

Automatic Metro Lines in Metro de Santiago (Chile)

APTA RAIL CONFERENCE

Denver, CO, June, 11th 2018

Constantin Dellis

“65% of children now enrolled in primary school in developed and developing countries, will ultimately end up working in new jobs that do not yet exist.”

Bank of America

“Future automation will change 47% of current employment, especially those that are labor-intensive.”

Carl Benedikt Frey and Michael A. Osborne

“By 2025, 90% of the jobs that remain, will undergo changes and will require to include new competencies.”

World Economic Forum

A black and white photograph of numerous incandescent lightbulbs scattered on a dark surface. One lightbulb in the center-left is illuminated, glowing bright white, while all the other bulbs around it are dark and unlit. This visual metaphor represents a single idea or innovation standing out from a sea of conventional or unimplemented concepts.

Automatism is requiring a “**paradigm shift**” in every stakeholder

1. Automatic lines in the world
2. Automatic Operation Model
3. Metro de Santiago Model



There are now **38** cities with automatic lines in the world

Up to 2016, we count with **850** automatic lines

By 2025 there will be **2,200 km** in operation.

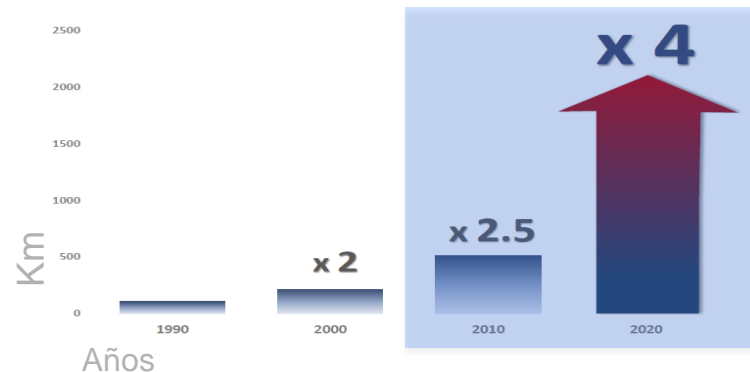
890 stations.



► Ciudades con líneas de metro totalmente automáticos en operación hasta Julio 2016

Did You Know That...?

- Automatic lines have been working for **40 years all around the world**.
- **50%** of automatic infrastructure are in: **France, South Korea, Arab Emirates and Singapore**.
- **Metro de Santiago** is part of the **23%** of the metros in the world that work with both conventional and automatic systems.
- Since their creation, automatic lines have had an **exponential growth**.
- The **new metro lines in the world** will now work with **an automatic system**.
- For 2028, **52% of Metro de Santiago's network** will be **automatic**.



1. Automatic lines in the world
2. **Automatic Operation Model**
3. Metro de Santiago Model



Why Are We Preferring Automatic Lines?

- Lower operating costs (~26%)
- Enhanced operational flexibility

Automatic lines benefit operators, customers, and workers

- Better safety standards
- Customer service improves
- Workers motivation grows

Main differences with the conventional model

- ❑ **Breaking Down Barriers**
 - ✓ Traffic and Service
 - ✓ Operations and Maintenance.
- ❑ **Great Operational Flexibility**
- ❑ **Employability Development**
 - ✓ New Challenges in New Assignments
- ❑ **Higher Safety**
 - ✓ Safer Operations



1. Automatic lines in the world
2. Automatic Operation Model
3. **Metro de Santiago Model**



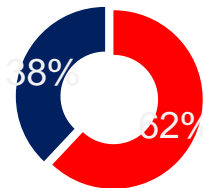
Corporate Profile and Mision

- Metro owns and operates the entire underground transportation system in Santiago
- Metro is a 100% state-owned company
- Strong financial performance and cash flow stability.
- Positive income for the last 18 years

Shareholders



Finance
Ministry



■ Corfo ■ State



State agency
promoting
entrepreneurship
and innovation



MISSION

To guarantee, as a protagonist operator of the integrated public transport system, **a safe, reliable travel experience in a sustainable and efficient** way, to develop a better city



VISION

Become a company where **all citizens feel proud of.**

Our Network

UTO L6 impact points in the network

5 Lines (1, 2, 4, 5, 6)

133 km of tracks

128 Stations

1.243 cars

16 combination stations

Line 3 will be opened
2019

(Up to now 80% of
progress)

- 22 Km
- 18 stations

Extensions of Line 3
and 2, new lines 7, 8 and 9
UNDERWAY (2023-2028)
(+ 60 kms)



Simbología Symbols	
Lineas de Metro	
Lineas de Metro	
1 San Pablo - Los Dominicos	Acceso Preferencial
2 La Cisterna - Mapocho Norte	Estación de Metro
3 Los Libertadores - Fernando Castillo Velasco	Estación de Metro
4 Plaza de Puelo Alto - Industrial	Estación de Metro
5 La Cisterna - Vitacura Maipo	Estación de Metro
6 Plaza de Maipo - Vicente Riquelme	Estación de Metro
7 Cerrillos - Los Grupos	Estación de Metro
8	Estación de Metro
9	Estación de Metro
Contacto:	
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Highly demanded operation, CBTC for a better travel experience



670 Mio passengers in 2017 (2,7 Mio passengers peak per working day).

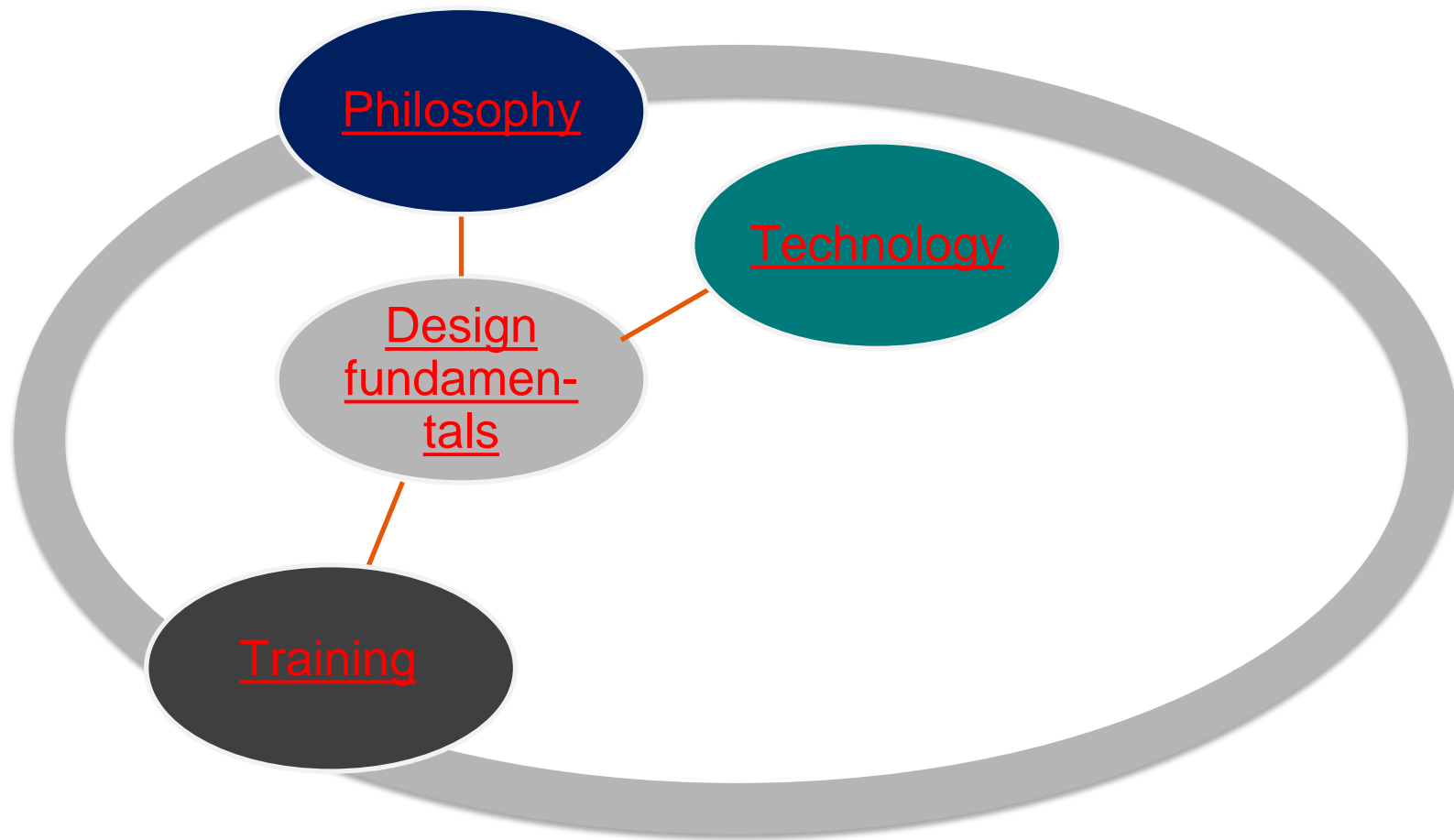
Our operation:

99% availability of trains at rush hour.

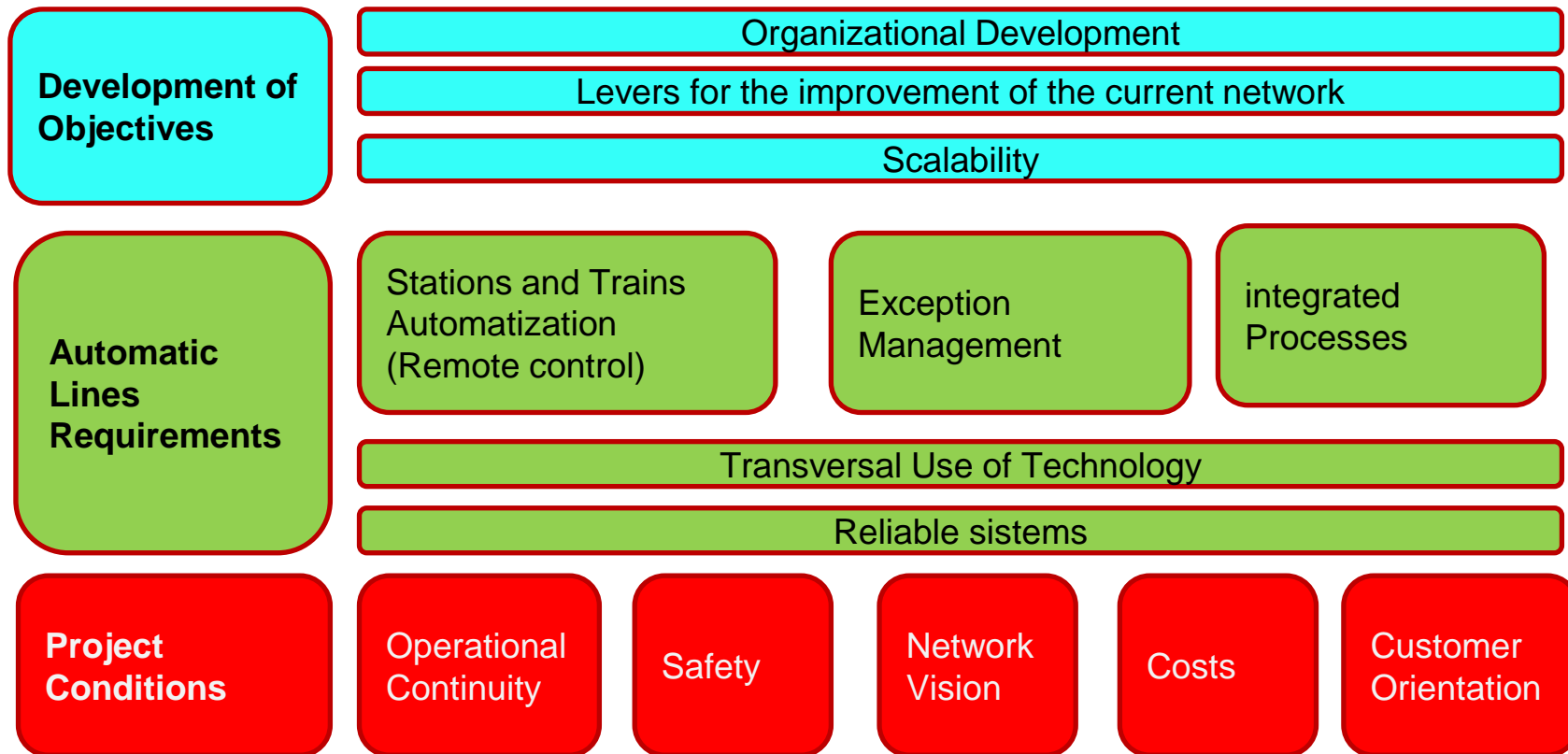
CBTC brownfield at Line 1: 12% peak hour supply increase (5000 pphd morning peak).











Operational Model



Design Fundamentals



Aspect	Non-automatic Lines	Automatic Lines	What improves
Circulation	GOa2 	GOa4 	Operational flexibility
Customer Service	On Site 	3 levels of Organization 	Greater reach
Exception Management	Lead on 	Remote Lead 	Higher resources
Operations Management	Business Unit 	Centralized 	Greater Control

Technology of Our New Automatic Lines

General



Universal
Accessibility



Direct Communication to the
Control Center at all levels



No stop information on
platforms



High coverage at
stations and trains

Stations



Signage platform
with traffic
information



Bidirectional doors



Automatic and
friendly charge



No entry to tracks
through platform

Trains



Operational Flexibility
(UTO)



Faster and safer
evacuation

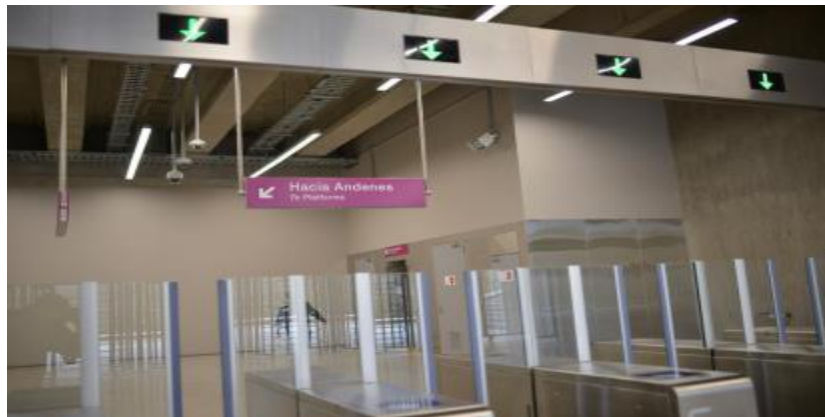


Pathtrack security
(catenary)



Air conditioner

Large spaces with natural light



Ticketing and Access Management



Platform screen door



UTO Trains – Catenary and Cameras inside Trains





Level

Concept

Means

3

Attended
Service

- ✓ Our on-site team coordinated by the CCO

2

Remote Service

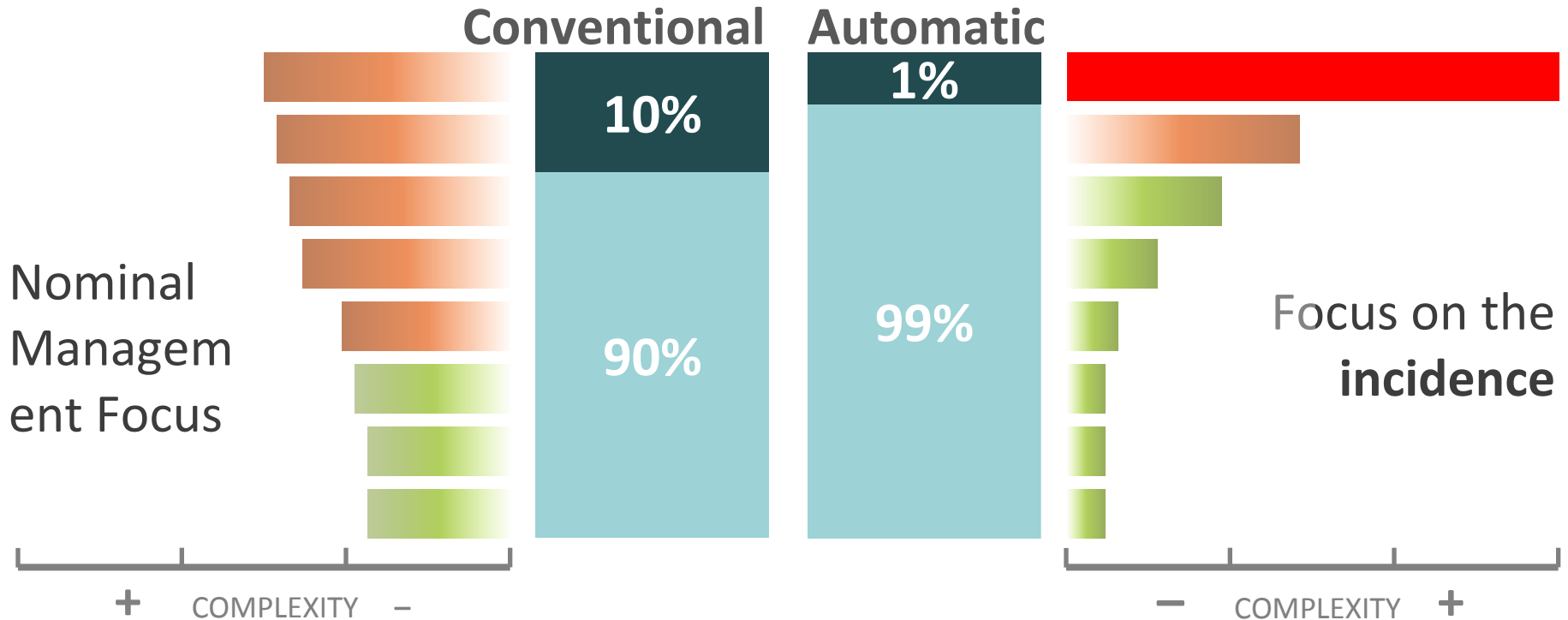
- ✓ Monitoring (**cameras**)
- ✓ Bi-directional communication devices, in teams and strategic places (**interphones**)

1

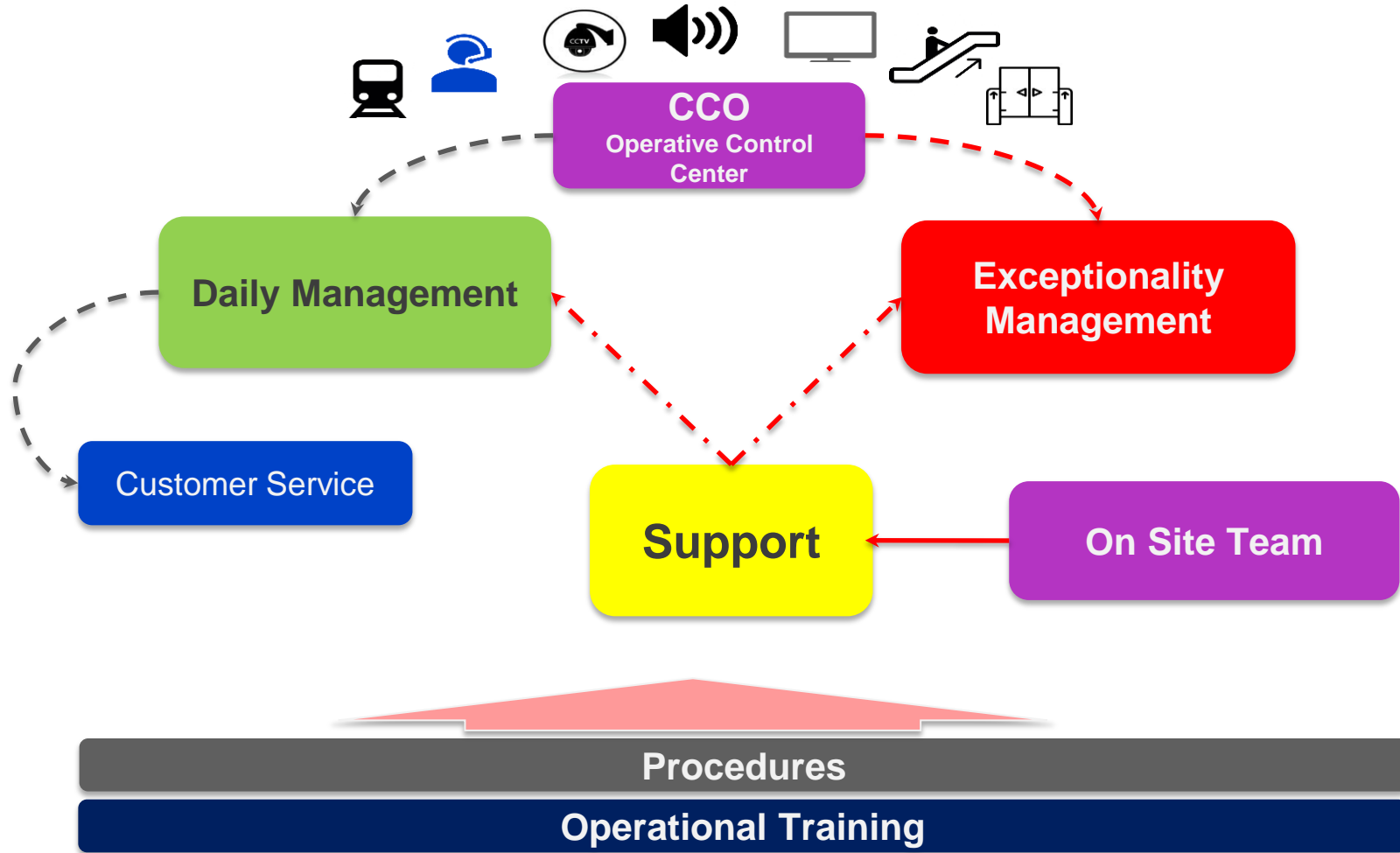
Self-Service

- ✓ Signage
- ✓ Information Screens (**interactive screens**)
- ✓ Versatile voice
- ✓ Electronic devices to inform and guide (**screens, customer service systems**)

- Events, although are now less frequent are now more complex, human intervention becoming critical (*the automation paradox*)



Philosophy- Centralized Management



Training Cycle for Automatic Lines Operations

Already driven in conventional lines

Improvement for Automatic Lines

Room



Sup Op

Review of knowledges

On Site



Sup Op

Exercise on site applying knowledge

Complete Matrix Room



Sup Op

Skills Matrix (software)

On Site + Processes Confirmation



Sup Op

Control Against Standard Application

Training Base on Work site

- **Schedule by Position**
- **Prioritization of the Agenda**
- **Tablet Software**
- **Simple Evaluation System**
- **Skills Matrix by knowledge level.**

For both On Site and CCO

*Sup: Supervisor or chief
Op: Operator or Agent.*



*“Line 6 has been a reunion
with the humanity among
people and Metro de
Santiago...”*

*...A technological leap that
has an impact of people’s
quality of life, making of our
city a better place.”*

And at the end of the day, a question for you:
When will there be high capacity UTO Line
in the USA?



Metro de Santiago offers assistance to support
US transit properties.

Consulting Services

- Due to its 42 years of experience, Metro de Santiago supports public and private entities that develop railway systems and their integration to the Public Transport Systems.
- This occurs through integrated strategical and technical consulting at any stage from design to start-up.
- Starting in 1985, **Metro de Santiago Consulting** has advised different metros of Latin America, promoting the development of an integrated and sustainable transport system, and leading the customers in challenges of sustainable growth and expansion.

**1. Financial
Sustainability
(Non-fare
Business)**

**2. Ticketing and
Fare-Collection
System**

**3 . Operational
Efficiency**

**4. Strategic
Marketing &
Communication**

**5. Project
Managment**

Executive Coaching & Training

Contact Details

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