

The Sanitation Economy & Public Health  
 Alexandra Knezovich, Toilet Board Coalition, Geneva  
 A Webber Training Teleclass



THE SANITATION ECONOMY  
& PUBLIC HEALTH


ALEXANDRA KNEZOVICH  
 DIRECTOR OF OPERATIONS  
 TOILET BOARD COALITION  
 GENEVA

HOSTED BY MICHAEL LINDENMAYER



www.webbertraining.com November 18, 2021

### WHY SANITATION?



**5 years into the race to the 2030 Targets**

**Safe sanitation**

In 2020 **3.6 billion people** lacked safely managed sanitation services



In 2020 **115 million people** gained access to safe sanitation services at home

By 2030, at this rate, **2.8 billion people** will still lack safe sanitation at home


To close the global gap, the rate of progress must move: **4x faster**

To eliminate inequalities progress must move:

- 4x faster** in rural areas globally
- 5x faster** in urban areas globally
- 9x faster** in fragile contexts
- 15x faster** in least developed countries

2



Hosted by Michael Lindenmayer  
 www.webbertraining.com

The Sanitation Economy & Public Health  
Alexandra Knezovich, Toilet Board Coalition, Geneva  
A Webber Training Teleclass

## ABOUT TOILET BOARD COALITION



**OUR VISION**

We envision a global marketplace – a sanitation economy – for self-sustaining and resilient sanitation systems that serve our population, strengthen our planet and generate economic returns for businesses of all sizes and geographies.




**OUR MISSION**

Drive private sector engagement towards universal access to sustainable safety managed sanitation.


3

**TOILET**  
BOARD COALITION

## WHO ARE WE



MICHAEL LINDENMAYER  
host



ALEXANDRA KNEZOVICH  
speaker

4

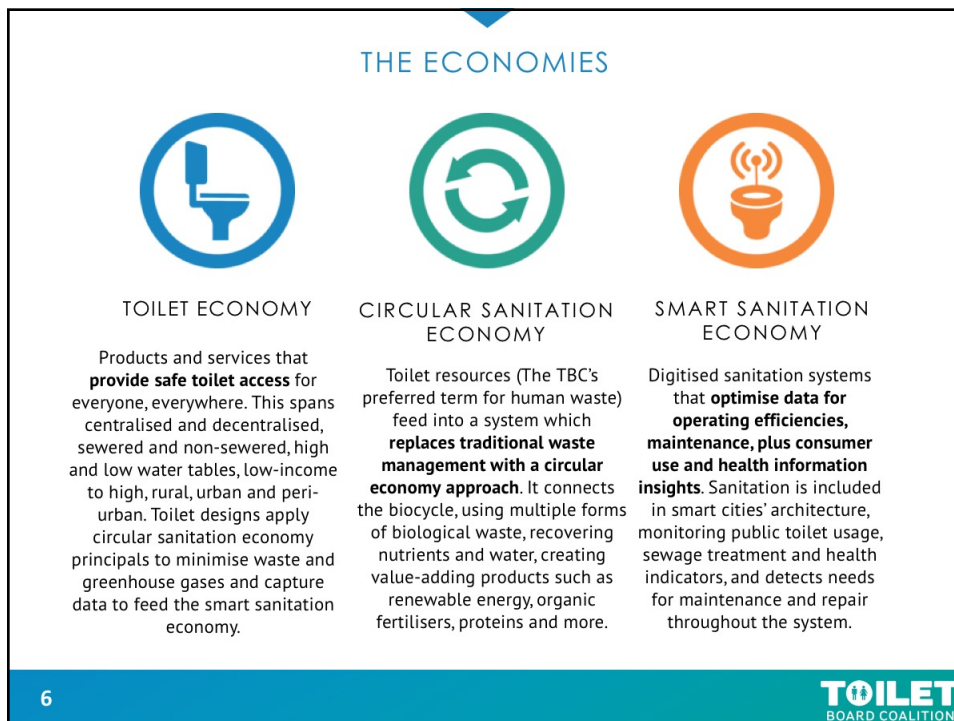
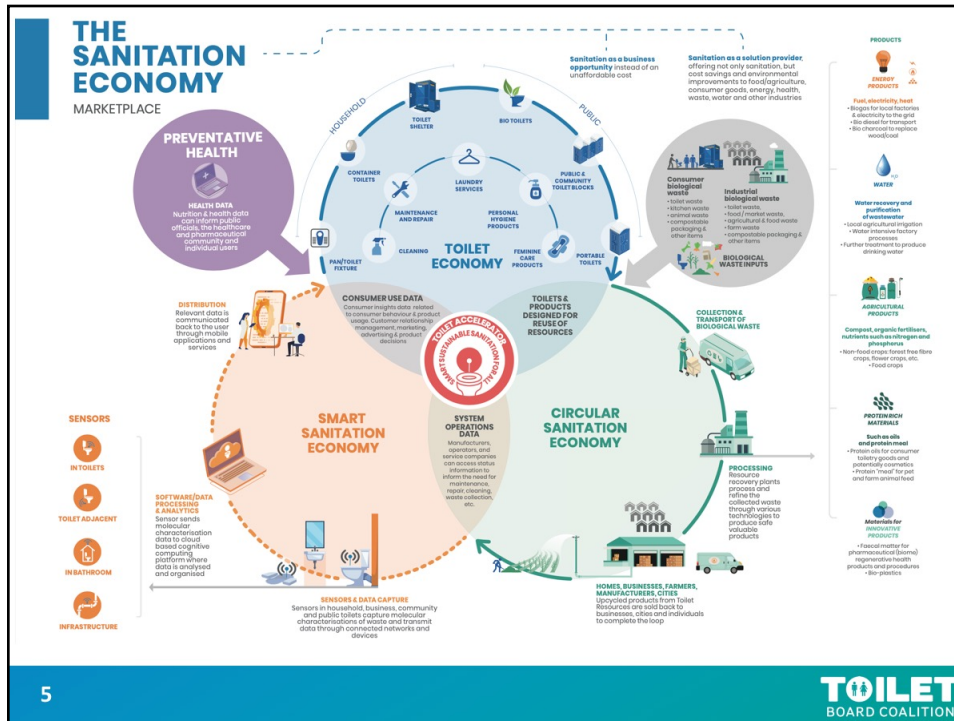
**TOILET**  
BOARD COALITION

Hosted by Michael Lindenmayer  
[www.webbertraining.com](http://www.webbertraining.com)

# The Sanitation Economy & Public Health

## Alexandra Knezovich, Toilet Board Coalition, Geneva

### A Webber Training Teleclass



# The Sanitation Economy & Public Health

## Alexandra Knezovich, Toilet Board Coalition, Geneva

### A Webber Training Teleclass

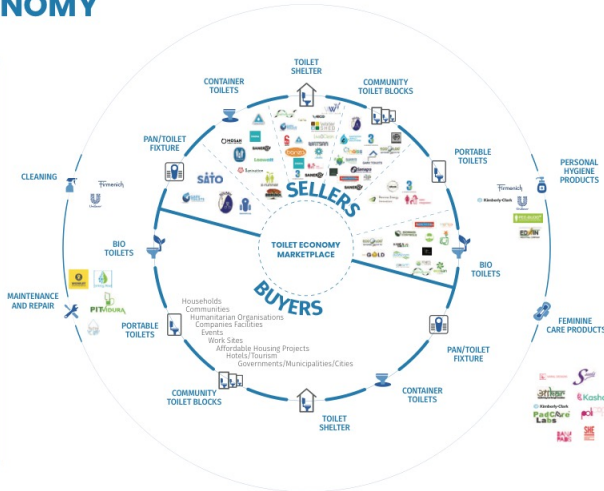
## THE TOILET ECONOMY MARKETPLACE

The toilet in the Sanitation Economy, provides new opportunities.

A Sanitation Economy toilet captures Toilet Resources optimised for conversion to value adding products.

A Sanitation Economy toilet captures data optimised to empower users, operations and maintenance, health and hygiene.

Pathways to scale include urban public and community toilet blocks, schools and healthcare facilities, housing developments, factories and facilities, agricultural plantations and mining communities.



7

**TOILET**  
BOARD COALITION

## THE CIRCULAR SANITATION ECONOMY MARKETPLACE

The Circular Sanitation Economy offers multiple opportunities for toilet resources to not only be safely collected and treated but to then be converted into a variety of value-adding products.

The Toilet Board Coalition has been working with cities and businesses to assess the most valuable outputs for their context. Imperative to profits and a successful scaling of the Sanitation Economy is conversion of 100% of the Toilet Resources.

Pathways to scale include Circular Sanitation Economy applications for cities, sectors such as agriculture, manufacturing and mining communities, and new standards for the safe re-use of Toilet Resources.



8

**TOILET**  
BOARD COALITION

The Sanitation Economy & Public Health  
 Alexandra Knezovich, Toilet Board Coalition, Geneva  
 A Webber Training Teleclass

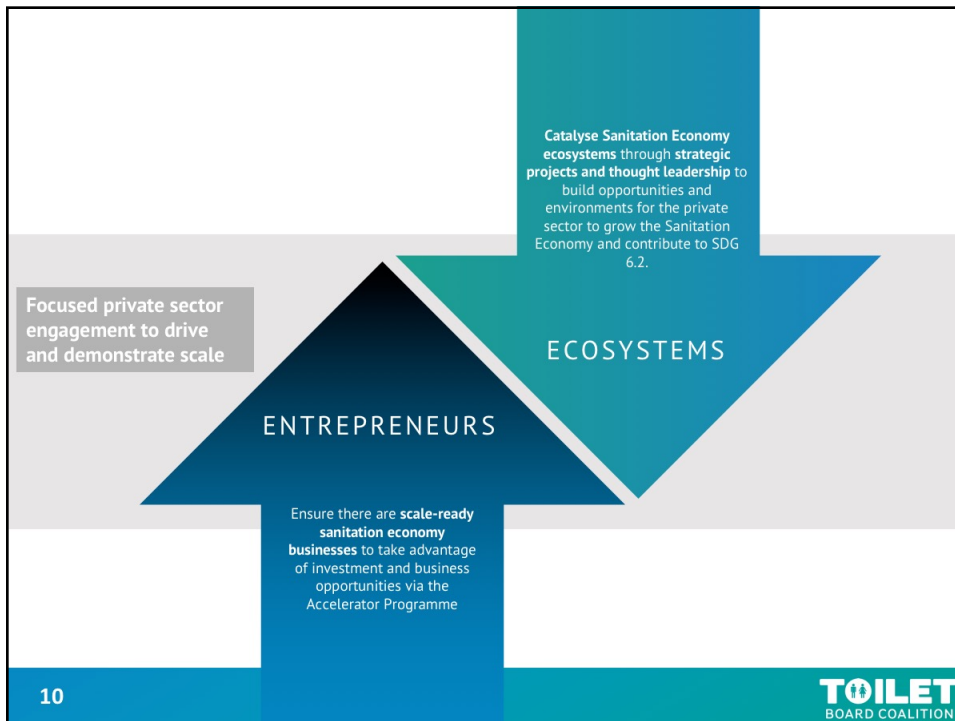
**THE SMART  
 SANITATION ECONOMY  
 MARKETPLACE**

There is a rapidly growing sector of smart sanitation technologies, from business optimisation to sanitation system and community health monitoring and space technologies.

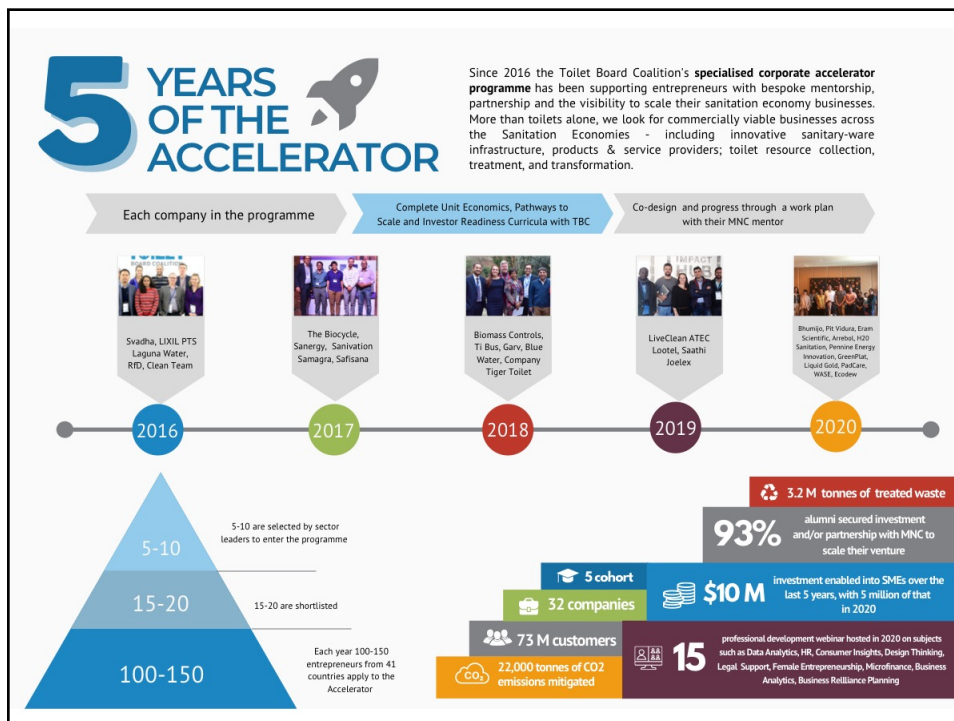
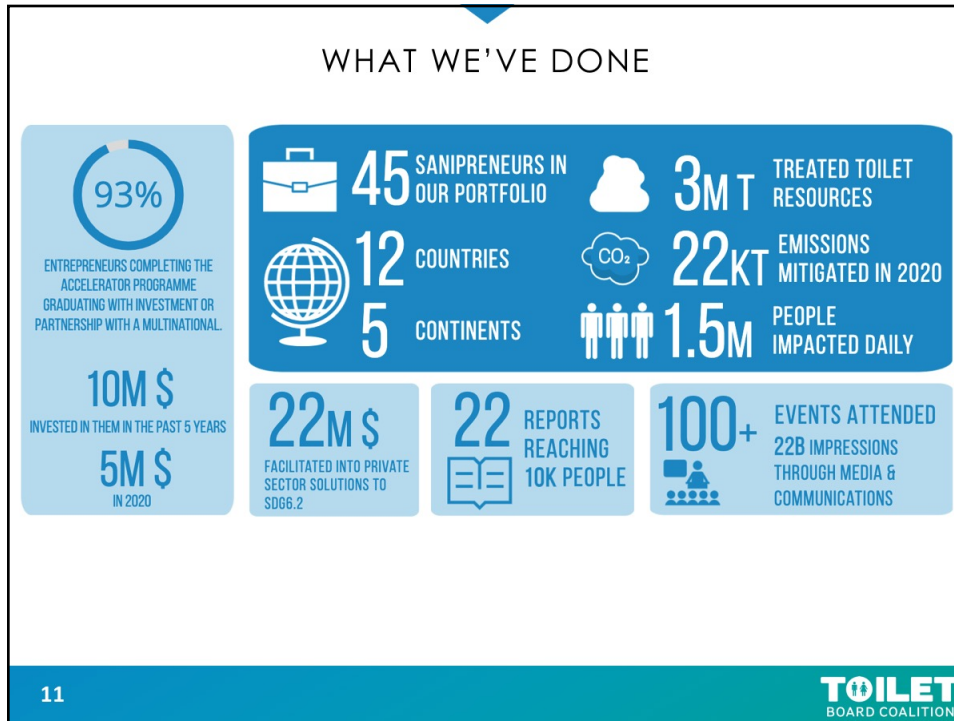
Data from sanitation systems offers the final push to take Sanitation Economy business models to profitable.

Digital technologies have the potential to activate new Sanitation Intelligence for cities, users, businesses and governments.

Pathways to scale include applying sensor technologies to toilets and sewage treatment connected to smart city control centres open data platforms to invite business solutions and innovation.

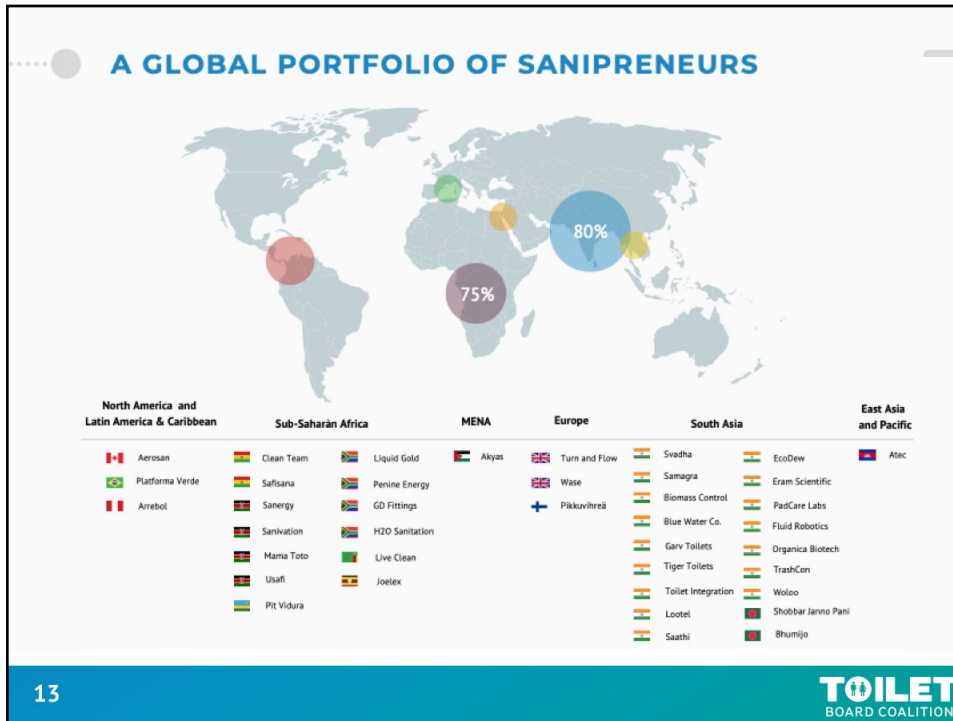


The Sanitation Economy & Public Health  
 Alexandra Knezovich, Toilet Board Coalition, Geneva  
 A Webber Training Teleclass



Hosted by Michael Lindenmayer  
[www.webbertraining.com](http://www.webbertraining.com)

The Sanitation Economy & Public Health  
 Alexandra Knezovich, Toilet Board Coalition, Geneva  
 A Webber Training Teleclass



### WHAT OUR ENTREPRENEURS THINK OF US


“The TBC is supporting early-stage sanitation companies and supporting their business practices. It has helped us develop our financial models and strategy.”

Thomas Fudge, CEO, WASE




“The TBC has helped Biomass Controls with inventory financing for projects in India. In the future, I am excited to work with other sanipreneurs that are complementary.”

Jeff Hallowell, Executive Chair Biomass Control



“Even though in the depths of a pandemic, there is always an opportunity and the passion for what we do. I've been able to army through any challenges with the right advice and mentorship. From that perspective, we thank TBC for its great network and it is a privilege to be amongst the innovators and entrepreneurs who are helping to achieve a very vital part of SDGs.”

Orion Herman, Co-Founder, Liquid Gold




“My skills in the context of marketing and operations, from where we seek the corporate value, have definitely improved, we are able to communicate with the customers because of the continuous support of the TBC.”

Ajinkya Dhariny, Founder & CEO, PaCare Labs



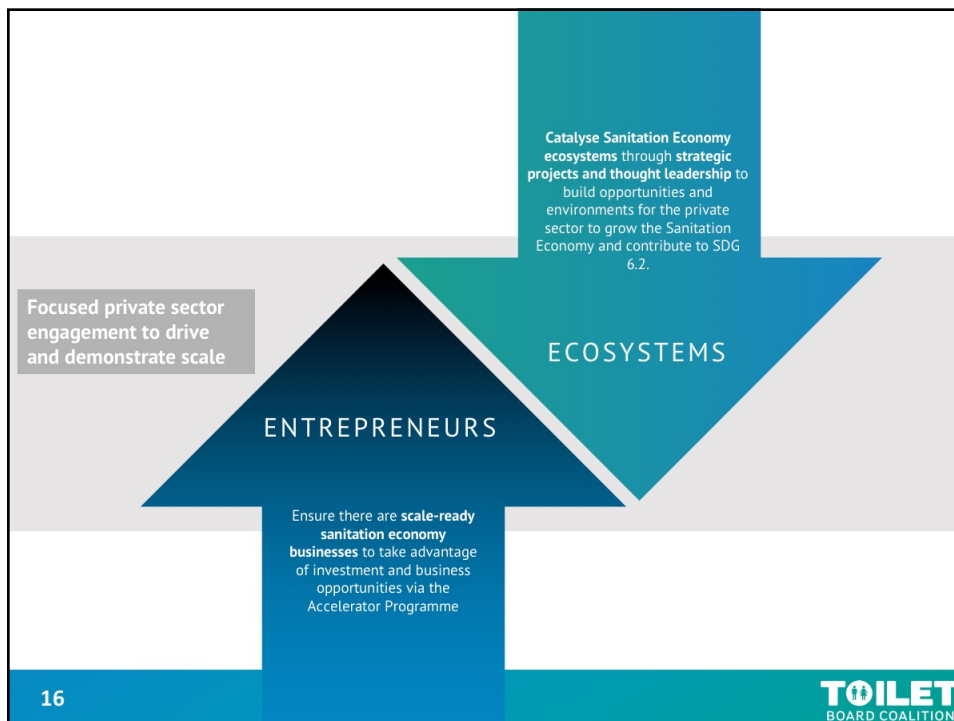
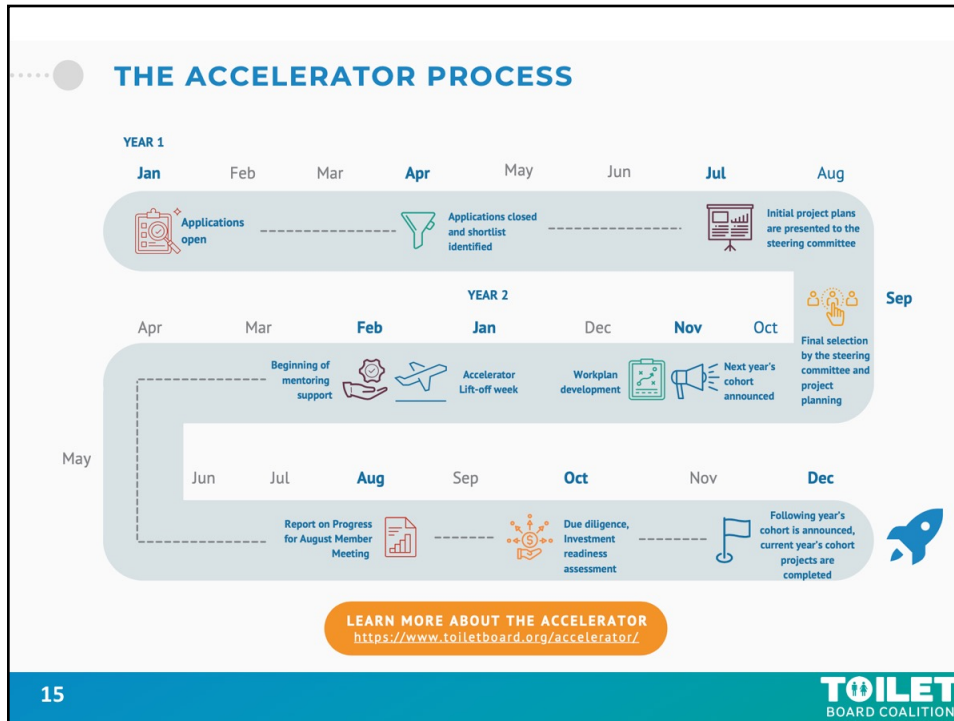
“TBC brought us the light about how relevant our business is to contribute to addressing the problem of sanitation. At the beginning of our history, our company was very focused on solid waste. TBC brought us many opportunities, but the most important are the learnings and the self-consciousness about our role in sanitation, this empowered our team and as consequence we have specialized. We are very excited and look forward to future partnerships.”

Chicko Sousa, Founder, GreenPlat



14 **TOILET BOARD COALITION**

The Sanitation Economy & Public Health  
 Alexandra Knezovich, Toilet Board Coalition, Geneva  
 A Webber Training Teleclass





The Sanitation Economy & Public Health  
 Alexandra Knezovich, Toilet Board Coalition, Geneva  
 A Webber Training Teleclass

PROJECTS



INNOVATION LABS

Co-design an Innovation Lab with the Toilet Board Coalition to engage with entrepreneurs and fill a technological, business model, geographic or demographic gap in the Sanitation Economy.



SCALE PROJECTS

Design and implement bespoke collaborative projects with multinational corporations (or local governments) to advance sustainable sanitation economy systems in a specific context.



KNOWLEDGE & INSIGHTS

Partner with the Toilet Board Coalition to highlight the business insights and new perspectives of the Sanitation Economy in a sector or geography through media, publications or the development of a standard.

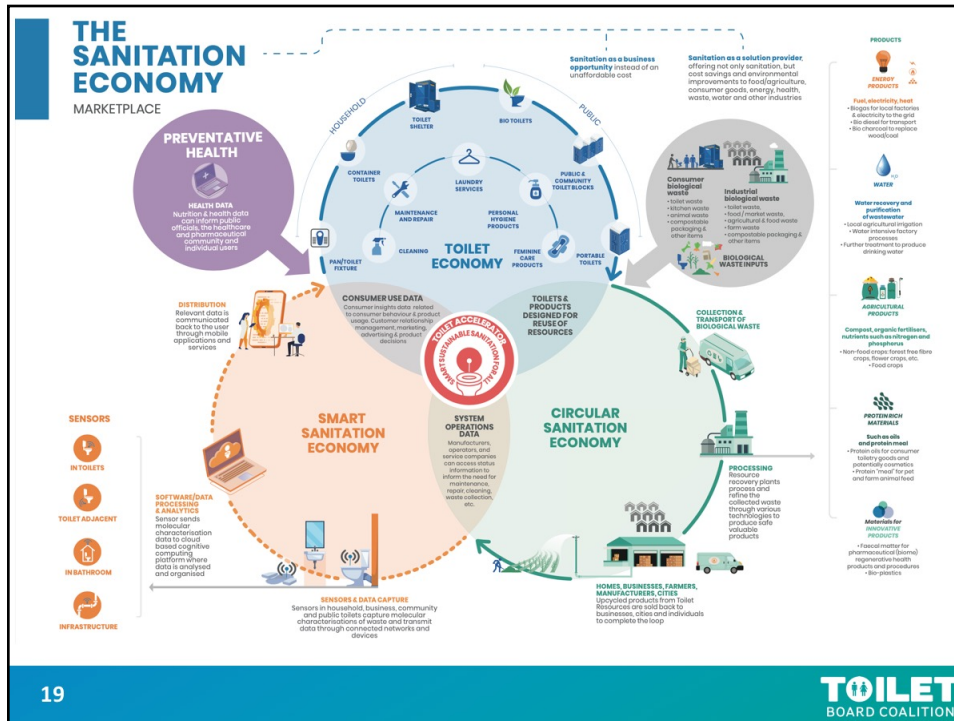
SANITATION  
ECONOMY  
MATERIALS



# The Sanitation Economy & Public Health

## Alexandra Knezovich, Toilet Board Coalition, Geneva

### A Webber Training Teleclass



## SMART SANITATION & PUBLIC HEALTH ROUNDTABLE

The TBC is primarily focused on understanding the potential of these use cases to shift the economics of sustainable sanitation provision to those without.

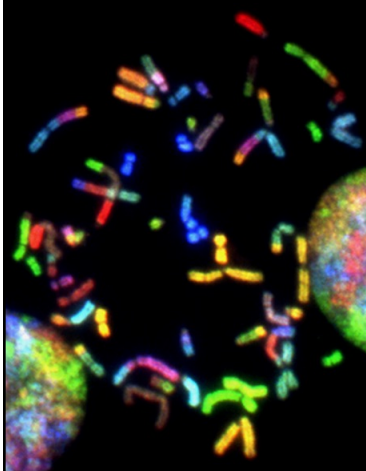
**Related 2025 Learning Goals**

- Identify how sanitation systems can safely generate data which can inform individual and community-scale preventative health interventions.
- Through development of a clear business case, stimulate increased innovation and adoption of digital applications for preventative health via sanitation.
- Stimulate new industries / service providers to enable digital health applications via sanitation

**20** **TOILET BOARD COALITION**

The Sanitation Economy & Public Health  
Alexandra Knezovich, Toilet Board Coalition, Geneva  
A Webber Training Teleclass

SMART SANITATION & PUBLIC HEALTH CRASH COURSE



**Health Data + Smart Sanitation: The Big Picture:**

Humans produce an abundant, diverse and consistently available health data resource every single day through their feces and urine. Toilets and the systems they are connected to have the opportunity to transform this data into a highly valuable resource.

**Big Data Opportunity**

To put this into perspective, if all 7 billion people on earth contributed just one health data point per day per year that would yield a database with two trillion five hundred fifty-five billion data points.

**3 Components to the Big Picture**

- Hardware (sensors and other detection/sampling)
- Software (data processing & analytics)
- Distribution (physical & mobile connections)

21

**TOILET**  
BOARD COALITION

HOW MIGHT THE PIECES FIT TOGETHER?

**COLLECTIVE POPULATION MONITORING**

**Data source:** public restrooms, sewage systems, wastewater treatment plants  
**Technological dependency:** smart sensors placed into sewage systems that can provide rapid data collection and analysis of a predetermined set of indicators

**Potential use case:** The seasonal flu vaccine is developed each year based on research conducted in collaboration with the WHO about which strains of the influenza virus are likely to be most common that year. Monitoring several sources of public sewage data for virus strains would provide a strong source of this data to inform development of more effective vaccines.



22

**TOILET**  
BOARD COALITION

**The Sanitation Economy & Public Health**  
**Alexandra Knezovich, Toilet Board Coalition, Geneva**  
**A Webber Training Teleclass**

**HOW MIGHT THE PIECES FIT TOGETHER?**

**DE-IDENTIFIED INDIVIDUAL & POPULATION MONITORING**

**Data source:** residential or public toilets or sensors

**Technological dependency:** smart toilets or smart sensors placed into toilets that can provide rapid data collection and analysis of a predetermined set of indicators, but do not identify individual users.

**Potential use case 1:** Thousands of smart toilets are installed in a community in a developing country suffering from a vitamin C deficiency. A public health organization implements measures to combat this deficiency, and progress is efficiently tracked via vitamin C measurements collected from the toilets—instead of frequent individual checkups which can be costly and culturally difficult.

**Potential use case 2:** A pharmaceutical company is seeking to develop a new drug. They are seeking to expand the number of individuals participating in their research and to expand the number of data points they collect. They now can dramatically scale up and remotely collect the data through a network of smart toilets that contain a customized sensor that screens for specific information that they designate.

23

**TOILET**  
BOARD COALITION

**HOW MIGHT THE PIECES FIT TOGETHER?**

**IDENTIFIED INDIVIDUAL MONITORING**

**Data source:** residential toilets or sensors

**Technological dependency:** smart toilets or sensors placed into toilets that can provide rapid data collection and analysis of a predetermined set of indicators, that can combine with external information about each individual user

**Potential use case 1:** Doctor prescribes a smart sensor that a diabetic patient is to place in his/her toilet. Sensor measures glucose levels in urine each time patient uses the bathroom. Sensor is connected to mobile devices: can send alerts to patient's phone, can send individual data points back to doctor so doctor can monitor patient's progress in real time and identify trends.

**Potential use case 2:** Doctor prescribes a smart sensor that a patient is to place in his/her toilet that screens for biomarkers for genetically predispositions. Sensor is connected to mobile devices: and can send alerts to patient's phone, can send individual data points back to doctor so doctor can monitor patient's progress in real time and identify trends.

24

**TOILET**  
BOARD COALITION

# The Sanitation Economy & Public Health

## Alexandra Knezovich, Toilet Board Coalition, Geneva

### A Webber Training Teleclass

#### THE COMMERCIAL CASE

Access to consistent, diverse and abundant health data is valuable. It is commercially viable when big data analytics can be applied that produce insights that can be transformed into revenue streams for enterprises or significant cost savings by government entities.

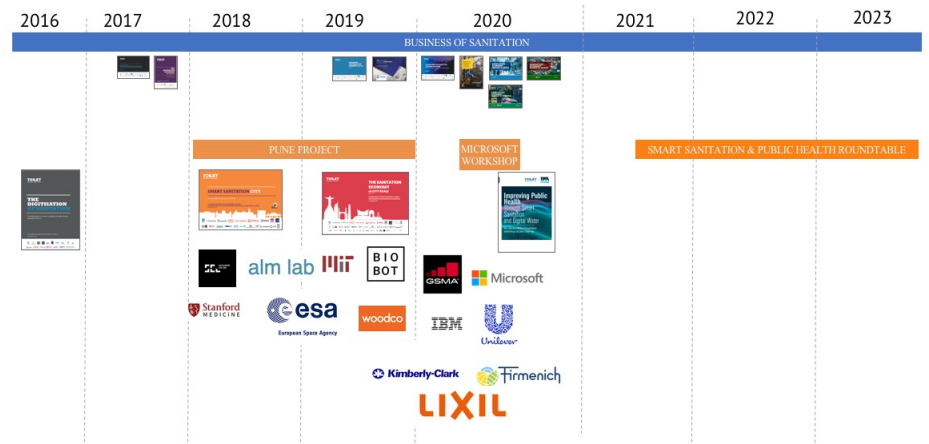
The purpose of a collaboration would be to help advance innovations, identify and engage in dialogue with potential buyers of the data and smart city sanitation solutions and accelerate businesses that introduce this new business model into the marketplace.



25

**TOILET**  
BOARD COALITION

#### FOUNDATIONS



26

**TOILET**  
BOARD COALITION

# The Sanitation Economy & Public Health

## Alexandra Knezovich, Toilet Board Coalition, Geneva

### A Webber Training Teleclass

## SMART SANITATION ECONOMY



27



## Microsoft Workshop (June 2020)

**Participants in the ecosystem**  
Who are all the participants in this ecosystem? Think wide and in the level of engagement of player (e.g. insurer, not SwissRe)



**THE ECOSYSTEM'S MOTIVATIONS MATRIX PLATFORM DESIGN TOOLKIT 2.2**

ACTORS	Sanitation service users	Public sector	Utilities	Various types of private sector players	Research & Innovation	Financing	Donors & international help organizations	Health & medical research	Sanitation providers	Data companies/providers	Technology providers	Identified Gaps
Sanitation service users	High	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Public sector	Low	High	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Utilities	Low	Low	High	Low	Low	Low	Low	Low	Low	Low	Low	Low
Various types of private sector players	Low	Low	Low	High	Low	Low	Low	Low	Low	Low	Low	Low
Research & Innovation	Low	Low	Low	Low	High	Low	Low	High	Low	Low	Low	Low
Financing	Low	Low	Low	Low	Low	High	Low	Low	Low	Low	Low	Low
Donors & international help organizations	Low	Low	Low	Low	Low	Low	High	Low	Low	Low	Low	Low
Health & medical research	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Low	Low
Sanitation providers	Low	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Low
Data companies/providers	Low	Low	Low	Low	Low	Low	Low	Low	Low	High	Low	Low
Technology providers	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	High	Low

28



# The Sanitation Economy & Public Health

## Alexandra Knezovich, Toilet Board Coalition, Geneva

### A Webber Training Teleclass

## MEMBER Workshop

Mapping of hurdles (yellow) & new advancements (green)

Roles the TBC could play

ENTREPRENEUR SUPPORT	PROJECTS	PUBLICATIONS	INVESTMENT
<ul style="list-style-type: none"> <li>Helping entrepreneurs understand market needs and develop business models</li> <li>Identify and promote data standards</li> <li>Develop a regulatory and standards framework</li> <li>Develop a regulatory and standards framework</li> <li>Develop a regulatory and standards framework</li> </ul>	<ul style="list-style-type: none"> <li>Helping entrepreneurs understand market needs and develop business models</li> <li>Identify and promote data standards</li> <li>Develop a regulatory and standards framework</li> <li>Develop a regulatory and standards framework</li> <li>Develop a regulatory and standards framework</li> </ul>	<ul style="list-style-type: none"> <li>Helping entrepreneurs understand market needs and develop business models</li> <li>Identify and promote data standards</li> <li>Develop a regulatory and standards framework</li> <li>Develop a regulatory and standards framework</li> <li>Develop a regulatory and standards framework</li> </ul>	<ul style="list-style-type: none"> <li>Helping entrepreneurs understand market needs and develop business models</li> <li>Identify and promote data standards</li> <li>Develop a regulatory and standards framework</li> <li>Develop a regulatory and standards framework</li> <li>Develop a regulatory and standards framework</li> </ul>

29

**TOILET**  
BOARD COALITION

## SMART SANITATION & PUBLIC HEALTH ROUNDTABLE

**Roundtable Chair** / Cinthya Ramirez, Toilet Board Coalition Independent Director and Director of Multilateral Engagement, Pfizer

**Vision** / A marketplace that leverages the full potential of data from sanitation systems in support of public health through infectious disease, AMR (Antimicrobial Resistance), and API (Active Pharmaceutical Ingredient) monitoring.

**Roundtable Objective** / Develop and advise projects demonstrating the capacity and value of data from sanitation systems to contribute to public health monitoring, pandemic preparedness and infectious disease control. The TBC is primarily focused on understanding the potential of these use cases to shift the economics of sustainable sanitation provision to those without.

30

**TOILET**  
BOARD COALITION

The Sanitation Economy & Public Health  
 Alexandra Knezovich, Toilet Board Coalition, Geneva  
 A Webber Training Teleclass

THANK YOU

Questions: [secretariat@toiletboard.org](mailto:secretariat@toiletboard.org)  
 Learn more: [www.toiletboard.org](http://www.toiletboard.org)

[www.webbertraining.com/schedulep1.php](http://www.webbertraining.com/schedulep1.php)

December 2, 2021 [EMERGING FUNGAL INFECTIONS AND INFECTION PREVENTION AND CONTROL](#)  
 Speaker: **Prof. Andreas Voss**, Radboud University, The Netherlands  
*(FREE Teleclass)*

December 16, 2021 [COVID-19 AS DRESS REHERSAL: THE RISE OF DISEASE X](#)  
 Speaker: **Prof. Stephen S. Morse**, Mailman School of Public Health, Columbia University

DECEMBER 2021						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18

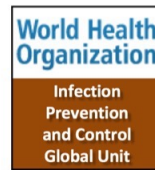
**2022 TELECLASS SCHEDULE ...  
 COMING DECEMBER 1**

Hosted by Michael Lindenmayer  
[www.webbertraining.com](http://www.webbertraining.com)



The Sanitation Economy & Public Health  
Alexandra Knezovich, Toilet Board Coalition, Geneva  
A Webber Training Teleclass

Thanks to Teleclass Education  
**PATRON SPONSORS**



Hosted by Michael Lindenmayer  
[www.webbertraining.com](http://www.webbertraining.com)