



## Station Quality: an Elusive but Worthwhile Concept

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- Involved with the design, specification and verification of Dutch stations since 2000
- An employee at ProRail since 2009
- Projects include Amsterdam Central and Schiphol Airport stations
- Graduated from the RSEI Masters in 2013
- Currently: PhD student at the Delft University of Technology

## Why is station quality important?

Relative impact of the trip stages on the total travel experience




## Quality



**Quality is an imprecise concept whose current definitions include:**

- *n.* a degree of excellence (synonym of grade): *the quality of competing air service*
- *n.* superiority in kind: merchandise of quality
- *n.* a distinguishing attribute (synonym of characteristic): possesses many fine qualities
- *n.* the attribute of an elementary sensation that makes it fundamentally unlike any other sensation
- *adj.* being of high quality

Merriam-Webster's Collegiate Dictionary, Eleventh Edition 

## Quality



“Quality is a characteristic of thought and statement that is recognized by a non-thinking process. Because definitions are a product of rigid, formal thinking, quality cannot be defined”

“People differ about quality, not because quality is different, but because people are different in terms of experience”.

*R.M. Pirsig, 'Zen and the Art of Motorcycle Maintenance'*



## Satisfaction



- “When we measure satisfaction what we’re really measuring is the difference between what a customer expects and what a customer perceives he gets”

*Dave Power III as cited in Pine and Gilmore, 1999*





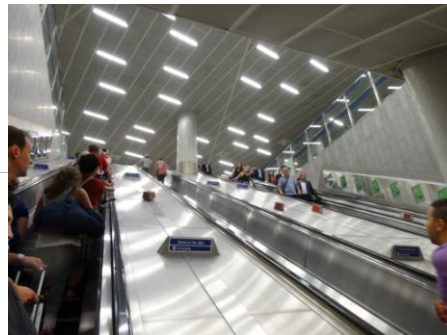
## Sacrifice

- To acquire a product or service, a sacrifice (or price) must be made (or paid)



## Effort

- “physical or mental energy needed to do something”







## Time

- “a non-spatial continuum that is measured in terms of events which succeed one another from past through present to future”
- “...is a personal experience, more dependent upon how you interpret the events than anything else”



## Servicescape

- the ‘landscape’ in which services are provided provides a clue regarding the quality of service that will be provided



*M. J. Bitner, 1992. Servicescapes: The Impact of Physical Surroundings on Customers and Employees*

## Value



$$\text{Value} = \frac{\text{benefits}}{\text{perceived time}}$$



## Generalised Cost Function

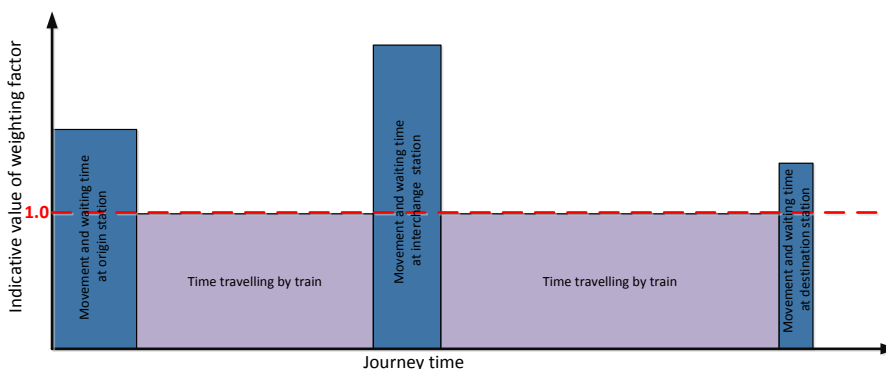


$$GC = v_{wk} * A + v_{wt} * W + IVT + F/VOT + I$$

where	GC:	Generalised Cost
	A:	total walking time to and from the service (min)
	W:	total waiting time for all services used on the journey (min)
	$v_{wk}$ :	weighting factor applied to time spent walking
	$v_{wt}$ :	weighting factor applied to time spent waiting
	IVT:	total in-vehicle time (min)
	F:	fare
	VOT:	Value Of Time
	I:	Interchange penalty (normally calculated as a time penalty multiplied by the number)



## A visualisation of the GCF



## Quality of Access

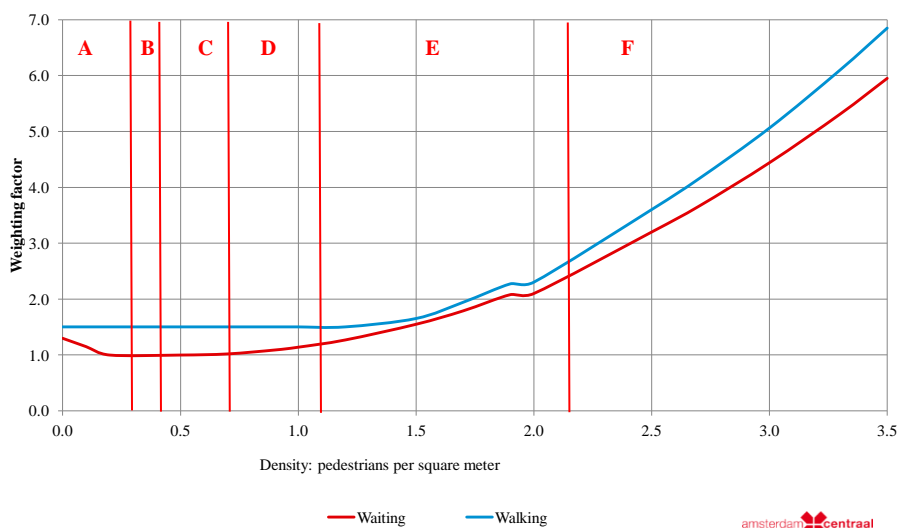


- accessibility of housing and destinations
- quality of het local public transport
- relationship of the bus stops etc. and the station
- easily accessible destinations on the rail network
- frequency of service

## Quality of Movement



## Impact density on perception of time





## Quality of the Waiting Experience

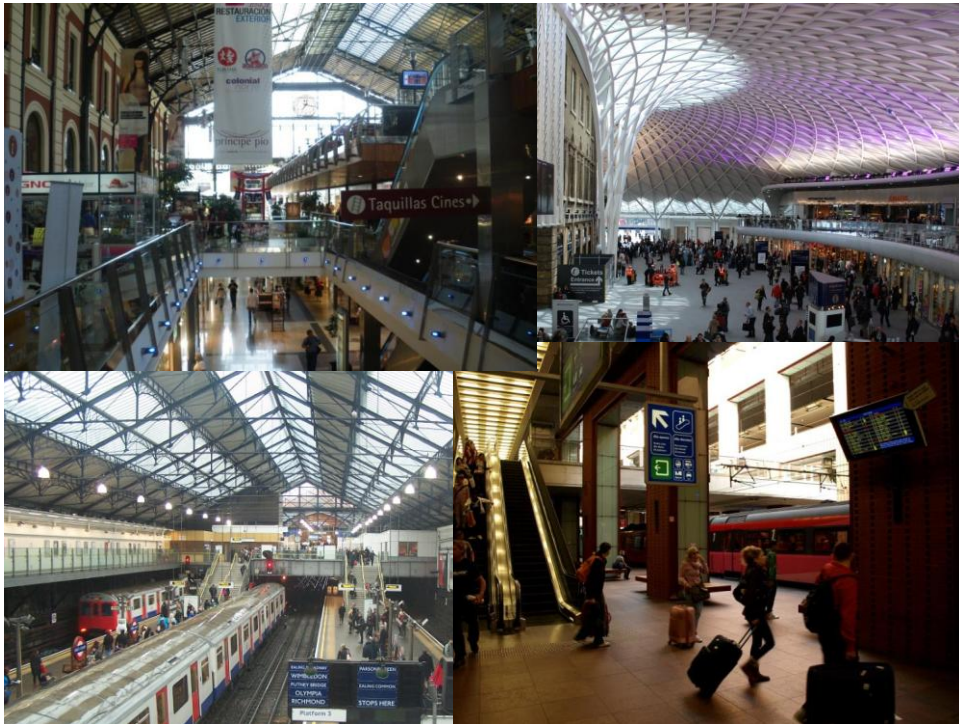


- uncertainty regarding the actual departure time
- uncertainty regarding a seat in the train
- standing space and benches
- distractions
- temperature, draft
- 'sensory stimulation'

## Quality of the Station Environment



- architecture
- aesthetics
- atmosphere
- sightlines
- colour, light, materials
- state of maintenance and cleanliness



## Quality of Ancillary Services



- retail en food
- advertising (as visual distraction)
- entertainment and music
- free newspapers
- wifi
- toilets

## Quality of the network of stations



- branding en image
- standard signing
- good furniture

## Station Quality Index



$$SQI = f_{sf} * f_{qa} * t_a + f_{pat} * f_{qmh} * t_h + f_{pat} * f_{qmv} * t_v + f_{sf} * f_{qw} * t_w + f_{qse} + f_{qas} + f_{qns}$$

- where
- $f_{sf}$ : represents a function of service frequency
  - $f_{qa}$ : represents the quality of access
  - $f_{pat}$ : represents a function of perceived available time
  - $f_{qmh}$ : represents the quality of horizontal movement
  - $f_{qmv}$ : represents the quality of vertical movement
  - $f_{qw}$ : represents the quality of the waiting experience
  - $t_a$ : represents the clock time accessing the station
  - $t_h$ : represents the clock time moving horizontally
  - $t_v$ : represents the clock time moving vertically
  - $t_w$ : represents the clock time spent waiting
  - $f_{qse}$ : represents the quality of the station environment
  - $f_{qas}$ : represents the quality of the ancillary services
  - $f_{qns}$ : represents the quality of the network of stations



## Transfer Penalty

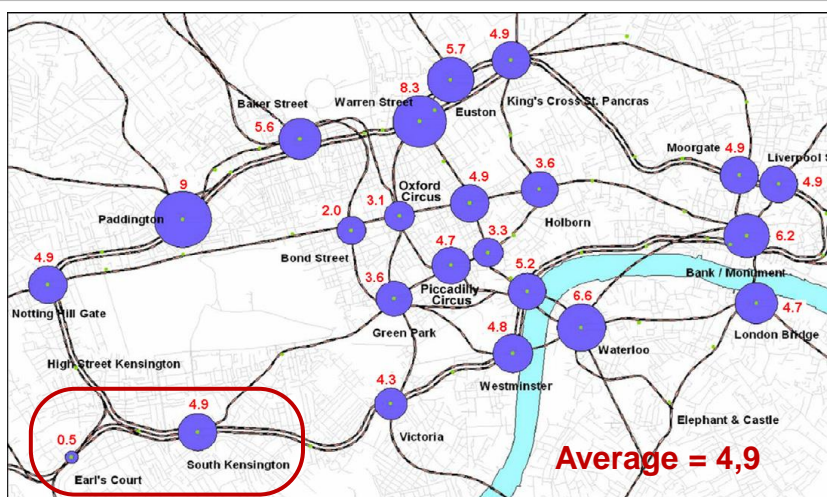


**Transport for London: the average passenger will choose to accept a route that is up to 4 minutes longer to avoid having to transfer**

- In such a calculation the transfer penalty includes all of the walking and waiting time and the effect of additional effort, congestion, unpleasantness etc.
- The penalty at an agreeable station with reasonable walking distances, escalators and limited congestion will be lower than at a disagreeable station



## Transfer penalties in London

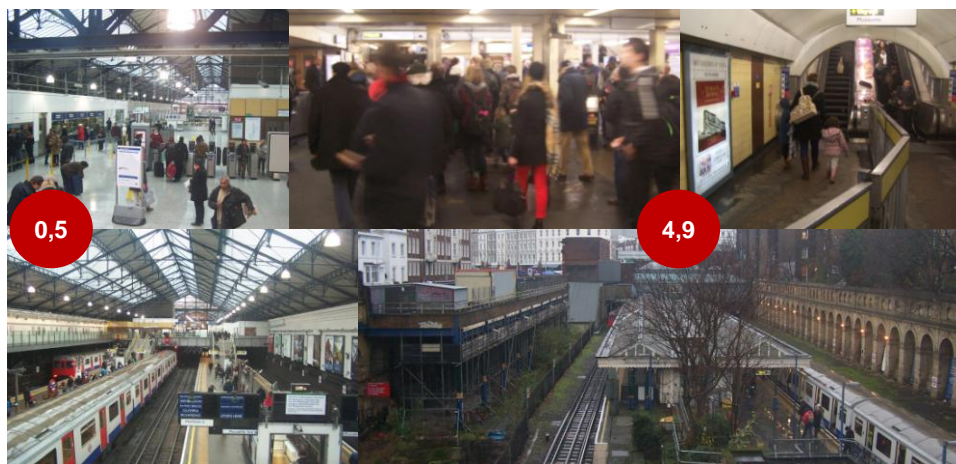




## Earl's Court & South Kensington



## Sightlines and quality of the walking route





**End**



Amsterdam Centraal in the year 2000 by Rudolf Das (1967)

