

In *Aims of Education* (delivered as an address to the Mathematical Association of England, 1916) the English mathematician turned philosopher Alfred North Whitehead (1861-1947) observed, “the University of Cambridge which had done best at teaching mathematics is the one from amongst whose graduates have come more of the English poets, while Oxford which has specialized in humanities, has tended to turn out writers who have attained, on the whole, a high level of mediocrity. I suppose that by the time one has discussed literature with a witty and learned professor, you know what has been achieved and how good it is. You become respectful and begin to wonder who am I to do better?”

Fast forward to the 21st century and allow this superficial observation: Bill Gates and Mark Zuckerberg both pioneered technological advances but originated, albeit in part, from Harvard rather than MIT. One can punch several holes in the parallel between Whitehead’s astute observation and my tongue-in-cheek reference to the two modern dropouts from Harvard who helped to make the “whole of the earth will be but one great neighborhood.” (Dr Arthur Holly Compton, *New York Times*, September 13, 1931).

I mention this comparison as a preface to the discussion of lifestyle technologies. Trials and tribulations of technological growth in the post-internet era, that is, in the past couple decades, are well documented by the bubbles and the troubles associated with bursting of bubbles. The next bubble waiting to burst may be anybody’s guess but the bets are accumulating on social networking in the post-IPO phase of the market leader. The burst (correction) may not be about social networking *per se* but about the monetizing prospect of social networking as a medium for advertisers and advertisement. In other words, a saturation point with respect to advertisers and advertising as a revenue source of social networking companies. Simply because a billion youngsters (limited purchasing power and an even shorter attention span) may use its “wall” to share with the world when they snog, sneeze or snigger, may not offer a sustainable value proposition. The fall [1] in Facebook access in the US (155 million to 149 million) may not be so slight or subtle. There is no “glue” that holds the user to the unstructured open platform void of utility except for the few years in our lives when (often misguided) we crave for self-expression, solicit recognition from peers, find creativity in faux fashions and substitute camaraderie with cyber-copain. Social networks enable us to masquerade and it may help us to ‘escape’ but for most well-meaning youth these digressions will have non-asymptotic limits. Selectivity [2] and services may be value-added differentiators in social media, for example, connections via LinkedIn and the race for Skype-esque phone service from Facebook.

According to the 2010 US Bureau of Census, there are about 80 million individuals in the US between the ages of 15-35 and about 40 million over 65 years (more time on their hands for online companionship). In the upwardly mobile 15-35 age group, less than 12 million earn above \$50,000 per annum while more than 22 million are married and about 7 million claim 3 or more as their household size (occupancy size may reflect dependents in household and consequently an indicator of reduced purchasing power).

¹ <http://adonismens.com/06/13/technology-news/social-networking-website-news/facebook-users-in-u-s-fall-back-by-5-per-cent/>

² <http://chronicle.com/blogs/wiredcampus/professors-consider-classroom-uses-for-google-plus/32131>

Thus, Moms and Dads, the bread winners who make sure that bread and butter are on the table, are not lounging in the virtual social café. They may not have time for a Second Life in between after-school pick up, swim meet or baseball clubs. They are neither “app” store customers for Big Ben Tea Timer or Plastic Surgery Simulator or YummySoup nor targets for advertisement unless relevant to their life and lifestyle. But, they make time for healthcare, education and transactions required for daily living. Hence, services growth may focus on lifestyle and transactions of the demographic who can afford the bills. The business of delivering lifestyle business services by controlling the medium (4G, 802.16m) in emerging economies may enable the “gatekeeper” to charge “entry fees” to “allow” the services to reach the customer.

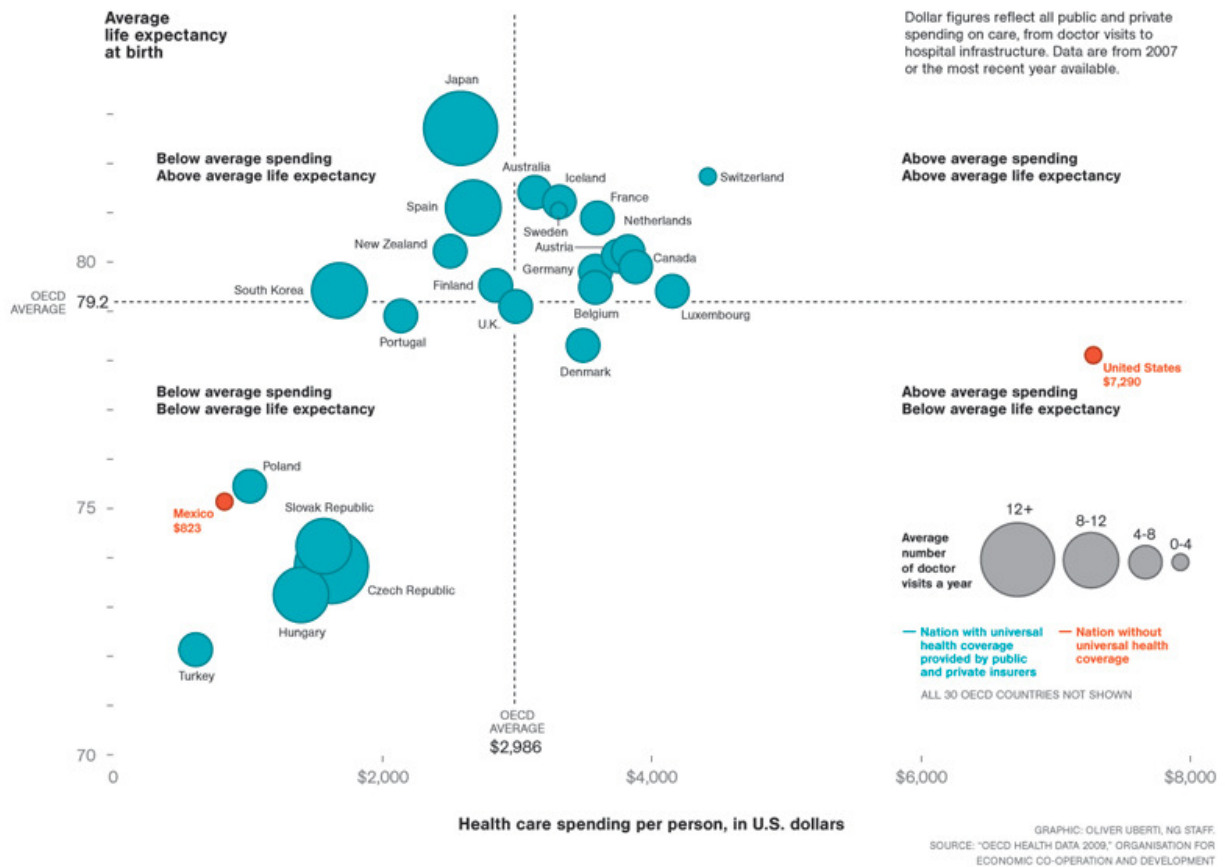
Bill Gates recently urged [3] a group of about 500 young minds from 77 countries assembled in Lindau (Germany) to imagine, invent and innovate for the poorest people in the world. From the world’s richest man the appeal for services, solutions and social recognition for problems that face the world’s poorest is not only extraordinary philanthropy but a call to leaders who may not have grasped the potential for profit from micro-revenue, nano-payments and economies of *scale based entrepreneurial innovation*. It is counter-intuitive and quite contrary to the conventional wisdom in finance and the P&L ethos relentlessly pounded by venture capitalists and analysts in quest of rapid return on investments or assets (ROI, ROA).

The emergence of new lines of business and economic growth may not start with \$1 billion in annual sales or services revenue. The significant lesson is provided by Apple’s Newton PDA, a disruptive innovation which failed to succeed (Case Study in Notes) because revenue from Newton was less than 1% of Apple’s revenue in 1994. There aren’t any \$1 billion ready markets. Conglomerates with imagination, vision and foresight must be willing to invest and also capable of shouldering the risks which leadership demands in order to reap the harvest. The future holds rich rewards for micro-payment based services for the poor.

The sources of new business growth may be similar, at least for the middle and lower income households, globally. The verticals are healthcare, education and retail or financial transactions for humdrum living. It may include services for energy, automobiles and home security. The range and offering of products and services in these verticals will vary depending on the socio-economic sub-categories of the consumer pool. Regional adaptability will influence local market share. A plethora of combinations and panoply of service levels will be necessary, which, in turn, requires multiple consumer driven supply networks (CDSN) to work in high jitter scenarios in asynchronous or non-linear modes. It calls for the ability to control access of the medium of delivery (4G, 802.16m), pervasive networks, convergence of platforms, location-aware ubiquitous computing, in-network processing, near real-time rapid response, agility and continuous intelligent re-optimization using artificial neural network learning algorithms to adapt sets in fuzzy logic application rules. *In other words, a theory of services may be based on a systems analyses and systems synthesis approach which will aim to integrate the trinity of sense, intelligence and response (SIR).*

³ <http://arstechnica.com/science/news/2011/06/bill-gates-talks-science-health-and-the-gates-foundation.ars>

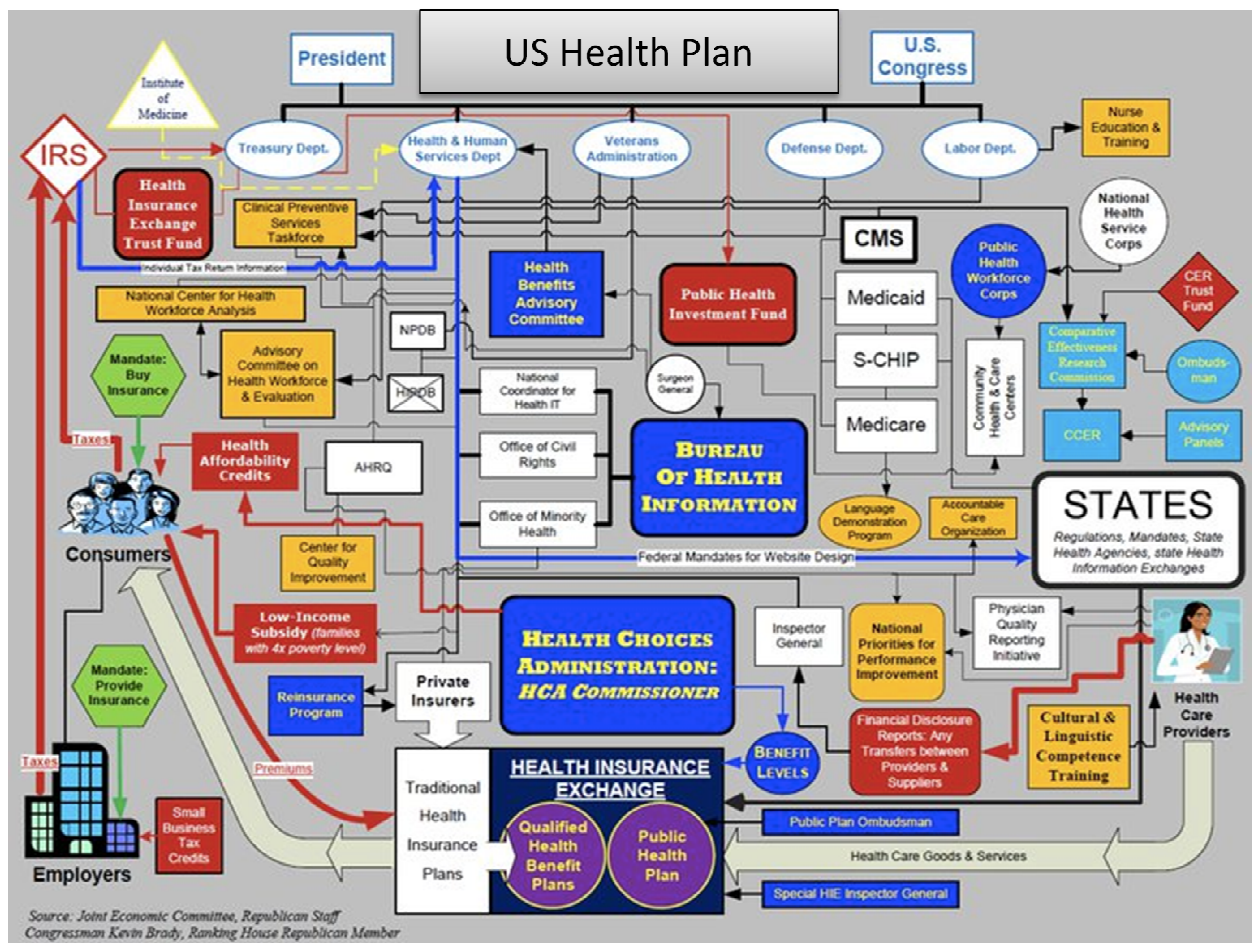
Profitability may mandate that execution of the SIR paradigm also draws on the classical confluence of risk pooling strategies, delayed differentiation, centralized supply chain collaboration, interoperability standards, QoS metrics and take advantage of the economies of *scale*. It is not inconceivable that select verticals may explore the virtues of loosely coupled systems or vertical integration to reduce total cost (COGS). Vertical integration to control the medium of delivery for mobile devices (4G, 802.16m) may increase revenue from micro-pay-per-access necessary to deliver near real-time software and analytics as a service (SAAS) or high security personal information exchange (healthcare, finance). In other words, there is an old adage, if you wish to sell cars, help to build the roads (equivalent to information gateways).



In the US alone, healthcare expenditure exceeded \$2 trillion per annum (2007) and rapidly approaching about 20% of GDP. OECD nations with nationalized healthcare spend about half the US (see graphic). The burden of healthcare is undermining economic growth in industrial nations and cost of healthcare in emerging economies (India, China, Brazil, Indonesia, SE Asia) may disrupt their development plans. It is well nigh impossible to offer any simple solution to curtail costs within the fractured infrastructure which provides healthcare in the US or even the “relatively better” situation of National Health Service in UK.

Overhaul of healthcare systems may [a] limit cost of services, [b] introduce a cap on salaries, [c] restrict use of drugs [4] based on cost versus value, [d] penalize for obesity/smoking/alcoholism and [e] mandate preventative health services including vaccinations. Any logical approach may be unpalatable to special interest groups with deep pockets (health insurance industry). Consequently, politics and media will work at the behest of the insurance industry to peddle the *status quo* and preserve the march of unreason.

Hopefully a breaking point will arrive to precipitate a catastrophic event. It may acutely polarize public perception, expose the deception of insurance cartels and catalyze political re-organization which may then entertain the virtues of a vertically integrated [5] health service as a national health service for all individuals. An insurance-free national health service may seem like a near-utopian proposition for the US unless it constructively dismantles the hemorrhaging bureaucracy in its health plan (see illustration).



⁴ <http://www.nytimes.com/2008/07/06/health/06avastin.html>

⁵ <http://www.economist.com/node/13173671>

Agnostic of geography, the rational delivery of healthcare systems may be optimized if outsourced and regulated as a fixed-profit business (most governments may be unable to acquire sufficient discipline in order to manage the healthcare delivery process). Very few businesses in the world are even capable of contemplating the delivery of a vertically integrated healthcare service (VIHS), albeit partial. A couple names rise to the surface, for example, GE (US) and Tata (India) may have the spectrum of parts and services which may lend itself for implementation if VIHS were to take effect. Whether these or other similar conglomerates are able to execute on an altruistic-fixed-profit-over-cost (AFPOC) system remains to be explored. The latter may depend on volume of service delivered and total health services cost.

If a contractor operated the US health system at 1% AFPOC the profit for the vendor may be \$30 billion. Attitude is one barrier to conceiving this modus operandi due to the prevalent perception that altruism and profitability are oxymoronic. \$30 billion pa is 20% of the revenue for large conglomerates even if 1% profit may seem low when compared to grocery chains. Kroger and Albertson's reported net margins of 7.6% and 5.1% (2001-2002) while supermarkets in general [6] target 6% profitability to claim success.

The principle of VIHS may include the conventional wisdom of supply chain. VIHS must orchestrate:

- [a] service supply chain – local GP, doctors, nurses, hospital staff, teaching hospitals, medical students
- [b] physical supply chain – beds, BP monitors, IV pumps, pharmaceuticals
- [c] financial supply chain – equipment and salaries, payment of services

Vertical integration in health services (VIHS) can be partial, at best. VIHS must be loosely coupled in a manner reflecting the Japanese automobile manufacturing practices about 50 years ago. The key problem with the VIHS concept is the pharmaceutical supply chain. The invention and innovation of new drugs, treatment or surgical equipment cannot be “contained” within any VIHS.

Discontent with VIHS over use of drugs and the “human” face of such displeasure will be PR nightmares. VIHS will best serve those who cannot afford expensive drug treatments or designer therapies. If grocery store shelf-stocking employee John Doe provided by national health service demands post-operative treatment of colon cancer with a drug that costs \$100,000 which may extend his life by a few weeks then VIHS may have to deny such care. The drug may be in a category beyond cost vs value threshold. If the John Doe is Mr Jeff Bezos then the treatment will be paid by the user. Thus, VIHS may be a schism between the haves and have-nots. Will it serve as another “third rail” of politics? Is the current alternative any better? Those who can afford buy insurance and those who can afford **more** buy **better** insurance. Individuals with pre-conditions are left out in the cold and then we have those who cannot afford to buy insurance, at all. VIHS will serve all individuals based on a gradient contribution of earned income paid as a tax. For the wealthy, treatment beyond VIHS in private clinics may be paid by other insurance schemes.

⁶ <http://www.mckinsey.com/practices/retail/knowledge/articles/competinginavaluedrivenworld.pdf>

Haves and have-nots are a fact of life but to minimize the number of have-nots is good business, prudent marketing strategy and an index of ethical corporate responsibility. Therefore, VIHS, albeit in part, is a tangible solution. For the greater good, individuals and families may have to choose, make sacrifices and endure events which they cannot control. It will be devastating for the few who may encounter restrictions and agonize over the lives of their loved ones. The system must search for alternatives and exceptions to alleviate such heartbreak but not at the cost of destabilizing the infrastructural constraints that must be imposed on the design of VIHS if it is expected to serve the masses, especially for the populous nations.

VIHS will be paralyzed without a cap on the cost of drugs [7] and a system to allow or deny FDA approved drugs for treatment. The thorny question of stifling innovation will surely raise its head, justifiably. The task is to ascertain if a drug (for example, Provenge costs \$93,000 for a treatment) manufacturer is within reasonable ethical norms to charge astronomical prices. Even if it is logical, can VIHS justify the cost vs the life expectancy of the patient? These are difficult questions with no clear answers or proven template to adjudicate. Also crucial for VIHS is its need to be released from indemnity. The cost of malpractice insurance and the threat of frivolous litigation must be eliminated. The latter will require introspection, vigilance and a deep sense of service (Hippocratic Oath). Elements within each society and the insurance industry will resist and destabilize (USA) such sweeping paradigm shifts. The latter may introduce even more paradoxes in our attempt to understand and respond to the social cry for socialized medicine if society proves its impotence to secure the role of public goods for social welfare.

VIHS must reduce the number of patients who may need resource consuming attentive services and hospital beds (except for emergencies). The domain of preventative medicine must be embedded in the practice of VIHS. It will demand a confluence of technology, remote monitoring [8] of the young and healthy, local GP and nurse practitioners. All in a concerted effort to reduce preventable emergencies and predict courses of action to mitigate health risks, in advance. None of these services exist adequately either in the US or in any other parts of the world, yet. The recent trend to digitize medical information (HIT) is a stepping stone but still far from the ubiquitous sensing systems and intelligent analytics we will need to determine the state of our health before we need *healthcare*. There may be a myriad of reasons why VIHS may not work. But without VIHS or a similar system, the cost of healthcare will cripple economic growth and development. To provide examples of what may work in the short term we may focus on a few parameters in remote health monitoring to aid preventative medicine. Height and weight, blood glucose and blood pressure data may create a health profile for most individuals including young people. Changes to normal metabolism (baseline) may be easily identified and appropriate action may be prescribed to reduce the possibility of hospitalization or an ambulance ride to the emergency room. For patients with defined problems, remote monitoring and real-time analytics may reduce re-hospitalization.

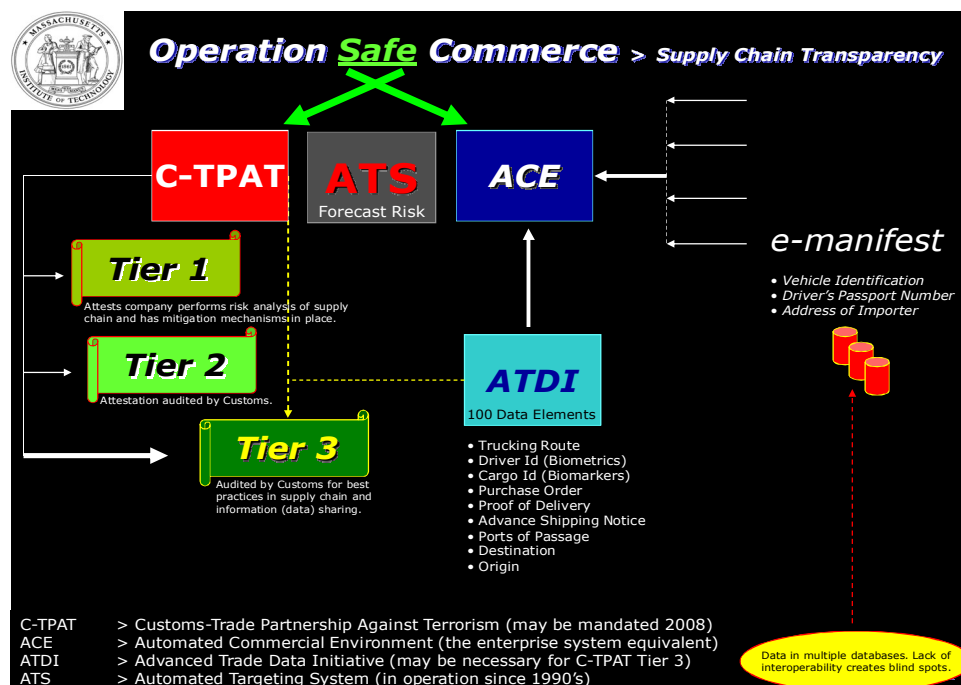
⁷ <http://www.nytimes.com/2011/06/28/health/28prostate.html>

⁸ <http://esd.mit.edu/wps/2008/esd-wp-2008-17.pdf> (Published Book Chapter <http://dspace.mit.edu/handle/1721.1/58972>)

Acquisition and transmission of the health data from remote monitors requires embedded software as a service and the ubiquitous medium or pervasive network for secure bidirectional exchange of data. Hence, SAAS and the need for the medium of delivery (4G, 802.16m) for businesses who may wish to profit from the emergence of pay-per-use healthcare device based services and subscriptions, as a prelude to VIHS.

Business growth through control of the medium, especially in emerging economies, allows a multitude of SAAS (SaaS) options in other fields, such as, logistics, supply chain, retail, education, energy efficiency, home security, auto insurance, financial transactions, lifestyle interactions and streaming entertainment. Some of these services may be spawned by the internet of things [9] if embedded [10] with ambient [11] intelligence to harvest data from the physical world and transmit via location-aware pervasive networks.

Profitability from IoT in business and security may depend on the **scale** of operation. Tools similar to GE VeriWise are often used for logistics (US, EU) but growth and ‘scale’ appears to be elsewhere. Cushman & Wakefield reports that the Indian logistics industry is expected to grow at the rate of 15% to 20% pa (\$385 billion by 2015). Indian rail network is spread over 70,000 km covering 7,000 stations and moves more than 1 million tons of freight per day. Logistics operation using the Trans-Siberian Railroad [12] may be soon used by China to bridge Beijing to Cape Agulhas via the Strait of Gibraltar. Growth will demand object intelligence to develop the supply-demand network of the future on the African continent.



⁹ <http://www.autoidlabs.org/uploads/media/MIT-AUTOID-WH-001.pdf>

¹⁰ http://www.amazon.com/When-Things-Start-Think-Gershenfeld/dp/080505880X#_

¹¹ <ftp://ftp.cordis.lu/pub/ist/docs/istagscenarios2010.pdf>

¹² [http://www.istiee.org/te/papers/N29/05%20\(pg.%2046-56\)%20Pasukeviciute.pdf](http://www.istiee.org/te/papers/N29/05%20(pg.%2046-56)%20Pasukeviciute.pdf)

☑ NOTES

CASE STUDY FROM *The Innovator's Dilemma* - PUSHING THE GROWTH RATE OF AN EMERGING MARKET ¹³

The history of Apple Computer's early entry into the hand-held computer, or personal digital assistant (PDA), market helps to clarify the difficulties confronting large companies in small markets. Apple Computer introduced its Apple I in 1976. It was at best a preliminary product with limited functionality, and the company sold a total of 200 units at \$666 each before withdrawing it from the market. But the Apple I wasn't a financial disaster. Apple had spent modestly on its development, and both Apple and its customers learned a lot about how desktop personal computers might be used. Apple incorporated this learning into its Apple II computer, introduced in 1977, which was highly successful. Apple sold 43,000 Apple II computers in the first two years they were on the market, and the product's success positioned the company as the leader in the personal computer industry. On the basis of the Apple II's success Apple went public in 1980.

A decade after the release of the Apple II, Apple Computer had grown into a \$5 billion company, and like all large and successful companies, it found itself having to add large chunks of revenue each year to preserve its equity value and organizational vitality. In the early 1990s, the emerging market for hand-held PDAs presented itself as a potential vehicle for achieving that needed growth. In many ways, this opportunity, analogous to that in 1978 when the Apple II computer helped shape its industry, was a great fit for Apple. Apple's distinctive design expertise was in user-friendly products, and user-friendliness and convenience were the basis of the PDA concept.

How did Apple approach this opportunity? Aggressively. It invested scores of millions of dollars to develop its product, dubbed the "Newton." The Newton's features were defined through one of the most thoroughly executed market research efforts in corporate history; focus groups and surveys of every type were used to determine what features consumers would want. The PDA had many of the characteristics of a disruptive computing technology, and recognizing the potential problems, Apple CEO John Sculley made the Newton's development a personal priority, promoting the product widely, and ensuring that the effort got the technical and financial resources it needed.

Apple sold 140,000 Newtons in 1993 and 1994, its first two years on the market. Most observers, of course, viewed the Newton as a big flop. Technically, its handwriting recognition capabilities were disappointing, and its wireless communications technologies had made it expensive. But what was most damning was that while Sculley had publicly positioned the Newton as a key product to sustain the company's growth, its first-year sales amounted to about 1% of Apple's revenues. Despite all the effort, the Newton made hardly a dent in Apple's need for new growth.

But was the Newton a failure? The timing of Newton's entry into the handheld market was akin to the timing of the Apple II into the desktop market. It was a market-creating, disruptive product targeted at an indefinable set of users whose needs were unknown to either themselves or Apple. On that basis, Newton's sales should have been a pleasant surprise to Apple's executives: It outsold the Apple II in its first two years by a factor of more than three to one. But while selling 43,000 units was viewed as an IPO-qualifying triumph in the smaller Apple of 1979, selling 140,000 Newtons was viewed as a failure in the giant Apple of 1994.

July 4, 2011

¹³ <http://arthaapps.googlecode.com/files/Harvard%20Business%20School%20Press%20-%20The%20Innovator's%20Dilemma.pdf>

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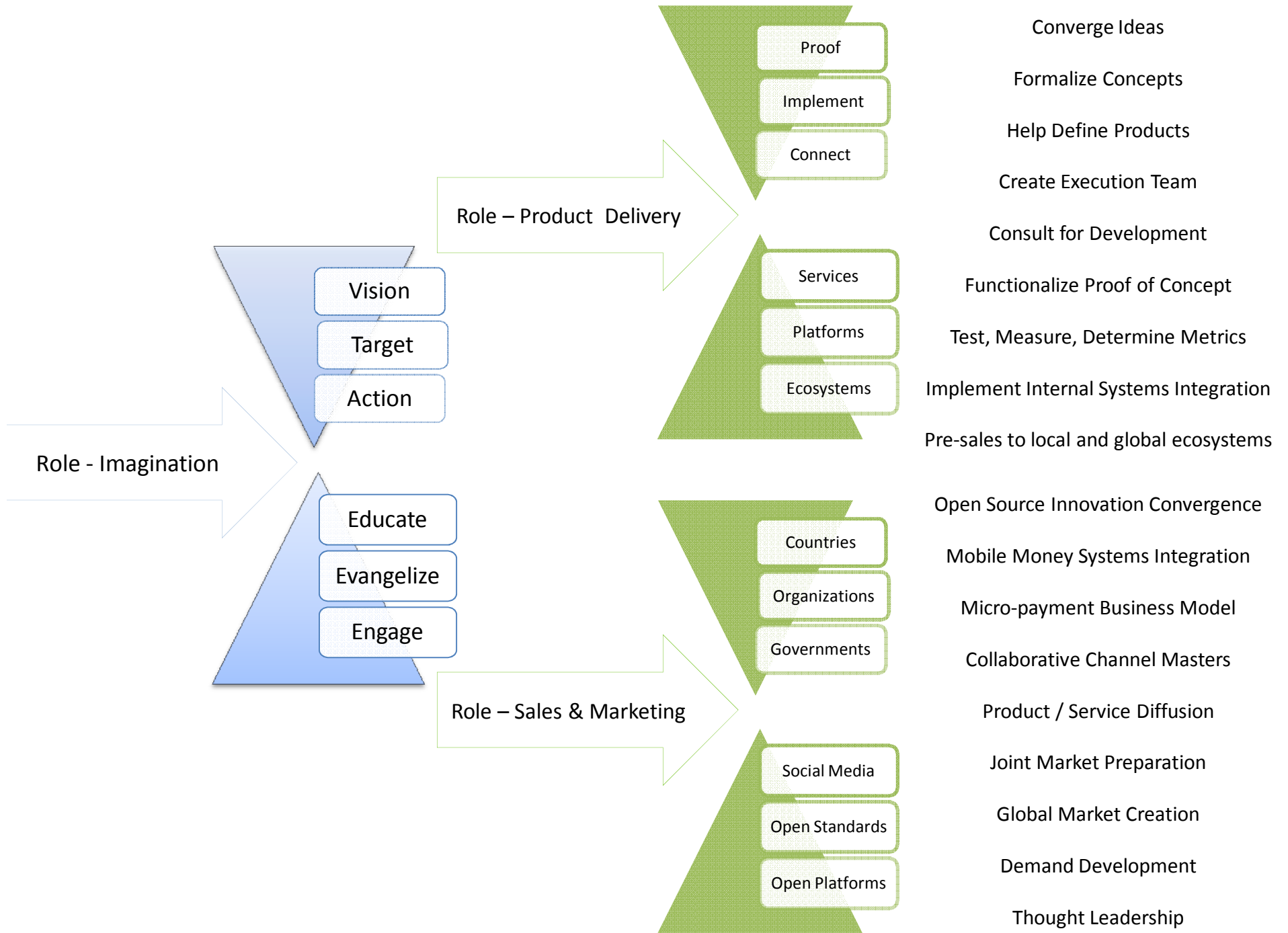
Sense. Intelligence. Response.

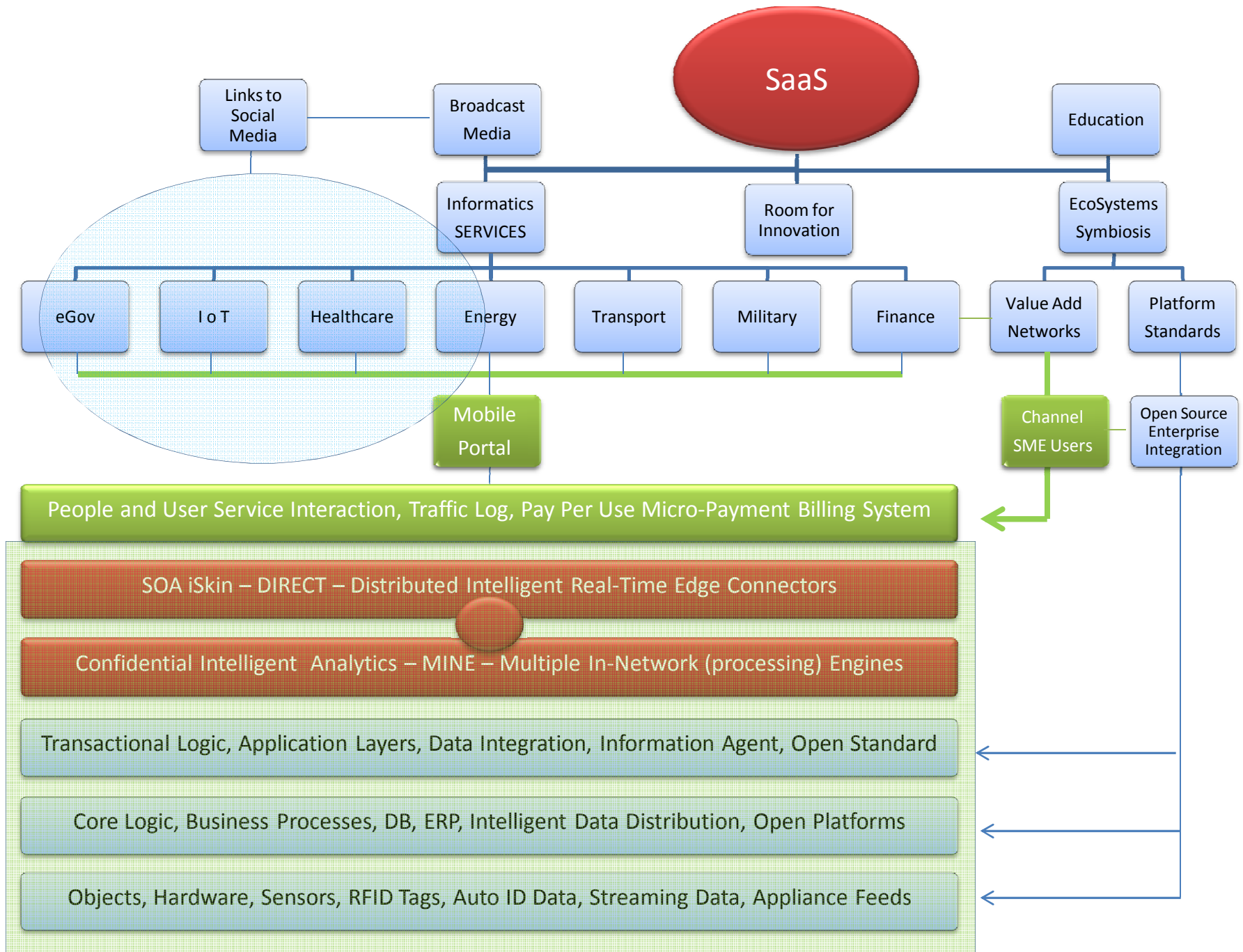
Systems Thinking Approach

Business Paradigms Driven By Paradoxes

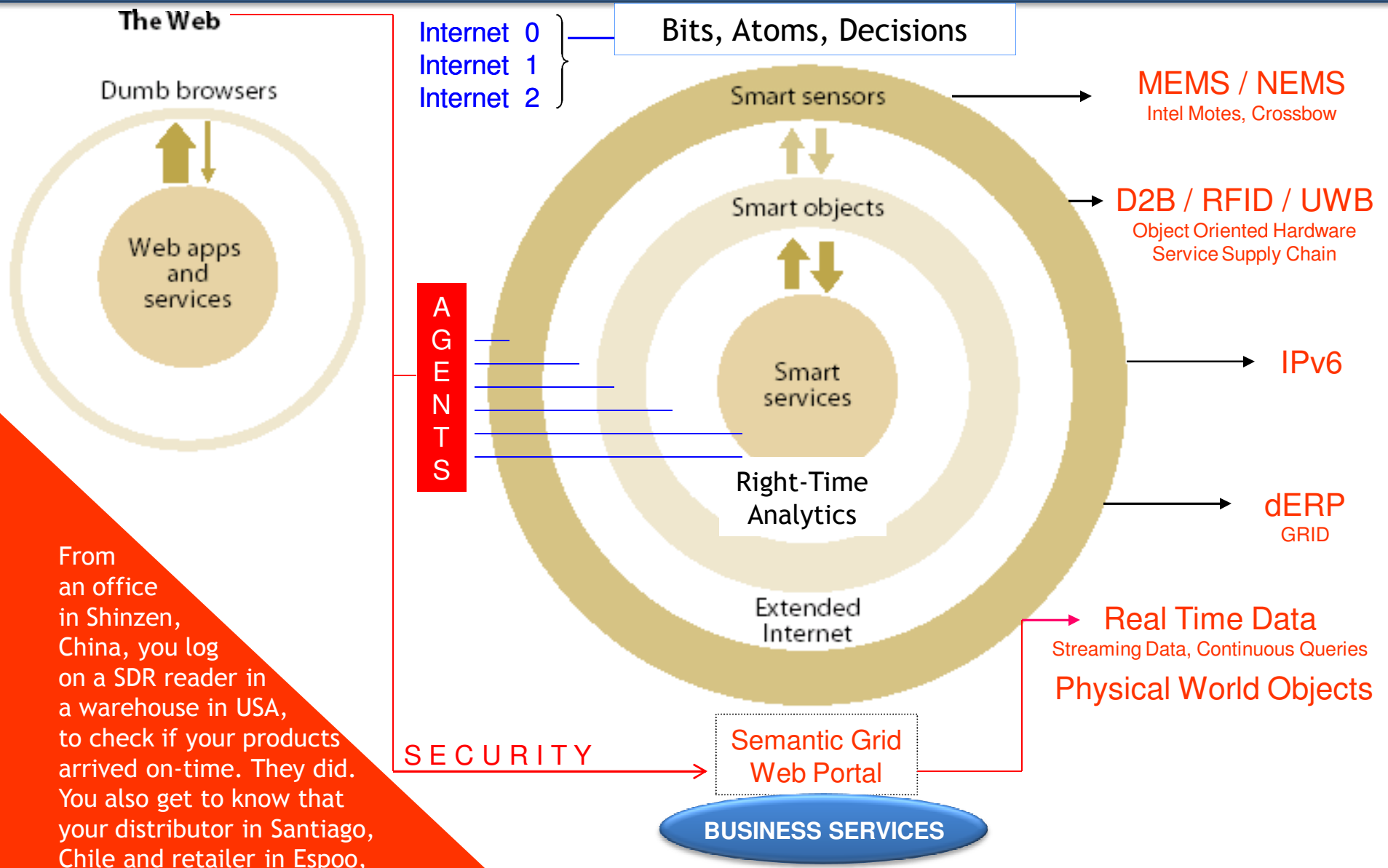
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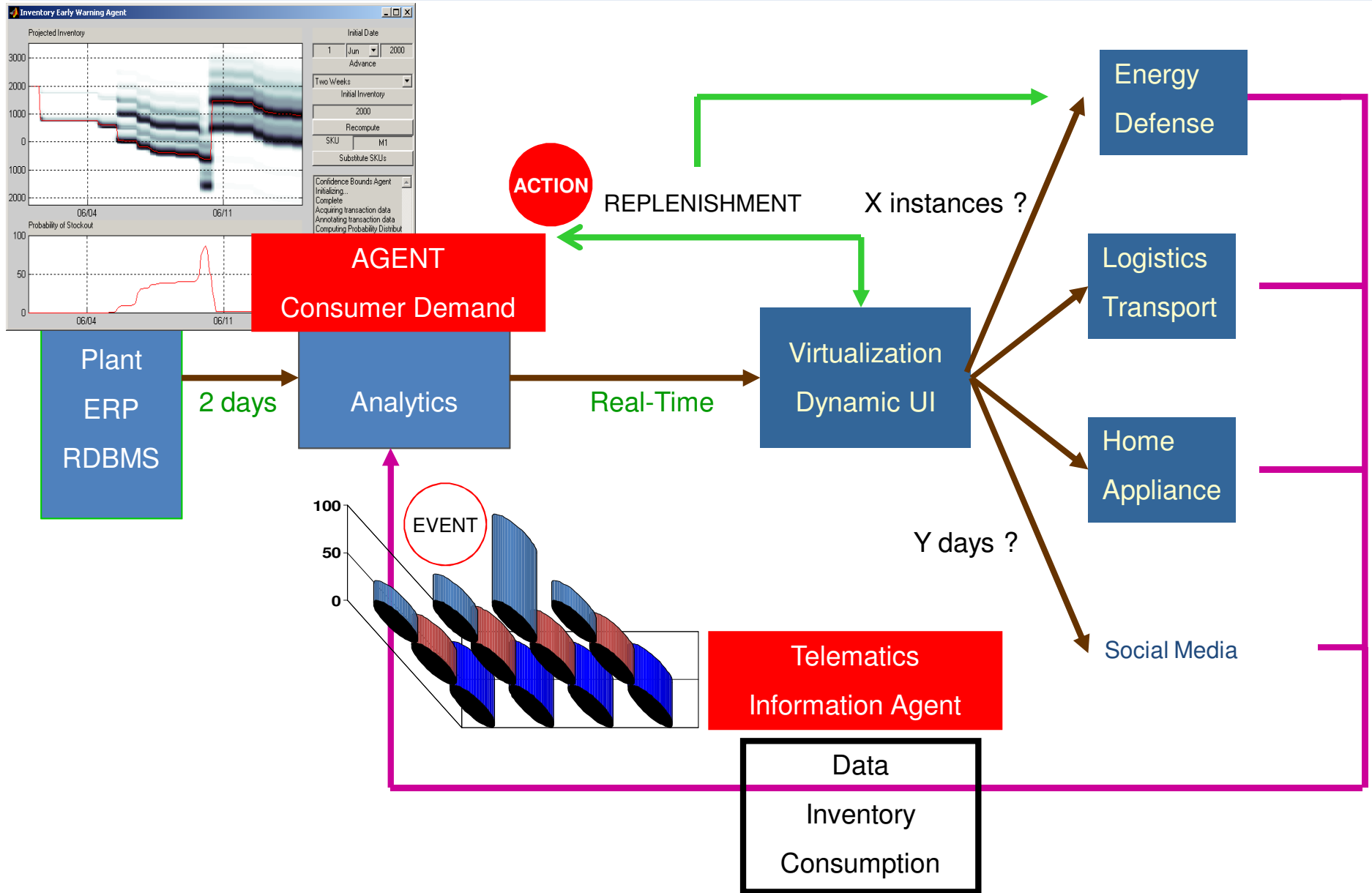
Integrating Ubiquitous Analytics in Real-Time with Data, Information, Application



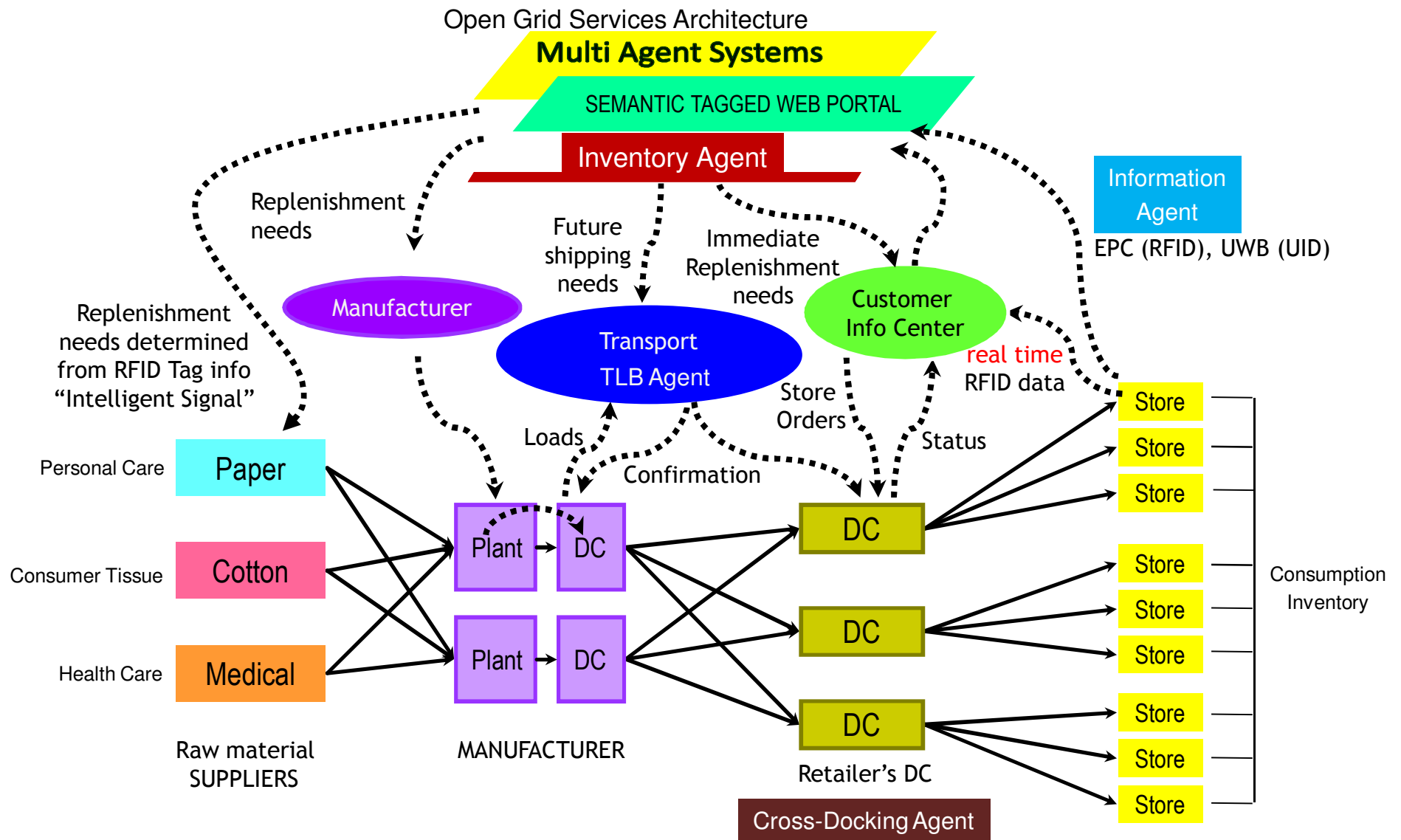
From an office in Shinzen, China, you log on a SDR reader in a warehouse in USA, to check if your products arrived on-time. They did. You also get to know that your distributor in Santiago, Chile and retailer in Espoo, Finland also checked the delivery status, moments before you logged on.

SDR Data Interrogators as Ubiquitous Internet Appliances in IoT (2003)

Intelligent Object Integration for Business Services – Pay Per Transaction



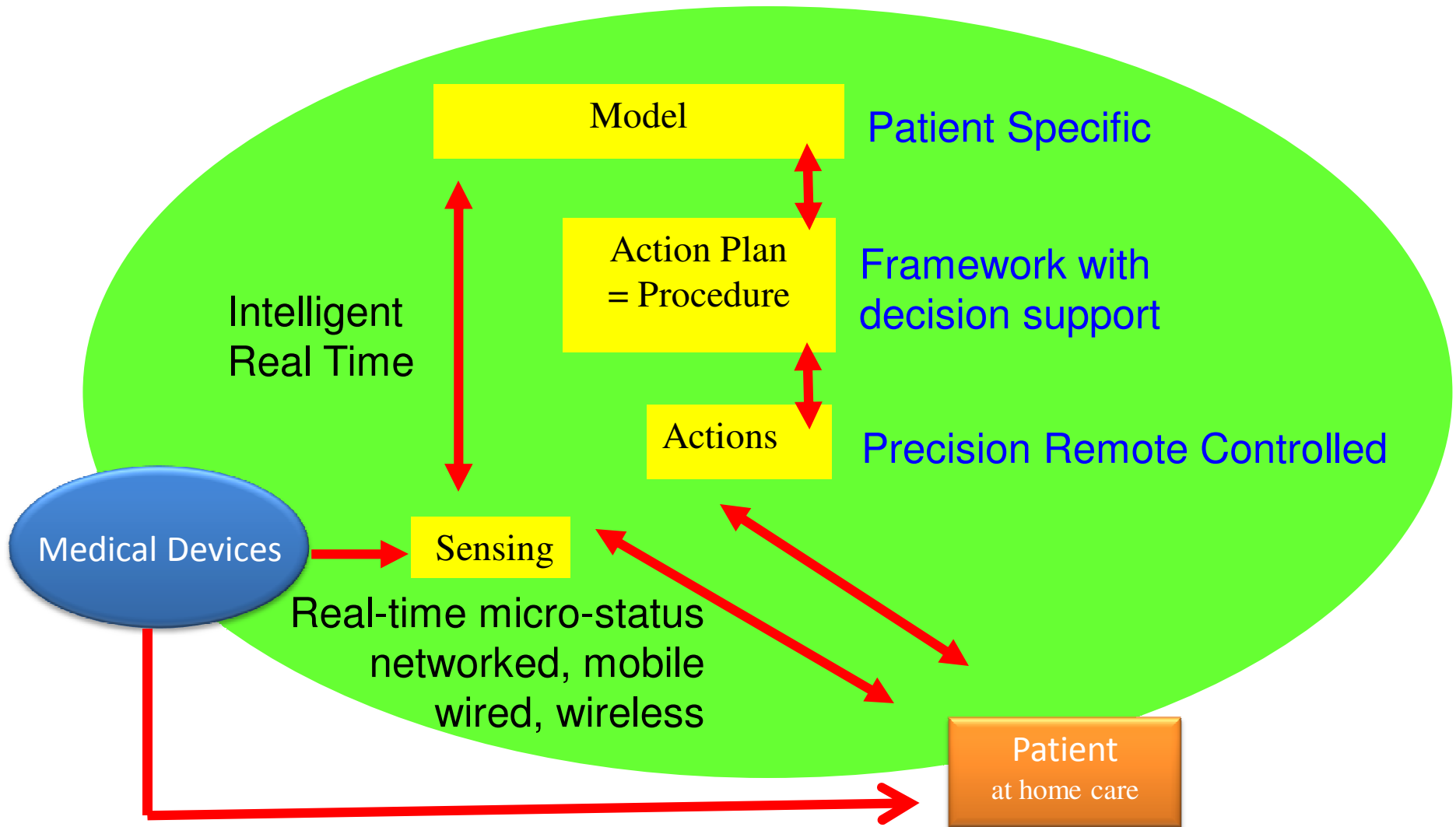
Network Systems Integration: Similarities in Retail (P&G) & Military (DoD)



Healthcare Informatics in Preventative, Attentive & Independent Living

Sense, then, Respond

Paradigms Driven By Paradoxes

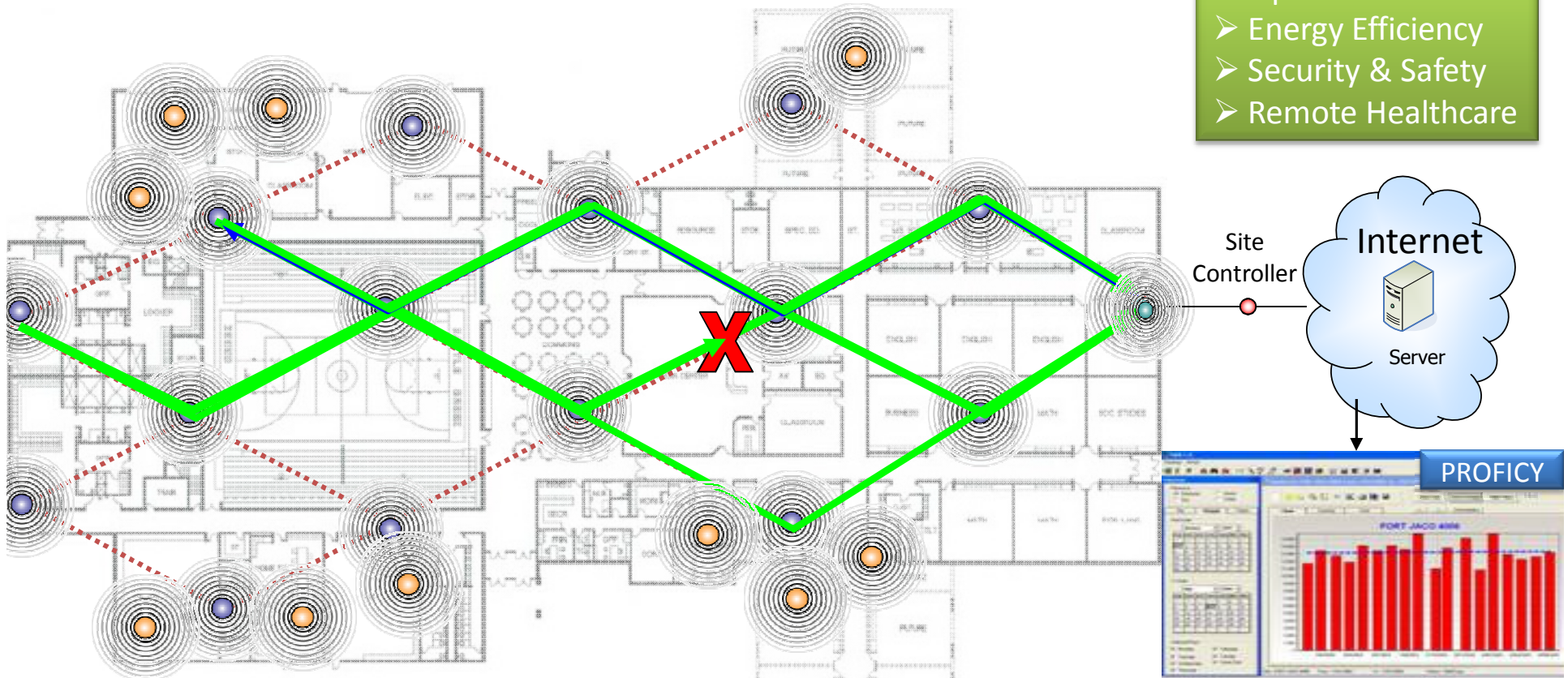


Energy Efficiency → Wireless Sensor Networks

- ❑ Sensors distributed over range > 100 meters
- ❑ Multiple dynamics and penetration of barriers
- ❑ No single point of failure (self-healing ad hoc mesh)
- ❑ Grid power not necessary (battery life 1 to 10 years)
- ❑ Bi-directional data (monitoring, reset, reconfiguration)
- ❑ Wireless sensors directly upload data to internet via IPv6

Ubiquitous WSN for

- Energy Efficiency
- Security & Safety
- Remote Healthcare





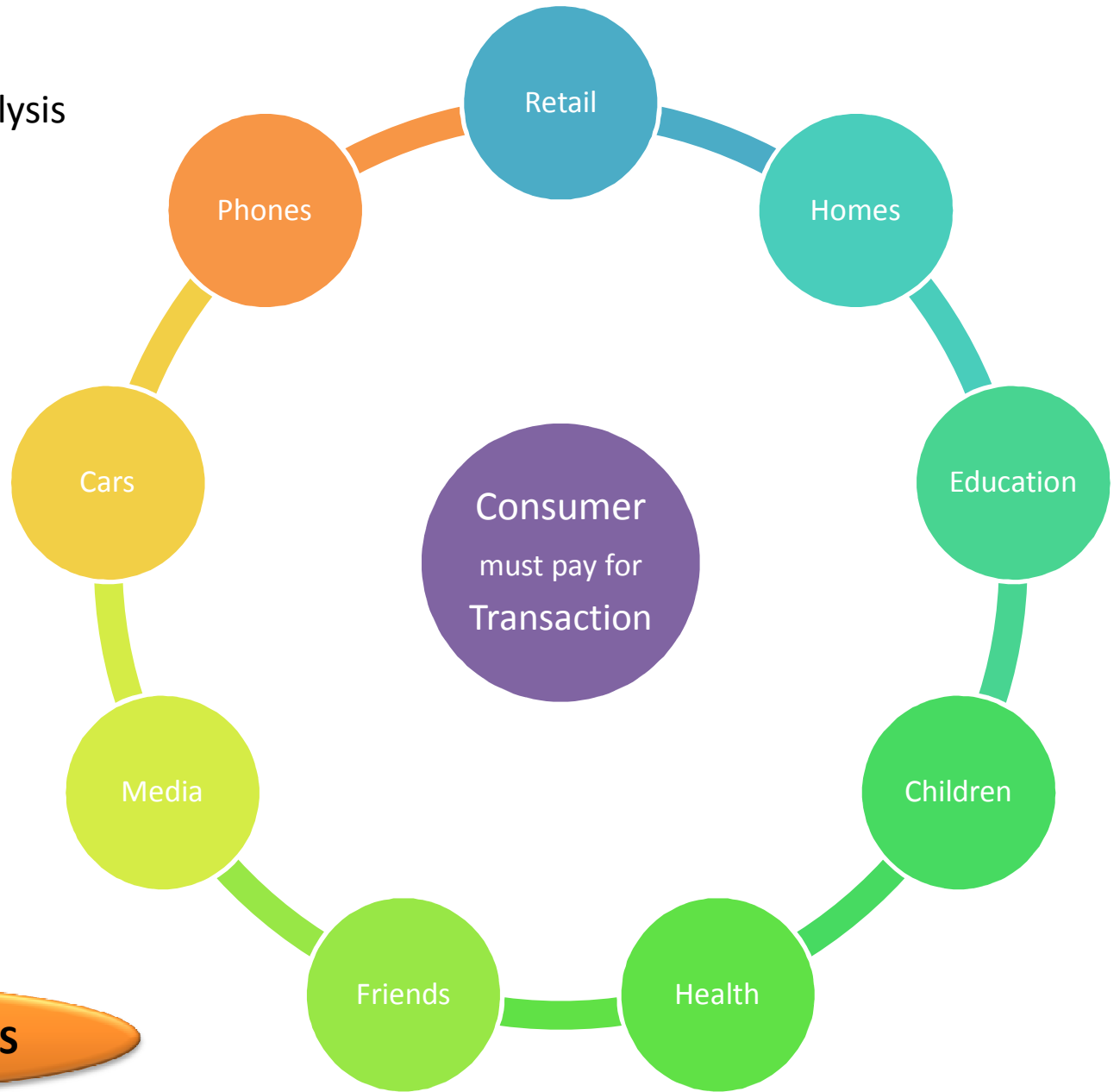
Lifestyle related points of transaction SAAS-SaaS integrated transactional interface



Transaction Cost Analysis



Micro-payments



MONEY MAKING IDEAS

MONEY MAKING IDEAS

Connect (mobile software) with OPM (other peoples money) at every POT (point of transaction)

Growth potential from SAAS mobile finance SaaS platform

Assume **189.9 billion instances** of electronic payments pa global *

Charge 1 cent per instance (transaction) with 10% market share

Earn **\$190 million** pa from pay per transaction micro-payments

Based on the assumption that US constitutes one-third of global non-cash payments.*
www.frbservices.org/files/communications/pdf/research/2007_payments_study.pdf

Number of noncash payments in US was 93.3 billion in 2006 (value of \$75.8 trillion).

	2003	2006	CAGR*
Total (billions)	81.4	93.3	4.6%
Checks (paid)	37.3	30.6	-6.4%
Debit card	15.6	25.3	17.5%
Signature	10.3	16.0	15.8%
PIN	5.3	9.4	20.6%
Credit card	19.0	21.7	4.6%
ACH	8.8	14.6	18.6%
EBT	0.8	1.1	10.0%



SaaS ECOSYSTEM

Anti-Vandalism
 SAAS
 SAFETY PIN
 Security System

MONEY MAKING IDEAS

Connect (telematics software) with personal automobile id (IPv6) to bill distance data.

Growth potential from pay per mile car insurance

Estimated number of personal automobiles in India and China 30 million

Estimated average distance 6000 miles or 180 billion car-miles per year

Charge (average) 2 cents per mile (age adjusted) for car insurance *

Revenue pa with 10% share **\$360 million**

Pay Per Mile insurance reduces barrier to entry and improves economies of scale

* US average for low risk, low cost insurance for middle-age individuals approximates 5 cents per mile based on 12,000 miles per year.

MONEY MAKING IDEAS

Connect (domestic telematics SaaS) with WSN - IPv6 (self-organizing motion sensors ad hoc mesh)

Growth potential from security - pay per hour home insurance

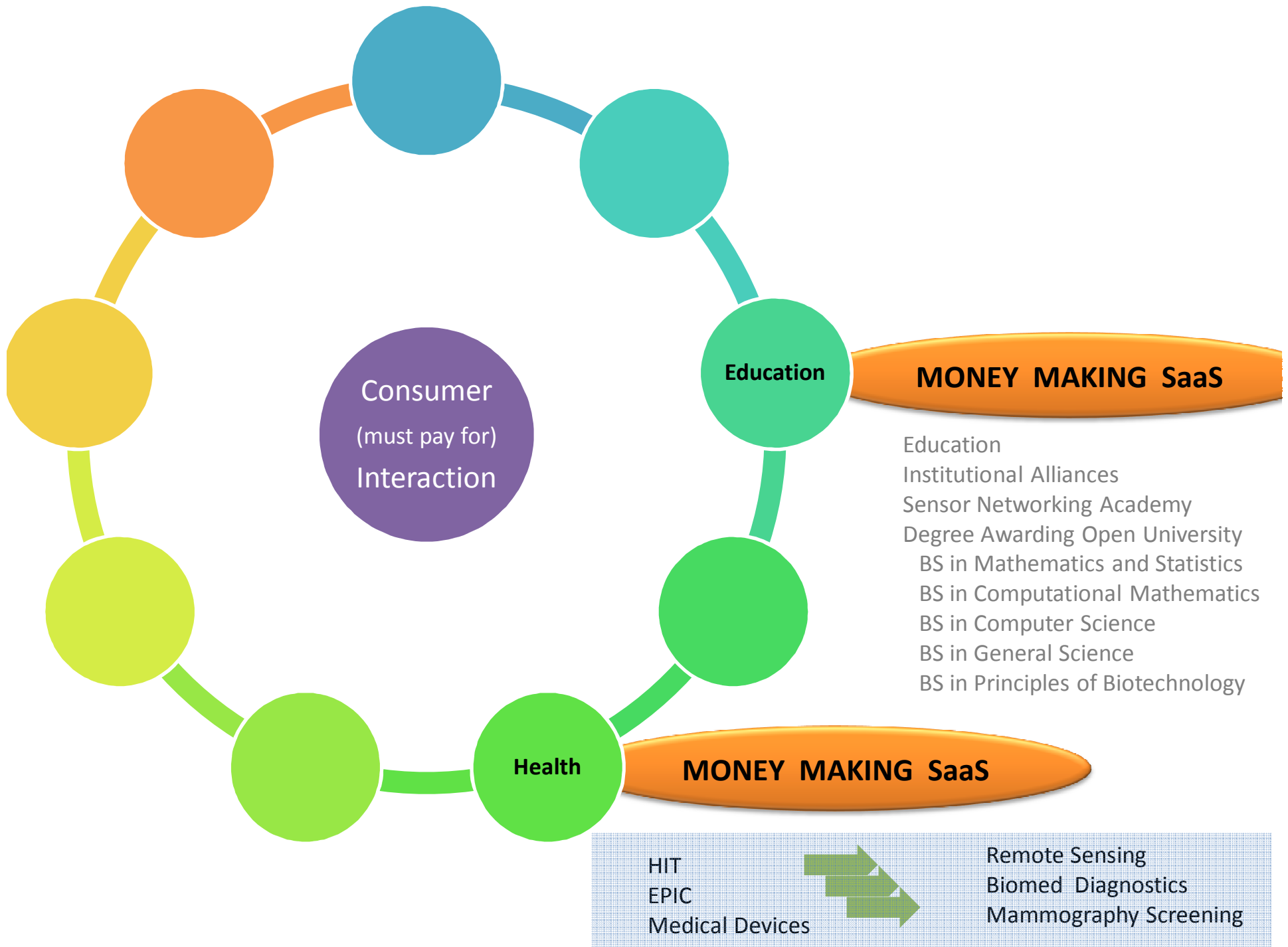
Estimated number of personal homes in India and China 250 million

Estimated average 4 hours unoccupied or 365 billion home-hours pa

Charge (average) 1 cent per hour

Revenue pa with 10% share **\$365 million**

Pay Per Hour insurance reduces barrier to entry and improves penetration



MONEY MAKING IDEAS

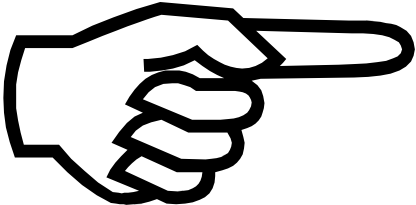
Connect (mobile software) with OPM (other peoples money) at every POT (point of transaction)

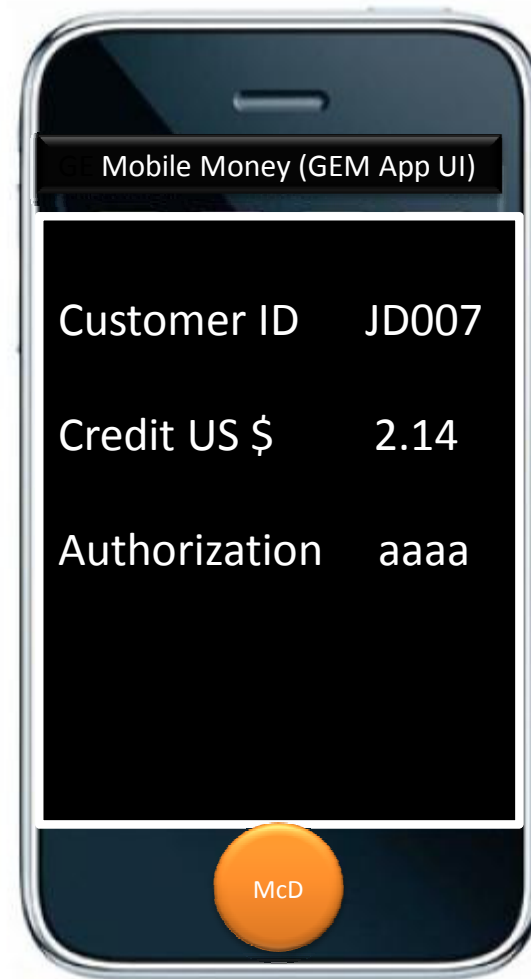
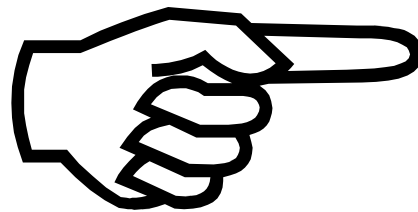
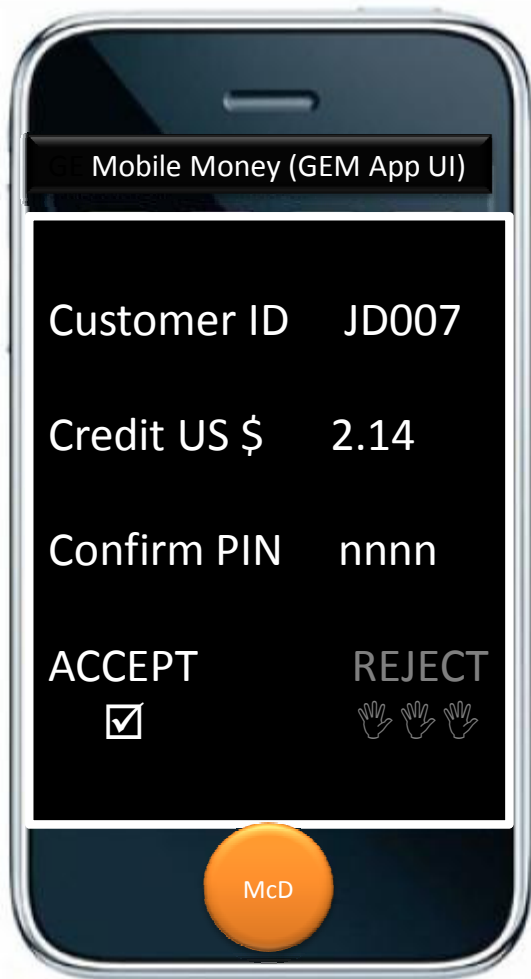


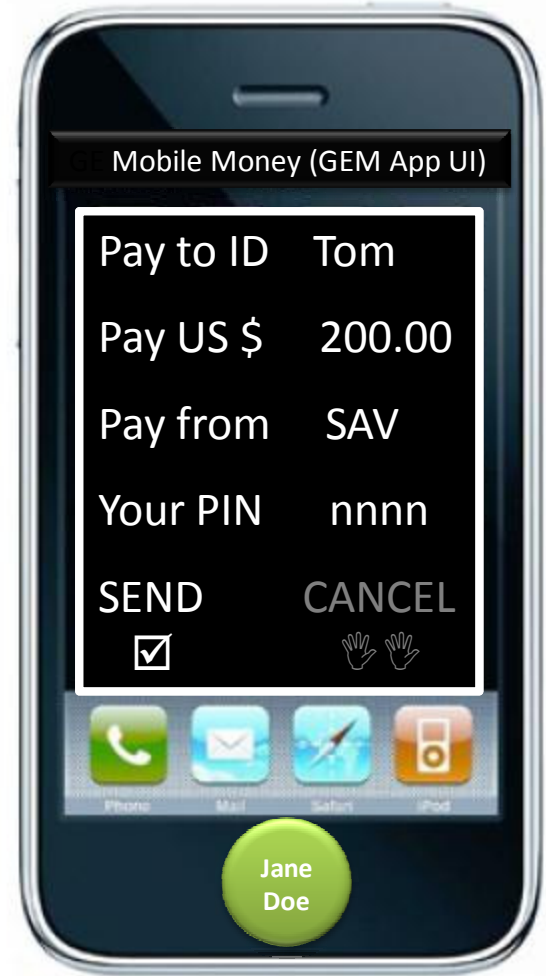
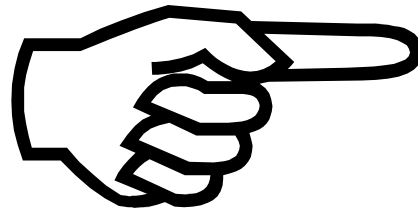
SaaS ECOSYSTEM

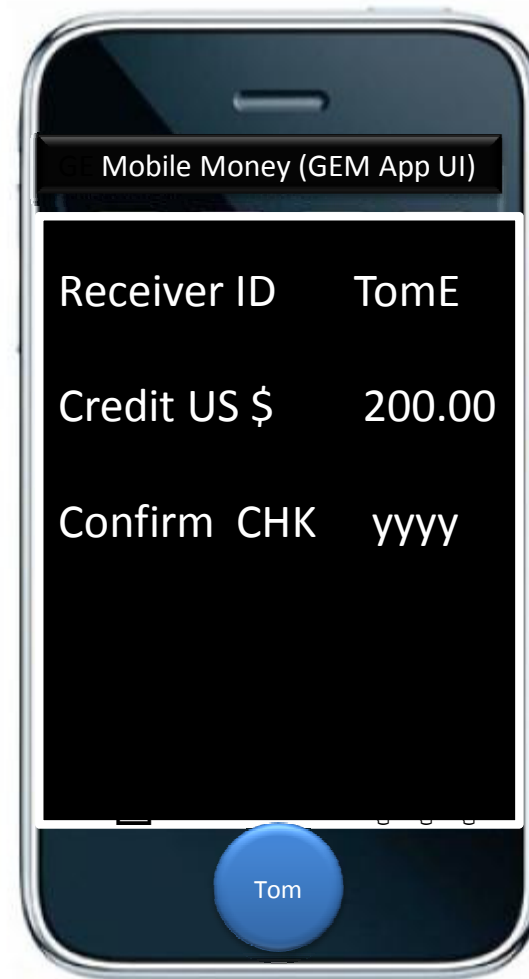
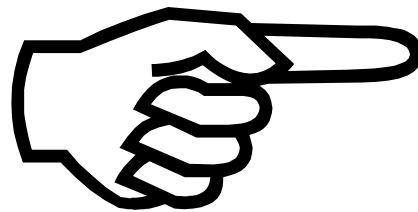
Anti-Vandalism
SAAS
SAFETY PIN
Security System

i2B











GEMM



Mobile Money



Go to GEMM

Register (Personal details, dbt / cdt cards, chk/sav/mma a/c)

Select PIN

Select SAFETY PIN

Create 1-Touch Frequent Pay To (eg Starbucks on Filmore)

Create Bill Pay, Transfers, Student Loans, Renewals, Charity

GEMM



MOBILE MONEY

- No need for cards
- Mobile Phone SaaS
- Secured by SAFETY PIN



SAFETY PIN

HOW IT WORKS



You are in Starbucks

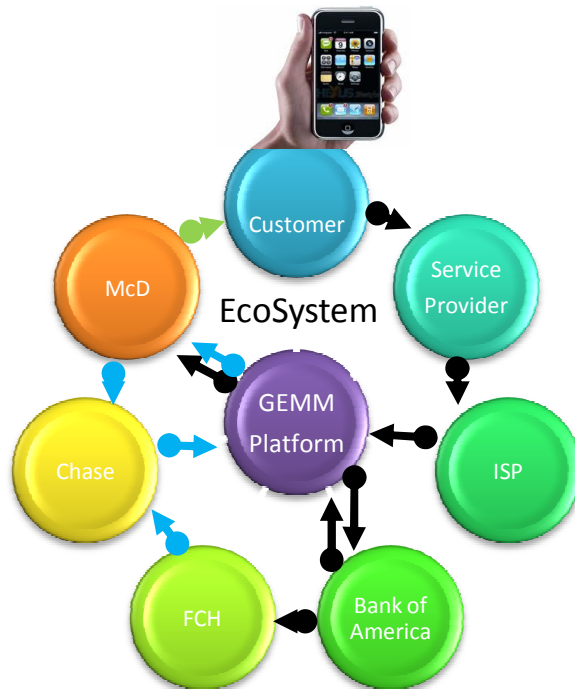
Ruffian approaches you and sticks a knife on your ribs

Gives you his id and demands you to transfer \$1,000 to his bank

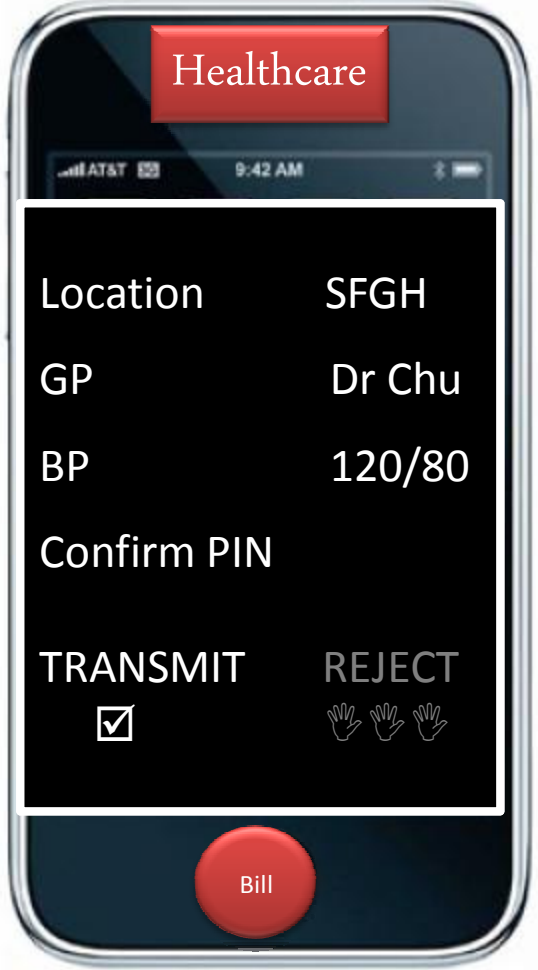
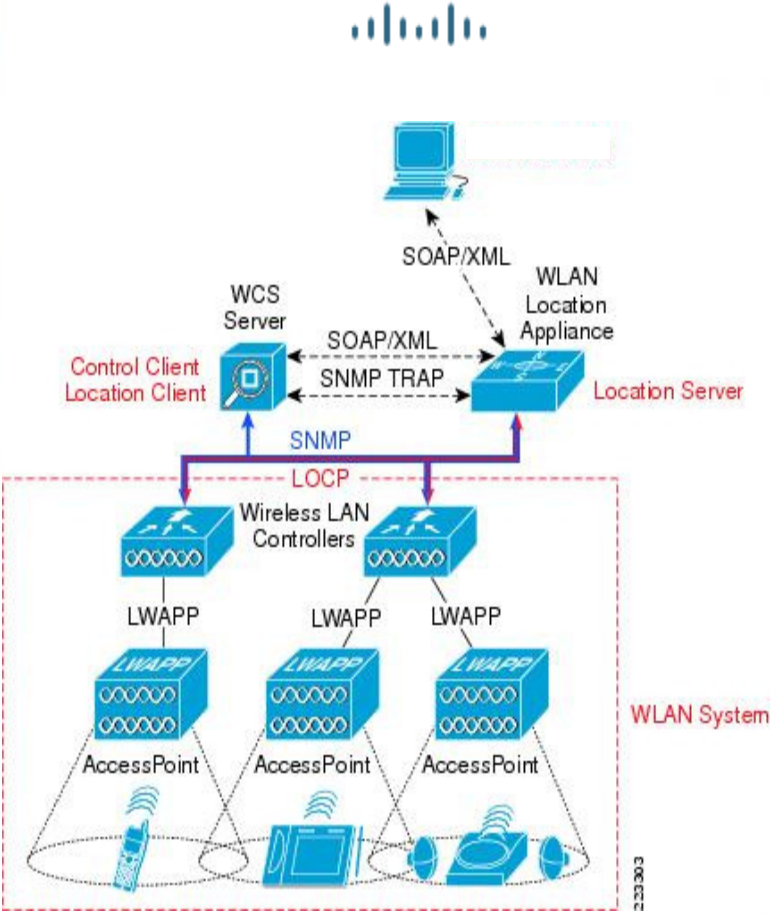
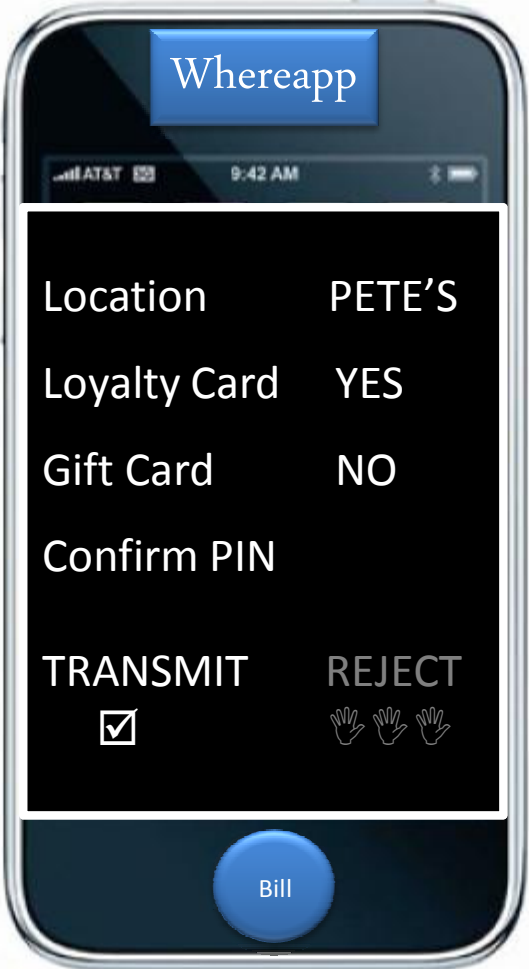
You comply but use your SAFETY PIN to transact (triggering GPS and camera)

Funds are actually transmitted and Gangman receives his account credit confirmation

SAFETY PIN alerts POLICE, BANK, STORE, EMERGENCY CONTACT (incident and location)

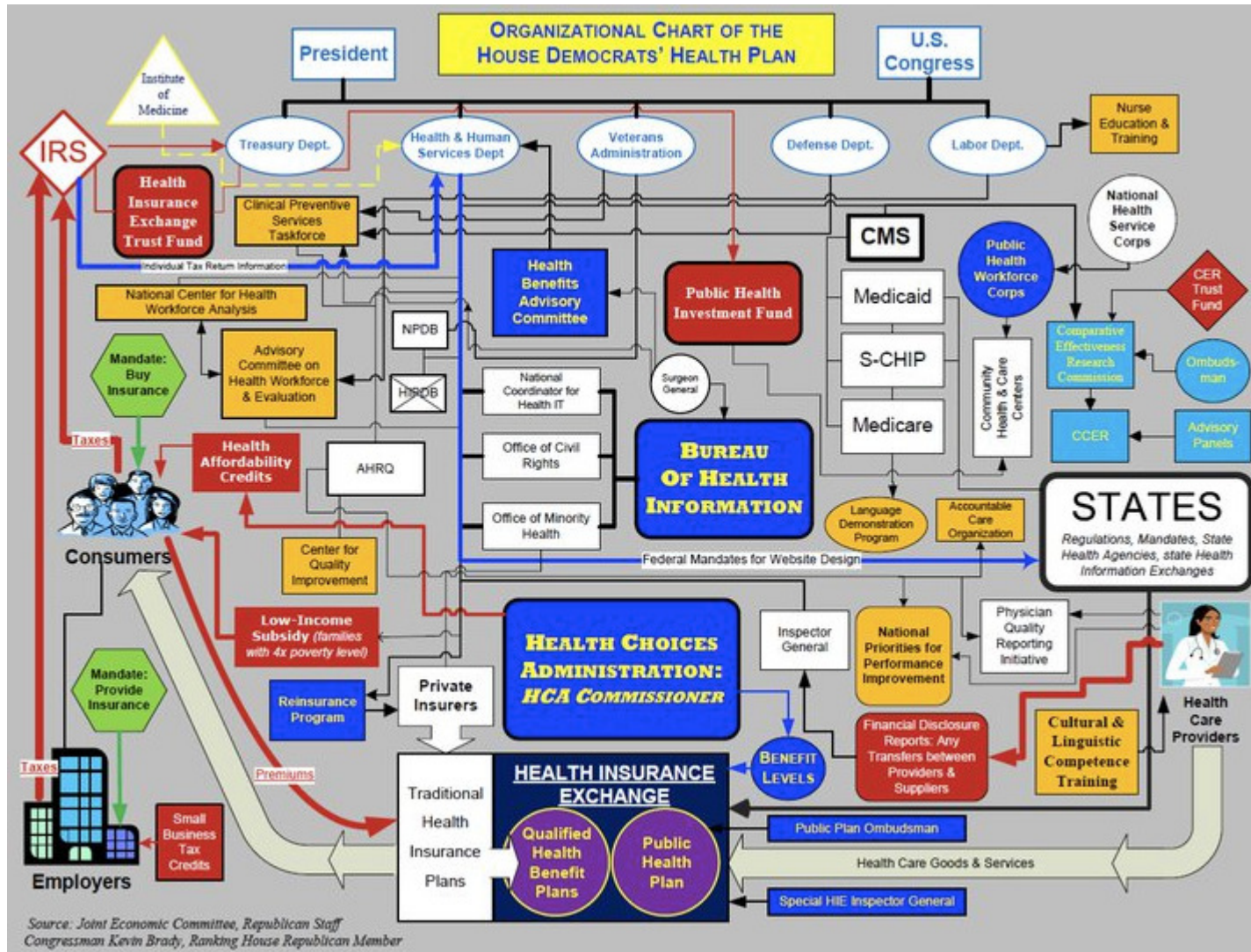


Store loyalty card out of the wallet and in your location aware mobile phone with unique IPv6 id



Location Aware Healthcare

US Healthcare Expenditure approaching ~\$3 trillion
 approaching ~20% GDP



How ??

Physical Supply Chain

Service Supply Chain

Vertically Integrated Healthcare VIHS

AFPOC Healthcare Services for US at 1% fixed profit-over-cost is about \$30 billion

GE Profit

Percent Total Segment Profit

	2001	2002	2003
Advanced Materials	7.59	5.41	3.10
Commercial Finance	15.26	17.89	19.67
Consumer Finance	8.49	9.73	10.87
Consumer & Industrial	4.74	3.07	2.90
Energy	25.95	34.03	20.67
Equipment & Other Services	-1.18	-2.10	-2.11
Healthcare	7.94	8.36	8.56
Infrastructure	0.14	1.61	2.32
Insurance	9.96	-0.51	10.57
NBC	7.46	8.96	10.05
Transportation	13.66	13.57	13.39

Market Cap of Software Services (2001-2011)

2001

2008

2011

2001	Name	HQ	Industry	Market Cap USD million	2008 [3]	Name	HQ	Industry	Market Cap USD m	2011 [1]	
1	GE	US	Various	477,406	1	Exxon Mobil	US	Oil and gas	403,366	1	Exxon Mobil 417,166.7
2	Cisco	US	Network	304,699	2	Petrochina	China	Oil and gas	325,320	2	PetroChina 326,199.2
3	Exxon Mobil	US	Oil & Gas	286,367	3	GE	US	Various	253,674	3	Apple Inc. 321,072.1
4	Pfizer	US	Pharma	263,996	4	Microsoft	US	Software	243,687	4	Industrial and Commercial Bank of China 251,078.1
5	Microsoft	US	Software	258,436	5	Wal-Mart	US	Retail	235,605	5	Petrobras 247,417.6
6	Wal-Mart	US	Retail	250,955	6	P&G	US	Retail	211,460	6	BHP Billiton 247,079.5
7	Citigroup	US	Banking	250,143	7	Industrial Commercial Bank of China	China	Banking	208,397	7	China Construction Bank 232,608.6
8	Vodafone	UK	Telco	227,175	8	Berkshire Hathaway	US	Insurance	202,901	8	Royal Dutch Shell 226,128.7
9	Intel	US	Computer	227,048	9	China Mobile	China	Telco	198,558	9	Chevron Corporation 215,780.6
10	Royal Dutch Shell	NL/UK	Oil & Gas	206,340	10	J & J	US	Health care	193,602	10	Microsoft 213,336.4