United Villages
Mobile Commerce Interface

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Anonymous MIT student
Dev SenGupta
Needs assessment – Required info

- Needs
  - Preliminary User Survey (Prashant)

- Context
  - Social Context (Dev)
  - Technology (Michael)
  - Economics of Technology (Michael)
  - User behavior (Anastasios)

- UV Economics
  - Questions for UV (Dev)
Legacy: Orissa (Behampur)

Population

- 36.7 million (2001 Census)

Urban/Rural

- 87% of the population live in the villages
- In rural areas over 65% of the population have no access to safe drinking water

Education

- The average literacy rate in Orissa is 63.08% (2001)
- Male literacy rate is 75.95% and female literacy rate is 50.51% (2001)

Economy

- Size: $18 billion (2004 estimate)
Legacy: Orissa Case Study (2007)
Data extracted by 18 Kiosk locations:

3 Surveys conducted by UV

- 17 DakNet Service Providers (DSPs) – 22 Questions
  - Demographics
  - Customer Satisfaction
  - Service Quality
Purpose: Determine traits common to successful DSPs

- 43 Customers – 19 Questions
  - 7 villages
  - Focused on 2 villages with high percentage of users
Purpose: Determine if current services provide customers a Cheaper means of performing activities like shopping and job Hunting - Savings Matrix.

- 17 Prospective Customers – 15 Questions
  - 7 villages
Purpose: Gather additional data for the Savings Matrix and understand why they have not used DakNet services yet.
Legacy: Orissa Case Study (2007)
Data extracted by 18 Kiosk locations:

Results

- DSPs share a strong entrepreneurial spirit
  - 53% of Kiosks are co-located with Public Call Offices – one-stop-shop for communications needs
- DSPs are well-educated (majority have completed grad studies)
  - 90% believe UV training is adequate for e-shop, email, SMS
  - They indicate that more than 50% of customers do not need assistance to use the kiosks.
- Only 55% of DSPs claim that DakNet services “always work”
  (“offline” kiosk status most common complaint)
- 82% claim that DakNet services “work half the time” or “always work”
- DSPs claim that marketing is the most difficult challenge
- There was wide variation in customer activity (0% - 100%) per kiosk (not using an account within 60 days)
- UV personnel claims that DSPs’ commitment varied with regard to building their kiosks – initiative required
Legacy: Orissa Case Study (2007)
Data extracted by 18 Kiosk locations:

Results

- DSPs claim that lengthy transmission time is a common customer gripe.
- Farmers were cited as the customer demographic they were not reaching.
- Customers stated to DSPs the following future services:
  - Loans
  - E-governance
  - Agriculture queries
  - Shaadi marriage
- DakNet Bandhus (DBs) have proven very successful signing up on average 6 new customers each as reported by DSPs:
  - E-shop
  - Email
  - Job search
- DSPs claim that health services and drinking water community needs could be met by UV in the future.

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## Legacy: Orissa Case Study (2007)

Data extracted by 18 Kiosk locations:

### Results

- 59% of villages lack internet access
- Electricity is available 22 hours per day except on heavy rain periods
- 65% of villagers produce some form of handcraft

<table>
<thead>
<tr>
<th>Service</th>
<th>Time Savings (Hrs)</th>
<th>Savings vs. Alts. (Rupees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Shop</td>
<td>3.6 Hrs</td>
<td>40</td>
</tr>
<tr>
<td>Email</td>
<td>1.5 Hrs</td>
<td>23</td>
</tr>
<tr>
<td>Job Search</td>
<td>1.1 Hrs</td>
<td>14</td>
</tr>
<tr>
<td>Travel Booking</td>
<td>2.9 Hrs</td>
<td>14</td>
</tr>
<tr>
<td>Voicemail</td>
<td>0.05 Hrs</td>
<td>7</td>
</tr>
<tr>
<td>SMS</td>
<td>0.02 Hrs</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Courtesy of PlaneMad. Used with permission.

Savings Matrix

 Courtesy of United Villages. Used with permission.
Legacy: Orissa Case Study (2007)
Data extracted by 18 Kiosk locations:

Results
(av. monthly personal income per customer: 3,550rps= $74)

Current Substitution Cost Savings per Customer

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Cost Savings per Customer</th>
<th>Monthly Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total E-Shop</td>
<td>$1.00</td>
<td></td>
</tr>
<tr>
<td>Email</td>
<td>$0.30</td>
<td></td>
</tr>
<tr>
<td>Job Search</td>
<td>$0.91</td>
<td></td>
</tr>
<tr>
<td>Travel Bookings</td>
<td>$0.03</td>
<td></td>
</tr>
<tr>
<td>Voicemail</td>
<td>$0.01</td>
<td></td>
</tr>
<tr>
<td>SMS</td>
<td>$0.01</td>
<td></td>
</tr>
<tr>
<td>Substitution</td>
<td></td>
<td>$2.26</td>
</tr>
</tbody>
</table>

Courtesy of PlaneMad. Used with permission.
Legacy: Orissa Case Study (2007)
Data extracted by 18 Kiosk locations:

Results

Current Opportunity Cost Savings

<table>
<thead>
<tr>
<th>Activity</th>
<th>Current (Monthly)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Shop Time Savings per Customer</td>
<td>3.6 Hours</td>
</tr>
<tr>
<td>Email Time Savings per Customer</td>
<td>0.8 Hours</td>
</tr>
<tr>
<td>Job Search Time Savings per Customer</td>
<td>1.8 Hours</td>
</tr>
<tr>
<td>Travel Bookings Time Savings per Customer</td>
<td>0.2 Hours</td>
</tr>
<tr>
<td>Voicemail Time Savings per Customer</td>
<td>0.002 Hours</td>
</tr>
<tr>
<td>SMS Time Savings per Customer</td>
<td>0.02 Hours</td>
</tr>
<tr>
<td>Total Time Savings per Customer</td>
<td>6.38 Hours</td>
</tr>
<tr>
<td>Average Monthly Income per Customer</td>
<td>$60</td>
</tr>
<tr>
<td>Average Hourly Income per Customer</td>
<td>$0.34</td>
</tr>
</tbody>
</table>

Opportunity Cost Savings per Customer per Month* $2.19
Current Focus: Rajasthan - Jaipur

Population
- 56.5 million (2001 Census)

Urban/Rural
- 78% Rural

Education
- Literacy: 61.03%

Economy
- Size: $11.5 billion (2003). Growth: 6% Ten-year CAGR
- Mix: Services (45%), Manufacturing (32.5%) & Agriculture (22.5%)
Technological Context

- Mobile DSPs have their own cell phones
  - Next week we will receive more info on the models
  - DPS have their own mobile plans
- Conflicting information regarding signal strength
  - CTO: Many villages have poor cell reception
  - CEO: Partnering with TATA Mobile to use their data plan
- 20/200 DSPs have computers
- J2ME Applications
  - CEO believes it will not be hard to install applications
- SMS + cue sheet was piloted but proved unpopular
  - CEO: Maybe not pushed hard enough vs. voice
  - Need more info
Possible Solutions

- J2ME apps that includes catalog
- SMS + Catalog
- Internet Portal (WAP)
- Interactive voice response (IVR)
- Voice operator and Call Center
J2ME Application

Pros:
- Rich user experience
  - Graphics: pictures of products
- Local error handling
- Catalog on phone?

Cons:
- Requires more advanced phone
- Development and portability issues
- Installing application requires Internet connection or computer + cable (or Bluetooth)
- Updating application requires reinstall
- Acclimation time for new modality
- Cost?
  - May require multiple SMS messages
SMS + Paper Catalog

Pros:
- Lowest common denominator technology
- Existing Modality
  - Tried but failed, why?

Cons:
- Cost:
- Catalogue required:
- Catalog has SMS format, instructions, and products
- Non-local error handling
- Multiple SMS messages
- Not guaranteed delivery
- Must acknowledge everything
Internet Portal (WAP)

Pros:
- Centralized solution
- Easy to update application and catalog
- Probably the future of mobile commerce
- Rich user experience
- Personalization of content

Cons:
- Requires data coverage and data plan
- Expensive for users
Interactive Voice Response

Pros:
- Targets illiterate
- Works with any phone
- Does not require human operators

Cons:
- Development difficult
  - Language issues
  - IVR system difficult to program and maintain
- Requires voice signal strength
- New modality?
  - Requires adaptation
  - History of annoying developed-world users
Voice Operators and Call Center

Pros:
- Targets illiterate
- Works with any phone
- DSPs are accustomed to speaking with UV
- Easy to convey additional information
- Allows for personalized interaction
- Might attract more users
- Error detection and correction done with operator

Cons:
- Have to pay for operators
- Might still require a paper catalog
- Requires voice signal strength
- Cost?
- Possibility of busy signal
A Recent (Unpublished) Study*

- **Goal:** Compare data entry error rates and costs for
  - J2ME Forms Application
  - SMS + cue sheet
  - Voice operator
- **Location:** Gujarat, India
- **Participants:** 13 healthworkers
  - 7 owned cell phones
  - All but 2 had used cell phones in the past
  - Education level ranged from 10 years to BA
- **Participants were trained on each modality**

* Thies et al., Evaluating the Accuracy of Data Collection on Mobile Phones: A Study of Forms, SMS, and Voice.
Results of Study: Error Rate

- Task required 11 fields to be completed
- Error rates (per field) across everyone:
  - J2ME: 4.2%
  - SMS + cue sheet: 4.5%
  - Voice Operator: 0.45%
- Error rates (per field) across phone owners:
  - J2ME: 2.6%
  - SMS + cue sheet: 3.3%
  - Voice Operator: 0%
- Average interaction time:
  - J2ME: 1:39
  - SMS + cue sheet: 1:37
  - Voice: 2:20
Technological Context

- Cell phone subscribers:
  - Orissa: 6.1 Million (1.1 Million CDMA)
  - Rajasthan: 16.4 Million (4.2 Million CDMA)

- Olufemi Omojola, CTO UV:
  - Many villages don’t have a strong enough signal to support voice (Olufemi Omojola, CTO UV)
  - Not many villagers have cell phones
  - Most village stores did not have computers but did have cells
  - J2ME apps do exist and infrastructure exists for apps on phone
    - Stores with computer and cables for phone
Technological Context

- Cell phone penetration among villagers in target villages?
- Are shared phones popular?
  - If so, who is providing the phones?
- Cell phone reception in target villages?
- What is the popularity of each of these modalities?
  - SMS
  - J2ME applications
  - Voice
  - Internet / WAP
Cost of Technologies

- How much is a cheap phone?
  - J2ME capable?

- What is the cost of the following services?
  - SMS
  - Voice
  - Internet
Cost Considerations

- In Gujarat costs are the following:
  - 3 RS per 3 minute phone call
  - 1.5 RS per SMS
- Voice operator solution has seemingly largest cost
  - Operators
  - Cost for call
- But could the Operator model attract the most users
  - Illiterate users
  - Existing and comforting modality to speak with a person
  - Users with basic phones (don't support J2ME)
  - SMS could require many messages (J2ME and SMS)
    - Acknowledgement messages
    - Order multiple products
    - Error correction
Need Assessment Questions

General Demographics
- Age
- Male/Female?
- Education Level
- Type of work
- Family size

Buying Pattern
- Daily/weekly Needs – small items (food items, music, movies etc.)
- Monthly Needs – bulk/large/infrequent items (fertilizer, clothes, etc.)
- Money spent on UV related services (daily, weekly, monthly)

Financial Capacity
- Daily/Monthly income

Technical Capabilities
- Own a phone?
  - If so, how much did you pay for it?
  - Do you plan to buy a new phone soon?
    - If so, why?
    - More features?
- Type of Phone
  - GSM or CDMA? (Who is your carrier?)
  - Does the phone support any of the following:
    - Java applications
    - Internet access

- Are you able to send and receive SMSs from your dwelling?
- Are you able to make a voice call from your dwelling?
- Do you share your phone with others?
  - If so, who?
  - Do you charge them to use your phone?
- Have you ever used an automated SMS service?
  - If so, did you find it easy to use?
- Have you ever used a java phone application?
  - If so, how was it installed?
    - Internet connection
    - Store with cable
- Have you ever used an interactive phone menu system?
  - If so, did you find it easy to use and were you satisfied?
- Does your phone have Internet capabilities?
  - If so, have you used them?
  - Do you have a data plan?
  - Are you able to surf pages from your dwelling?

• Response to legacy system
  Do you like to interact with Bandhus? (if not why? If yes why?)
  - Do you like the catalogs?
  - What specific items do you order (daily, weekly, monthly)?
  - How satisfied are you with existing service (scale of unhappy to very satisfied)?
  - Any problems faced – explain below?
    - Money transaction errors
    - Delivery delays
    - Erroneous deliveries
    - Other...
  - What changes would you like to see?