Building a Successful Enterprise GIS Strategy
An ROI Approach

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ESRI Account Manager

Presentation Overview

• Current ROI Case Studies/What we know about ROI
• Introduction to ESRI/PA Consulting ROI Methodology/Approach
• The need for an ROI-driven methodology
• Challenges with existing approaches
• Objectives of the ROI Approach
• A tour of the Approach - key insights, tools & templates
• Q & A
GIS Implementations Follow Common Patterns

- Desktop
- Multi-User
- Federated

Application Portfolio

ArcGIS Server

- Professional
- Work-Groups

Organizations

- Integration
- Sharing
- Collaboration

"Analyzing GIS Return On Investment revealed some common themes"
Common Themes for GIS Return on Investment

Wide GIS Application Portfolio

- Public Access
- Map Automation
- Business
- License Audit
- Solid Waste
- Housing
- Sewer Master
- Plan
- General Plan
- Property
- Notification

Common Themes for GIS Return on Investment

GIS Used by Many Departments
Common Themes for GIS Return on Investment

Applications with Rapid Payoffs

Geocode Existing Data

<table>
<thead>
<tr>
<th>ZIP Code</th>
<th>LU</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>12101</td>
<td>R</td>
<td>123 Main St</td>
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<tr>
<td>132102</td>
<td>R</td>
<td>125 Main St</td>
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<tr>
<td>132103</td>
<td>C</td>
<td>127 Main St</td>
</tr>
<tr>
<td>132104</td>
<td>I</td>
<td>400 Industry Way</td>
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<tr>
<td>132105</td>
<td>P</td>
<td>101 Park Lane</td>
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<tr>
<td>121001</td>
<td>R</td>
<td>122 Main St</td>
</tr>
</tbody>
</table>
Common Themes for GIS Return on Investment

Multiple Use Data

Water Line Databases
- Managed by Public Utilities
- Additional

- Engineering
  - Site Selection
  - Site Analysis
- Economic Development
  - Economic Impact Analysis

Utility Billing
- Water Service Records
- Water Meters

Unfinished Mandates
- Water Balance
- Inspections
- Public Access

Data Access Drives Application Development

Resource Inventories
- Land Management
- Incident Mapping

Network Analysis
- Corridor Selection
- Logistics
- Transportation Modeling

Watershed Analysis
- Spread & Diffusion
- Geoprocess Modeling

Land Management
- Facility Management
- Resource Exploration

Engineering Design
- Demographic Analysis
- Topographic Analysis
The Benefits of GIS

• Save Money/Cost Avoidance
• Save Time
• Increase Efficiency
• Increase Accuracy
• Increase Productivity
• Increase Communication & Collaboration
• Generate Revenue
• Support Decision Making
• Aid Budgeting
• Automate Workflow
• Build an Information Base
• Manage Resources
• Improve Access to Government

Case Studies – Data Automation

• Los Angeles County
  – Automated Cadastral Map Books

  – Result:
    • Eliminated:
      – 2,000 Overtime Hours
      – 20,800 Regular Hours
    • Annual Savings of $90,000
Case Studies – Geo-Auditing for Revenue Generation

- Martin County, FL
  - GIS Cell Tower/Parcel Database
  - Commercial Taxation to Parcels
  - Result: Increased County Tax Base by 3.5 Million Dollars

Case Studies – Increased Efficiency

- Police Department, Lincoln, NE
  - GIS to Identify Problem Areas
  - Target Residents
  - Result: 67% Reduction in Burglaries in 7 Weeks
Case Studies – Increased Productivity

• Planning Commission, Sumpter, SC
  – Filing System to GIS:
    • Track Land Use Cases
    • Create Parcel Buffers
    • Generate Public Notification Letters
  – Results:
    • 90% Reduction in Public Notification Effort
    • Saved 2 Months Personnel Time
    • Save County up to 4% on Flood Insurance Premiums

Case Studies – Cost Savings/Cost Avoidance

• Bolder County, CO
  – Road Maintenance Dept.
  – Sign Inventory
  – 7,000+ Signs to manage
  – Results:
    • $20,000 inventory cost savings
More case study examples!

Making a case for ROI – how do we get from here to there?

- Savings of approximately 500 hours of staff time annually across four departments.
The ROI Approach - Building an Enterprise GIS

A collaborative effort between ESRI and PA Consulting Group
- The methodology was originally developed by PA Consulting group for supporting mainstream IT Programs
- Adapted to be GIS-specific by leveraging ESRI's GIS expertise

*Business Benefits of GIS: An ROI Approach*
- Supporting materials @
- Published by ESRI Press, August 2008

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Need to Improve How to Quantify Benefits of GIS

- **Typical focus has been on activities**
  - Tasks
    - Consumption of Resources indicated Production/Value
    - Enhanced with technology
      - Building bigger, better, more
- **Recommended alternative: Focus on value**
  - Improve the Business
    - Must be Business-led, Benefits-focused & fact-based
  - Prove the Return on investment
    - Tangibly enhance the business
## Our Observations

<table>
<thead>
<tr>
<th>Typical GIS Initiative</th>
<th>A Successful Initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology-led</td>
<td>Business-led</td>
</tr>
<tr>
<td>Technology-driven</td>
<td>Benefits-driven</td>
</tr>
<tr>
<td>Delivers against project milestones</td>
<td>Delivers measurable value to stakeholders</td>
</tr>
<tr>
<td>Focused on Delivering Applications &amp; Functionality</td>
<td>Focused on delivering business capability</td>
</tr>
<tr>
<td>Short-lived buy-in</td>
<td>Long-term stakeholder commitment to success</td>
</tr>
<tr>
<td>Sells GIS thru technology demonstration</td>
<td>Builds consensus by demonstrating value opps</td>
</tr>
<tr>
<td>Not linked Explicitly to organizational objectives</td>
<td>Linked to organizational objectives</td>
</tr>
<tr>
<td>Cannot measure success based on value delivered</td>
<td>Can measure success based on the return on investment</td>
</tr>
</tbody>
</table>

## Customer viewpoint – Issues and Challenges Faced

- Compete to secure an appropriate share of IT-related budget
- Prove the real-value (ROI) of a GIS-related investment
- Prioritise GIS-related investments based on the value delivered to an organisation
- Deliver a growing portfolio of complex GIS enabled initiatives
- Build consensus to allow ‘enterprise’ opportunities to emerge
- Deliver successfully on expected business benefits, not just project milestones
Myths about “ROI” and Business Case development

• Myth #1: “My organization already has mature GIS so they don't need a business case to justify investment in GIS”
• Myth #2: “We are a public organization and more concerned with ‘saving a life’… not ROI”
• Myth #3: “We can't prove the benefit of GIS quantitatively anyway, so why bother?”
• Myth #4: “Proving ROI to my organizations with metrics from other organizations will trigger them to buy” (convince them)
• Myth #5: “A positive NPV is all that's needed to confirm they should be investing in GIS”

ROI: Multiple Definitions

• We use ROI as a generic term to indicate that a given investment will have a positive return to the organization
• It can be described in many forms
  – ROI % return
  – Net Present Value (NPV)
  – Impact to operating free cash flow
  – Impact to P&L
  – Internal Rate of Return (IRR)
• In our experience, ROI (however defined) alone doesn’t secure funding.
• The key is to build consensus and commitment across the organization, and to structure a program of work that will deliver tangible value that everyone believes in.
The Need for This Methodology

- Challenges with Existing Approaches & Literature
  - Hard-To-Find Comprehensive GIS-focused approach
  - Specific Industries
  - Financial analyses
  - Explains what not how
  - Too technology-driven
  - Typically bottom-up (needs analysis)
- Compelling Examples
- No ‘Standardized’ Approach

Key Questions Asked by Budget-holders

- How can business impact be quantified?
- What will be the initial and ongoing expenses?
- What are the resources required?
- When will the business benefits be delivered?
- What’s the financial case?
Objectives of the ROI Approach

- Quantify Impact on ...
  - Revenue growth, assurance and protection
  - Cost containment or reduction
  - Service Excellence
  - Regulatory Compliance
  - Health & Safety
  - Shareholder Value
- Identify ...
  - Initial Capital Expenditure
  - Continuous expenses
- Forecast ...
  - When benefits will be realized
- Define ...
  - Resources required
  - Governance, Management
- Provide ...
  - Financial case (NPV, IRR, Discounted Payback, FCF ...)

Show how to contribute business value to an organization
Determine how much it will cost
Estimate how long it will take
Setting up management oversight
Calculate return on investment

End-to-End Repeatable Steps

1. Prepare for ROI Project
2. Identify Opportunities
3. Prioritize Opportunities
4. Build GIS Program
5. Define Control
6. Estimate Benefits
7. Calculate ROI
8. Benefits Roadmap
9. Build and Present Report
Planning and Investigation

- Understand the context of the ROI project
- Find challenges and opportunities
- Win executive ‘hearts and minds’

Prepare for the ROI Project

- Treat the ROI study as a project
  - It has a defined group of stakeholders who will contribute
  - It has a project plan with start, end dates and well defined activities
  - It has active stakeholder management
  - It has deliverables
- Define your ROI Project Plan
- Build SWOT Analysis of your existing GIS implementation or past attempts.
- The rule here is “Plan and be prepared”
Identify Business Opportunities

- Identify business opportunities for GIS by speaking to your Executives
- Utilize structured interview techniques and scripts
- The focus is on what they see as opportunities or problem areas in their organization
- Take the opportunity to engage with them and educate them, but don’t ‘sell GIS’ to them

Example: Interview Template

<table>
<thead>
<tr>
<th>Topic</th>
<th>General Questions</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>How can we improve the customer experience?</td>
<td></td>
</tr>
<tr>
<td>Finance</td>
<td>What are the key business drivers?</td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>How can we improve our technology infrastructure?</td>
<td></td>
</tr>
</tbody>
</table>

Interview Template:

- Utilize structured interview techniques and scripts
- The focus is on what they see as opportunities or problem areas in their organization
- Take the opportunity to engage with them and educate them, but don’t ‘sell GIS’ to them
Prioritize Business Opportunities (1)

- Use the information gathered from your Executives during interviews
  - And any follow-up meetings with their direct reports
- Collate it together in the Template
- Flesh out the opportunities identified by adding an SCQA for each opportunity
- Also identify metrics that relate to each opportunity
- Avoid politically sensitive benefits e.g. cost reduction via headcount

Example: Benefits Template

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Benefit</th>
<th>Problem</th>
<th>Scenarios</th>
<th>Value</th>
<th>Cost</th>
<th>Timeline</th>
<th>Impact</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
</tbody>
</table>

- Prioritize Opportunities
- Use information gathered from Executives during interviews and any follow-up meetings with their direct reports
- Collate it together in the Template
- Flesh out the opportunities identified by adding an SCQA for each opportunity
- Also identify metrics that relate to each opportunity
- Avoid politically sensitive benefits e.g. cost reduction via headcount

Benefits Template

- Example: Benefits Template
Prioritize Business Opportunities (2)

- Use the template to help prioritize the benefits identified based on
  - Value to the organization
  - Ease of Implementation (delivery)
- At this stage “value” is subjective, but is guided by Executives
- The template will generate a quadrant diagram
- Focus on the benefits falling in the top right quadrant

Example: Quadrant Diagram
What we have accomplished so far

- Engaged with key stakeholders in the business in a professional, structured way
- Assembled a fact-based SWOT analysis
- Identified and prioritized the key business benefits
- Broken down organizational barriers
- Identified ‘quick wins’ for the business
- Gathered a majority of information we'll need to model the benefits quantitatively

Program Definition

- Turn business opportunities into GIS projects
- Define project control and governance
Construct the GIS Program

- Determine what will practically need to be done to deliver the benefits
- Distill the Program into component parts (hardware, software, data, etc)
- Seek to combine ‘like projects’ together and not 1:1 to benefits
  - Take an enterprise view, not application view
- Be pragmatic
- Use Post-it® notes as a means to deal with complexity

Program Pyramid

Program Pyramid – Project Definition

City of Springfield Project 1: City-wide Basemap Web Service

<table>
<thead>
<tr>
<th>Project Objectives</th>
<th>Key Activities</th>
<th>Key Outcome/Deliverable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create an integrated city-wide basemap as a web service that comprises key layers that will be used in multiple City applications.</td>
<td>1. Develop a geographic data model for key basemap layers. 2. Acquire and install server hardware and GIS software suitable for managing and serving data over the web. 3. Extract key features from existing CAD files and load into server basemap database. 4. Update content as necessary with additional data. 5. Publish basemap as a web service. 6. Operate and maintain system.</td>
<td>1. City-wide basemap web service that will provide capability for several other projects in the Program.</td>
</tr>
</tbody>
</table>

Description
Create an integrated city-wide basemap as a web service that comprises key layers that will be used in multiple City applications.

Extraneous Duration
Define Program Control

- Governance is a leading cause of program failure
- Ensure you have adequate controls in place to be successful
- Use the Project Governance Capability Maturity Model (CMM) to rank your team
  - Exposes your strengths and weaknesses
- Shore up any weak spots and be realistic
- Define your delivery team structure (in-house vs external)

Example: Capability Maturity Model
Example: Delivery Team

**Business Analysis**

- Specify the budget for the GIS Program
- Estimate value of the benefits
- Build GIS benefits roadmap
- Calculate financial metrics
Specify & Cost GIS Program (1)

- Assemble your GIS Program budget forecast (CapEx & OpEx)
- Team with your finance department
- Build your budget from the bottom-up, in a robust, defensible manner
- Use the Budget Template to guide you through the budgeting process

Example: Budget Template Definitions

<table>
<thead>
<tr>
<th>Budget Template</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Template Name</td>
<td>The budget template is used to guide the budgeting process through the use of a template that contains the most commonly used elements of a GIS budget.</td>
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<tr>
<td>Narrative</td>
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</tbody>
</table>
Example: Budget Template

**YEARLY TOTAL**

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Expenditure</td>
<td>243,460</td>
<td>5,199</td>
<td>4,889</td>
</tr>
<tr>
<td>Operating Expenditure</td>
<td>34,245</td>
<td>35,274</td>
<td>32,851</td>
</tr>
</tbody>
</table>

Use these figures to populate the Financial Calculations template.

Specify & Cost GIS Program (2)

- Guidance is provided
  - Capital v. Operational expenditure
  - Depreciation
  - Internal Capitalization of Labor
- Output used to populate the “cost” side of the ROI calculation
- Dashboards are automatically generated to provide a full 3 year view

3-Year CapEx & OpEx Budget
Calculate the Benefits

- Quantify in tangible terms
- One of the most challenging aspects of any ROI calculation
- Requires you to model the impacts of GIS as an enabling technology on workflow (base case vs GIS case)

Example: Benefits Model (1)
Example: Benefits Model (2)

<table>
<thead>
<tr>
<th>Input Type</th>
<th>Variable</th>
<th>Base Case</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Fuel Price (per Gallon)</td>
<td>$3.10</td>
<td>$3.26</td>
</tr>
<tr>
<td>Fixed</td>
<td>Average Truck Miles (per gallon)</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Variable</td>
<td>Average Truck Mileage (per day)</td>
<td>200</td>
<td>170</td>
</tr>
<tr>
<td>Fixed</td>
<td>Number of Miles between Truck Service</td>
<td>5000</td>
<td>5000</td>
</tr>
<tr>
<td>Fixed</td>
<td>Average Cost of Truck Service</td>
<td>450</td>
<td>450</td>
</tr>
<tr>
<td>Fixed</td>
<td>Number of Trucks Required Per Day</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Derived</td>
<td>Total Fuel Mileage Per Day</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Derived</td>
<td>Total Fuel Cost Per Day</td>
<td>6,200</td>
<td>6,200</td>
</tr>
<tr>
<td>Fixed</td>
<td>Average Delivery Days Per Year</td>
<td>240</td>
<td>240</td>
</tr>
</tbody>
</table>

Create the Benefits Roadmap

- Illustrates the program activity on a quarterly basis
- Focus on benefit delivered, not project milestones
- Provides a clear ‘roadmap’ for the program
- Built from the discrete project’s defined in Step 4
- Must be realistic, achievable and have broad commitment from the business to succeed
Calculate the Financial Metrics

- Team with your finance department
- Use budget (cost) and benefits calculated in earlier steps to calculate ROI, NPV, IRR etc
- Template provides ‘fill in the blank’ entry and automatically calculates financial metrics
- Template also provides guidance on interpreting the results e.g. ‘creates value’ or ‘destroys value’
- Not just about a positive NPV, it is about successfully delivering on the promised benefit!

Quantified Benefits from Step 7

Budget (cost) from Step 6

= NPV, IRR, MCFCFS, ROI, Payback

Example – Financial Metrics
Prepare and Deliver Report

- Pulling it all together
- Final stage simply summarizes the results of the study
- At this stage, it should be for completeness; not to win budget
- Hearts and minds should have been won long ago, well before executives read the report (which they likely won’t do!)
- Normally a Word-based report plus an Executive Presentation or summary

Insights to consider when using this approach…

- Getting at the numbers
- Proving the impact if you don’t ‘do it’ (e.g. risk management)
- Don’t focus on time-based studies and headcount
- Team with your finance department
- Don’t go it alone
- Sell business value, not GIS
- Be led by the business, not the technology
- Invest the time to plan.
- Speak the language of your executives
- Don’t over evangelize. GIS is not the center of the universe!
Key benefits for your organization

- Avoid a siloed approach to GIS
- Leverage existing investment in GIS technology, data or processes more fully to benefit your organization
- Establish strong stakeholder buy-in, commitment and understanding
- Further validate and refine the work already completed for existing GIS implementations
- Mutual agreement between senior business leaders of the potential opportunities for leveraging GIS
- A common understanding and prioritization, based on fact-based, benefits-focused metrics, of the business benefits
- A defensible budget forecast and achievable roadmap for your Enterprise GIS Program
- And….career advancement!

Understanding the User License Agreement

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(and Answers)