Systematize Everything.

Downtown is a System of Systems.

Main street businesses and districts have marketing systems, infrastructure systems, regulatory systems and organizational systems, among others. Accepting this reality, the study of systems and the application systems analysis is useful when addressing the plans, programs, facilities and services provided by downtown private, public and institutional organizations.

Main Street Shops form a System.

The very nature of a main street is that of a master system. Whether likened to a retail shopping mall or a downtown partnership, the fact that many stores, restaurants and professional offices are co-located in a small zone along a single street makes them co-dependents. They will collectively survive or individually wither.

Rules.

- Always think in terms of systems.
- Collaborate while competing.
- Always leverage everything.
- Always find multiple benefits from every action.

Thinking and Learning.

Every professional regards her/himself as a thinker, a thoughtful person ready to tackle the problems of the day. In reality, little time is devoted to thinking about thinking, the tools available and how to attack the various types of problems to be tackled.

Research says most of a persons' learning is done before entering the first grade. Despite that, life-long learning is the call of the day; continuing to learn to think is time well spent. If tomorrow you only know what you know today, you are behind.

The Critical Thinking Community

Critical thinking...the awakening of the intellect to the study of itself.

Critical thinking is a rich concept that has been developing throughout the past 2,500 years. The term "critical thinking" has its roots in the mid-late 20th century. We offer here overlapping definitions, together which form a substantive, transdisciplinary conception of critical thinking.

Read more at: http://www.criticalthinking.org/

Creative thinking, critical thinking, systemic thinking, random thinking and ideating are learned skills. While every professional regards her/himself as a thinker ready to tackle the issues of the day, in reality, little time is devoted to thinking about thinking, learning about the tools available and how to attack the various types of problems to be tackled.

Systems Thinking.

Systems theory is an interdisciplinary field of science that studies the nature of complex systems in nature, society and science. The main systemic ideas to be aware of are:

- A System is an organized collection of parts or sub-systems that are integrated to accomplish a pre-meditated objective.
- Systems have certain inputs that go through processes that lead to decisions to produce outputs. If one part of the system is changed, the overall system is changed.
- Everything is connected to everything else; pull one string and everything moves.
- Systems analysis is an explicit formal inquiry carried out to help decision-makers identify a better course of action and make a better decision than s/he might otherwise make.

- Systems analysis is called upon when systems are complex and the outcome of any course of action is uncertain.
- Systems can be transparent and easily monitored for performance evaluations.
- A systemic view of organizations is trans-disciplinary and integrative. The systems approach gives primacy to the inter-relationships, not to the elements of the system.
- Systems Analysis, the learned skill, provides tools and techniques for studying systems in a holistic manner.
- Everyone eventually hears everything; the grapevine is an incredibly effective system for communicating accurate and inaccurate information; invest in a public information system designed to be factual.
- Effective systems save time and money; they offer the opportunity to avoid duplications and unnecessary repetitions.

A systems approach can be applied to many facilities not traditionally systematized, such as a public art management system that addresses locations, calls for artists, maintenance and replacement schedules.

Whether it's parking, underground refuse systems, high-speed broadband internet systems or multi-modal transportation systems, systems thinking is what is needed when managing small cities.

*A great resource is **Thinking in Systems: A Primer** by Donella H. Meadows (Author) and Diana Wright (Editor). Ms. Meadows worked on The **Limits of Growth** for the Club of Rome, published in 1960 anticipating the conditions of the 21st century. She fully understands and explains the systems approach to developmental analysis.*

"Smart" Cities.

The US DOT Smart City Challenge offers cities a great opportunity to examine their operating systems and learn better practices for cities across the nation employing innovative technologies. "Smart" city programs are the ultimate application of systems thinking.

"In December, 2015, the U.S. Department of Transportation [U.S. DOT] launched our Smart City Challenge, asking mid-sized cities across America to develop ideas for an integrated, first-of-its-kind smart transportation system that would use data, applications, and technology to help people and goods move more quickly, cheaply, and efficiently.

The Challenge generated an overwhelming response: 78 applicant cities shared the challenges they face and ideas for how to tackle them. Then, the seven finalists worked with DOT to further develop their ideas.

The lessons for small city main streets are several. First, every small city can learn new techniques from the several "smart" applications to the US DOT. Second, measuring outcomes is important. Performance evaluations report progress, or the lack thereof, either of which inspires further learning, innovation and action.

"With the publication of our report, 'Smart City Challenge: Lessons for Building Cities of the Future,' we are making good on our promise to share the lessons we learned about the transportation challenges America's cities face and about the innovative solutions that could help us meet those challenges. The winner of the $40 million grant was Columbus, Ohio.

The applications from Columbus and the other six finalists are instructive. Their ideas and approaches provide insights and information about sustainable practices, "green" initiatives, business models and management systems to be developed to organize, manage and monitor progress. The other six finalists were:

Austin
Denver
Kansas City
Pittsburgh
Portland
San Francisco

Link:https://www.transportation.gov/smartcity/7-finalists-cities.

Downtown is a System of Systems.

The very nature of a main street is that of a master system. Whether likened to a retail shopping mall or a downtown partnership, the fact that many stores, restaurants and professional offices are co-located in a small zone along a single street makes them co-dependents who will collectively survive or individually wither.

A "smart" pole.

Since downtown is a system of systems, there are many facilities and services that benefit from a systems approach. They are:

1. Marketing and Management
2. Land Use and Circulation
3. Transportation, Parking, Stormwater
4. Energy, Internet Service, Security
5. Open space, Public Art
6. Solid Waste, Water and Sewer Utilities

The Dashboard Concept.

In ***Smart Machines***, the IBM authors present the idea of smart systems coming together in a city-wide dashboard. Such a dashboard connected to the streetlight and power pole network flush with sensors can provide an incredible amount of real time, cross-platform, location-specific information about the city's social, economic and physical systems.

Pre-designing the dashboard is an important step in offering a transparent, real-time performance management process.

Master Planning.

The inherent prerequisite for development of every master system is a master plan, a comprehensive, long-term plan that considers the fundamentals of the system being designed plus its direct and indirect impacts….impacts of externalities on the system and impacts of the system on its environment.

A great source to learn the traditional planning process is ***Urban Land Use Planning***, Fourth Edition by Edward J. Kaiser, David J. Godschalk and F. Stuart Chapin Jr, University of Illinois Press. NASA also presents a good master planning process on their website.

Experiment on Main Street.

Use main street as an incubator for new ideas. Experiment with "green" products and systems to develop operational systems for broader, citywide application.

Marketing - Management Systems.

Downtown coordinators, main street managers and redevelopment directors are professionals that provide useful services to a merchants' association, a community redevelopment agency or related groups committed to the well-being of every business, private and public, on main street.

These professionals understand systems and the idea that district-wide marketing provides benefits that individual marketing efforts do not. Clustering is a viable strategy.

Advertisements, celebrations and sales events happen most effectively when conducted district-wide. District websites that are easy to navigate and pleasant to peruse are essential.

Master Transportation Systems.

A holistic transportation system that uses the best features of each mode of travel provides the best service. A street network has a hierarchy of street functions properly located in the network. Mass transit combines the best features of regular bus service, premium service and specialty service for the impaired and impoverished.

Forward thinking is required to anticipate the fundamental changes looming based on rideshare service like Uber and Lyft and autonomous vehicles. Reduced parking areas and increased pick-up/drop-off areas will likely happen. Cars spending less time parked may increase traffic congestion and pollution. Electric vehicles and charging stations are also part of the future program.

Downtown is a key destination for all modes of travel. Thoughtful system design can boost downtown businesses catering to travelers, commuters and visitors. Strategically located parking facilities and ubiquitous bikeways and pedways complete the system.

Master Parking Systems.

Parking is a critical factor in commercial success, just like location. Parking systems consist of on-street and off-street parking in consolidated public parking lots or garages. A systems approach is required since it is impractical in a downtown setting for each store to provide the required number of parking spaces on-site.

On main street, the usual stumbling block is a disagreement over who should use on-street parking. Is the space in front of the store for the store owners; or their customers?

One hopes the customer advocates win this argument. All said, the objective is good customer parking.

- Posted time limits with strict enforcement is one way to solve this problem.
- Parking meters are more drastic but they solve the problem; they also produce revenue but create customer angst.
- Both approaches require personnel and both work with free off-street public parking.

Parking lots can be designed to allow for the efficient siting of future parking decks or buildings. Plan for success; think through the second generation of site development.

Master Stormwater Systems.

Downtown settings preclude the use of land for on-site drainage for each building site; so a master system with curbs, gutters and master ponds is usually in place to handle downtown stormwater. The stormwater goes somewhere, usually out of sight unless it can be funneled to a site that is designed and maintained as a visual amenity that creates real estate value.

Master Energy Systems.

Downtown can be a cell within the areawide power grid that has its own unique features. Utility lines can be more easily provided underground. Substations and micro-grid can be established to enable reliable service. Solar energy sources can take advantage of roof tops, parking lots and streets.

A downtown energy cell enables monitoring programs to measure electric consumption and determine if conservation measures are working.

Small cities have public streetlight and power distribution systems. They can be re-designed in collaboration with technology companies, regulators and stakeholders to create a robust, city-wide information system.

Master Internet Services.

Internet Service Master Plans. Downtown may consider internet service a commercial service provided by private vendors or a public utility. In either case, downtown can benefit from an internet service master plan [ISMP]. The plan ensures that businesses, residents and emergency service providers have full access to high-speed broadband internet service.

Smart Poles. An approach used by many cities and utility companies is to use the existing system of streetlight and power poles. In general, they are everywhere. Connecting the existing downtown poles to the internet, with wires or without, opens a broad universe of information collection and distribution. Add sensors to the poles and the amount of information that can be collected and disseminated is enormous.

Master Security Systems.

Main streets have unique security needs. They have businesses, employees, residents and visitors that produce large numbers of people on the streets, in the buildings and parks. Police, fire protection and emergency response systems are usually a combination of codes aimed at prevention and rescue resources ready for emergency response.

A downtown plan for law enforcement, fire and rescue makes main street safer and more inviting to residents, businesses and visitors.

Master Open Space Systems.

A holistic open space system ties together all elements of the city that are not buildings or pavement. A holistic system includes parks and recreations areas plus, school grounds, wetland and upland conservation areas, lakes and streams, open easements such as power line easements and the trails and sidewalks that connect them.

The challenge is to consider the entire city to be a park and to design the open spaces such that each one contributes to the system and serves as a public amenity. Public ergonomics and cleanliness are essential.

Art marks the West Orange Trail in downtown Oakland FL.

Master Public Art Systems.

The provision of public art on main street can be systematized in the sense that there is a plan for locations of certain types of art [sculptures, murals, etc.] and a schedule and budget for acquiring art pieces. A Public Arts Plan provides guidance and energy to beautify main street.

Lake Placid FL. Town of Murals.

Master Utility Collection and Distribution Systems.

Potable water systems, wastewater systems and solid waste systems are traditional utility systems managed by cities with a master systems approach. These services are typically provided to downtown properties. Over time, they will be re-built and up-graded with “green” and “smart” technologies.

'Smart" Solid Waste Systems.

Kissimmee Uses Innovation to Solve Solid Waste Management With Underground Refuse Systems. The City, along with Jay Wheeler, President of Underground Refuse Systems, presented an innovative way to overcome the challenge that so many cities and counties throughout the United States have to confront. Sensors communicate when the receptacles need to be emptied. The problems with commercial dumpsters, corrals and spillage are solved by the system pictured below.

Kissimmee is the first government agency to partner with Underground Refuse Systems, a local business that is part of the UCF Business Incubator located in downtown Kissimmee. Underground Refuse Systems is the first of its kind in the United States to utilize underground trash containers. They eliminate unwanted dumpster use, unsettling odors, the unsightliness of above ground storage containers and the unnecessary use of space. The system is operational in Kissimmee FL.

Source:
https://www.youtube.com/watch?v=S_o9Eu2iT64

Solid waste receptacles, Kissimmee FL.

Conclusions.

1. Downtown is a system of systems.
2. A systems approach is critical to take advantage of the multiple benefits inherent in each system and the synergies available from systems that collaborate.
3. The many systems downtown are:
   - Marketing and Management
   - Land Use and Circulation
   - Transportation, Parking, Stormwater
   - Energy, Internet Service, Security
   - Open space, Public Art
   - Solid Waste, Water and Sewer Utilities
4. Much of the city's infrastructure will be re-built in the coming decades; the re-building offers the opportunity to up-grade facilities to take advantage of "green" and "smart" technologies as a matter of course based on long-range planning rather than on an emergency basis.
5. Downtowns are fertile fields for experimentation; new systems and techniques can be tried on main street for later application city-wide if the experiment is successful.
6. A Dashboard that consolidates the reporting systems from the many individual facility and service reports can improve efficiency and effectiveness of the city's performance.
7. Learning from the experience of other cities pioneering "smart" technologies is being facilitated by each leading-edge city, the US EPA, the US DOT and many other sources; take advantage.