

Application of gis to transport planning

Business



Solutions to the Essay Assignment 1. Various components of a GIS system A GIS can be divided into five components: People, Data, Hardware, Software, and Procedures. No one part can run without the other. People: Is the component that actually makes the GIS work. Which include an excess of positions like GIS managers, database administrators, application specialists e. t.

c Data: most time consuming and costly aspect of initiating a GIS is creating a database, the operation of GIS depends wholly on availability of data's. E. g. patial data or attribute data. Hardware: consists of the physical technical equipment needed to run a GIS and this includes a computer system and input and output devices such as scanners, digitizers,

GPS data loggers, and printers. Software: There are many different GIS software packages available.

All packages must be capable of data input, storage, management, transformation, analysis, and output. Procedures: include how the data will be retrieved, input into the system, stored, managed, transformed, analyzed, and finally presented in a final output. . In ArcCatalog 1. Select a folder in the Catalog tree.

2. Click the File menu, point to New, and click Shapefile. 3. Click in the Name text box and type a name for the new shapefile. 4.

Click the Feature Type dropdown arrow and click the type of feature the shape file will contain. (Point, polyline, and polygon). 5. Click Edit to define the shapefile's coordinate system. 6. Select, import, or define a new coordinate system, then click OK.

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7. If the shape file will store polylines representing routes, check Coordinates will contain M values. 8.

If the shapefile will store three-dimensional features, check Coordinates will contain Z values. 9. Click OK.

The new shapefile appears in the folder's contents. 3. Application of GIS to transport planning include: a. GIS technologies can provide a visual framework for conceptualizing and understanding how transportation contributes to a region GHG (green house gas) emissions profile. This ability could help lead transport planners to develop more effective GHG reduction policies.

b. GIS application helps the transport planners in highway mapping; It aids the planner by the use of GPS. 4. Major factors to consider when carrying out a CBA on transport project: Benefits Costs Discounting a. Benefits The benefits of transportation projects are commonly defined as reductions in transportation costs.

However, on this website, benefits are defined as all of the effects of the project/program on its users or the society at large, even those effects that are negative (sometimes referred to as disbenefits). Benefits and disbenefits are measurable and have economic value.

These are the benefits most commonly considered in benefit-cost analysis of transportation projects: Travel time or delay reductions: The Value of Travel Time (VTT) refers to the cost of time spent on transport. It includes costs to businesses of the time their employees and vehicles spend on travel,

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and costs to consumers of personal (unpaid) time spent on travel. The Value of Travel Time Savings (VTTS) refers to the benefits from reduced travel time costs. Travel time savings is often the principal benefit of a transportation project.

Congestion relief projects are justified primarily by the reduction in travel time they will bring about. Travel time savings can also lead to reductions in vehicle operating costs. Vehicle cost savings: Changes in the costs of owning and operating vehicles (trucks as well as cars) resulting from a transportation improvement project are counted as benefits or disbenefits. Accident reductions (safety): A change in traffic accident (also called crash or collision) rates that results from a transportation project has an economic value. E.

g.

A railroad crossing is moved above grade, eliminating conflicts between trains and pedestrian and vehicle traffic on the street. Air Emission and greenhouse gas reductions: The costs of increased air pollution emissions and the benefits of emission reductions. E. g.

A transit system converts from diesel buses to compressed natural gas buses, reducing emissions. Parking costs savings from projects that reduce vehicle ownership and use: Public transit service improvements cause some commuters to shift from driving to transit, reducing city centre parking problems. . Costs Costs are generally easier to measure than benefits and easier to value, because they represent goods or services that are usually traded for money, such as labour, land, and materials. Typical costs of a

transportation improvement project are: * Initial costs: A project's initial costs are those that are incurred during the design and construction process. Site acquisition; planning, design, engineering, and construction * Continuing costs: A project incurs continuing costs after the facility is completed and while it is in use.

Operations: Traffic management, toll taking, bus operations, and terminal operations. Maintenance: Routine servicing of equipment and facilities (sometimes referred to as preventive maintenance), repair and cleanup required by accidents or adverse weather Rehabilitation costs: A project's rehabilitation costs include the future cost of repairs and improvements beyond routine maintenance. E. g. paving a road with asphalt is being compared with repaving with concrete.

The latter has higher initial costs but also has a longer life before it needs rehabilitation.

End of project" costs: Costs that are incurred at the end of a project or period of analysis include: Residual value (a negative cost) — the estimated value of project assets at the end of the period of analysis, representing their expected value in continuing use Salvage value (a negative cost) — the estimated value of an asset in cases where there exists a market for selling the asset Close-out — costs incurred at the end of the project's operation to put the project " to bed," assuming the analysis period coincides with the project's operation period. . Discounting A dollar today is worth more than a dollar five years from now even if there is no inflation because today's dollar can be used productively in the ensuing five years, yielding a value greater

than the initial dollar. Future benefits and costs are discounted to reflect this fact.

The purpose of discounting is to put all present and future costs and benefits in a common metric, their present value.

Discounting is present in all benefit-cost 5. Data a robust transport database should consist include the following: a. Population b. Transportation facilities c. Road networks d.

Financial resources e. Traffic control features f. Zones g. Modes h. Parks e.

t. c Application/usefulness to transport planning includes the following:

Population: helps the transport planners to estimate the number of commuter in a given region.

Transportation facilities: information's on the available transport facilities in the state helps the planners to know what facility is lacking Road networks: number of road networks in the state helps the planners to where to focus on as regards road construction. Traffic controls features: this takes care of the traffic control system in regulation of traffic Zones: the zoning system helps the planners to plan the development counties and subdivisions Modes and parks: the information about the number of modes in use help s the planners to improve on it and create more. .

Calculate the value of time (hr) in a city. Average monthly income: 36000 a.

Average monthly income = 36000 Working hrs = 8am-5pm = 9hrs Day of the wk = 5 Wks of the month = 4 Days of the wk * wks of the month (5*4) =

$20 \times 9 \times 20 = 36000$
 $36000 / 180 = 200/\text{hr}$
b. Time savings of 30mins 60mins = 1hr
30mins = ? hr = 0.5hrs
 $0.5 \text{ hrs} \times 5 \text{ days a wk} = 2.5$

$2.5/\text{wk} \times 4 \text{ wks /month} = 10\text{hrs}$
 $200/\text{hr} \times 10 \text{ hrs} = 2000 \text{ extra}$
The new average monthly income = $36000 + 2000\text{extra} = 38000$ |