data from Oct 2015 to Feb 2016; others #salud/#saude (Spanish/Portugese for "health"); #who (WHO) etc.

• 67,000 tweets collected;

Tools for Analytics

R language "twitteR" library for user IR & Statistica (v. 13) text miner tool to analyze tweets. Concept extraction, location analysis, & timeline analysis also performed on the data

Key Concepts Extraction: December 2015
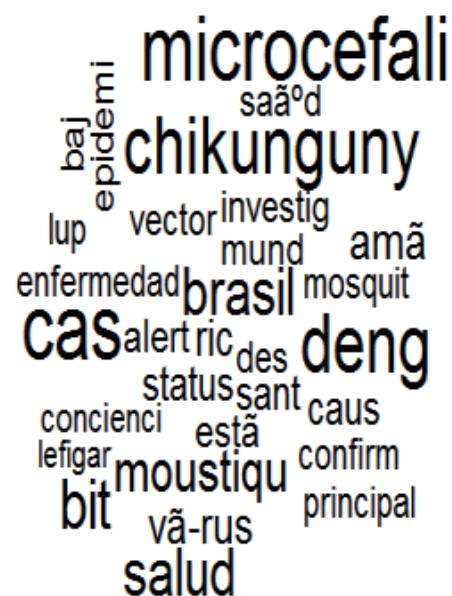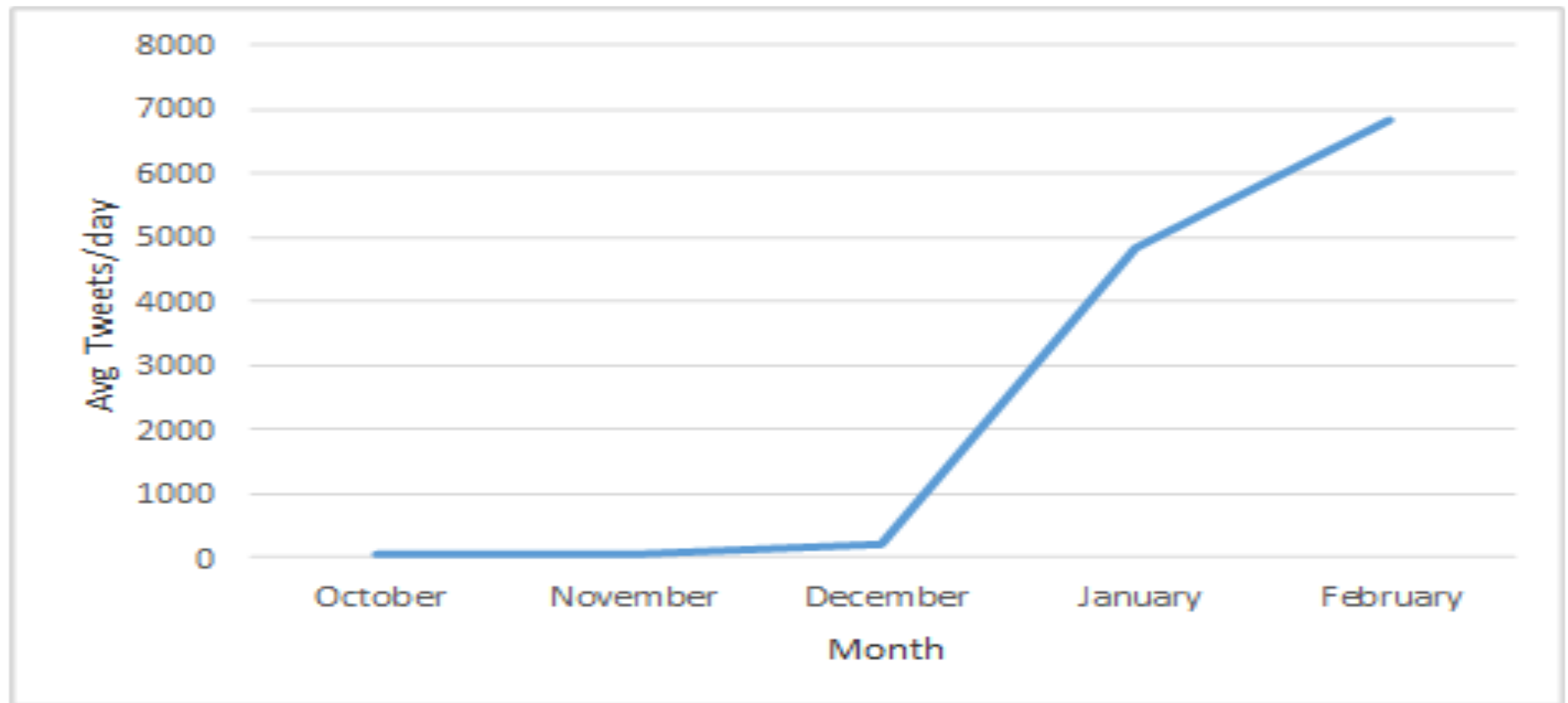

Figure.4. Important English concepts in December	Figure.5. Important Spanish concepts in December

Location analysis
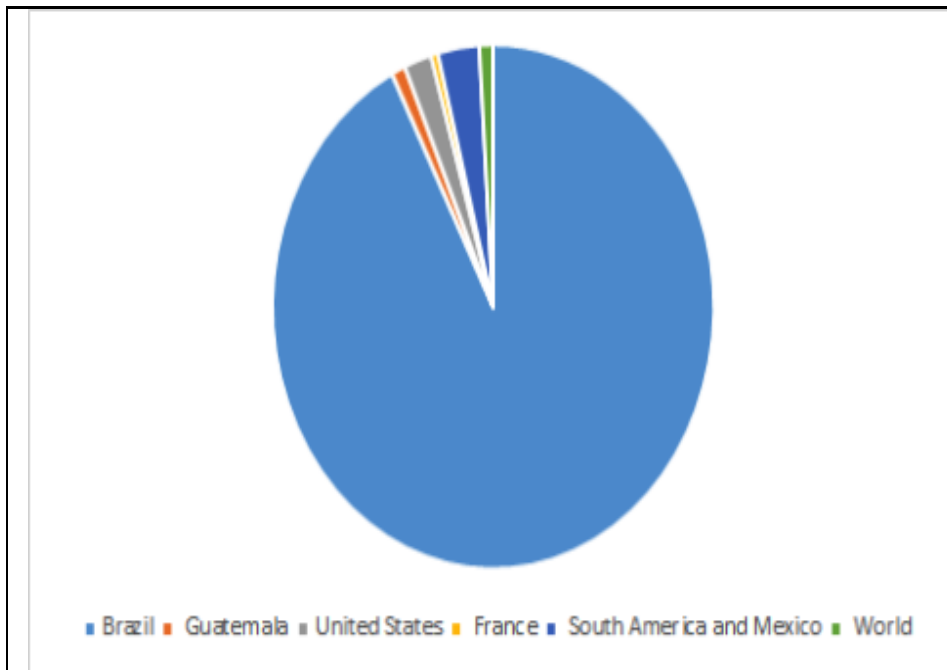## (December 2015 –January 2016)

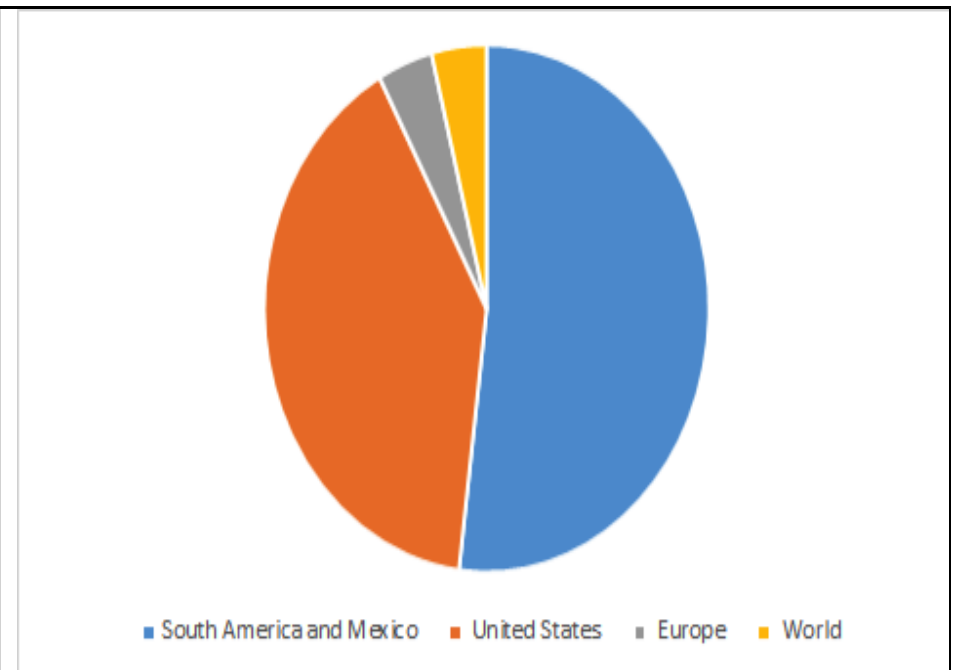| Figure.12. December 2015 Twitter users' locations | Figure.13. January 2016 Twitter users' locations |

Key Lessons about Social Media

- Zika tweets FOLLOWED disease development but evidence of a *digital divide.* Tweets initially focused in Brazil, then spread quickly globally when disease reached *developed countries*

- Twitter cannot be used *"on its own"* for disease tracking but must be coupled with other *authoritative* sources (CDC).

- Social media could spread *"misinformation"*, for example, Genetically Modified Mosquito misinformation (ScienceDaily, 2016).

IOTs Diffusion: New Information Competencies (ICs)

What it Means to be "Connected"

- Interconnectedness demands new skills, a mix of hard-soft intellectual skills set:
  - Entrepreneurship
  - Cross-, multi- and trans-disciplinary know-how
  - Health informatics & telematics competencies
  - Strategic thinking & innovation focus
  - Big data analytics (insights)
  - Complex listening, problem-solving, leadership
  - Human-machine interactive and communication skills
  - Life-Long Learning

Innovative Performance

- Knowledge absorption provides foundation for learning & change
- Dynamic capabilities drives innovation & performance

Knowledge Absorption

- Recognize useful External Knowledge

- Understanding/assimilating New Knowledge

- Integrating/Applying Knowledge to Commercial Ends: Evidence of +Correlation

between Knowledge absorptive & innovation capabilities => sustained CA

External + New Knowledge	→	Competitive Advantage

Knowledge Absorption → Dynamic Capabilities → Innovation Performance
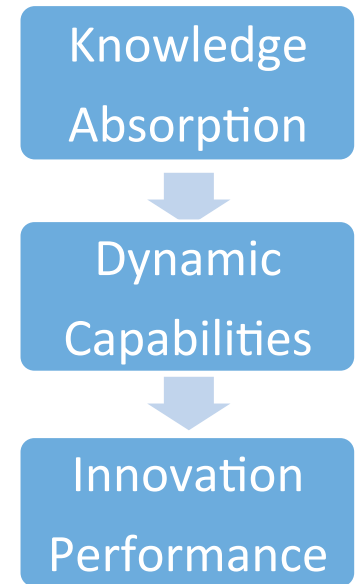
Dynamic Capabilities

- Capabilities associated with responding to changes in the environment
- They exist as identifiable processes

Sensing
Learning
Integrating
Co-ordinating → Dynamic Capabilities → Operational Capabilities

- Microfoundations
  - Elements in the firm's control that contribute to the organization's DCs
  - Knowledge and skills (KSAOs), human capital, technology related to IOTs

BIG DATA/IOTs will transform Educators

- New Informatics Competencies drive organization innovation

- Knowledge of technology, coupled with knowledge of where gaps in practice are, enable Analytics/IOT users to contribute to innovation

- Specific Competencies may be more appropriate for different Analytics/IOT users

- Changes in career paths is happening across the developed world, so New ICs will be increasingly important

Future Outlooks

Futures of Big Data/IOTs

- Massive Data (SpaceX); Data Movements v. Static Data

- Beyond Sensors & Semiconductors; Robots; Wireless World

- Know ALL – Mind Control (Self-Driving Cars)

- Digitization of human parts…

- Parallel Worlds – being able to be in different places at the same time

- **Living Forever?**