Indigenous Knowledge Governance System: A holistic model for indigenous knowledge management.

ELOKA Workshop

Data Management and Local Knowledge: Building a Network to Support Community-Based Research and Monitoring

Tariq Zaman\textsuperscript{1}, Alvin Yeo Wee\textsuperscript{1} and Narayanan Kulathuramaiyer\textsuperscript{2}

\textsuperscript{1}Institute of Social Informatics and Technological Innovations-
Center of Excellence for Rural Informatics (ISITI-CoERI)

\textsuperscript{2}Faculty of Computer Sciences and Information Technology.
Universiti Malaysia Sarawak (UNIMAS)
Background

The Projects and communities were we work
eBario project and Replication

• A National Pilot Project on Bridging the Digital Divide in East Malaysia
• Multi-Disciplinary Research
• Community Service + Faculty Research
• National and International Research Grants
• Local and Foreign Collaborators/Partners
• 2007, Replication of same concept in four more sites.
# eBario Replication Model - Community Engagement and Implementation

<table>
<thead>
<tr>
<th></th>
<th>eBario</th>
<th>eLamai</th>
<th>eBuayan</th>
<th>eBa’Kelalan</th>
<th>eLarapan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethnic Groups</strong></td>
<td>Kelabits</td>
<td>Penans</td>
<td>Dusun</td>
<td>Lun Bawang</td>
<td>Bajau</td>
</tr>
<tr>
<td><strong>Languages</strong></td>
<td>Kelabit</td>
<td>Penan</td>
<td>Dusun</td>
<td>Lun Bawang</td>
<td>Bajau</td>
</tr>
<tr>
<td><strong>Governance Structure</strong></td>
<td>Through representative</td>
<td>Consensus</td>
<td>Through representative</td>
<td>Through representative</td>
<td>Authoritarian</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td>Christianity</td>
<td>Christianity</td>
<td>Christianity</td>
<td>Christianity</td>
<td>Islam</td>
</tr>
<tr>
<td><strong>Technologies</strong></td>
<td>Solar</td>
<td>Solar and Hydro</td>
<td>Micro Hydro</td>
<td>Solar</td>
<td>Solar</td>
</tr>
<tr>
<td><strong>Partnerships</strong></td>
<td>M’asia Gov, CoERI, Community</td>
<td>M’asia Gov, Japan Gov, CoERI, Community</td>
<td>M’asia Gov, Japan Gov, CoERI, Community</td>
<td>M’asia Gov, Japan Gov, CoERI, Community</td>
<td>M’asia Gov, Japan Gov, CoERI, Community</td>
</tr>
<tr>
<td><strong>Access</strong></td>
<td>By Air</td>
<td>By Air and then by Boat</td>
<td>By Air, By Road and then By foot</td>
<td>By Air</td>
<td>By Air, By Road and then By Boat</td>
</tr>
</tbody>
</table>
Research Methodology

System Analysis (IKM Factors Finding)
- Exploring IKM Mapping Methodology

Framework Modeling and Validating
- IK Governance Framework.
- Designing Experiment for validating the framework
Motivation.

- **Indigenous Knowledge (IK)** as resource for global solutions (The World Bank, 2004).
- Western world are exploring **digitisation as a means of preservation** and/or improving access and knowledge of their collections (Agrawal, 2002).
- Use of ICTs for indigenous cultural preservation and revitalization can lead to **several challenges** (Oppenneer, 2011).
- For scientific community and organisations IK management is management of corpus of facts rather than management of and by a living system (Zaman et al. 2010).
- The importance of the **social and cultural frameworks** in which this knowledge is rooted is somehow less well established (Fulvio Mazzocchi, 2008).
- For indigenous communities, knowledge represents a critical resource that needs to be focused towards **specific processes and governance activities** so it is necessary for ICT researchers to **develop more holistic approach** for designing indigenous knowledge management system.
Issues

• Open Data Movement:
  – Who will suffer - issue of Privacy.
  – Who can take benefit - Effective use needs expertise.
  – Open data will leads towards Data Divide.

• Epistemological problem of definitions
Indigenous Knowledge Management

IKM as Living System not just Corpus of Facts.
Indigenous Knowledge Management is a living model that describes the processes of adaptation, creation, accumulation and utilization of community’s collective or individual’s IK (based on Berkes 1999: 8 & Mearnsa, and du Toit, 2008).
<table>
<thead>
<tr>
<th>No.</th>
<th>Variable.</th>
<th>Modal Value</th>
<th>Strong / Moderate/Weak</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Participate in strategic networks and partnerships.</td>
<td>3</td>
<td>Strong</td>
</tr>
<tr>
<td>2</td>
<td>Have recognition to individual and collective knowledge.</td>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>3</td>
<td>Have well established practices of stakeholders' involvement in decision making.</td>
<td>1</td>
<td>Weak</td>
</tr>
<tr>
<td>4</td>
<td>Collaborate with other communities and government for development.</td>
<td>1</td>
<td>Weak</td>
</tr>
<tr>
<td>5</td>
<td>Have mechanism for sharing knowledge.</td>
<td>1</td>
<td>Weak</td>
</tr>
<tr>
<td>6</td>
<td>Protection of knowledge assets.</td>
<td>1</td>
<td>Weak</td>
</tr>
<tr>
<td>7</td>
<td>Acceptance to new technologies</td>
<td>3</td>
<td>Strong</td>
</tr>
<tr>
<td>8</td>
<td>Have recognition of knowledgebase as asset</td>
<td>3</td>
<td>Strong</td>
</tr>
<tr>
<td>9</td>
<td>Community supports new technologies.</td>
<td>3</td>
<td>Strong</td>
</tr>
<tr>
<td>10</td>
<td>Community Promotes team building and group activities for mutual learning.</td>
<td>3</td>
<td>Strong</td>
</tr>
<tr>
<td>11</td>
<td>Acknowledgment to individual contributions.</td>
<td>1</td>
<td>Weak</td>
</tr>
<tr>
<td>12</td>
<td>Have ability to outsource skills and expertise.</td>
<td>1</td>
<td>Weak</td>
</tr>
<tr>
<td>13</td>
<td>Community recognition of required knowledge.</td>
<td>1</td>
<td>Weak</td>
</tr>
<tr>
<td>14</td>
<td>Acquire new skill and knowledge from external sources.</td>
<td>3</td>
<td>Strong</td>
</tr>
<tr>
<td>15</td>
<td>Using External knowledge</td>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>16</td>
<td>Build Partnerships with external groups for acquiring new knowledge.</td>
<td>1</td>
<td>Weak</td>
</tr>
</tbody>
</table>

Zaman, T., Kulathuramaiyer, N., Yeo, A.W., Formulating Strategic Directions for Indigenous Knowledge Management System, Semantic Technology And Knowledge Engineering Conference (STAKE 2010), 2010
Indigenous Knowledge Governance Framework (IKGF)
IKGF 7-Layer Model

Kelabit irau mekaa ngadan – Name Changing Ceremony

Capital Layer
- Human Capital
- Social Capital
- Structural Capital
- Process Capital

Governance Layer
- Communities (hosts), parents, and children
- Social System, Adet.
- Collaborative Mechanism Irau-Ceremony in longhouse
- Know. Processes

Activity Layer
- Prepare Food
- Do Speeches
- Sing Songs
- Change Name
- Story Telling

Knowledge Management Layer
- Adapting
- Creating
- Using

Information Repository Layer
- Recipe
- Proverbs
- Poems
- Music
- Songs
- Name
- Folklores
- Stories

I.K.M. Mapping Methodology
- I.K.M. Model
- I.K.M.S Mapping Tool
- Data Collections Methodology
- K.S. Data Analysis Methodology

External Environment
- New trends, Religions, Govt policies
UML Model
Application for Botanical Indigenous Knowledge Management of Penans in Long Lamai
<table>
<thead>
<tr>
<th>Participation</th>
<th>Sarawak Biodiversity Centre (SBC)</th>
<th>Global Diversity Fund (GDF) Sabah</th>
<th>Long Lamai Sarawak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partnership</td>
<td>Core-Group Level</td>
<td>Village Level</td>
<td>Village Level</td>
</tr>
<tr>
<td></td>
<td>Community and Gov</td>
<td>Community (9 Villages of Buayan), Pacos, Global Diversity Fund and Sabah Government</td>
<td>ISITI-CoERI, Longa Lamai, Long Balai’</td>
</tr>
<tr>
<td>Training.</td>
<td>Documentation, Audio, and Pictures</td>
<td>Documentation, Audio, Video, Paintings, Pictures and GIS</td>
<td>Documentation, Audio, Video, Pictures, GIS and software</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conservation of Plants</th>
<th>Ex-situ</th>
<th>In-situ</th>
<th>N/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation of Data (Manual)</td>
<td>In-situ</td>
<td>In-situ</td>
<td>In-situ</td>
</tr>
<tr>
<td>Conservation of Data (Digital)</td>
<td>Ex-situ</td>
<td>Ex-situ</td>
<td>e-In situ</td>
</tr>
<tr>
<td>Info-structure Governance</td>
<td>SBC</td>
<td>GDF</td>
<td>Community</td>
</tr>
<tr>
<td>Infra-structure Governance</td>
<td>Community</td>
<td>GDF by local community (employees)</td>
<td>Community</td>
</tr>
<tr>
<td>Beyond Documentation Organisational Level</td>
<td>R &amp; D program, Patent,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beyond Documentation Community Level</td>
<td>Herbal Products</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Free Prior and Informed Consent Certificate
<table>
<thead>
<tr>
<th>Capital Layer</th>
<th>Skilled Human Resource, Competency Development,</th>
<th>Identity, Bonding and Bridging, Participation, Norms, Sense of Belonging</th>
<th>Intellectual Property, Database system</th>
<th>New processes of D. Data collection, generational gap etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governance Layer</td>
<td>Youth, Elders, IK database Manager, ISITI-CoERI</td>
<td>Customary Laws (Declaratory)</td>
<td>Gotong Ryong, Trainings.</td>
<td>IKM processes</td>
</tr>
<tr>
<td>Activity Layer</td>
<td>Identification of Plants</td>
<td>Collecting D. photos, attaching annotations, Collecting GPS coordinates</td>
<td>Conducting Trainings, Designing BIKDBMS, Attaching scientific annotations, Developing BIKDBMS</td>
<td>Use of IK DBMS</td>
</tr>
<tr>
<td>Knowledge Management Layer</td>
<td>Utilizing</td>
<td>Creation, Adapting</td>
<td>Creation, Accumulating, Adapting, Utilizing</td>
<td></td>
</tr>
<tr>
<td>Information Repository Layer</td>
<td>Experience</td>
<td>Audio and textual, GPS Coordinates, Traditional Protocols, Pictures</td>
<td>Skills to use digital equipment, Scientific info, Design of the system</td>
<td>BIKDBMS</td>
</tr>
<tr>
<td>I.K.M Mapping Methodology</td>
<td>IKM Framework</td>
<td>IKM Mapping Methodology</td>
<td>Data Collection Methodology</td>
<td>Data Analysis Methodology</td>
</tr>
</tbody>
</table>

Certificate for Free, Prior and Informed consent

External Environment
Long Lanai Community

ISITI-CoERI

Process Flow Diagram

- Youth
- Elders
- IK Manager
- Pictures
- GPS Coordinates
- Plants
- Penans’ BIK
- D DBMS
- D eBuayan/ISITI
- Botanist
- Trainings
- Scientific Name
- Knowledge Engineer
- Software Developer

- Collect
- Access
- Combine
- Accumulate
- Provide
- Attach
- Define
- Manages

- Trainings conduct
- Scientific Name provide
- Knowledge Engineer develops
- Software Developer develops

- GPS Coordinates combine
- Plants accumulate
- Penans’ BIK provide
- eBuayan/ISITI access

- Youth access
- Elders collect
- IK Manager define

- Long Lanai Community
- Process Flow Diagram
- ISITI-CoERI
Acknowledgement
Do you have any questions?

Alvin W. Yeo
alvin@isiti.unimas.my

Tariq Zaman
tariqzaman@lawyer.com

Narayanan Kulathuramaiyer
nara@fit.unimas.my