Introduction of ICT to World Heritage Site in Luang Prabang, Lao PDR

Sustainable development and
Integrated management

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UNESCO World Heritage town of Luang Prabang

UNESCO World Heritage Site: 1995

# of tourists: 50,000 – 60,000 (～1996)

80,000 (1998)

196,106 (2003)

(Sources: Luang Prabang Government 2000, Luang Prabang Provincial Tourism Office, 2004)

World Heritage Site & Development

World Heritage Sites have not only positive impacts but also negative impacts

Illegal construction and changing landscape

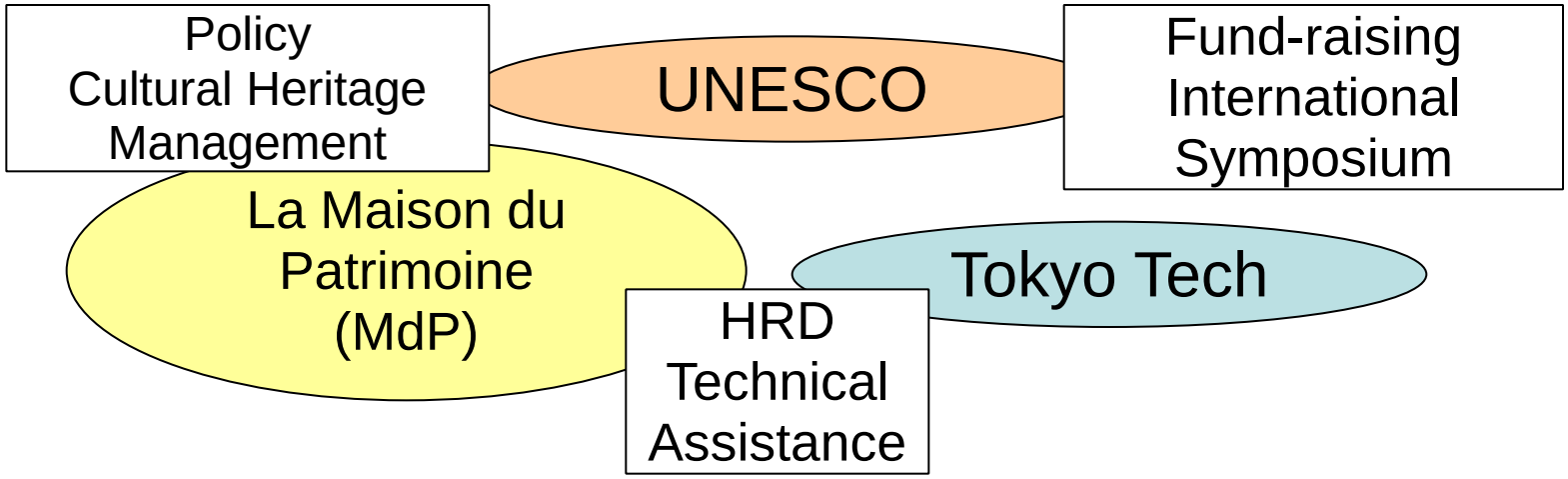
Need for specific policy
Information sharing
Education

Unplanned infrastructure

Increased traffic & illegal parking

Project Background (as of 2004)

Tripartite Collaboration



- ICT contribution
  - *"ICT itself is not an element which makes people wealthy, but it could accelerate development for the local population by facilitating access to information and communication, thus complementing benefit of other fields." (ITU, 1984)*

Needs Assessment
Application of ICT (2004)

Participation to the seminar "Fighting Poverty through Heritage" organized by UNESCO

Field survey
- –Interviews at local sites
- –Questioners at local sites
- –Site observation

Meeting with Heritage Committee

Discussion and brainstorming with counter-parts

Needs Analysis

Which kind of technology?

What befits?

Who are target users?

Who? & How to maintain ?

Project components (Phase 1: 2005-2008)

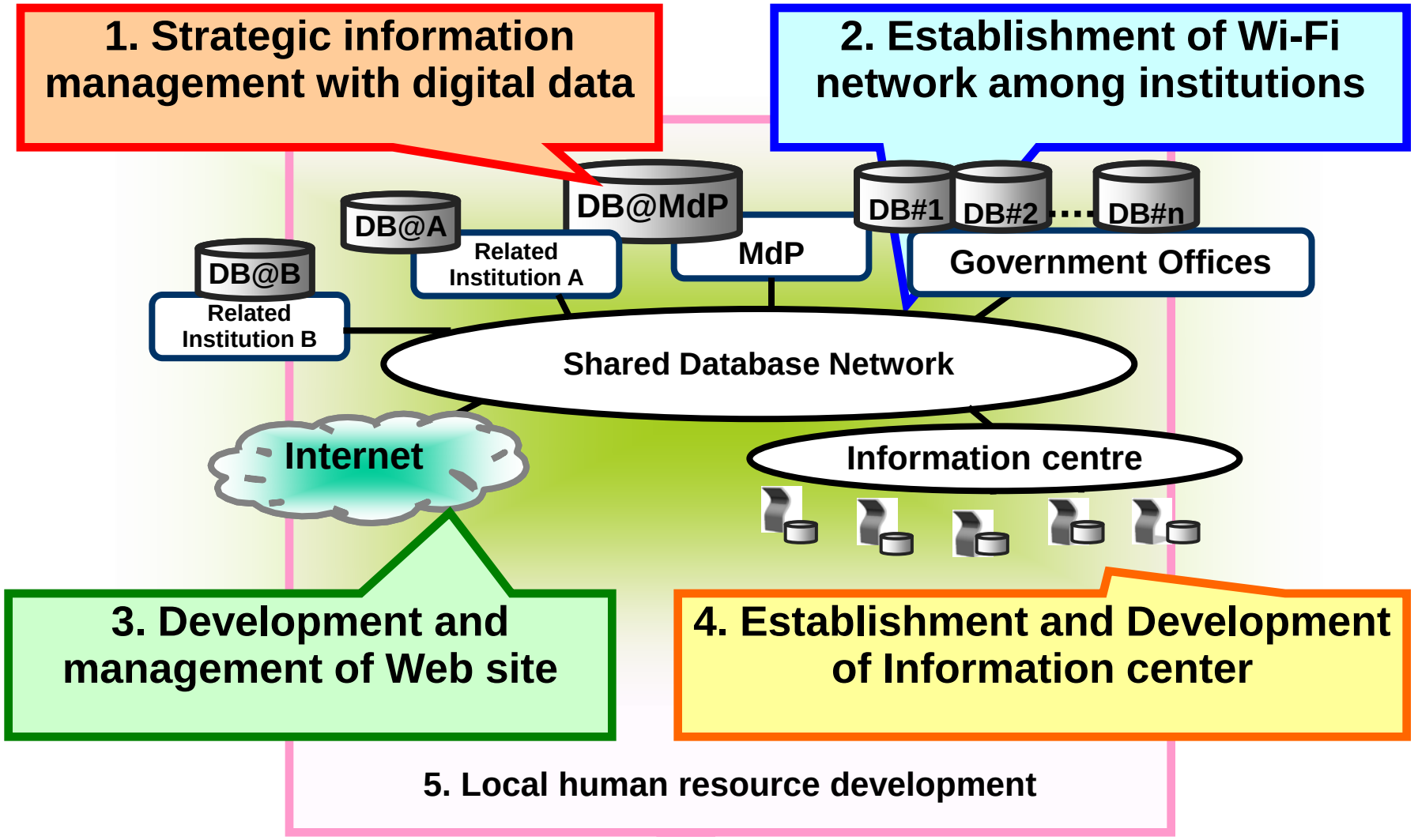


Figure 1 Identified model from needs analysis
Source: ***brainstorming and meeting in MdP, Luang Prabang, Lao PDR, Jan 2005***

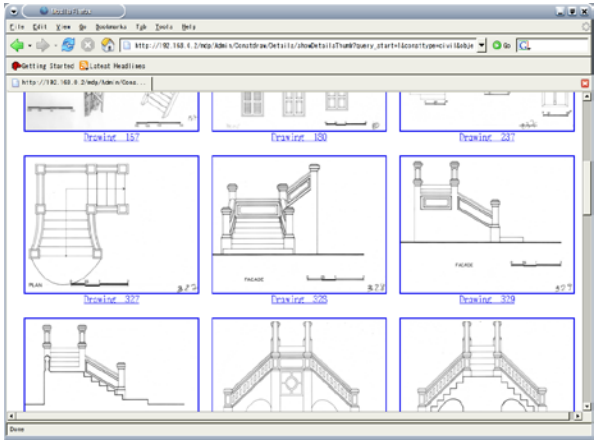
1. Strategic information management with digital data

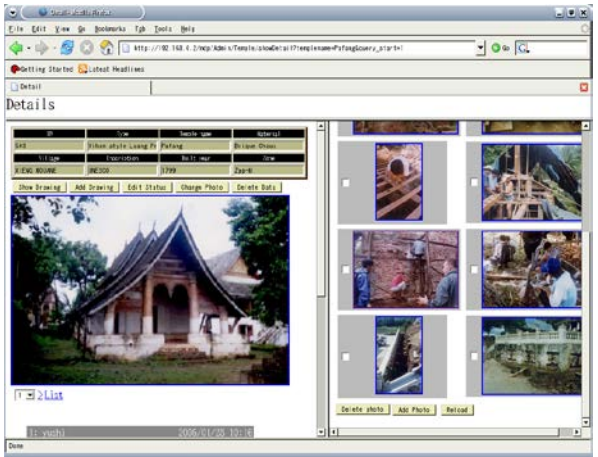
The previous situation

- Under-utilization of the abundant information
  - Paper-based data
  - Stand alone system

- Keep the data in good condition
- Be shared among institutions
- Be disseminated to the Internet

- Client-server system
- Web-based user interface
- Free and open source software (FOSS)
  - Sustainability = legality and cost performance
- Digitization of information
  - Thousands of drawings and photos are scanned.



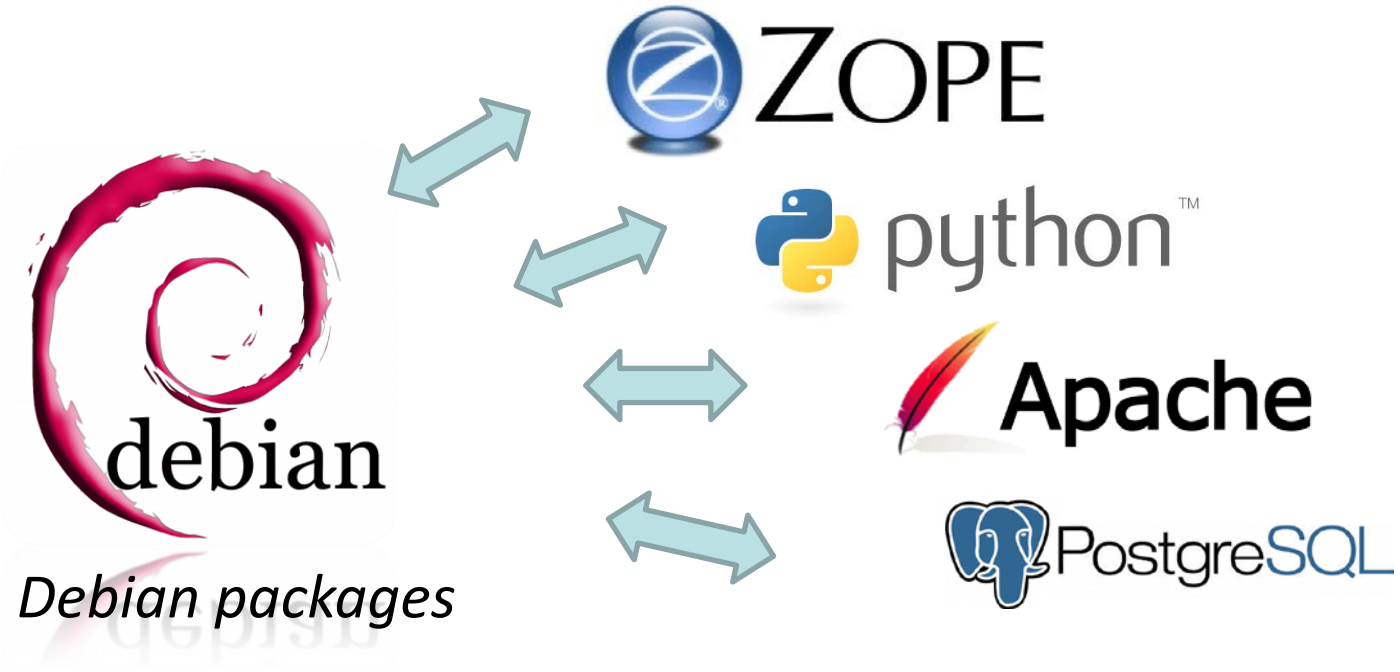


1. Strategic information management with digital data

Development of Database System

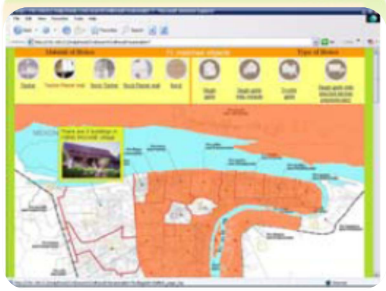
Software Components

- FOSS (Free and Open Source Software)
  - Cost-free and Legality for sustainability
  - Human resource is more important
- Based on Debian GNU/Linux Operating System

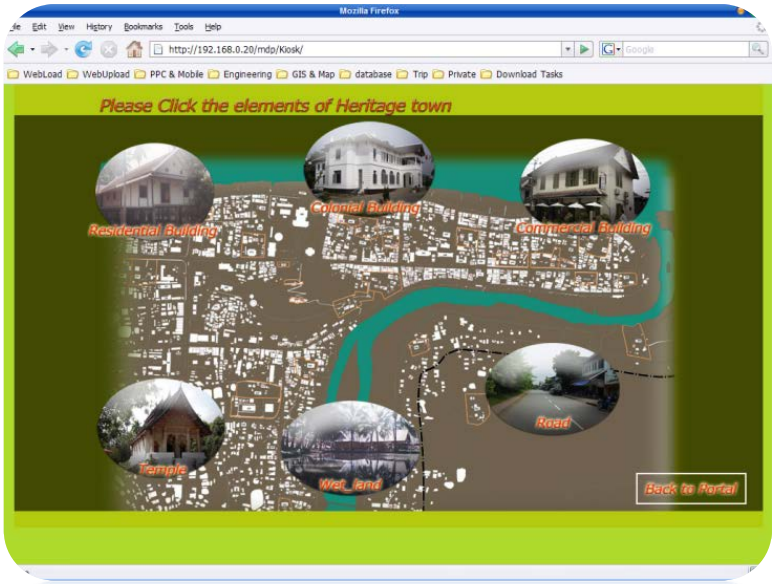


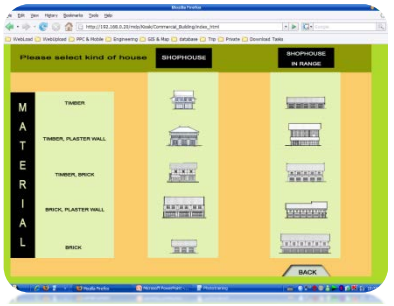
Heritage Database

- Document protected objects in heritage zone area
- 611 buildings, 183 wetlands, 240 roads and 2,870 architecture drawings

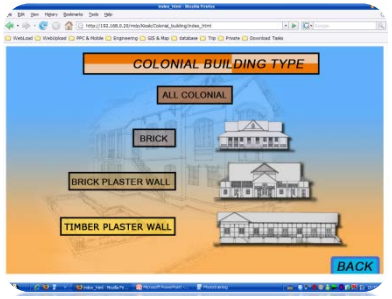


Vernacular buildings

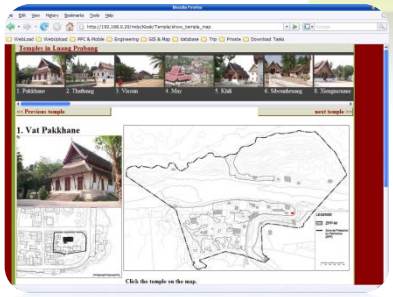




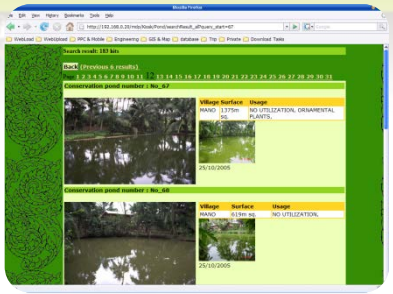
Shop houses building



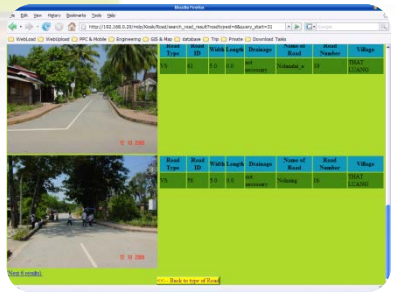
Colonial building



Monasteries



Wetland



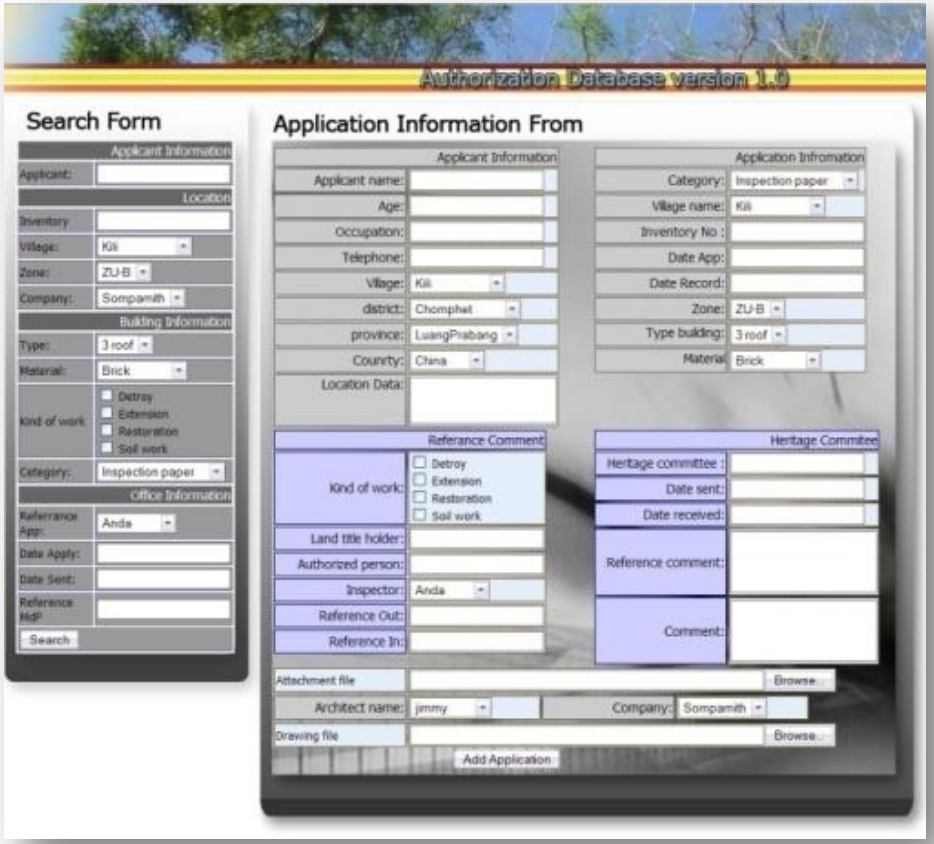
Road

Heritage Database in ICT center, (2007)

Authorization Database

- To facilitate Authorization Unit of Department of Luang Prabang World Heritage.
- Authorization process by compiling information on permission and recommendation of constructions.
- 320 authorization cases between 2001 and 2008

- The structure of authorization database was carefully designed in close cooperation with architects from Authorization Unit of DPL.
- Searching the cases by four categories
  - •Applicant information
  - •Building location
  - •Building information
  - •Administration information



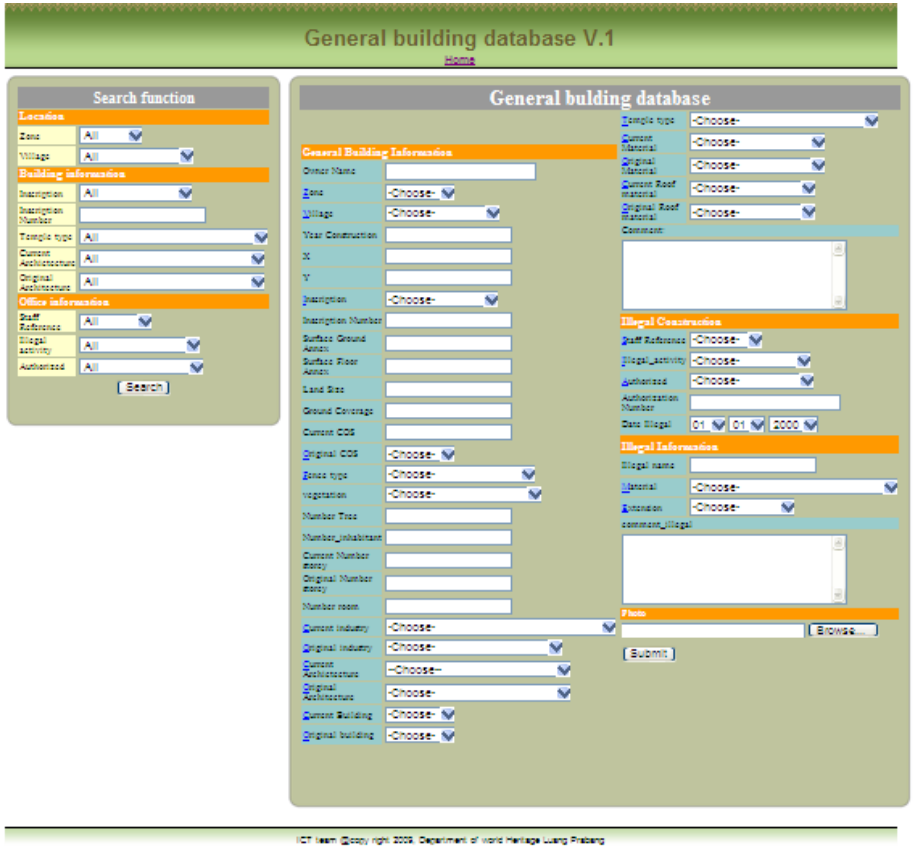
General Building and Construction Control Database

- Disorganized Data Management for General Buildings in PSMV.
- The Large Number of Buildings and its difficulties for Management.

Important Functions:

1) Gather all General Information of Buildings Within World Heritage Site
2) Monitor Unauthorized Constructions in the Heritage Site.

- 743 buildings in six villages which were collected through extensive field survey.
- In addition to general information, the database manages the record of unauthorized constructions found from 2001 to 2005 and most recent activities in 2009.



2. Establishment of Wi-Fi network among institutions

Previous situation
- No permanent internet connection
- No government LAN
- Expensive PCs

Networking among government institutions
- To promote information sharing
- Complementing the collaboration among related institutions

Why wireless?
- Support better townscape
- Cost efficiency both on initial cost and running cost

Why Wi-Fi?
- Low price of the equipments
- Popularity
- License-free under specific conditions
- Lots of practices in the world

4. Development and operation of the ICT Center

The previous situation

- Insufficient access to information on public services and valuable cultural heritage

The ICT center aims to

- Provide public information to the local people
  - To provide necessary information in daily life
  - To encourage public awareness
- Provide tourism information
  - To provide tourist's better information to promote extended stay (thus increased economic contribution)
- **Educate younger generation**
  - **For basic computer use**
  - **For the well educated human resource for town development and tourism**

Self-sustainable operation

- Self-sustainable financial cycle
- Reflection of the user's needs/feedback

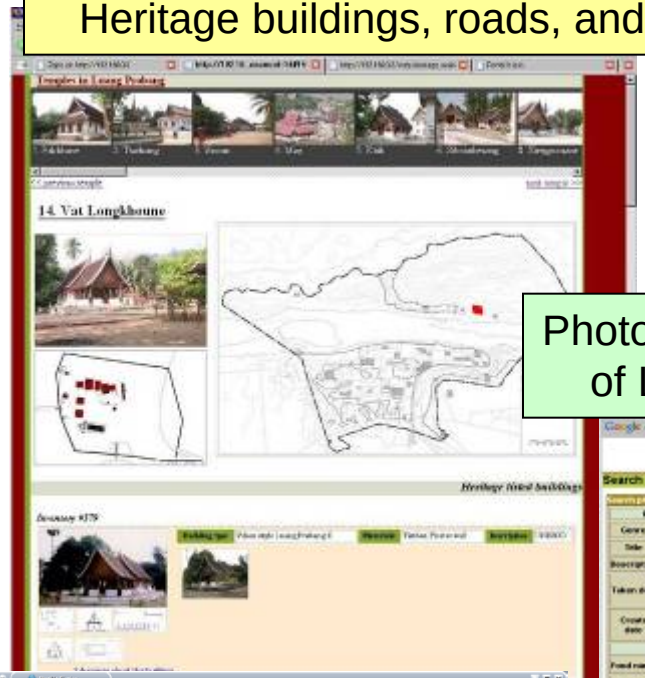
4. Development and operation of the ICT Center

Located next to the first rehabilitated building (planned for ethnic museum)

ICT center
- Traditional Lao style building
- First floor: ICT center
- Second floor: ICT team office

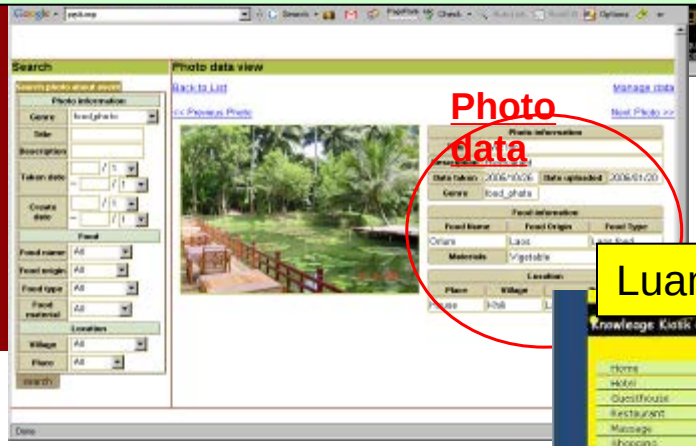
4. Development and operation of the ICT Center

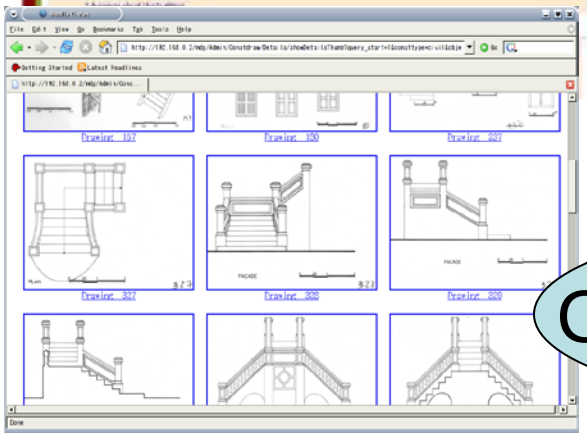
Database on
Heritage buildings, roads, and wetlands



Information on MdP and Luang Prabang

Photo Database on People and Culture
of Luang Prabang





Luang Prabang Yellow pages

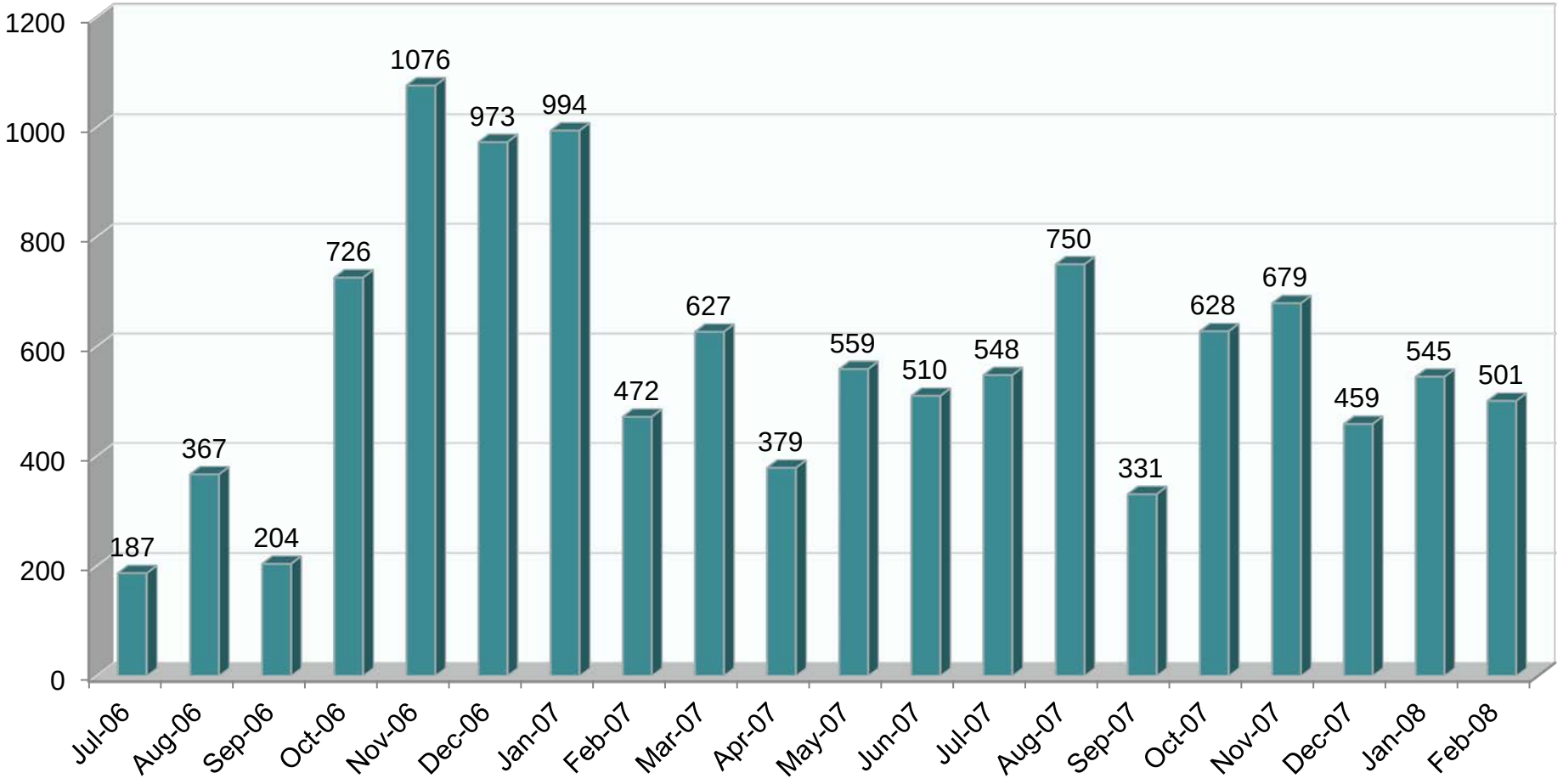
Contents in service

4. Development and operation of the ICT Center

The first pilot site of ICT Center : Preliminary Monitoring

Number of Visitors from July 2006 to Feb 2008

Total visitors = 11 515



Establishment of ICT Center 1

- Established in July 14, 2006

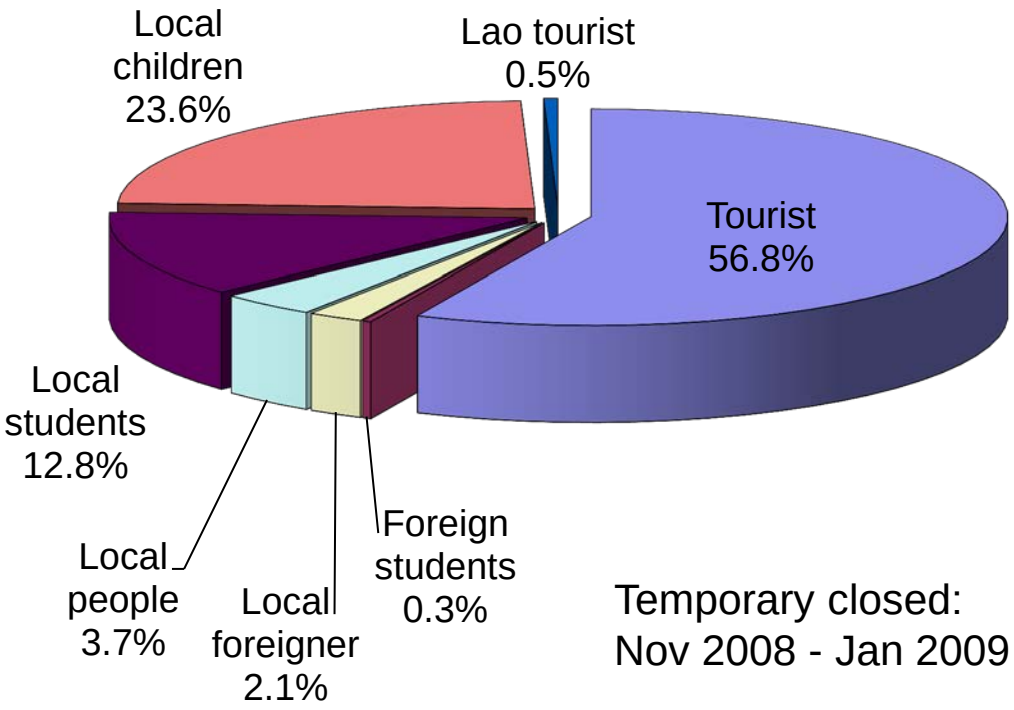
The ICT center via databases aims to

- Provide public information to the local people
- Provide tourism information
- Educate younger generation

Visitors of ICT Center (July 2006 – Feb 2012)

Total Visitors = 19,682

Lao People = 41%



Temporary closed:
Nov 2008 - Jan 2009

Visitor record breakdown of ICT center, (2009)

Establishment of ICT Center 2

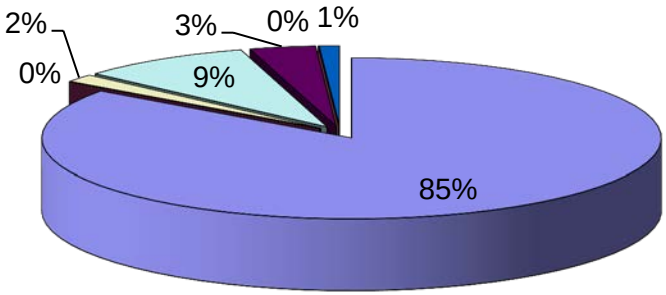
Chronological increase of local people in ICT

(change in first 12 months)

July – Sep 2006

(N＝758)

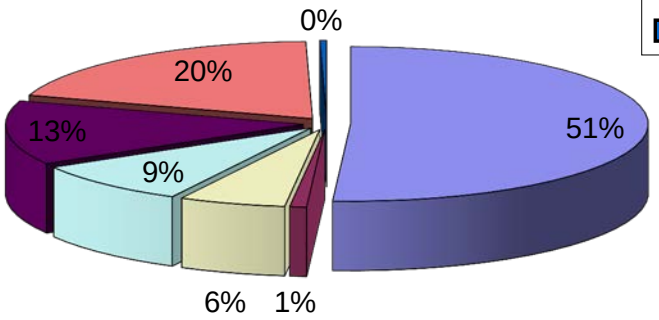
Lao People = 13%



Oct – Dec 2006

(N=2775)

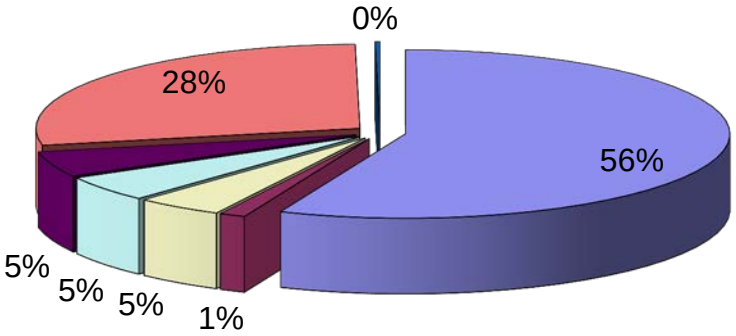
Lao People = 38%



Jan – Mar 2007

(N=2093)

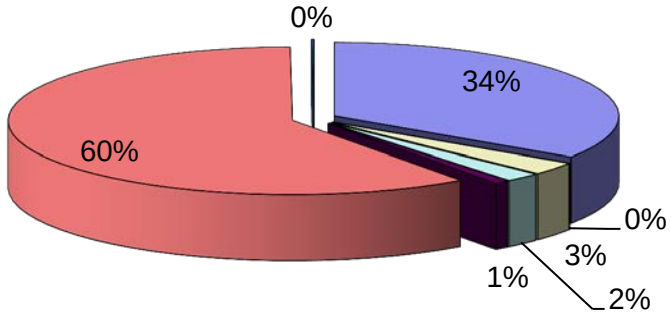
Lao People = 38%



Apr – Jun 2007

(N=1448)

Lao People = 63%



ICT Center Users: Local Youth, Government Officials and Tourists

Photos taken by ICT team, (2007 - 2008)

Local activity 1: Organization of local children art competition and exhibition

75 participants
- 32 hand drawn
- 43 computer drawn

Local activity 2: Short lecture on ICT to students of Souphonouvong University

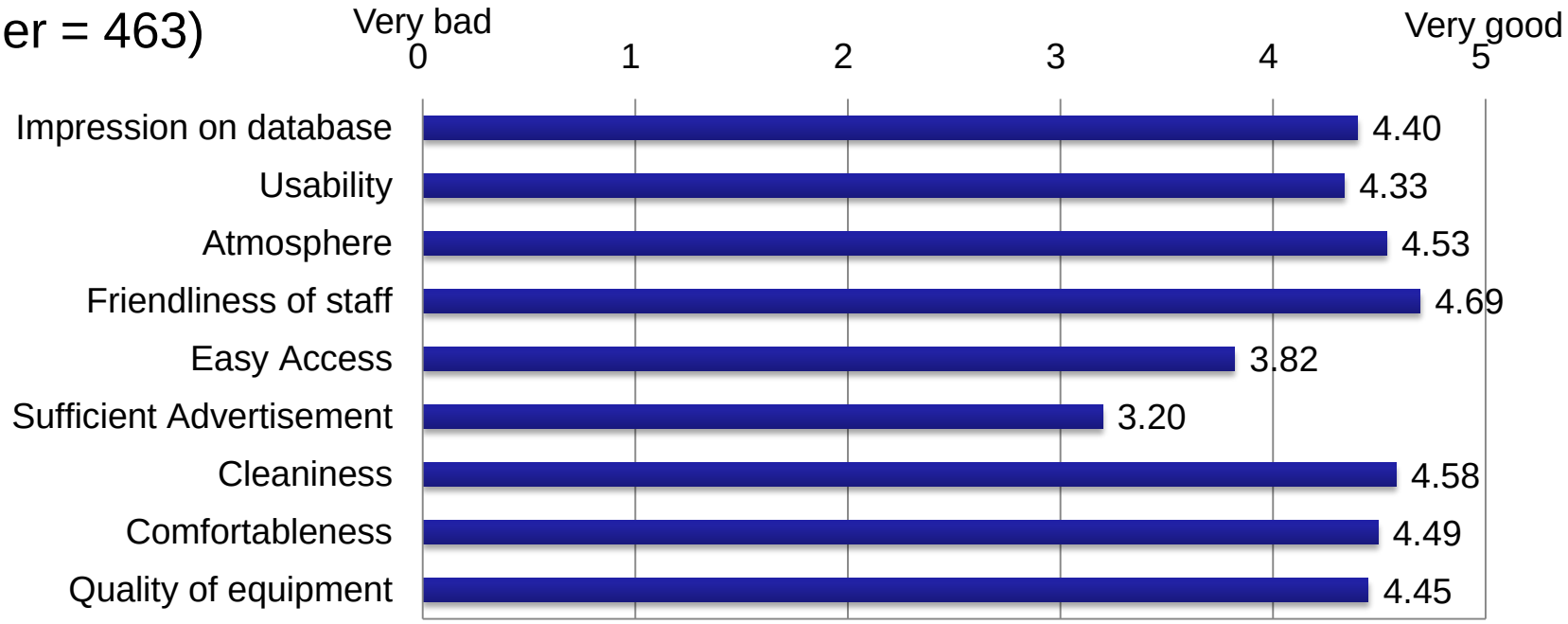
30 IT Undergraduates
- Lecture on
  - Database applications
  - Open source software

Photos taken by ICT team, (2007, 2008)

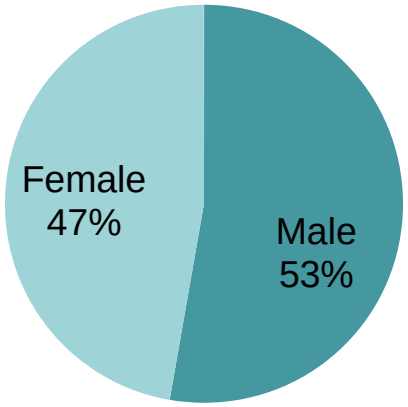
Feedback from the foreign visitors

July 2006 – Feb 2008

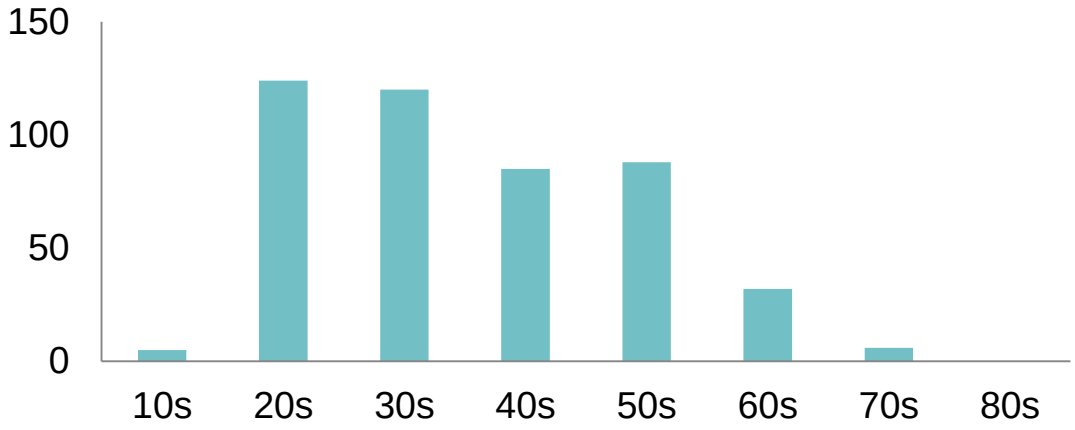
(Number = 463)



Gender of Visitors



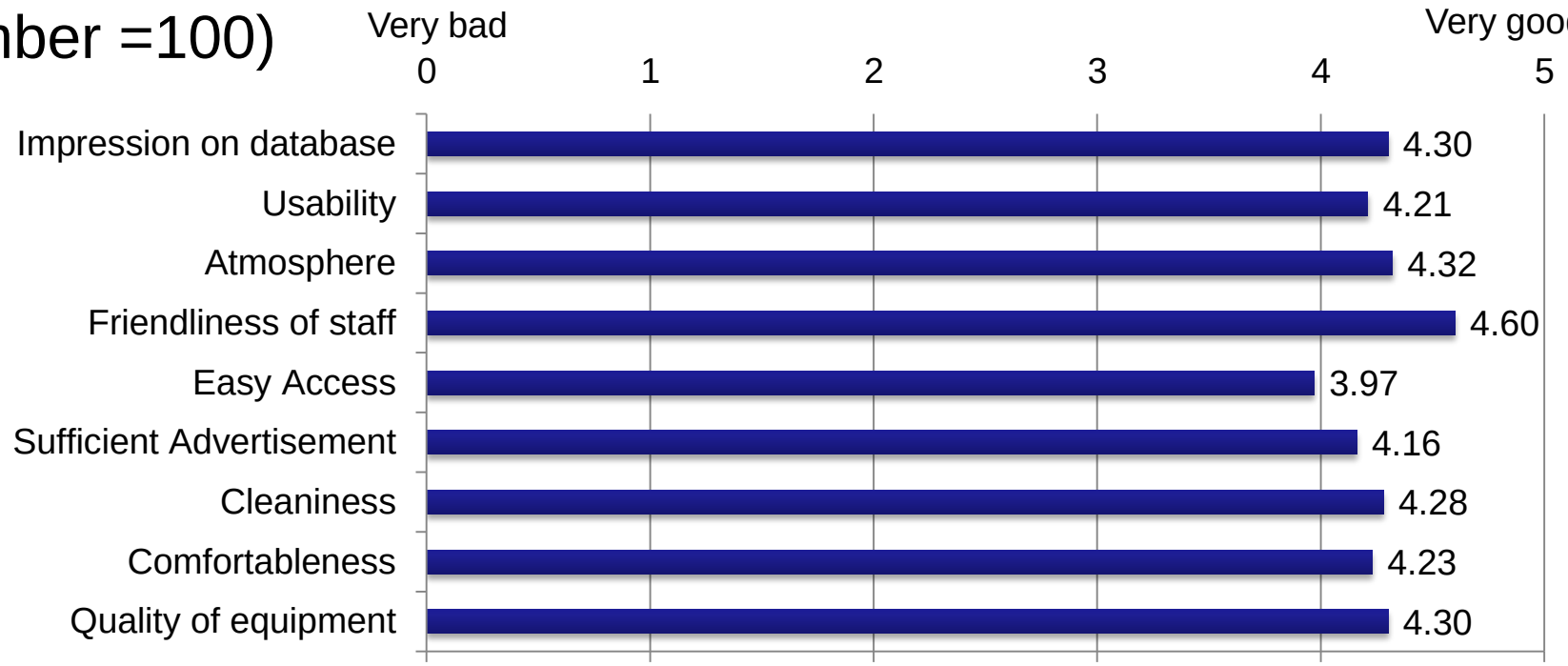
Age of Visitors



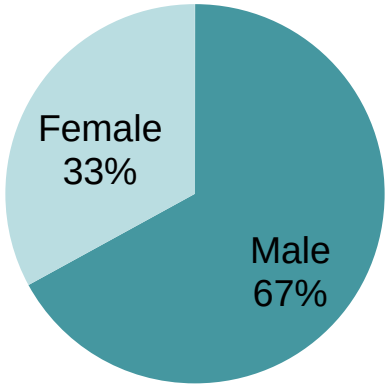
Feedback from the local visitors

July 2006 – Feb 2008

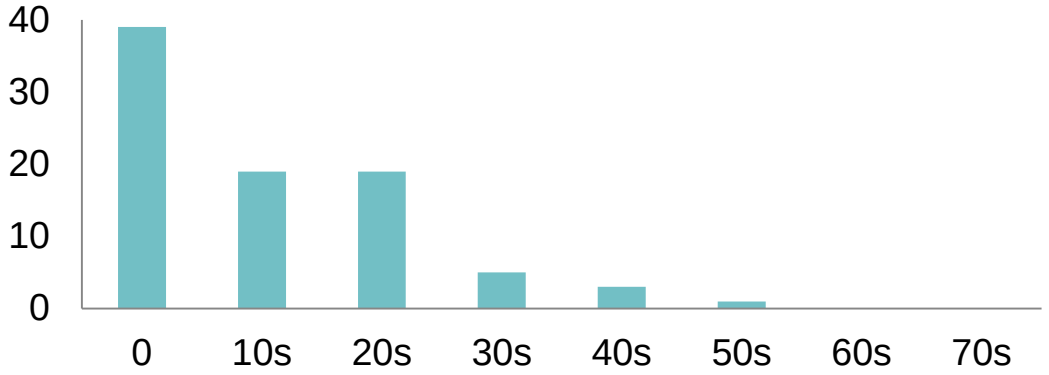
(Number =100)



Gender of Visitors



Age of Visitors



Feedback comments from the local visitors

Lao people should know old histories.

Great opportunity for young generation to learn about heritage conservation and protection

More advertisement is suggested

Add more drawing of temples and other cultural heritage.

School children “we can use computer and read more books”

Add information on nature and suggested visiting spots

Internet access is desirable

“I enjoy drawing houses and animals” from children in local drawing competition

More advertisement is suggested for local schools and travel agencies

Updating information is important. Insert dates to the info.

Excellent ideas to show Lao culture and tradition.

Beautify surrounding with flower garden

Demonstrate in a symposium

Don’t close this center, we need it

Add Interactive games or competition,

More historical event pictures such as the old king

5. Human resource development in ICT team

The previous situation

- No ICT engineer to implement and operate the project components
- Use of illegally copied software

Series of local ICT training workshops

- Establishment of local ICT team
- Needs-based practical training
  - The products from training were provided for daily use.
- Using FOSS

Contents of workshops – chosen upon demands

1. Development of web site
2. Administration of Linux server
3. Implementation of LAN
4. Development of web-based database applications
5. Design of data structure

5. Human resource development in ICT team

Local ICT workshops

Project Background (Phase 2: 2009-2012)

1995 **Luang Prabang** World Heritage Site

Three Outstanding Universal Values

Rapid increase of tourists

Development Pressure

Guesthouses, restaurants & tourist sites

Trigger constructions

Possible change in landscape or impact on Outstanding Universal Values

2008

World Heritage Committee (Evaluation)

Propose 15 recommendations

Recommendation No. 5 and 6: Updated map of all buildings and inventory buildings

Department of World Heritage (Ministry of Information and Culture)

Tokyo Institute of Technology

Introduce GIS (Geographical Information System) to visualize and analyze the chronological changes in townscape affected by building constructions

What GIS Software can do?

Numerical data

Map data

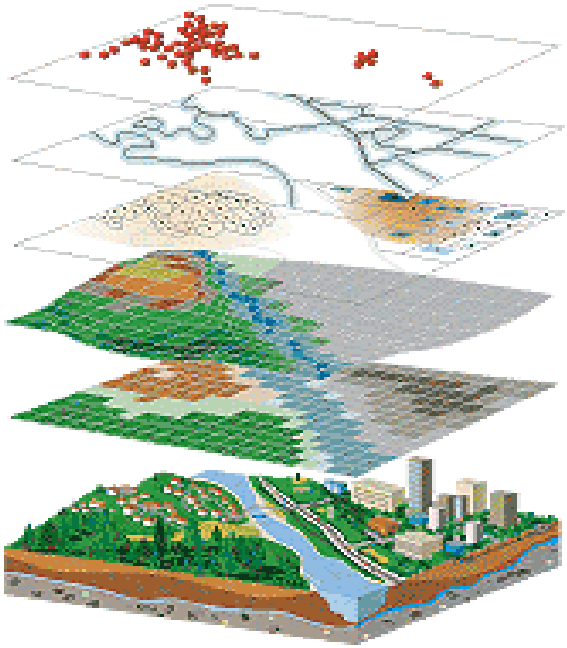
Geographical Information System (GIS)

User

Software Tools + **Database**

Simplification

The Real World

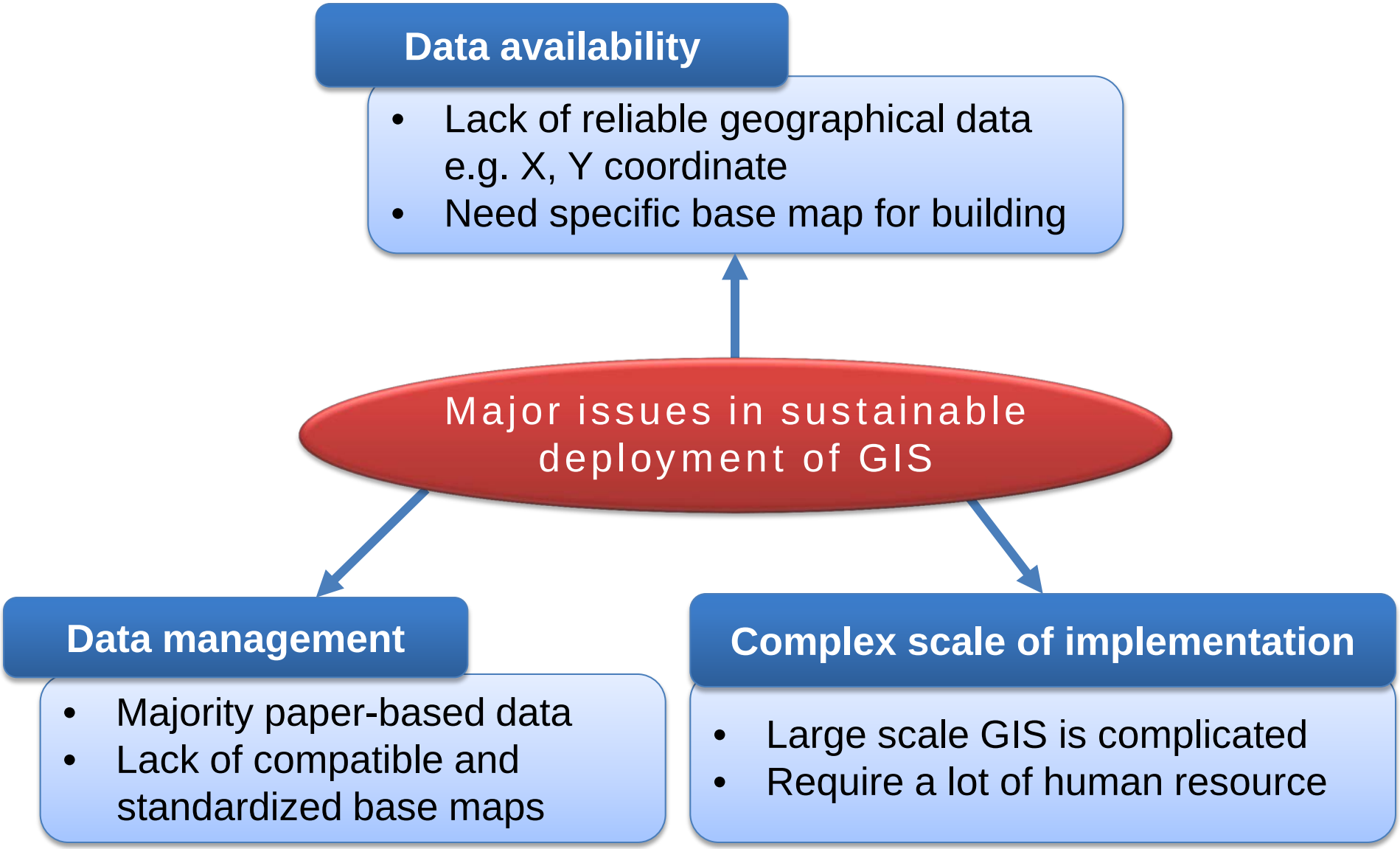


Users: Local government decision makers

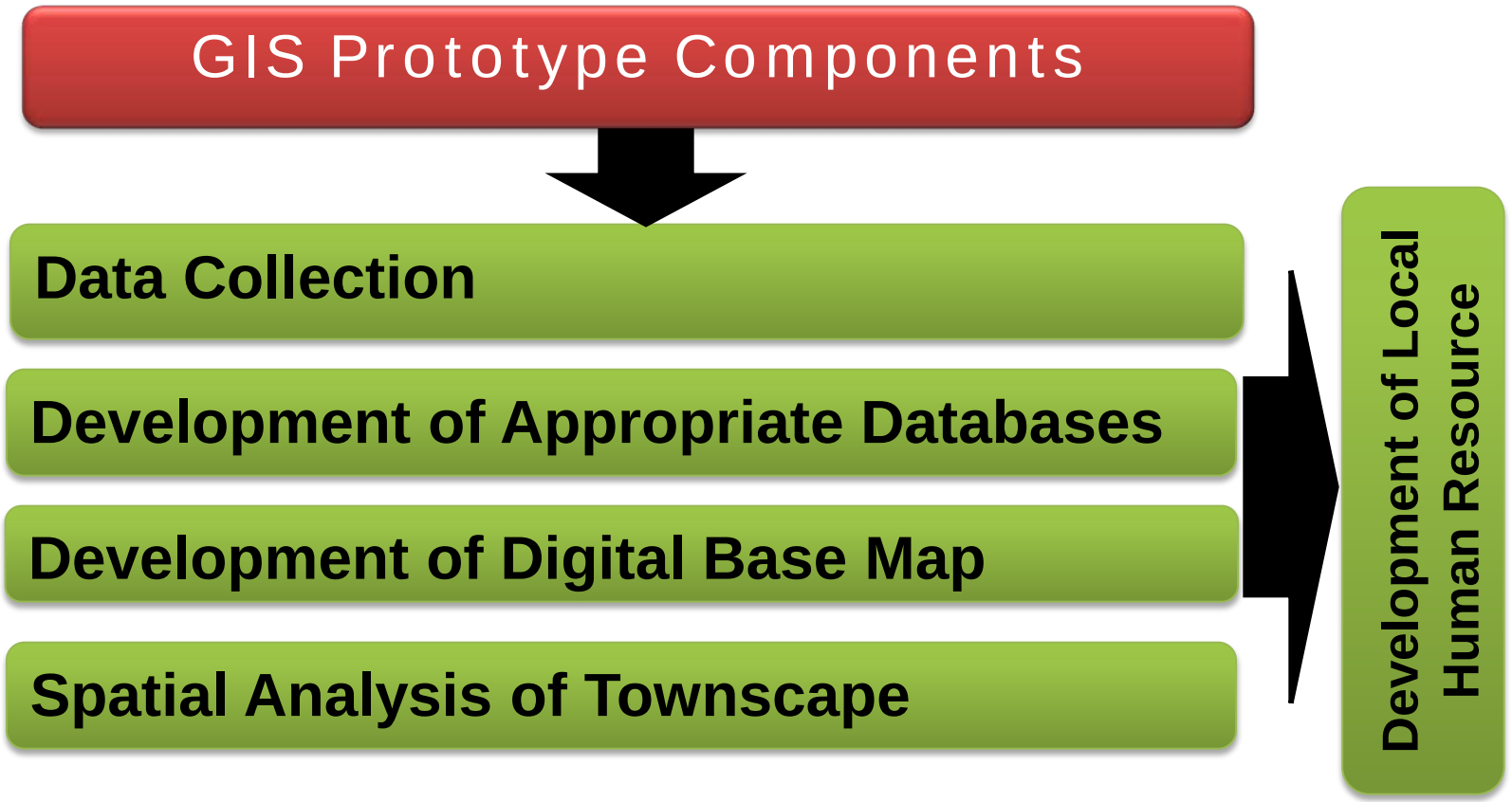
Analyze layers of information

Make the **right** decisions

Major Issues of Sustainable GIS in Luang Prabang



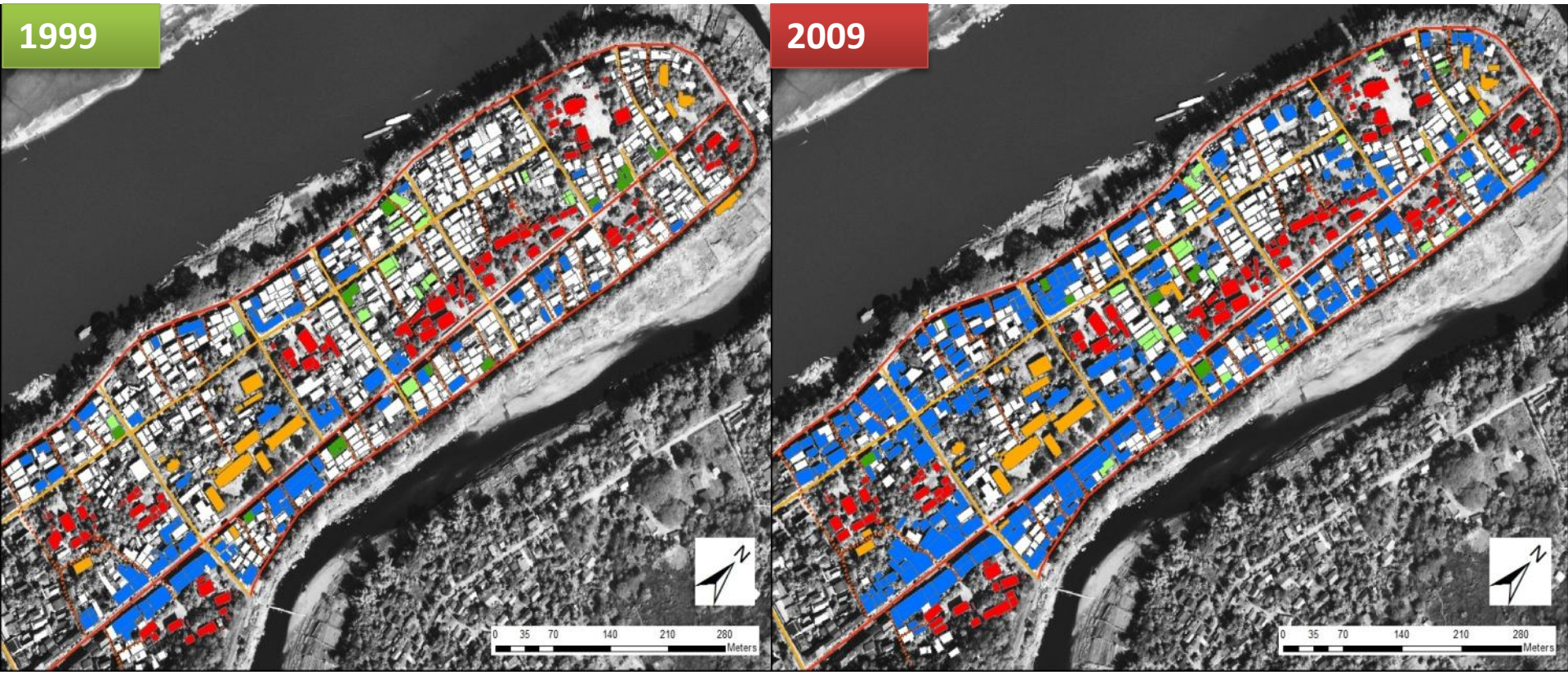
Development of GIS Prototype



Example of spatial analysis

Building usage

Transition of building usage from residence to touristic



Mixed resident and small business

VR Panorama

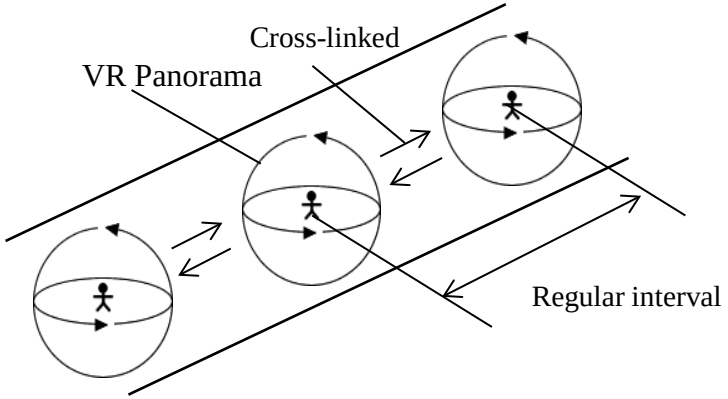
Project Title:	Application of Virtual Reality (VR) Panorama for Townscape Monitoring in the World Heritage Site of Luang Prabang
Project Contents:	Introduction of townscape visualization technology
Objectives:	1) To examine the current monitoring procedure in DPL 2) To introduce townscape visualization technology 3) To examine usability of prototype
Activities:	1) Survey on current townscape monitoring method in DPL 2) Development of Street-View prototype

Activity 1.1

Development of Street-View prototype

Objective:

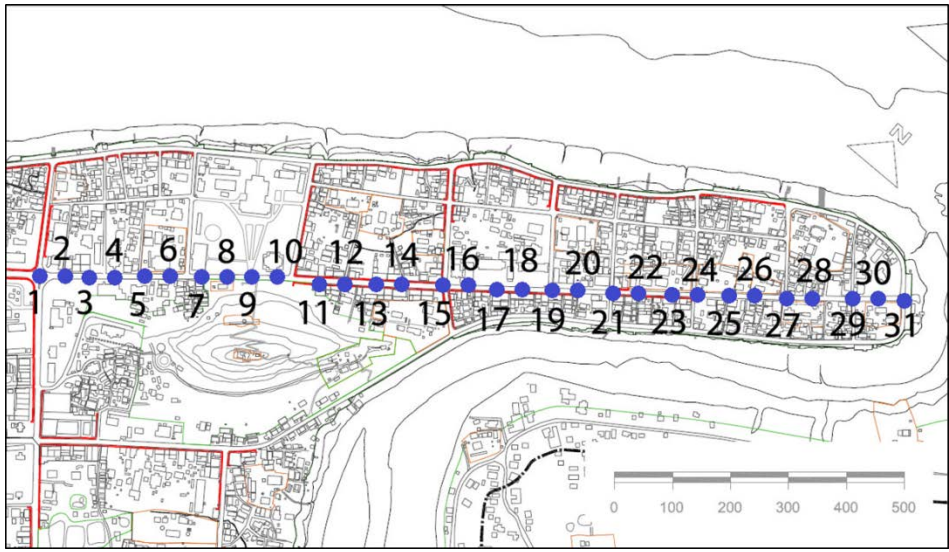
- To introduce prototype of Street-View as townscape visualization technology



Concept of Street-View

Pilot site:

- Main road of core heritage area
- 1.5km
- 31 spots, 50m interval



Pilot Site

Source: Safeguarding and Preservation Plan (PSMV), (2001)

Activity 1.2

Development of Street-View prototype

Training on how to create Street-View:

- Taking photos with fish-eye lens
- Stitching into a panorama image
- Authoring into Street-View

Equipment:

- DSLR: Nikon D80
- Fish-eye lens: FIT-85
- Tripod: SLIK F630
- Stitching software: Hugin (FOSS)
- Authoring software: SaladoPlayer, SaladoConverter, SaladoConfigurator (FOSS)

Activity 1.3

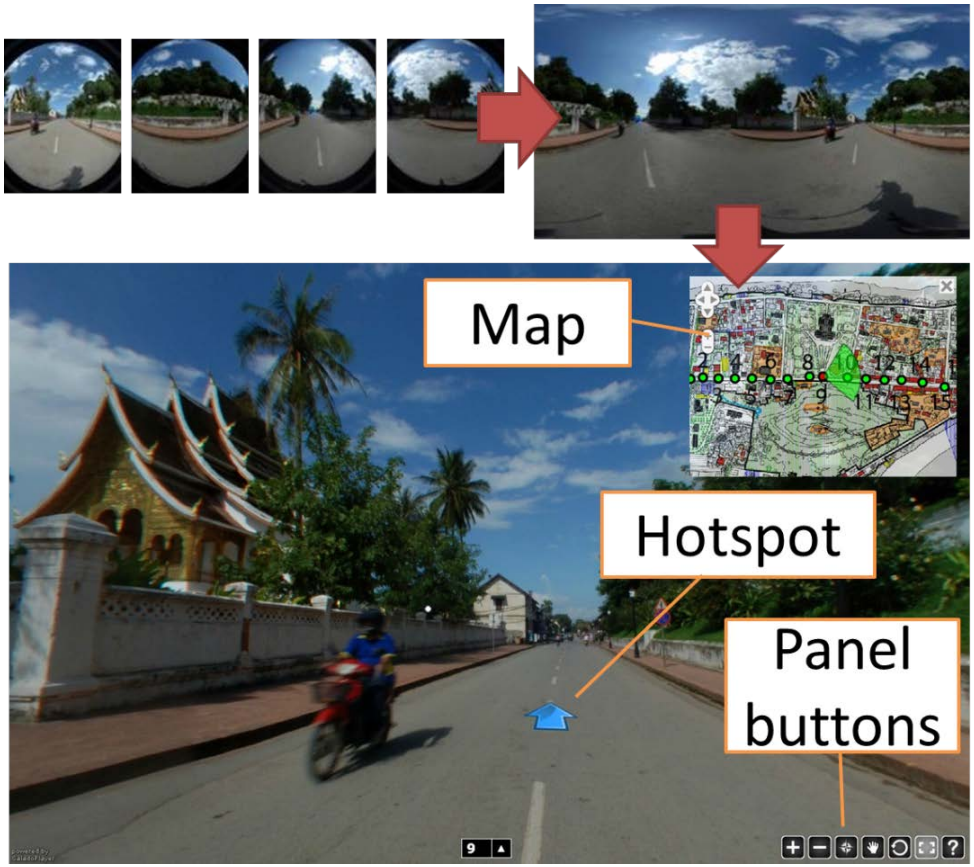
Development of Street-View prototype

Time Spent:

- 2 weeks
- by 2 staff members

Main Purpose of Street-View prototype:

- To see if the townscape follows the rules and regulations described in master plan



Steps of developing Street-View

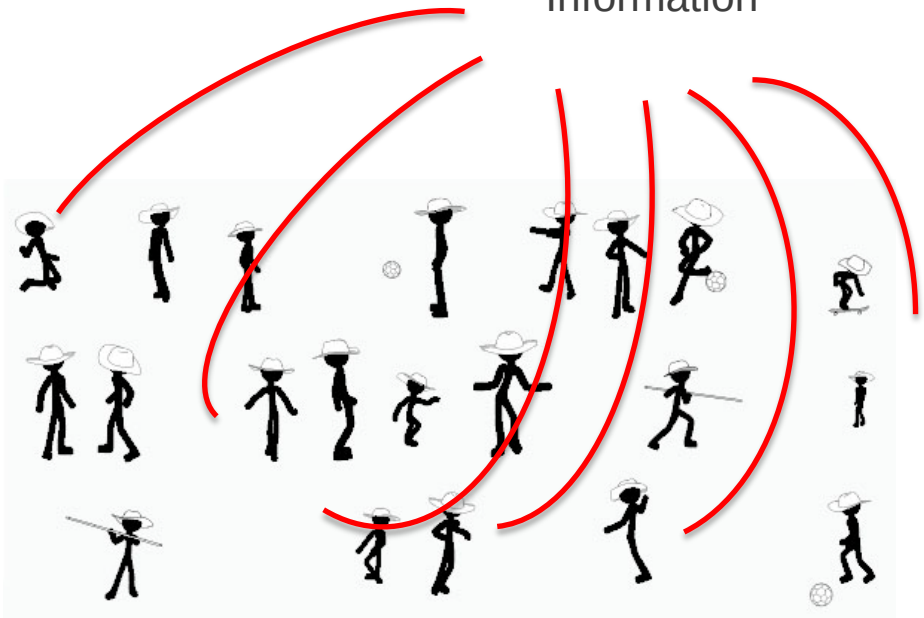
Mobile Learning

Current Study

Factors – Mobile Learning Acceptance

Design of Appropriate Mobile Learning Application

Dissemination of Awareness Information



Preservation of Luang Prabang World Heritage Site

Mobile Learning Development Activities

Brainstorm and discussions with DPL members

Data collection from target users

Training of mobile programming with local ICT staff

Prototype development