

cs598c: Technologies for the Developing World

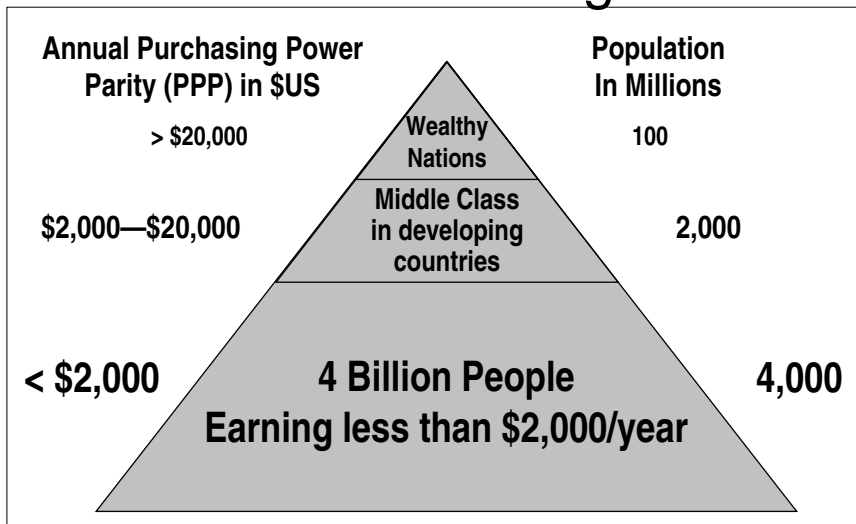
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Spring 2005

Outline

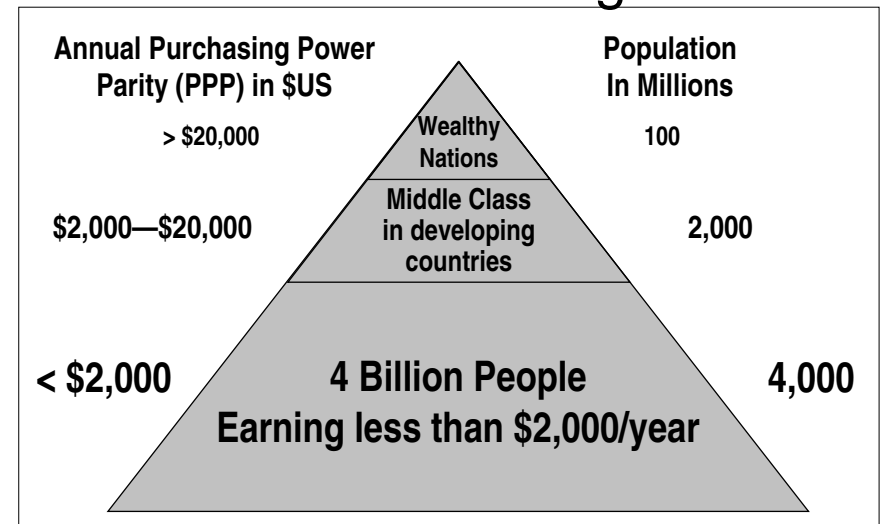
- Introduction
- Course focus and topics
- Logistics

Whom are we talking about?



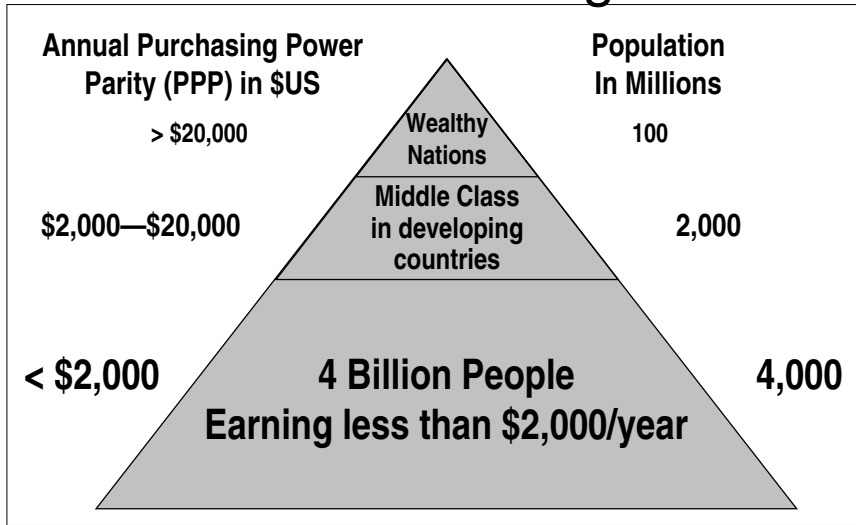
Source: Prahalad & Hammond, Harvard Business Review, Vol. 80, Issue 9 (Sep. 2002), pp48-58

Whom are we talking about?



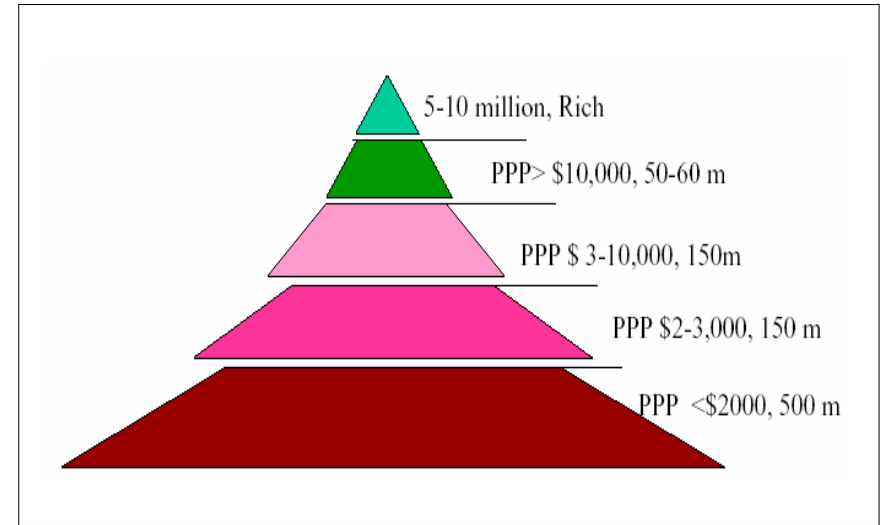
- Bottom tier expected to grow to 6 billion in the next 40 years

Whom are we talking about?



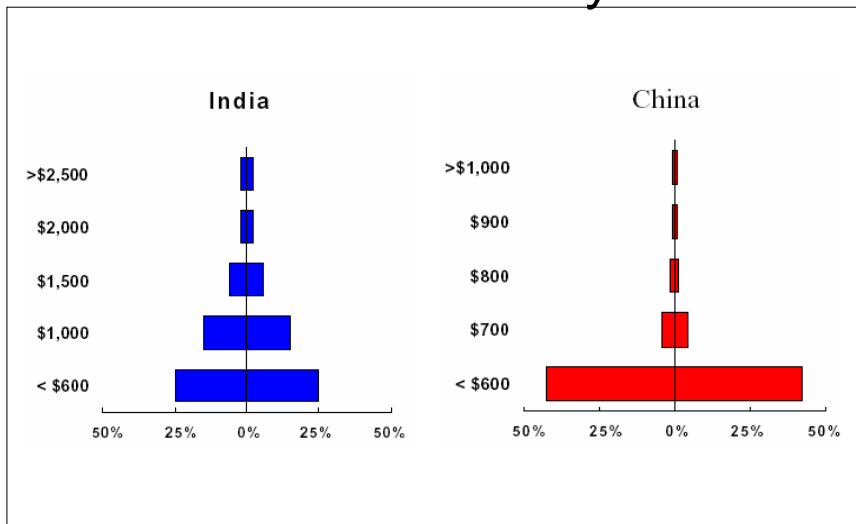
- 1 billion lives on < \$1 per day

India



Source: <http://www.wri.org/meb/wrisummit/pdfs/hart.pdf>

Not the same everywhere



Source: <http://www.wri.org/meb/wrisummit/pdfs/hart.pdf>

Why do people work on this?



Technology, Entertainment, Design (TED) Conference, March, 2003, Monterey, California

- It's a good cause: "What should I do with my life?"
- It's a challenge: takes ingenuity
- Entrepreneurial: there's money to be made

Why do people work on this?

- It's a good cause: "What should I do with my life?"
 - Amdahl's Law: $OverallSpeedup = \frac{1}{(1-f) + \frac{f}{s}}$
 - Need to pick components that consume big f
 - What to work on? $f = 2/3$ or $f = 1/60$?

Why do people work on this?

- It's a good cause: "What should I do with my life?"
- It's a challenge: need innovations
 - Myth: all about transplanting/replicating cheap, low-tech, old solutions
 - Consider the US: 4% of world's population, consumes 25% of the planet's energy, try replicating that
 - Requires intellect, innovations, new technologies
 - "Reverse technology transfer" back to the 1st world

Why do people work on this?

- It's a good cause: "What should I do with my life?"
- It's a challenge: need innovations
- Entrepreneurial: there's money to be made
 - Myth: strictly humanitarian causes, no customer, no profit, no viable business
 - Aid not sustainable, need to be investment, need sustainable business
 - The poor accounts for 40%-60% of all economic activity: a viable market
 - It's about empowerment, creating opportunities and wealth for all

It's expensive to be poor (Mumbai, India)

	Dharavi (shantytown)	Warden Road (affluent)	Ratio
Credit (APR)	600-1000%	12-18%	60-75x
Water (100 gal)	\$0.43	\$0.011	37x
Phone (cents/min)	4-5	2.5	2x
Diarrhea Meds	\$20	\$2	10x
Rice (\$/kg)	\$0.28	\$0.24	1.2x

Source: http://pdf.wri.org/whatworks_serving_profitably.pdf

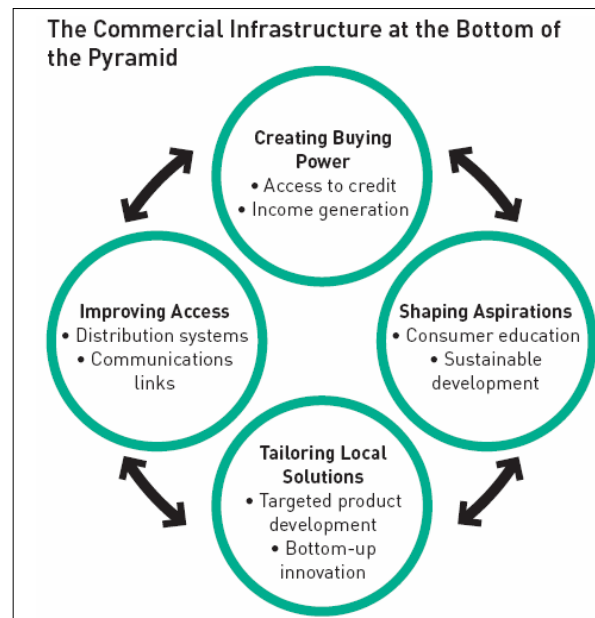
The poor has purchasing power (Mumbai, India)

	Dharavi (shantytown)
Television set	85%
Pressure cooker, mixer	75%
Gas stove	60%
Telephones	21%

- May seem counter-intuitive, but...
- They use limited resources in ways that reflect their reality

Source: http://pdf.wri.org/whatworks_serving_profitably.pdf

How?

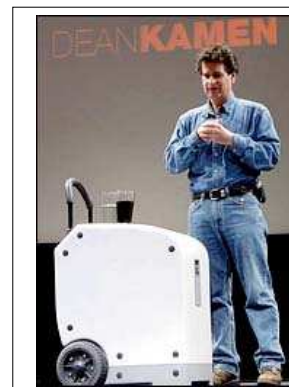


- ICT (Information Communication Technologies) can help in each of these aspects
- Each of these aspects needs to be kept in mind when developing ICT solutions

How?

- Creating buying power
 - Micro-finance
 - Startup packages for ICT franchises
- Shaping aspirations
 - Roles of “disruptive” technologies
- Improving access
 - Improve roads, distribution systems, communication
 - Information poverty: single biggest roadblock
 - Goal: create single inter-connected market
- Tailoring local solutions
 - Understand local strengths, exploit local capabilities
 - Adapt (instead of replicating) western systems

To be successful, need all three...



Technology, Entertainment, Design (TED) Conference, March, 2003, Monterey, California

- Dedication to the “global good”
- Ingenuity and innovation
- Business discipline: sustainable results

Why talk about this in a university?

- Solve real-world problems that can change people's lives
- Hard problems that can use the best minds
- “Reverse transfer” of technologies back to the 1st world

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What to focus on?



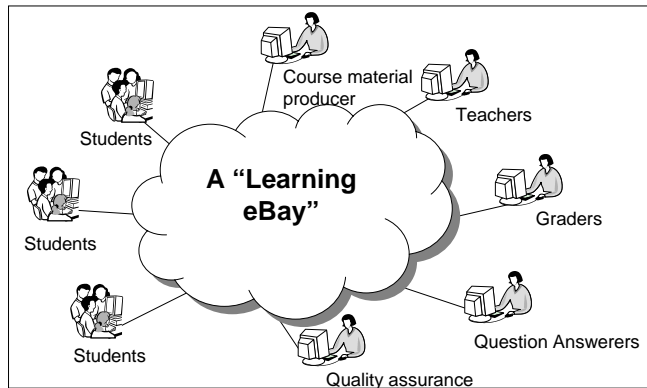
- Peter Bell (president of CARE):
 - Three top priorities of combating extreme poverty...

What to focus on?



- Peter Bell (president of CARE):
 - Three top priorities of combating extreme poverty...
 - Basic education, clean water, fighting AIDs

A “Learning eBay”



- Allows distributed participants to “plug themselves in”
- Matches supply and demand
- Service offerers: both volunteers and professionals
- Encourages specialization, fosters efficiency
- Flexible time and location commitments by participants

Focus of this class...

- How to provide connectivity (basic enabling technology)
- Delivery of basic education
- Selected other applications enabled by connectivity

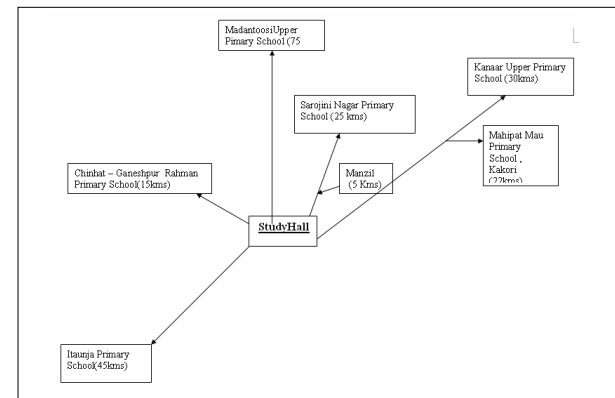
- Little 10K ft view/hand-waving
- Specifics-oriented

Focus of this class...



- Project-oriented, (concrete and specific) idea-oriented
- Possible collaboration in our ongoing effort
- Summer deployment in India (collaborative effort with local education expert)
- Aim for tangible and long term results

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Topics (tentative)

- Introduction
- Background
 - Connectivity options
 - Organizational structures for ICT deployment
 - Example uses and applications
- Turning the postal system into a generic digital network
 - Delay tolerant networks (DTNs)

Topics (2)

- Delivering basic education
 - India school (test bed) background
 - Summer goals
 - The “education eBay”
 - Relationship with learning science
- Present prototype (Sumeet Sobti)
 - Demonstration
 - Internals
 - Next steps
 - Other project ideas

Topics (3)

- Student projects
 - Peer-to-peer mobile storage (Summet Sobti)
 - Village eBay (Archer Batcheller)
 - A Postmanet prototype and analysis of its routing algorithms (Nitin Garg)
- Video of Peter Bell’s talk at Princeton
- Class projects

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Logistics

- Meet
 - Once per week (change time?)
 - Possibly individual meetings on projects
- Grade
 - If you're taking it for grade, grade based on projects
 - Auditing welcome
- Web site