



Applying AI driven Digital Transformation to empower sustainability controls

**Digital Twins as Models of
complex real world systems
and tools enabling holistic
Management and Governance**

Overview of PharosN platform functionalities



OBJECTIVES

Smart Governance application areas:

Agro-Industries, Provinces, Regions, Urban Areas, Cities, Districts, Campuses, eHealth, Water, Waste, Natural and cultural assets, Raw materials, Circular economy, Climate crisis & actions, Energy Efficiency, Green & Integrated transport, Critical infrastructures, Social dynamics trends, etc

An aerial photograph of a densely populated city, likely a favela, with numerous small buildings and colorful roofs. The city is set against a backdrop of hills and a clear sky. Overlaid on the image are seven yellow rectangular boxes containing blue text, each posing a question about smart city technologies.

Smart parking? Electric-cars?

Smart waste collection?

Smart Water?

Interesting events notifications?

Smart Traffic management?

Smart energy grids?

Smart routes planning, etc?



Smart Outcome Monitoring in Evidence-Based Policymaking requirements

Smart Governance needs comprehensive systemic knowledge of evidence

Needs for prompt response to keep control

Real time becomes a must due to increasing dynamics of change

Predictive & prescriptive analytics needed to assist decision makers in effective responses

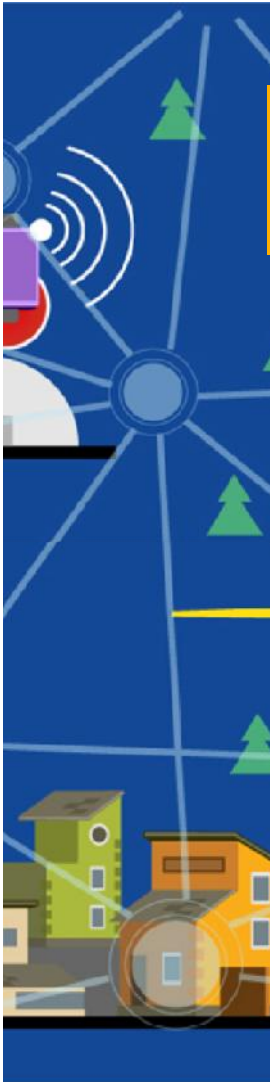
Blockchain technology to ensure identity of events, actions, data sources and results



Can a human monitor complex Big System of System in real time?



Looking after each 1000+... process charts in real time? Really?



PharosN software is AI, Big Data, blockchain driven app

Running Digital Twin as model of the target **Big System of System (BigSoS)** in real time

Collecting big data streams from large number of various heterogenous data sources

Analysing each data stream and its combinations in real time and transforming it into holistic

Answering about the ongoing status “How is my BigSoS?” anytime, in real time.

Analysing BigSoS performance in real time and all the time

Notebooks



Tablets

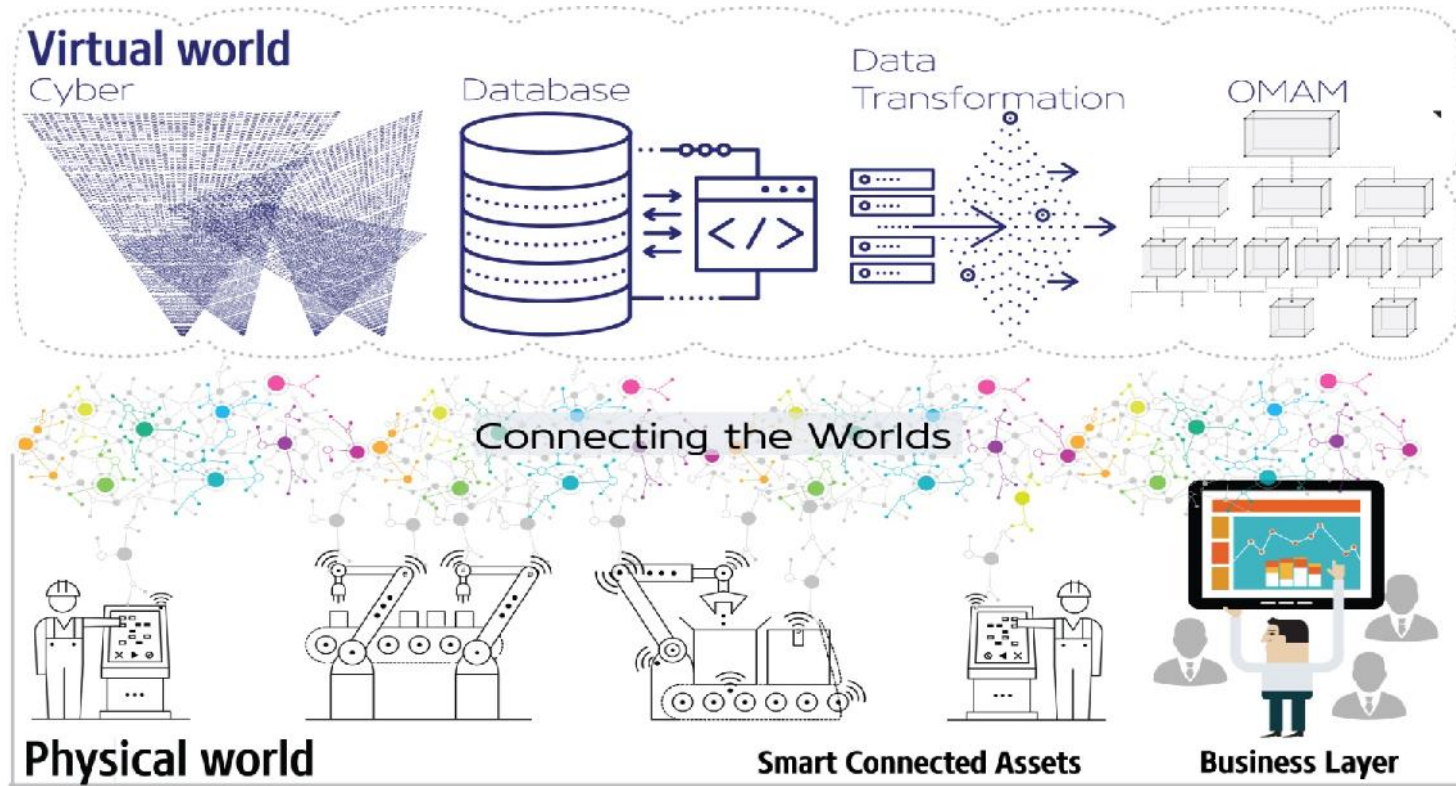


Mobiles



The holistic vision of real time BigSoS performance and its prediction on common mobile devices!

Linking the worlds by Digital Twin Model (OMAM)

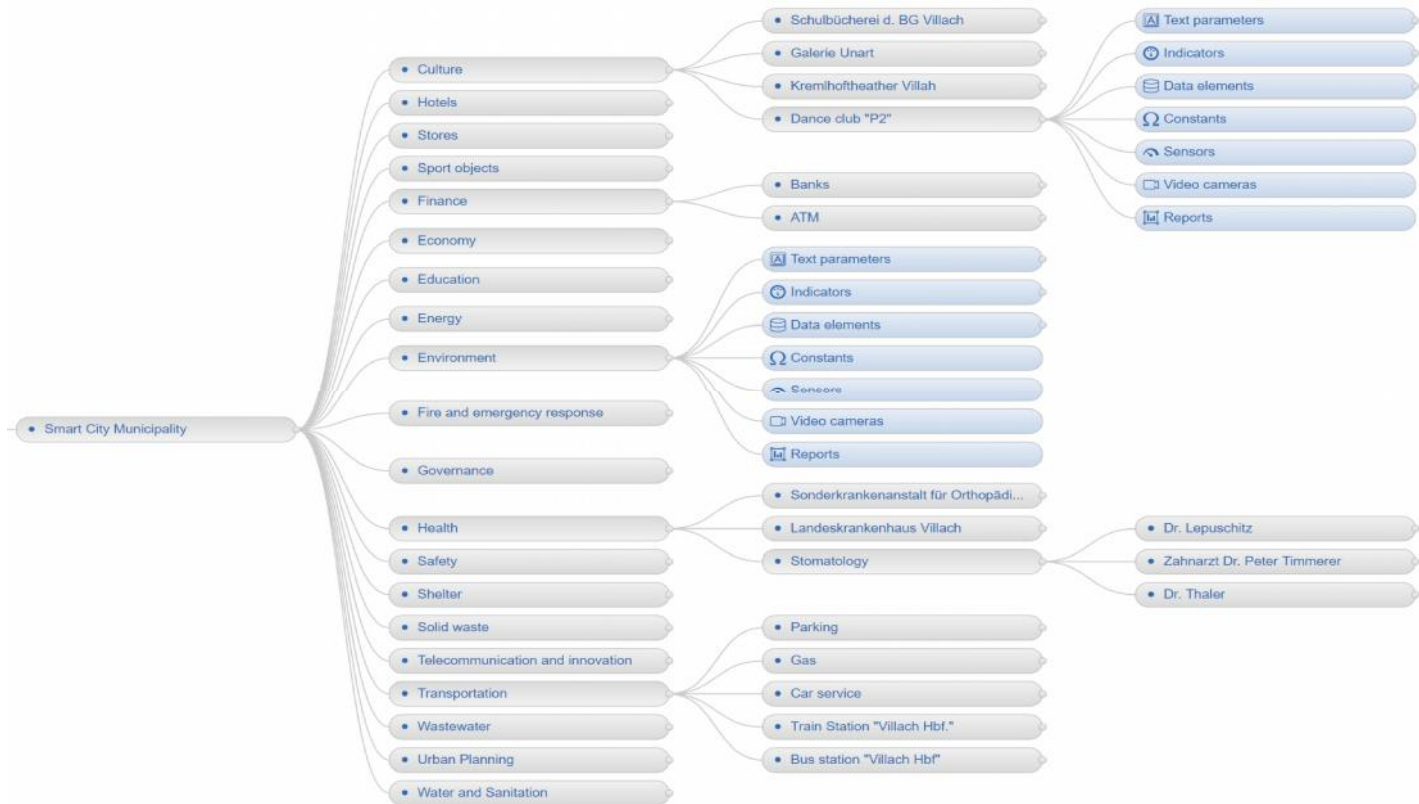


Open Metropolitan Assets Model = OMAM



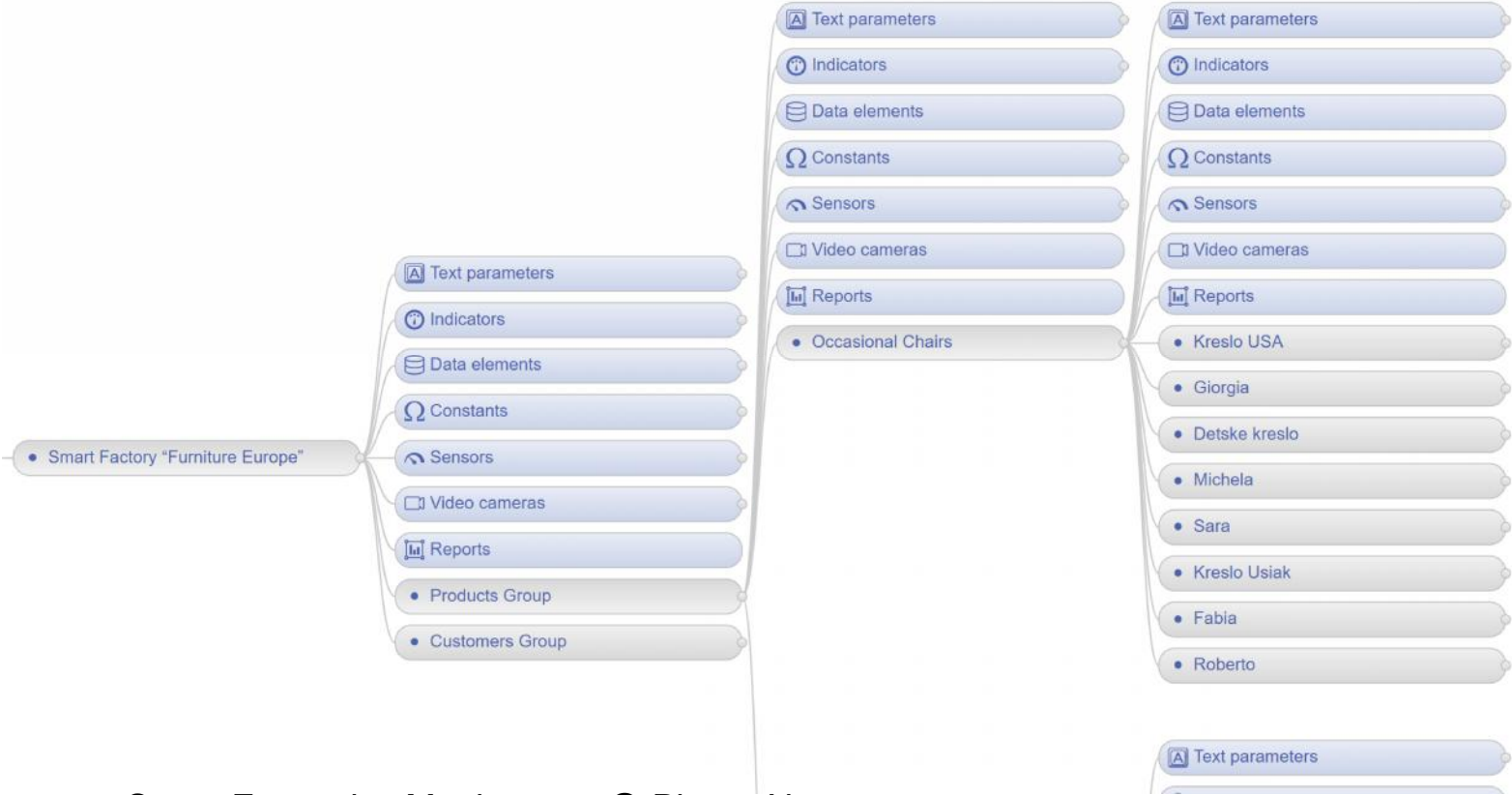
Examples of Digital Twin Models of Big Systems of Systems

Twin Model for a Smart City by ISO 37120 @ PharosN



International standard ISO 37120:2018
 Sustainable development of communities — Indicators for city services and quality of life

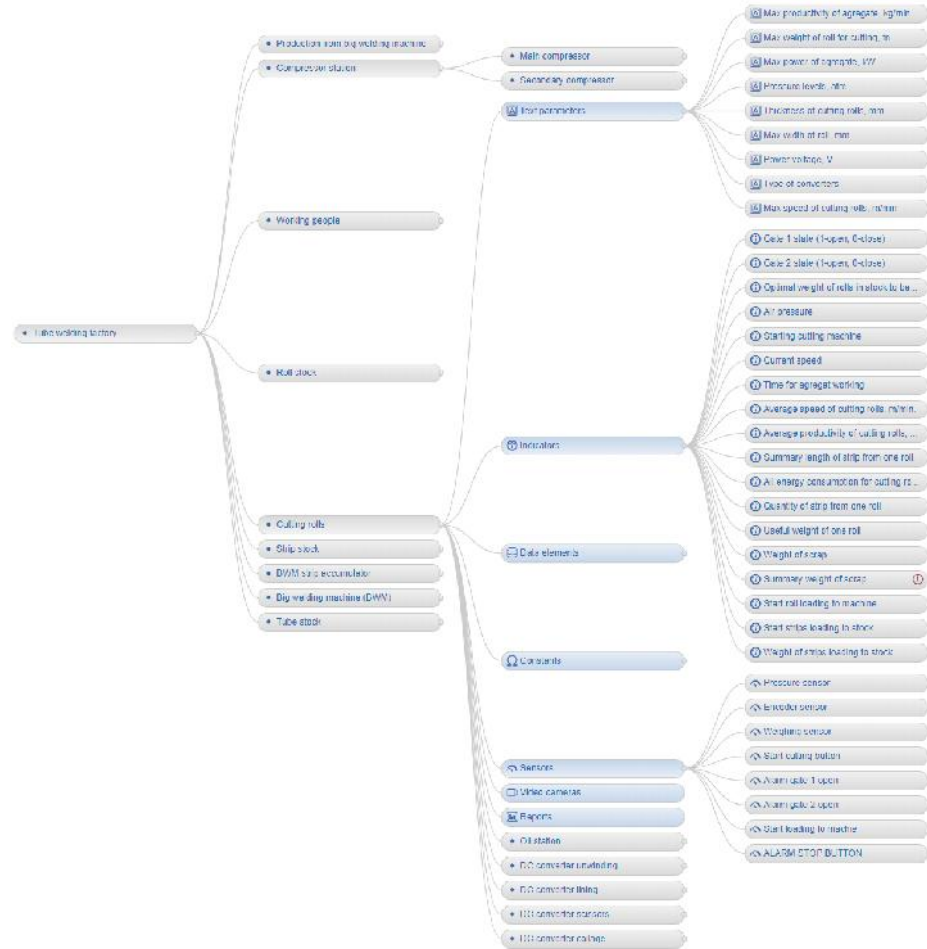
Twin Model for a Furniture Manufacturing



Smart Enterprise Monitor app @ PharosN



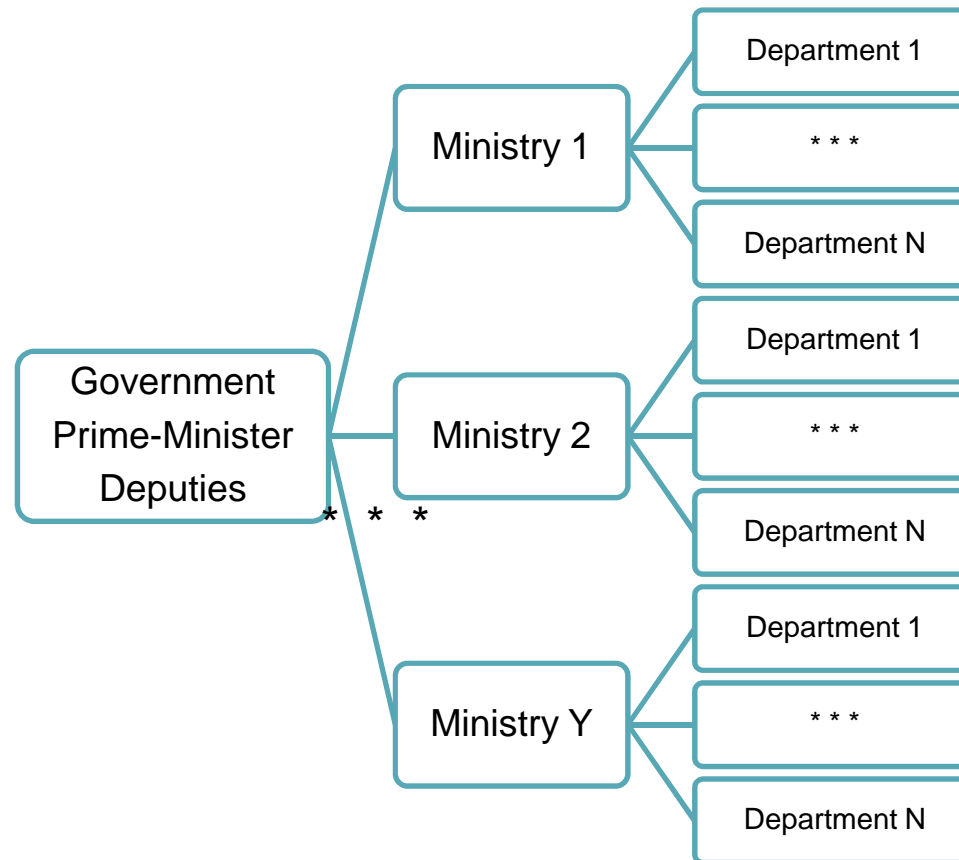
Twin Model for Tube Welding Factory



Smart
Enterprise
Monitor app
@ PharosN

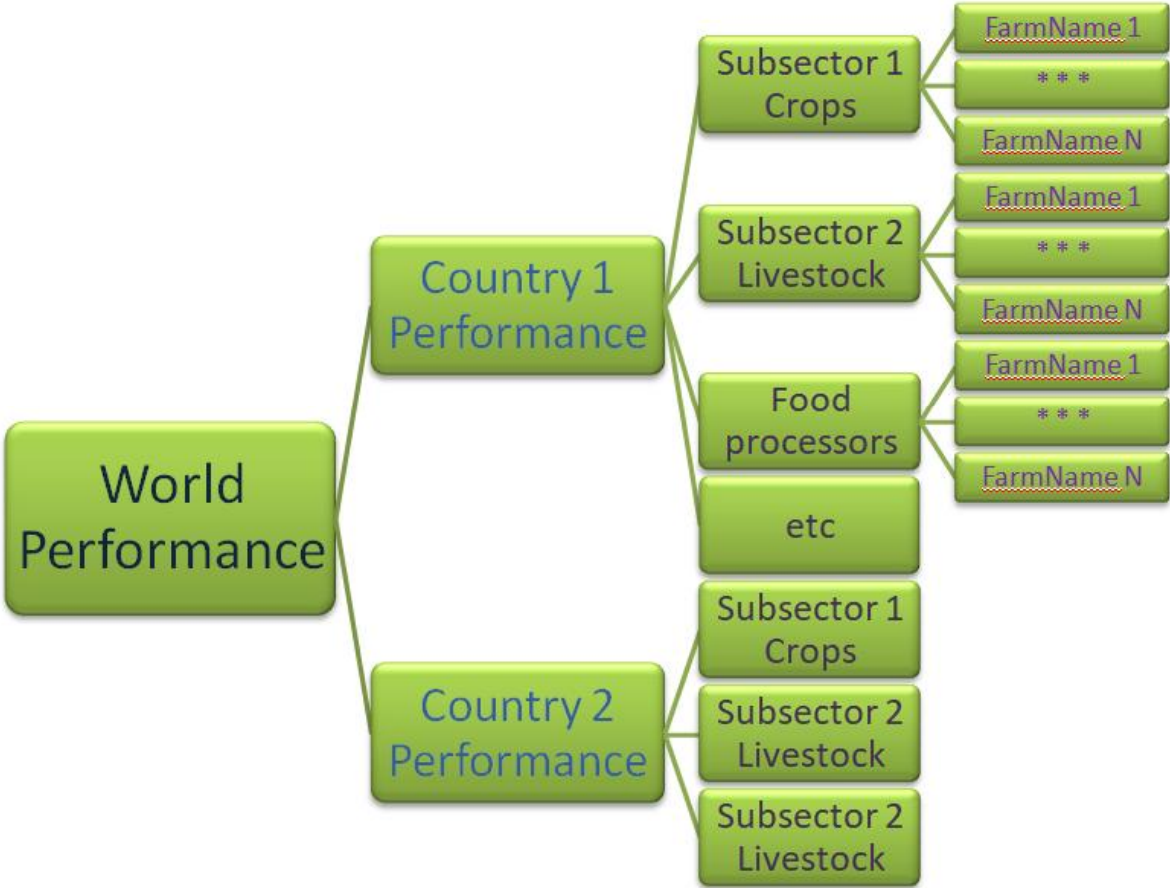


Generic Central Governance Twin Model for a country

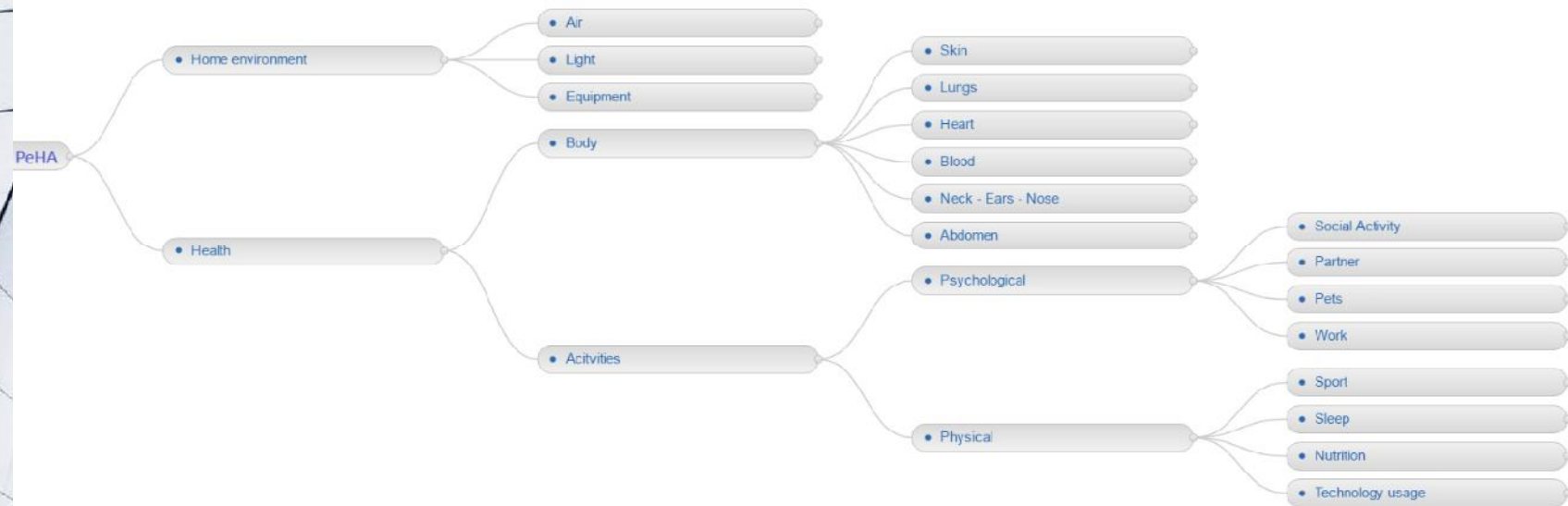




Pharos Agri-Business Navigator model (UNIDO)



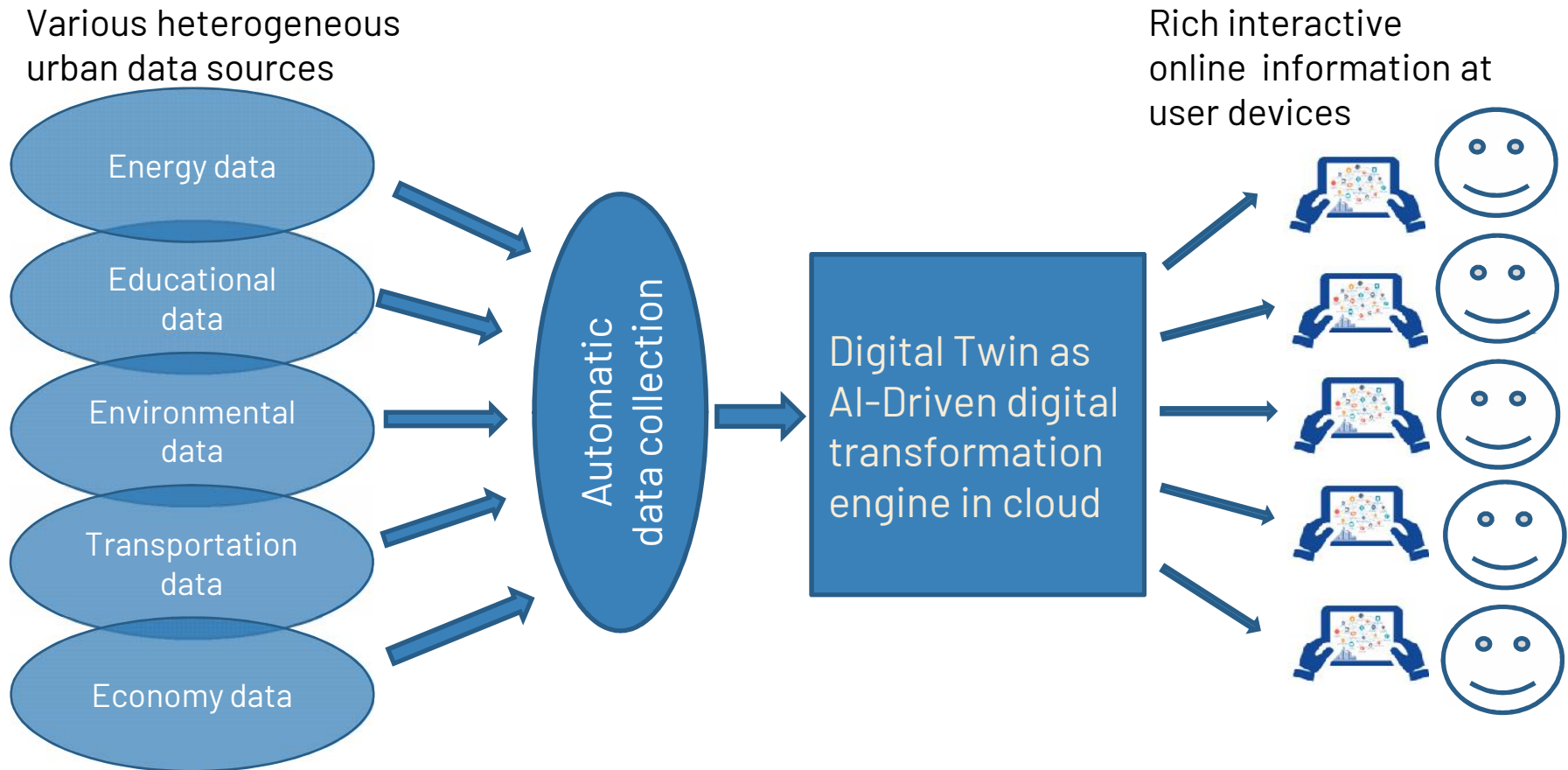
Digital Twin Model for eHealth @ PharosN



Model includes human Health, Environment and Activities

HOLISTIC CORE OPERATIONS: Governance case

Data, Transformation, Smart Governance Monitor, Stakeholders



Presenting Digital Twin calculations simple and easy



The screenshot displays the PharosN Monitoring Dashboard. The top navigation bar includes 'Main Menu', 'Mobile', 'Events Log', 'Tools', and 'Portal Central'. A search bar is present with the text 'Type your search here'. Below the navigation is a toolbar with various icons for navigation and actions.

The main content area is titled 'Monitor ISO 37120' and contains a table with the following columns: Object Name, Status, Tags, Calculated by engine, and Updated on monitor. The table lists various smart city categories such as Environment, Smart City Municipality, Education, Fire and emergency response, etc.

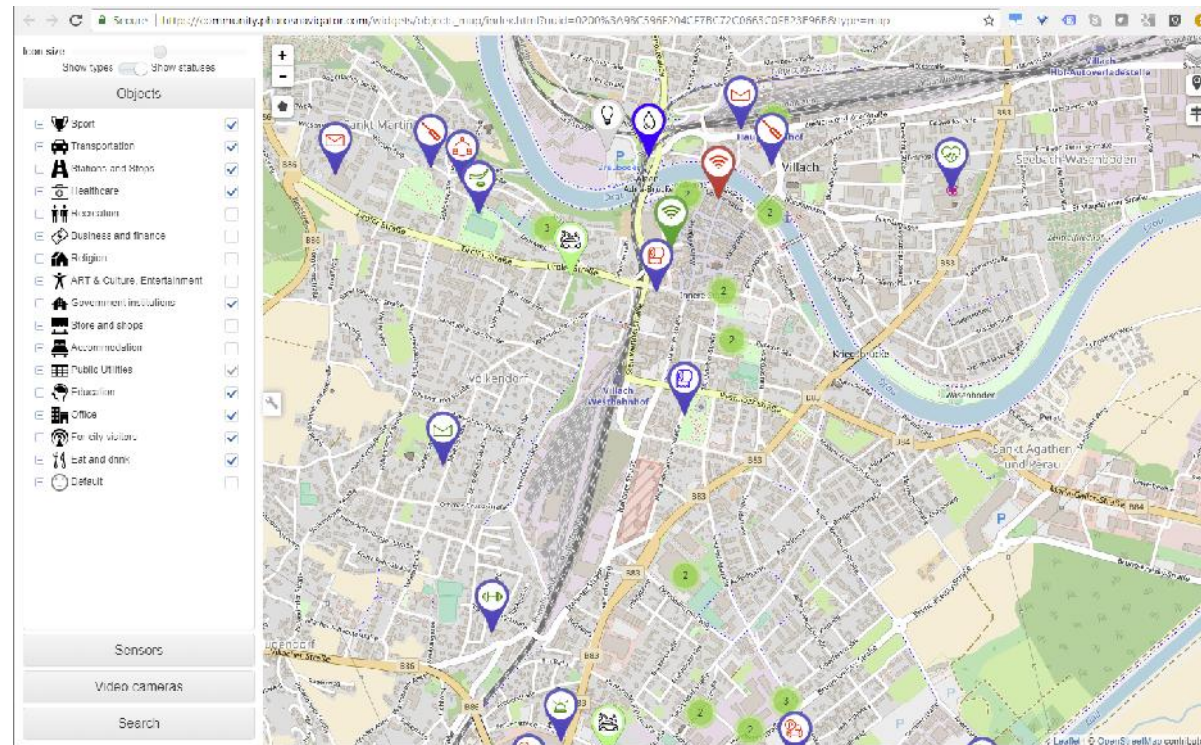
Below the main table is an 'Events Log' section with columns: Flag, Event Description, Source, Time, Date, and Updated on monitor. It shows a list of calculation events for various objects.

Object Name	Status	Tags	Calculated by engine	Updated on monitor
Environment		Particulates, CO2s, Carbon dioxide, Concentration, Environment	2015-08-10T16:51:53	2015-02-31T17:51:53
Smart City Municipality		City, Municipality, Council, Urban area, ISO 37120, Services, Management, Benchmarking, ISO 37101	2015-08-10T16:51:53	2015-02-31T17:51:53
Education		Schools, Primary, Education, Secondary, Students	2015-08-26T16:49:57	2015-02-31T17:49:57
Fire and emergency response		Fire-related deaths, Emergency Response, Disaster-related deaths, Fire Response, Firefighters	2015-08-31T16:42:55	2015-02-31T17:42:55
Telecommunication and innovation		Internet, Cell phones, Connections	2015-08-31T16:42:55	2015-02-31T17:42:55
Energy		Renewable sources, Consumption, Electricity	2015-08-31T16:42:55	2015-02-31T17:42:55
Green space		Waste management, Parks, Recreation, Municipal buildings	2015-08-31T16:42:55	2015-02-31T17:42:55
Urban Planning		Ozone area, Urban Planning	2015-08-31T16:42:55	2015-02-31T17:42:55
Water and Sanitation		Sanitation facilities, Potable water, Access to improved water, Water supply	2015-08-31T16:42:55	2015-02-31T17:42:55
Safety		Police, Homocides, Safety	2015-08-31T16:42:55	2015-02-31T17:42:55
Health		Physicians, Hospital beds, Health, Life expectancy, Child mortality	2015-08-31T16:42:55	2015-02-31T17:42:55
Waste/water		Primary treatment, Wastewater collection, Wastewater treatment, Secondary treatment	2015-08-31T16:42:55	2015-02-31T17:42:55
Shelter		Slums, Shelter	2015-08-31T16:42:55	2015-02-31T17:42:55
Finance		Finance, Municipality's revenue, expenditures, Debt service	2015-08-31T16:42:55	2015-02-31T17:42:55
Solid waste		Waste Collection, Solid waste, Recycled waste	2015-08-31T16:42:55	2015-02-31T17:42:55
Economy		Oil prices, Labor, Property value, Income, Economy, Employment	2015-08-31T16:42:55	2015-02-31T17:42:55
Transportation		Personal automobiles, Passenger transport, Public transport, Public trips	2015-08-31T16:42:55	2015-02-31T17:42:55

Flag	Event Description	Source	Time	Date	Updated on monitor
	Calculating new states of the object "Zaharwrt Dr. Peter Timmerm", Last state: Closed	Server_1	10:51:59	10.08.2016	2015-02-31T17:52:01
	Calculating new states of the object "Internet cafe Martina", Last state: Open	Server_1	16:51:59	10.08.2016	2015-02-31T17:52:00
	Calculating new states of the object "Dr. Thaler", Last state: Open	Server_1	10:51:59	10.08.2016	2015-02-31T17:52:01
	Calculating new states of the object "Smart City Municipality", Last state: Deficient	Server_1	16:51:59	10.08.2016	2015-02-31T17:52:00
	Calculating new states of the object "Bank Austria AG", Last state: Open	Server_1	16:51:59	10.08.2016	2015-02-31T17:52:00
	Calculating new states of the object "Environment", Last state: Optimum	Server_1	16:51:59	10.08.2016	2015-02-31T17:52:00

Monitoring Dashboard @ PharosN platform

Digital Twin presents its results at GIS maps



Monitoring dashboard for a tube welding factory




Main Menu									
Monitor Tube Welding Factory									
Object Name	Status	Info	Map	Tags	Calculated by engine	Updated on monitor	Info		
Tube welding factory	Deficient	Info	Map	Production, Tube, Factory	2019-06-26T21:17:39	2019-06-26T20:17:40	Info		
Cutting rolls	Excellent	Info	Map	Strips, Cutting, Aggregate	2019-06-26T21:17:38	2019-06-26T20:17:40	Info		
Tube stock	Deficient	Info	Map	Stock, Tube	2019-06-26T21:17:37	2019-06-26T20:17:40	Info		
Big welding machine (BWM)	Excellent	Info	Map	Aggregate, Frequency, Welding	2019-06-26T21:17:36	2019-06-26T20:17:40	Info		
DC converter scissors	Excellent	Info	Map	DC converter, Converter, scissors	2019-06-26T21:17:34	2019-06-26T20:17:40	Info		
DC converter unwinding	Excellent	Info	Map	DC converter, Motor unwinding, Converter	2019-06-26T21:17:33	2019-06-26T20:17:40	Info		
BWM strip accumulator	Excellent	Info	Map	Strips, Aggregate, Accumulator	2019-06-26T21:17:07	2019-06-26T20:17:13	Info		
Oil station	Excellent	Info	Map	Oil pressure, Oil station	2019-06-26T21:17:03	2019-06-26T20:17:13	Info		
DC converter lining	Excellent	Info	Map	DC converter, Converter, Lining	2019-06-26T21:17:03	2019-06-26T20:17:13	Info		
DC converter collage	Excellent	Info	Map	DC converter, Converter, Collage	2019-06-26T21:17:03	2019-06-26T20:17:13	Info		
Compressor station	Excellent	Info	Map	Pressure, Compressor station	2019-06-26T21:12:22	2019-06-26T20:12:26	Info		
Frequency converter convoyer	Excellent	Info	Map	Converter, Frequency, Convoyer	2019-06-26T21:12:19	2019-06-26T20:12:26	Info		
Frequency converter calibration	Excellent	Info	Map	Converter, Frequency, Calibration	2019-06-26T21:12:19	2019-06-26T20:12:25	Info		
Frequency converter shaping	Excellent	Info	Map	Converter, Frequency, Shaping	2019-06-26T21:12:19	2019-06-26T20:12:25	Info		
Roll stock	Excellent	Info	Map	Rolls, Stock	2019-06-26T21:12:18	2019-06-26T20:12:26	Info		
Strip stock	Excellent	Info	Map	Stock, Strips	2019-06-26T21:12:18	2019-06-26T20:12:26	Info		

Events Log					
Flag	Event Description	Source	Time	Date	Updated on monitor
Info	Calculating new states of the object "Tube welding factory". Last state: Deficient	Server_1	21:17:39	26.06.2019	2019-06-26T20:17:39
Info	Calculating new states of the object "Cutting rolls". Last state: Excellent	Server_1	21:17:39	26.06.2019	2019-06-26T20:17:39
Info	Calculating new states of the object "Tube stock". Last state: Deficient	Server_1	21:17:39	26.06.2019	2019-06-26T20:17:39
Info	Calculating new states of the object "Big welding machine (BWM)". Last state: Excellent	Server_1	21:17:39	26.06.2019	2019-06-26T20:17:39
Info	Calculating new states of the object "DC converter scissors". Last state: Excellent	Server_1	21:17:39	26.06.2019	2019-06-26T20:17:39
Info	Calculating new states of the object "DC converter unwinding". Last state: Excellent	Server_1	21:17:39	26.06.2019	2019-06-26T20:17:39


Interactive report for a tube welding factory - Overview

Report for "Cutting rolls"

Overview Descriptors Indicators Data Elements Sensors Video cameras Constants



Object name: Cutting rolls











Current state:  (Excellent)

Report date & time: 2019-06-26T20:22:38

Path: [Tube welding factory](#) > [Cutting rolls](#)

Optional object states

Sub-objects and their states

Object	Map	State	Impact on the state
 Oil station			✓
 DC converter lining			✓
 DC converter unwinding			✓
 DC converter collage			✓
 DC converter scissors			✓



Sample Use Cases



Waste



Health



Energy



Open Data



Education



WARNING CITIZENS & TOURISTS ABOUT ACCIDENTS



Use case 3: WARNING CITIZENS and TOURISTS ABOUT ACCIDENTS

Pedestrians use mobile apps to find out the most routes in the city – walk with kids, elderly, dogs, shopping, etc

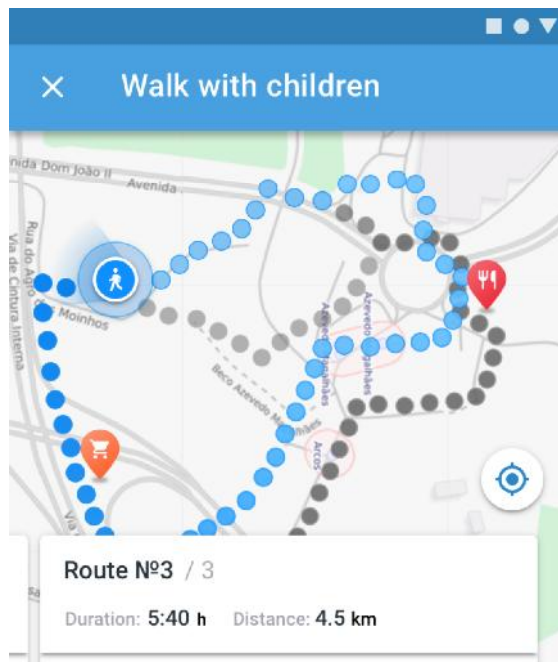
On their way SGM keeps monitoring each pedestrian location in the city (anonymous service using GPS)

In case of accident (gas/water leaks, explosions, fires, etc) SGM automatically notifies all pedestrians near the accident zone and offers rerouting prescriptions at mobiles

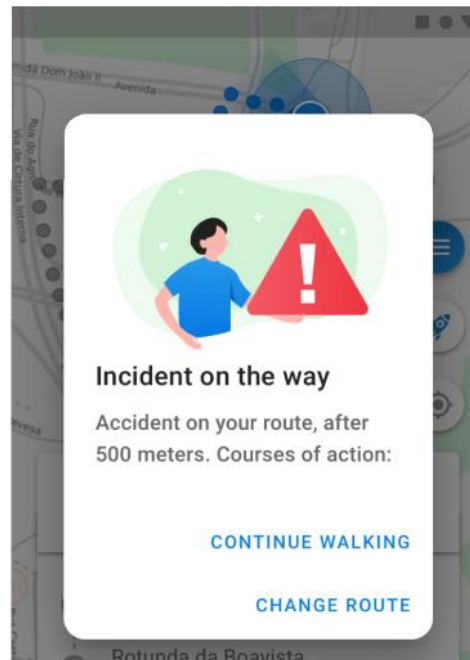
City operational center has full control of the situation and capacity to manage it.

SMART PEDESTRIAN ASSISTANT: for citizens and city administrations

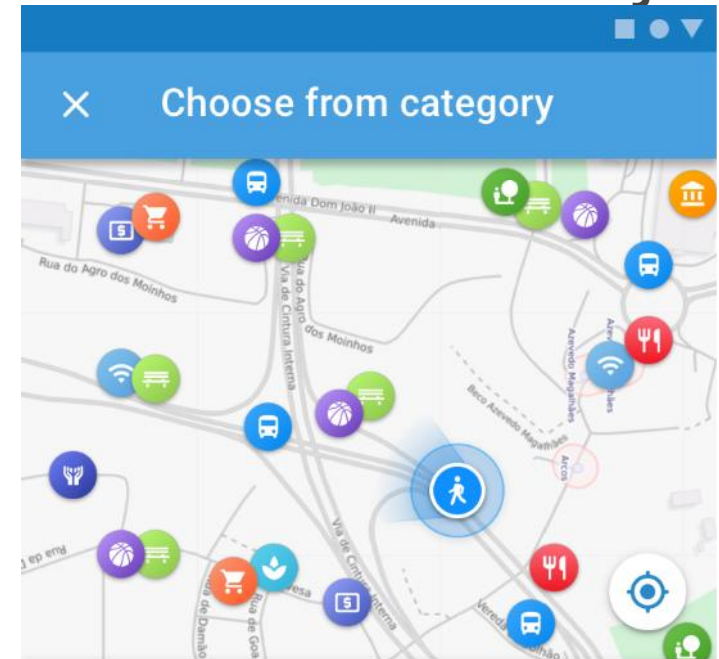
Route selection



Notifications



Choose what is interesting





**REAL TIME PERFORMANCE
ANALYTICS ABOUT ONGOING
PROCESSES IN MANY APPS**

OPERATIONAL TRANSPARENCY FOR MONITORING AND PERFORMANCE IN REAL TIME FOR DIVERSE APPLICATIONS

Shopping Centres



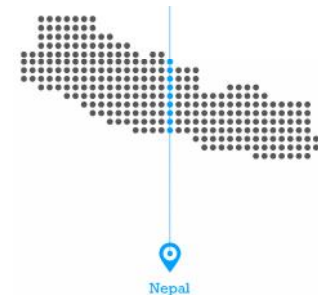
Automatic collection of metering data about each shop operations: water, electricity, waste, number of visitors, current shop status, fire, etc ...

Smart districts



Each costs element for buildings and totals, revenue by categories and totals, etc

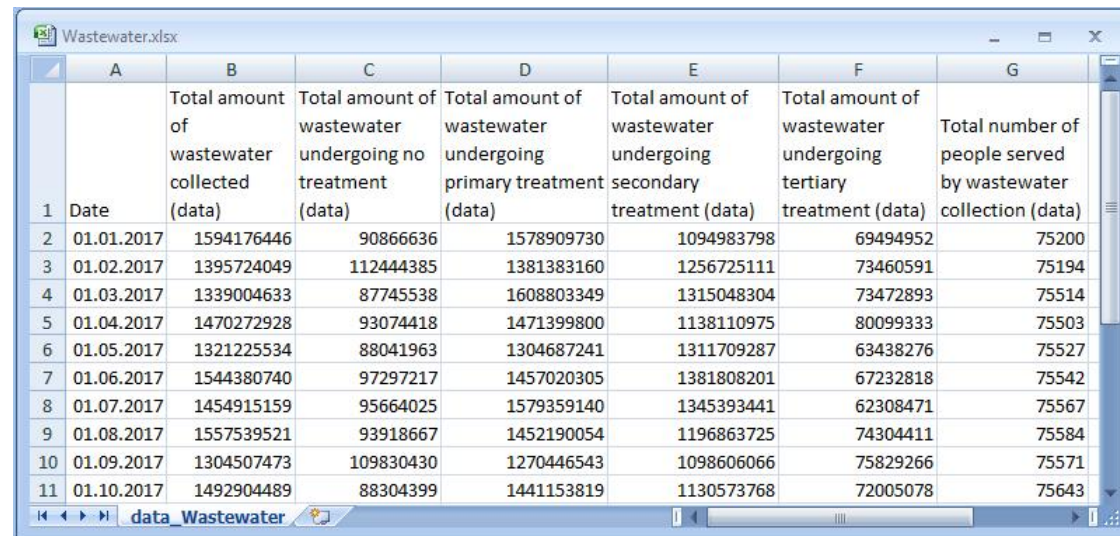
Schools, etc



CO2, operational control, school performance, etc

EXAMPLE OF OPTIONAL DATA SOURCE IN MS EXCEL

Waste water city data by ISO 37120 in MS Excel spreadsheet



	A	B	C	D	E	F	G
1	Date	Total amount of wastewater collected (data)	Total amount of wastewater undergoing no treatment (data)	Total amount of wastewater undergoing primary treatment (data)	Total amount of wastewater undergoing secondary treatment (data)	Total amount of wastewater undergoing tertiary treatment (data)	Total number of people served by wastewater collection (data)
2	01.01.2017	1594176446	90866636	1578909730	1094983798	69494952	75200
3	01.02.2017	1395724049	112444385	1381383160	1256725111	73460591	75194
4	01.03.2017	1339004633	87745538	1608803349	1315048304	73472893	75514
5	01.04.2017	1470272928	93074418	1471399800	1138110975	80099333	75503
6	01.05.2017	1321225534	88041963	1304687241	1311709287	63438276	75527
7	01.06.2017	1544380740	97297217	1457020305	1381808201	67232818	75542
8	01.07.2017	1454915159	95664025	1579359140	1345393441	62308471	75567
9	01.08.2017	1557539521	93918667	1452190054	1196863725	74304411	75584
10	01.09.2017	1304507473	109830430	1270446543	1098606066	75829266	75571
11	01.10.2017	1492904489	88304399	1441153819	1130573768	72005078	75643

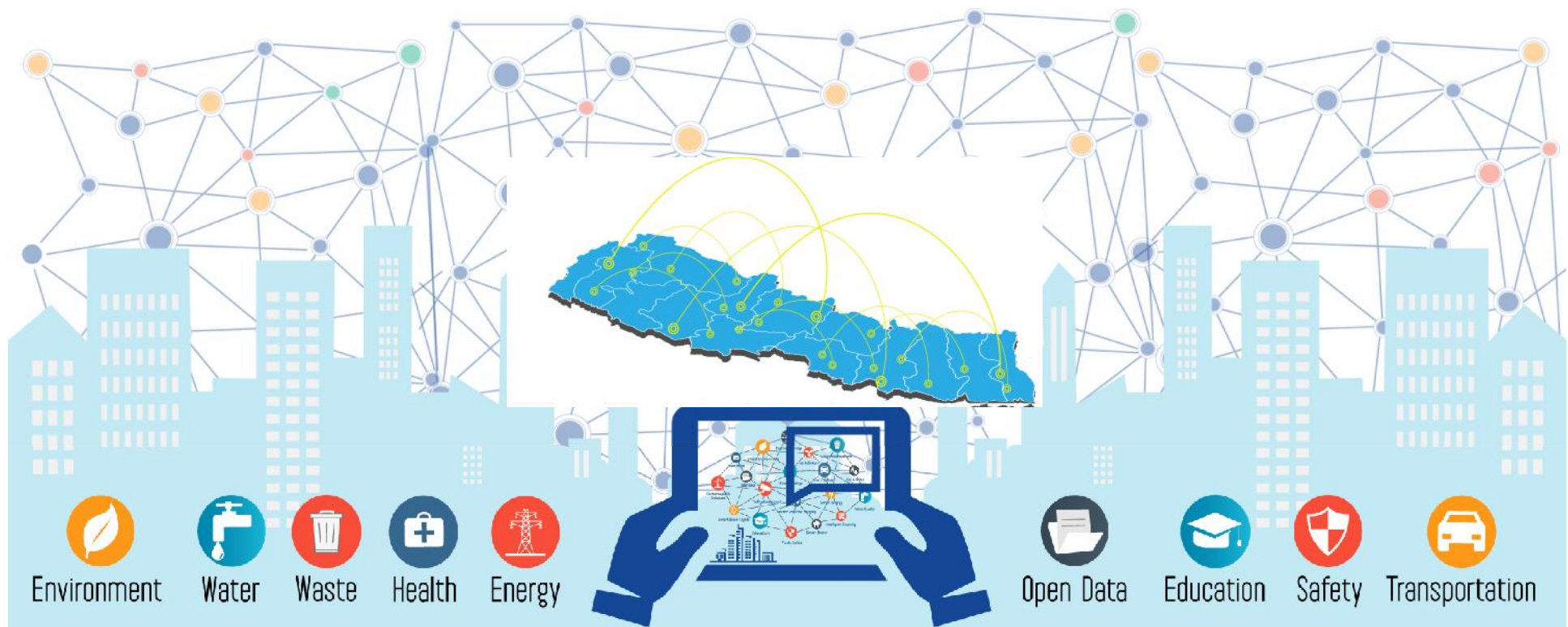
The 20 spreadsheet files for ISO 37120 urban model are periodically updated by different organisations and city departments e.g. monthly. Smart Governance Monitor automatically imports all of them from different city locations, servers, Google docs, Dropbox, etc to calculate KPIs and its presenting at Monitoring Dashboard

AUTOMATIC BIG DATA COLLECTION AND EVALUATION

Database example: Spreadsheets

1. Data import from multiple spreadsheets
2. Storing data locally in system database
3. Calculating indicators for each indicator
4. Analysing each KPI value against planned targets for the normal operations
5. Calculating totals for all system objects
6. Presenting results at interactive reports & dashboards for all stakeholders using common mobiles





Any questions about Smart Governance & Management & eHealth Monitoring apps, business opportunities and partnering for grants?
Contacts us by using feedback forms at web: <http://pharosnavigator.com>