

Gender and Technology

Advancement of Women in Rural India

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Presentation at:



September 29, 2010

You can tell the condition of a nation by looking at the status of its women.

- Jawaharlal Nehru, First Prime Minister of India

Gender equality is more than a goal in itself. It is a precondition for meeting the challenge of reducing poverty, promoting sustainable development and building good governance.

- Former U.N. Secretary General Kofi Annan

Agenda

- Technology and gender differences: Lessons from research in developed countries in MIS
- The big picture: Some challenges in rural India
- MDG: Overall and related to women
- Reporting on one Internet kiosk project in India



July 15 Headlines in...

THE HINDU

IT parks to be completed by September

... Both new IT parks are estimated to cost approximately Rs. 16 crores each.

Poverty more in India than sub-Saharan Africa

New U.N. index builds up fuller picture of poor lives; Madhya Pradesh 'comparable to Congo.' There are more poor people in eight states of India than in the 26 countries of sub-Saharan Africa, a study reveals today.

More than 410 million people live in poverty in the Indian States, including Bihar, Uttar Pradesh and West Bengal, researchers at Oxford University, England, found. The "intensity" of the poverty in parts of India is equal to, if not worse than, that in Africa.

Some Challenges Related to Women in Rural India

- Many jobs held by women have been displaced by technology, especially heavy machinery (now operated by men)
- High infant, child and maternal mortality rates
 - Reasons: illiteracy, lack of knowledge, lack of medical care
- Urban-rural divide inflates macro-level statistics to look better than they really are
 - Urban areas are well-developed and the rich can get medical care comparable to the developed world



MDGs Adopted in 2000

Targets Revised in 2010



A Gateway to the UN System's Work on the MDGs

Goal 4: Reduce child mortality

Target 4.A: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate

4.1 Under-five mortality rate

4.2 Infant mortality rate

4.3 Proportion of 1 year-old children immunised against measles

Goal 5: Improve maternal health

Target 5.A: Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio

5.1 Maternal mortality ratio

5.2 Proportion of births attended by skilled health personnel

Target 5.B: Achieve, by 2015, universal access to reproductive health 5.3 Contraceptive prevalence rate

5.4 Adolescent birth rate

5.5 Antenatal care coverage (at least one visit and at least four visits)

5.6 Unmet need for family planning

G@ID: Using information technology to reach MDGs by 2015

By Eryn Bailey

 ShareThis

3 September 2010 [MediaGlobal]:

The United Nations Department of Economic and Social Affairs (UN DESA) convened from 1-2 September 2010, to discuss G@ID, the role of Global Alliance of Information Communication and Technology (ICT) and Development in accomplishing the Millennium Development Goals (MDGs) by 2015.

With five years left to reach the eight goals agreed upon by UN Member States in 2000, G@ID offers a new approach to actualizing these global objectives in a timely manner.



Secretary-General Meets Chair of UN-GAID. (Photo Credit: UN Photo/Eskinder Debebe)

Secretary-General Ban Ki-moon approved the work of G@ID to create a web program for use on the MDGs in September of 2006. Ki-moon is now the Honorary Chair of G@ID, helping to advance an agenda that will bring aid relief into the digital age.

The chair, Talal Abu-Ghazaleh, met with delegates from across the information and technology (ICT) sector to discuss the use of a web interface, the Matrix, which could help to achieve the MDGs via an interactive exchange of ideas on project management in various regions of the world.

Technology Initiatives in India

- Kiosks, cell phones, portals, etc. etc.
- At least 150 known Internet kiosk projects existed around 2004
- Many funding agencies: UN, Microsoft, IBM, Cisco, State Bank of India, etc.
- Success rate: 15% approx
 - Empirical evidence limited
- Drivers of success: Little is known

Project



Initiative:
800 villages in India

Research project:
10 of those villages
+
10 adjacent villages

Intervention

- PC-based kiosk
- 1 Internet kiosk for every 100 families
- Staffed 16 hours a day, 365 days a year
 - Staffed by volunteers
 - No microeconomy related to kiosks



Broad Objectives

- Fair pricing of agricultural commodities
 - Reduce abuse of farmers and tradespersons
- Education
 - Basic literacy, farming practices
- Weather
 - Timely weather information
- Health care
 - Infant mortality, preventive health measures, population control

What Data Did We (Are We) Collect(ing)?

Village chars (survey)	Individual/ household (survey)	Behavior (system logs)	Outcomes (archival)
<ul style="list-style-type: none">•Location•Crops grown•Demographic profile•Governance modes	<ul style="list-style-type: none">•Demographics•Personality (e.g., Big-5)•Culture variables•Social networks (advice, friendship, hindrance) from men, women and children	<ul style="list-style-type: none">•Use data—direct and proxy	<ul style="list-style-type: none">•Income•Crop information and agri-production (target and neighboring villages)•Health-related variables

Mortality Rates*

Year	Control group (10 villages)	Intervention group (10 villages)
2002	73.1	73.5
2003	70.3	70.8
2004 (intervention)	68.4	68.5
2005	66.2	65.1
2006	64.1	61.8
2007	61.8	56.4
2008	59.4	52.2
2009	57.3	49.1

* Coded as an index of infant, child and maternal mortality per 1000 live births (still-born data accuracy was low, thus excluded)

Kiosk Use by Women

Year	% of men using kiosks	% of women using kiosks
2004 (intervention)	19.5	4.8
2005	24.5	5.5
2006	28.2	6.9
2007	26.9	7.5
2008	28.1	8.2
2009	28.4	8.8

Model

Level-1

Lead user

+

Friendship Network
(Eigenvector centrality)

+

Medical care
(visits)

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Mortality

Level-0

Predicting Medical Care: Level 0

	1	2	3	4	5
R ²	.24	.29	.34	.35	.43
ΔR ² (see note 2)		.05***	.10***	.10***	.08***
<i>Control variables:</i>					
Age	.17***	.15**	.13**	.13**	.13**
Marital status	-.12**	-.11**	-.08	-.08	-.08
Family size	-.03	-.02	-.02	-.02	-.02
# of children	.07	.05	.03	.03	.03
Education level	.15***	.13**	.11**	.07	.07
Mortalities in family	.15***	.15***	.13**	.11**	.11**
Knowledge	.17***	.12**	.13**	.13**	.13**
Need (pregnancy)	.25***	.20***	.20***	.16***	.15***
<i>Social network constructs (strong ties):</i>					
Eigenvector centrality		.17***		.12**	.07
<i>Social network constructs (weak ties):</i>					
Eigenvector centrality			.26***	.20***	.04
<i>Social network constructs (strong ties X weak ties):</i>					
Eigenvector centrality					.33***

Predicting Medical Care: Multilevel

	1	2
R ²	.28	.48
ΔR ² (see note 2)		.20***
<i>Level-1</i>		
<i>Control variables:</i>		
Village population	-.05	-.03
Year	-.15***	-.12**
<i>Lead users:</i>		
% of lead weak-tie lead users		-.21***
<i>Level-0</i>		
<i>Control variables:</i>		
Age	.17***	.12**
Marital status	-.12**	-.07
Family size	-.03	-.02
# of children	.07	.03
Education level	.15***	.06
Mortalities in family	.15***	.11**
Knowledge	.17***	.13**
Need (pregnancy)	.25***	.14**
<i>Social network constructs (strong ties):</i>		
Eigenvector centrality		.06
<i>Social network constructs (weak ties):</i>		
Eigenvector centrality		.03
<i>Social network constructs (strong ties X weak ties):</i>		
Eigenvector centrality		.32***

What Does the Interaction Mean?

		Strong ties	
		Few (low)	Many (high)
Weak ties	Few (low)	Worst	Bad
	Many (high)	Best	Moderate



Predicting Mortality

	1	2
R ²	.23	.39
ΔR ² (see note 2)		.16***
<i>Control variables:</i>		
Age	.14**	.12**
Marital status	-.12**	-.11**
Family size	-.07	-.02
# of children	.05	.02
Education level	-.16***	.12**
Mortalities in family	.13**	.12**
Knowledge	-.16***	.14**
Need (pregnancy)	.28***	.23***
<i>Medical care</i>		
Medical care (visits)		-.40***

What Reduces Mortality Rates?

- As has been known for a while, medical care is crucial
- Strong ties are detrimental
- Weak ties are valuable
- Technology kiosks are helpful
- Lead users being more embedded via weak ties is helpful



Actionable Guidance

- Deploying technology kiosks and finding ways to support them is crucial
- Mechanisms to overcome negative effects of strong ties have always been and are crucial
- Fostering more weak ties is important and may be a solution to the “strong tie problem”
- Finding ways to have lead users with several weak ties could be vital

Technology and Gender Differences: Lessons Learned from Developed Countries

	Low on Demographic variables			High on Demographic variables		
	Women	Men	Significance of difference	Women	Men	Significance of difference
<i>Age</i>						
Attitude	✓✓✓	✓✓✓	X	✓	✓✓✓	✓✓✓
Social infl	✓	✓	X	✓✓✓	X	✓✓
Beh'l control	✓	✓	X	✓✓	X	✓
<i>Income</i>						
Attitude	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓
Social infl	✓✓✓	X	✓✓	✓✓✓	X	✓✓
Beh'l control	✓✓✓	X	✓✓	✓✓✓	X	✓✓
<i>Education</i>						
Attitude	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓
Social infl	✓✓✓	X	✓	✓✓	X	✓
Beh'l control	✓✓✓	X	✓	✓✓	X	✓
<i>Occupation</i>						
Attitude	✓✓✓	✓✓✓	✓✓	✓✓	✓✓✓	✓✓✓
Social infl	✓✓✓	X	✓✓	✓✓✓	X	✓
Beh'l control	✓✓	X	✓	✓✓✓	X	✓✓

Notes:

1. Attitude: extent of liking to use the tech; Social influence: extent of peer pressure to use the tech; Behavioral control: extent to which internal and external factors are in place to facilitate techn use.
2. Significance of difference represents the significance of the interaction term (e.g., A X GENDER), and was also confirmed by test of beta differences across independent samples using Chow's test.

Eigenvector Centrality

- **Eigenvector centrality** (Bonacich 1972) is defined as the principal eigenvector of the adjacency matrix defining the network. The defining equation of an eigenvector is

$$\lambda \mathbf{v} = \mathbf{A} \mathbf{v}$$

where \mathbf{A} is the adjacency matrix of the graph, λ is a constant (the eigenvalue), and \mathbf{v} is the eigenvector. The equation lends itself to the interpretation that a node that has a high eigenvector score is one that is adjacent to nodes that are themselves high scorers. UCINET calculates eigenvector centralities in a range of 0 to 1. We multiply this score by 100 to get a range from 0 to 100.

Study Design and Data Collection Challenges

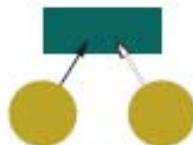
Things We Cannot/Could Not Control	What We Tried to Do
<ul style="list-style-type: none">➤ India is culturally diverse➤ Different crops grow in different parts of India➤ Monsoons in India vary from year to year➤ Different interviewers➤ Different trainers➤ Population growth in India	<ul style="list-style-type: none">✓ Measure cultural chars✓ Collect adjacent control group (village) data✓ Collect adjacent control group (village) data✓ Compare across interviewers✓ Compare across trainers✓ Nothing ☹️

Challenges Faced and Solutions

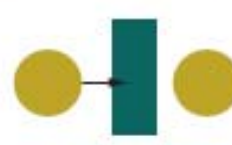
- Politics and bureaucracy
 - *Local “panchayat” buy-in*
- Literacy rate
 - *Conduct personal interviews*
- Language
 - *Training by Microsoft India employees*
 - *Surveys conducted by out-of-town “locals” (Lions Club volunteers)*
- Roster-based social network surveys are very long and time-consuming to collect
 - *Choose smaller villages*
 - *Incentives, conduct personal interviews*
- Maintaining a high response rate
 - *Incentives*
- Getting records from government archives
 - *Employ 8-20 people full-time year-round for the past 5 years*



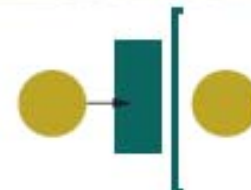
(a) Cooperative



(b) Dominated



(c) Intermediated



(d) Indirect

Figure 1. A continuum of intermediated information tasks: (a) students crowd around a Hole-In-the-Wall kiosk; (b) one user voluntarily defers to another while accessing a railway kiosk; (c) a staff member collects data from a microfinance client; (d) the same staff member makes a deposit at a local bank.

Another Indian cultural trait Hofstede notes is a high *power-distance* index. This indicates a “high level of inequality of power and wealth within the society.” This gap can exist between social groups, between the rich and the poor, between genders, and within the same social group or family. People in such societies sometimes also display a diminished tendency to question or contradict those they perceive to be in control. As a result

Economic factors

According to the CIA World Factbook (www.cia.gov/cia/publications/factbook/geos/in.html), India has a population of over 1 billion people, 25 percent of whom are living below the poverty line. Under these conditions, it’s neither advisable nor possible for every person to have a personal computing device. Except for the rich and the upper-middle class, people must share technology within a social

ated information tasks from observed usage scenarios in India. We categorized our taxonomy according to the intermediation level—the degree to which a secondary user has direct access to the computing device.

Cooperative

Cooperative interaction occurs when numerous users gather around a single device with equal (or near equal) access



Questions or Comments?

Thank You!

