

# If Telecommunication is Such a Good Substitute for Travel, Why Does Congestion Continue to Get Worse?

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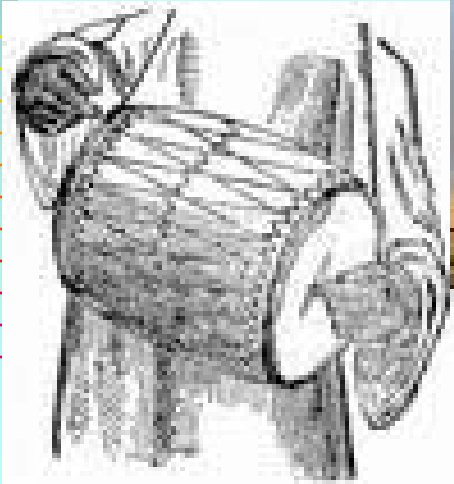
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# Introduction

- We've been telecommunicating for an awfully long time now... by sound...



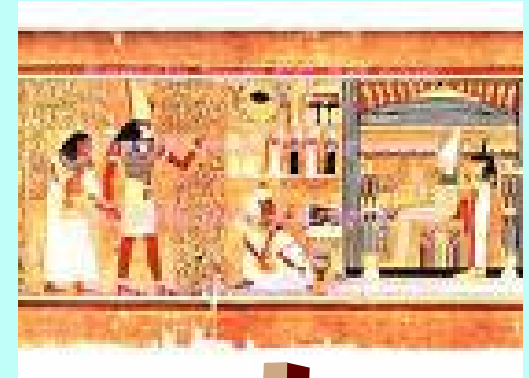
# Introduction (cont'd)

■ and sight...



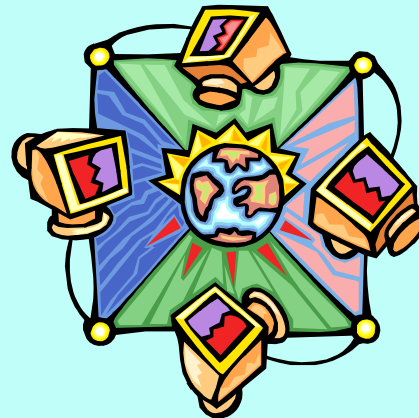
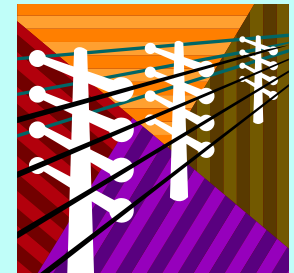
# Introduction (cont'd)

## ■ The written word...



# Introduction (cont'd)

## ■ Electronic communication...



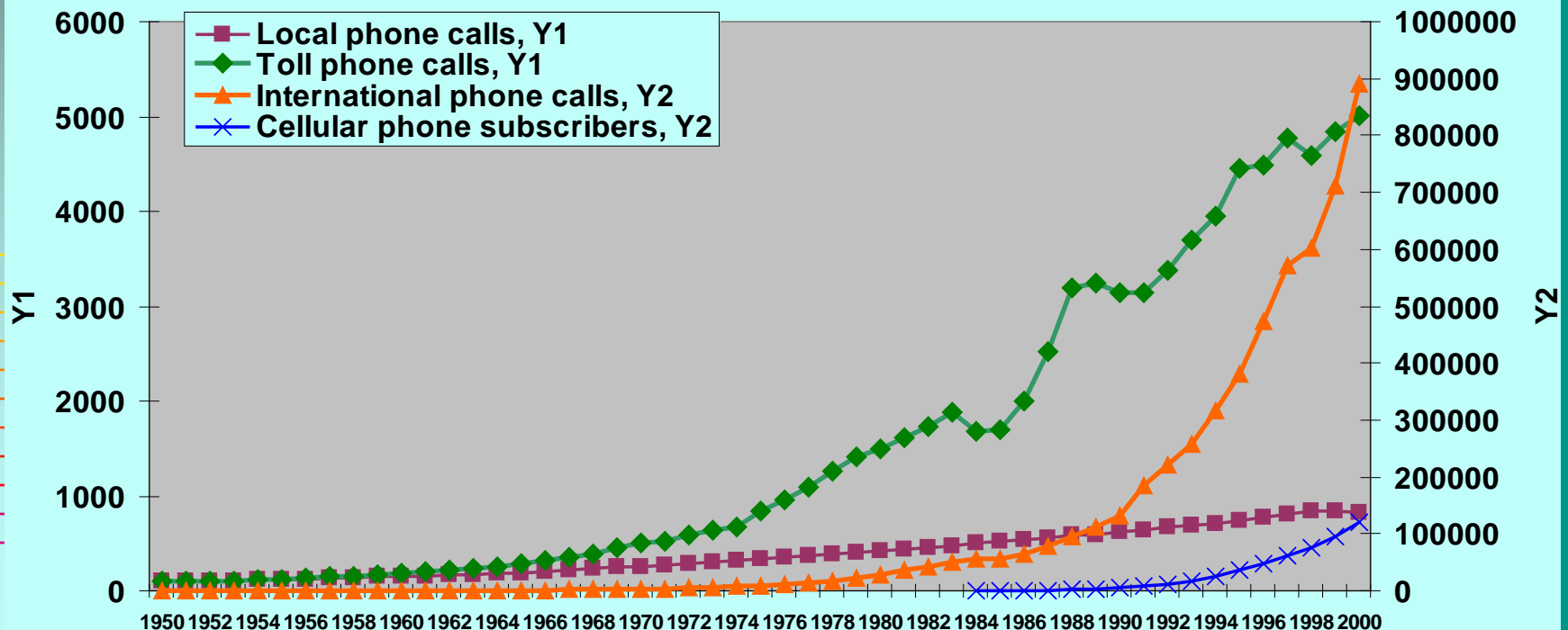
## Introduction (cont'd)

- Saving travel has been at least one motivation from the beginning
- Made explicit from the late 1800s
  - 1879 *London Spectator* and *The Times*
  - 1899, H. G. Wells, “When the Sleeper Wakes”
    - » The “kineto-tele-photograph” = videoconferencing
  - 1909, E. M. Forster, “The Machine Stops”
- Subject of scholarly study (congestion reduction perspective) since 1960s

# Introduction (cont'd)

- So since information/communication technology (ICT) usage looks like this...

Telecommunications Trends (1950 = 100)



## Introduction (cont'd)

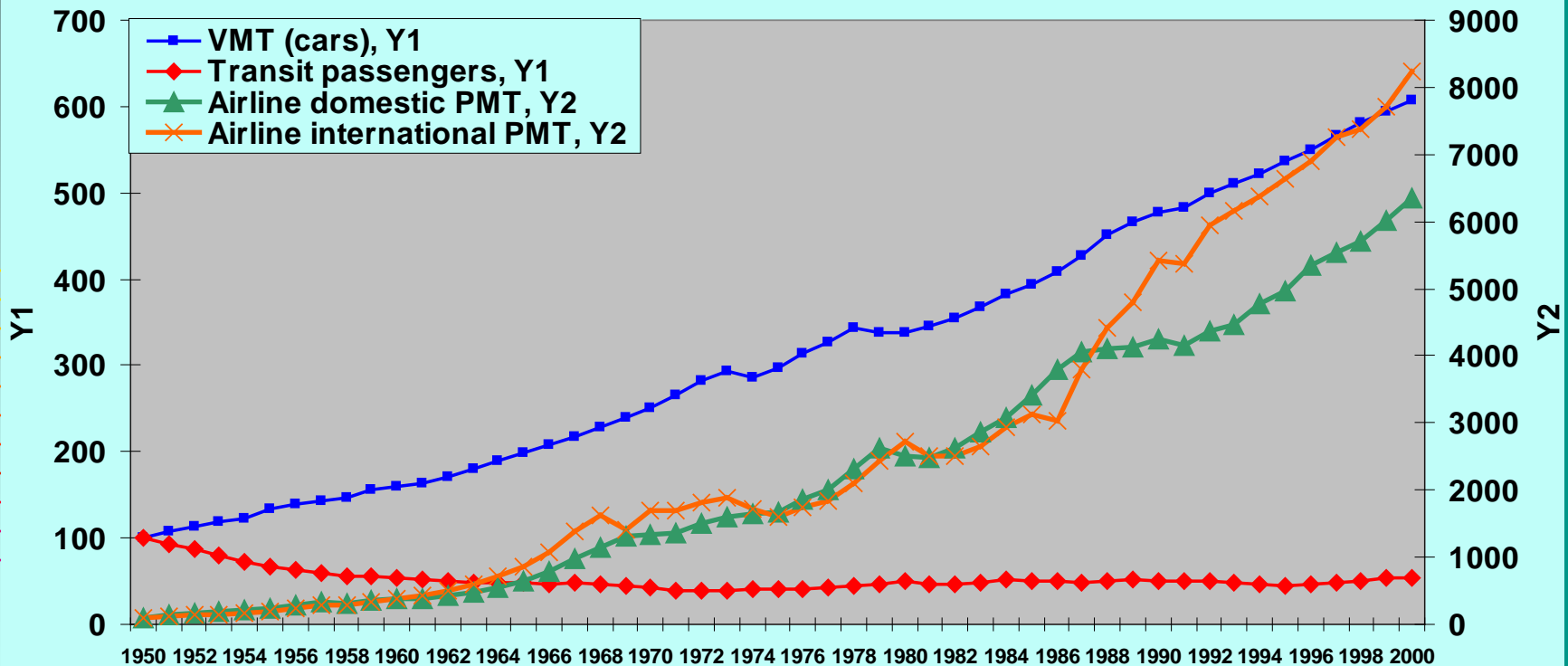
- Then surely traffic congestion must have almost disappeared by now?



# Introduction (cont'd)

■ But wait – then why does it look like this??

Transportation Trends (1950 = 100)



# Introduction (cont'd)

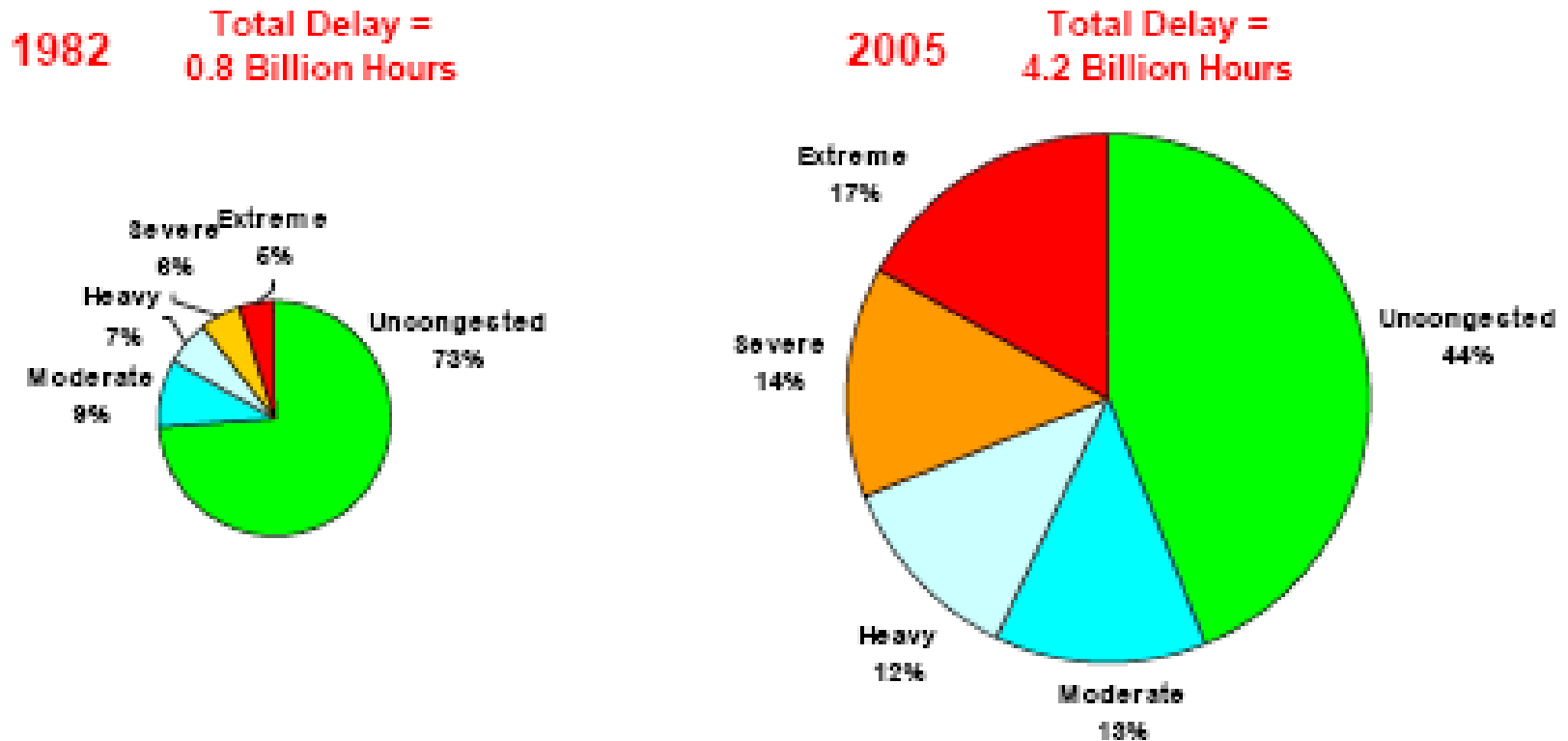
- And this?!



# Introduction (cont'd)

## ■ And this?

Exhibit 10. Congestion Growth – 1982 to 2005



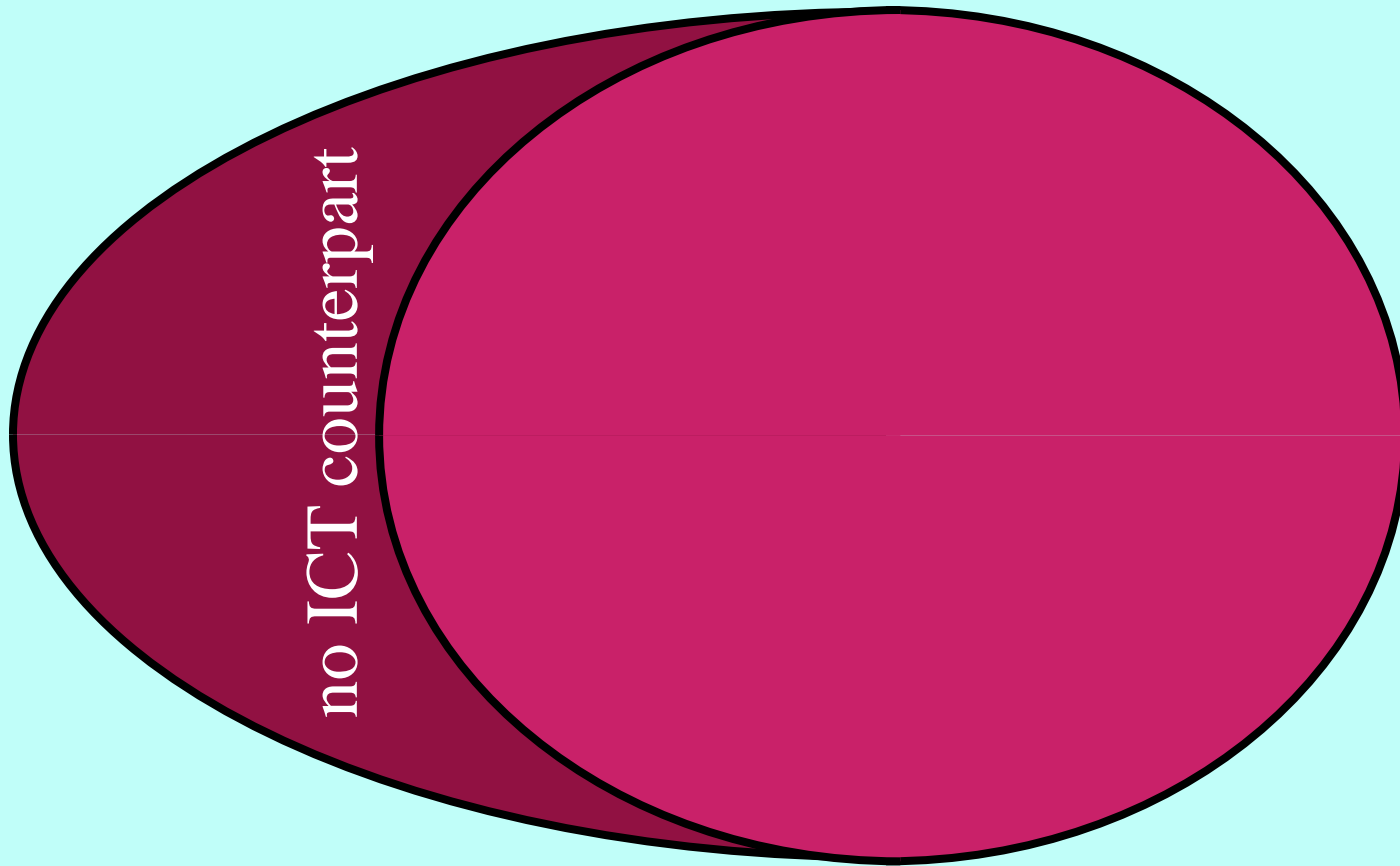
# The purposes of this talk are...

- To explain this apparent paradox:
  - 5 reasons why ICT *doesn't decrease* travel
  - 7 reasons why it *actively increases* it
- To discuss reasons for optimism that ICT can reduce travel (only 4...)
- To (briefly) explore policy implications



Activities

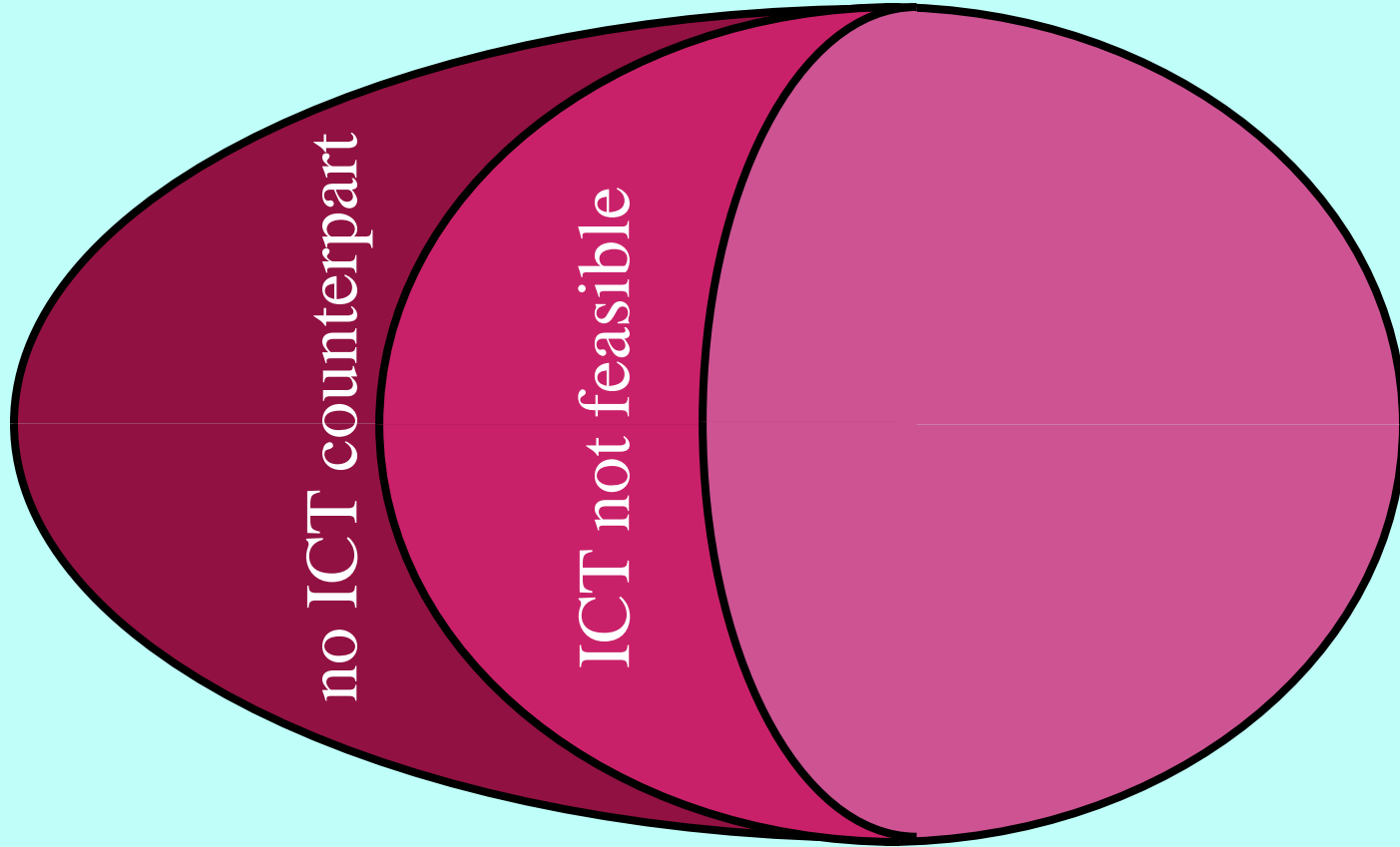
# 1. Not all activities have an ICT counterpart



# 1. Not all activities have an ICT counterpart

- *Co-location* of people is needed to
  - perform surgery
  - cut hair
  - care for children
- Humans must be in *specific locations* to
  - garden, clean house
  - repair vehicles
  - fix plumbing
- We need *material objects*, not digital files, for
  - food, clothing, shelter, & amenities

## 2. ICT is not always a feasible alternative

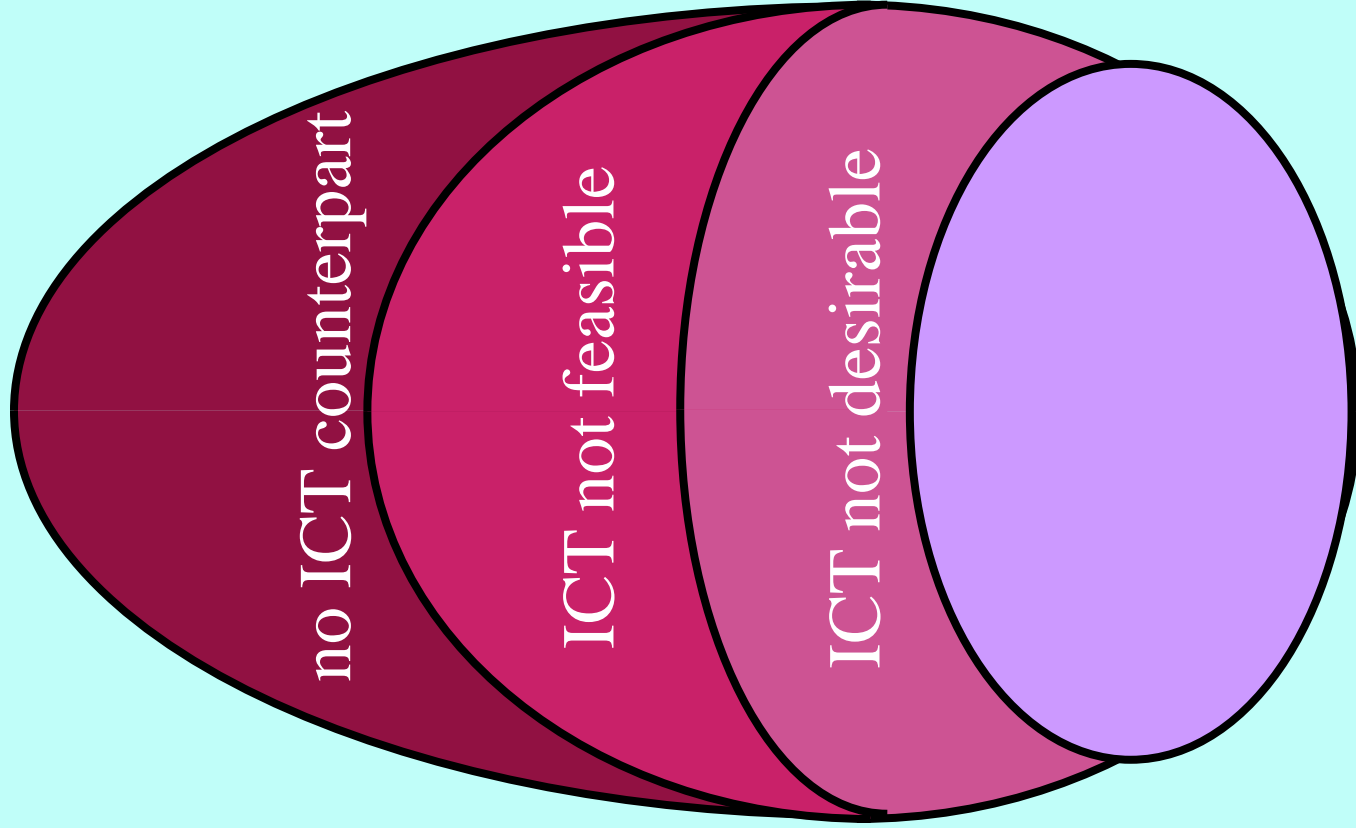




## 2. ICT is not always a feasible alternative

- Infrastructure not ubiquitous
- Even if infrastructure present, the requisite service may not be available
- Even if service available, it may not be activated for the event in question

### 3. ICT is not always a desirable substitute



### 3. ICT is not always a desirable substitute

- Location amenities
- Co-presence with other people (& objects!)
  - Need for touch
  - Richer communication, relationship development possibilities
- Side trip, trip chaining possibilities
- Welcome departure from routine
- Escape from pressures “back home”
- Signal of status
- Preference for authenticity over virtuality

## 4. Travel carries (some) positive utility

- Curiosity, variety-, adventure-seeking
- Exposure to the environment, information-gathering
- Enjoyment of a route, not just a destination
- Pride in skillful control of movement
- Conquest
- Sensation of speed or even just movement
- Symbolic value (status, independence)
- Escape, buffer
- Physical/mental therapy
- Synergy

## 4. (cont'd)

- As the psychologists would say, some travel is “*autotelic*” – undertaken for its own sake (auto = self; telos = goal or purpose)
- Many characteristics of *undirected* travel that contribute to its positive utility apply to more *directed* travel as well (to degrees differing by person and circumstance)

## 4. (cont'd)

### ■ Resulting in

- *Trips that don't have to be made* (e.g. commuting instead of telecommuting)
- and, for trips that *do* have to be made:
  - » *Destinations* that are farther than “necessary”
  - » A preference for travel *modes* offering independence, status, speed, etc.
  - » *Routes* that are longer than necessary (for scenery, variety, companionship, etc.)



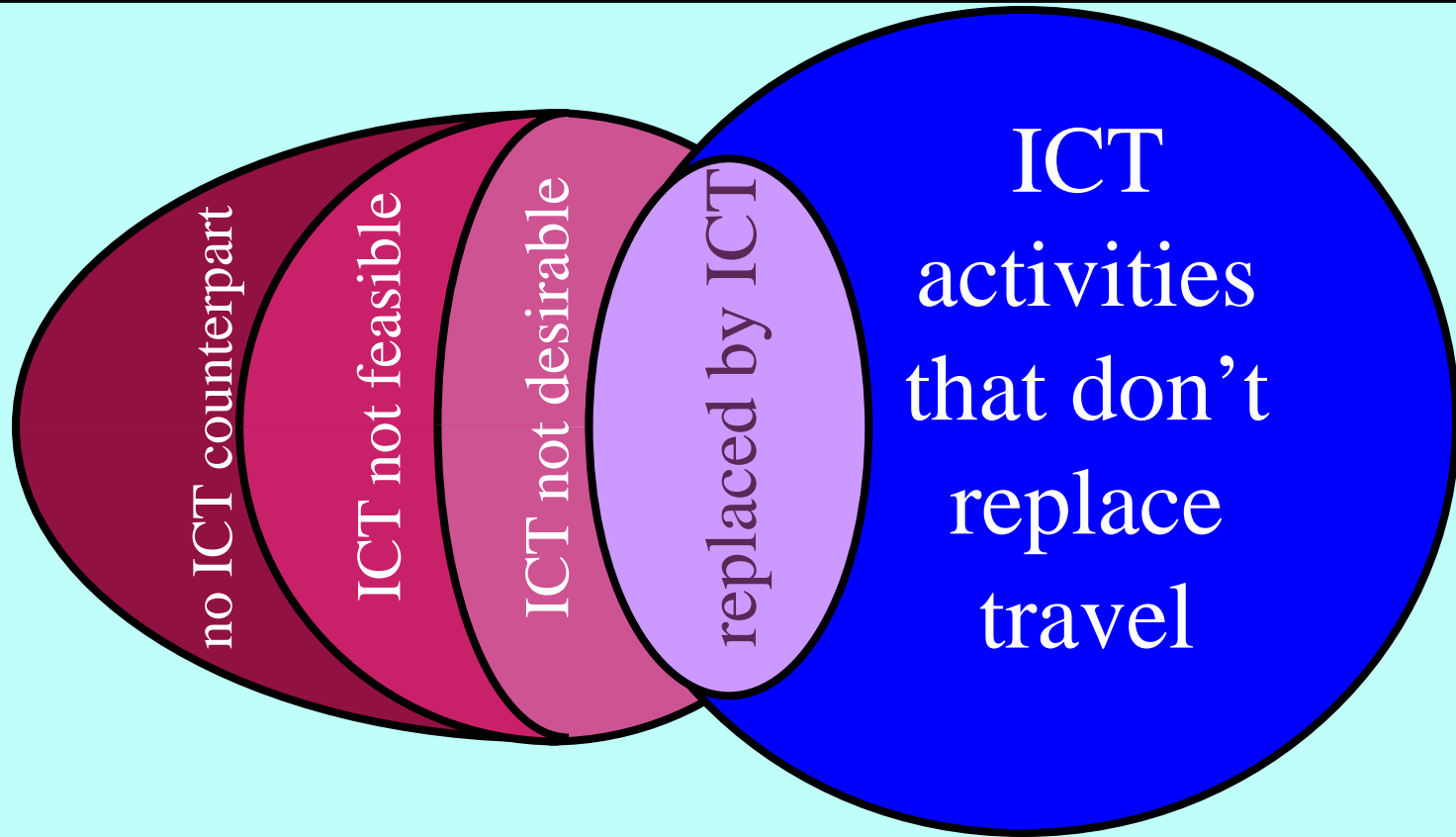
no ICT counterpart

ICT not feasible

ICT not desirable

replaced by ICT

## 5. Not all ICT uses replace travel



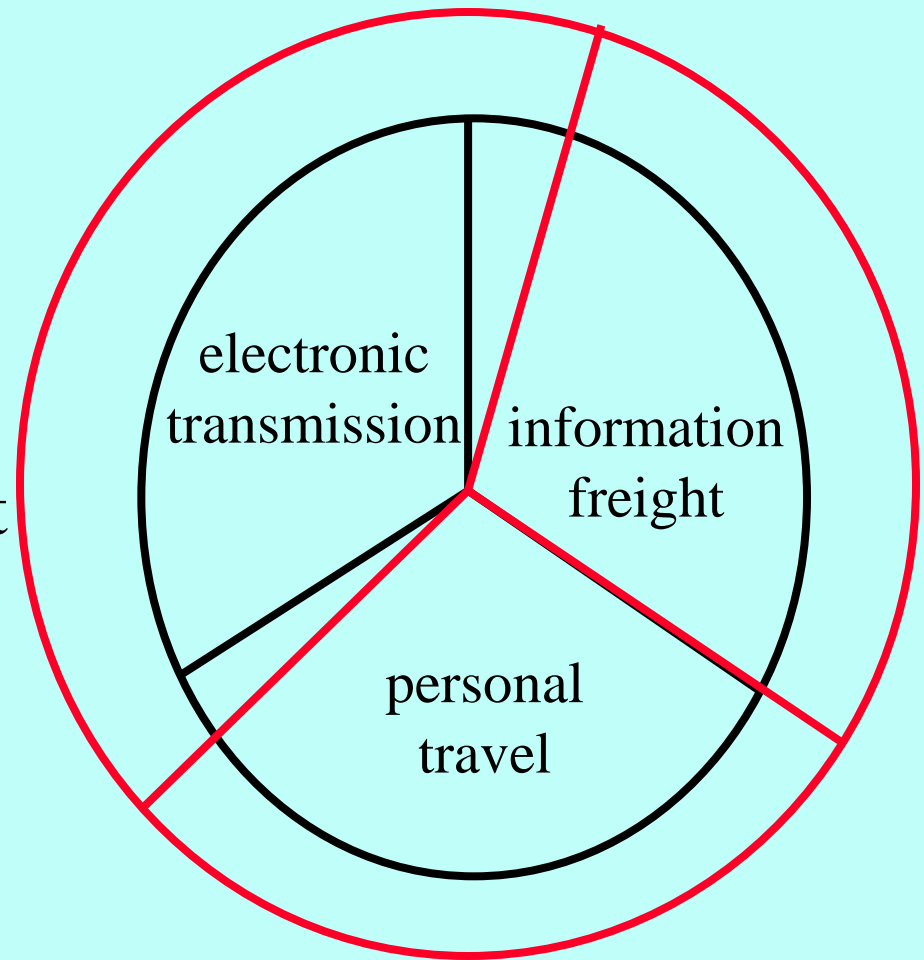


## 5. Not all ICT uses replace travel

- The alternative may not be
  - traveling to the activitybut rather
  - not conducting the activity at all
- Consider
  - distance learning
  - internet shopping
  - e-mail

## 5. (cont'd)

- The travel share of the communications pie *may* be decreasing
- but the whole pie is expanding so much, that
- in absolute terms, travel is still increasing



## 6. ICT saves time in general

- Some of the time saved (e.g. by telecommuting) could be spent on other activities, possibly involving travel
- Empirically, does not appear to be a strong effect
- But could generate some travel at the margin

## 7. ICT permits travel to be sold more cheaply

- Price comparisons
- Price alerts
- Last-minute bargains
- Possible effects:
  - Can *save money on a given trip* – savings may be partly spent on more travel
  - May *substitute a longer trip* for the same budget
  - May *stimulate entirely new trips* – more affordable to more people

## 8. ICT increases the efficiency of the transportation system

- Lowering the time and/or monetary cost of travel increases the demand for it
- Applications:
  - Intelligent Transportation Systems
  - Electronic Data Interchange
  - Global Positioning System
  - Radio Frequency Identification

## 9. ICT increases productivity/ enjoyment of travel time

- ICT-enabled activities while traveling:
  - Talking on the phone
  - Working on a standalone laptop
  - Surfing the web
- Reduce the motivation to *save* travel time
- At the margin, may actively *increase* it
  - Choose a longer transit commute over auto

## BUS ROUTES

The average wait for a  
city bus is 12.8 minutes.

Do something with your nothing.

You have time. That nothing time. The time in between everything else you have to do. In just a few short minutes, you could make a dent in a Sudoku puzzle or play three holes of golf. Touch Generations is a series of games that easily get you in, out, and on with the rest of your day. It's your nothing time. Do something with it. For more games and information, go to [TouchGenerations.com](http://TouchGenerations.com)



NINTENDO DS



# My commute is 25 e-mails long.

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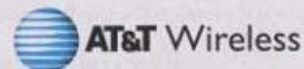


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## 9. (cont'd)

- ICT-enabled activities while traveling:
  - Talking on the phone
  - Working on a standalone laptop
  - Surfing the web
- Reduce the motivation to *save* travel time
- At the margin, may actively *increase* it
  - Choose a longer transit commute over auto
  - Can make more business trips

## 10. ICT directly stimulates additional travel

- Message content may directly invite travel
  - “Mr. Watson, come here – I want to see you”
  - Use of mobile phone to schedule meetings
- Increasing accessibility increases engagement in activities that collaterally involve travel

HEY, if I took pictures of the baby and e-mailed them to the in-laws, maybe they wouldn't visit as often. WAIT. What if that just made them want to visit more?

Digit

Digital Imaging

Digital Imaging

ONLINE PRODUCTIVITY

HIGH PERFORMANCE

ENTERTAINMENT

UP

Turn On the Fun



Online or in the store, find what you need to stay in touch. Turn On the Fun™ BestBuy.com™

## 10. (cont'd)

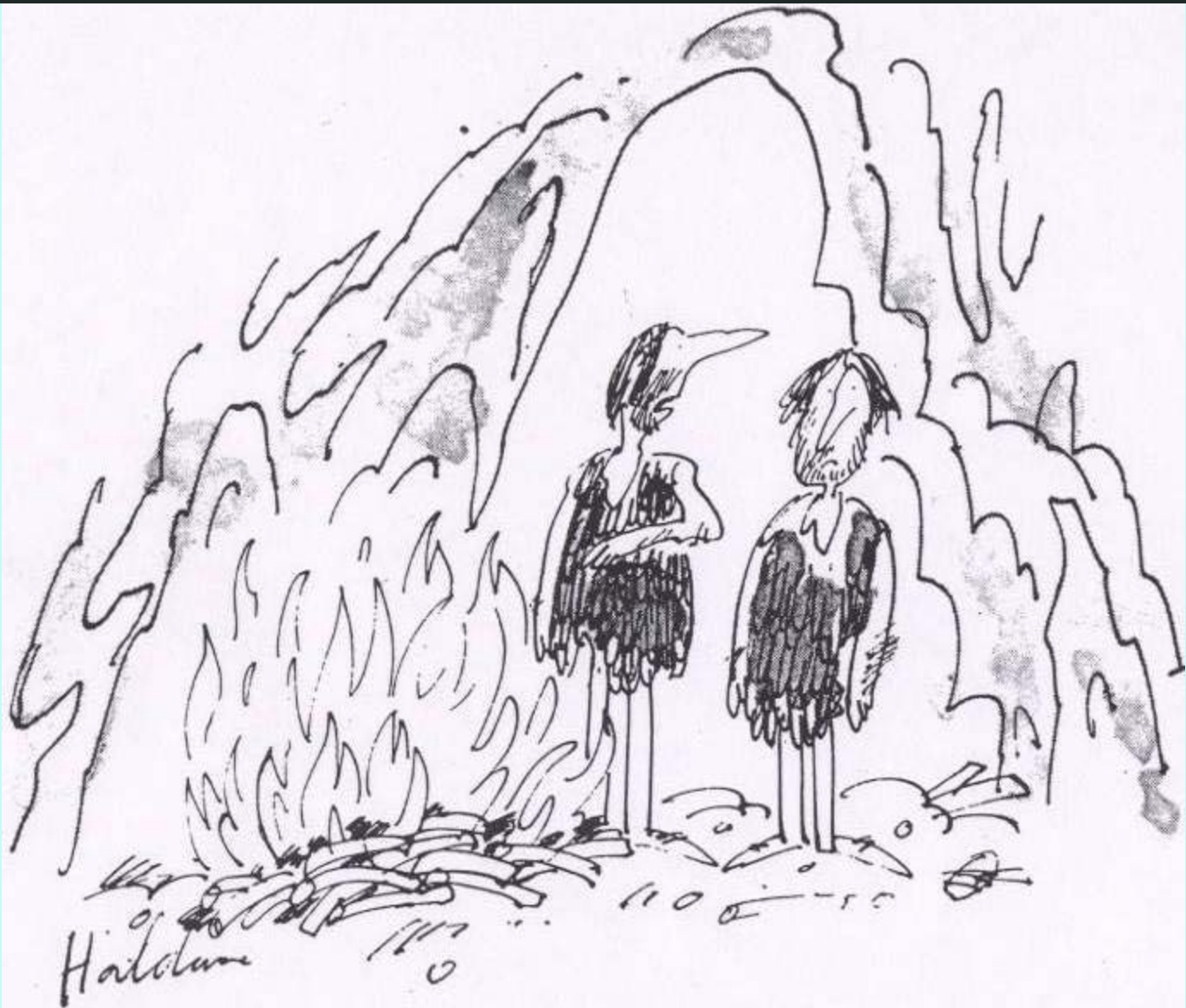
- Message content may directly invite travel
  - “Mr. Watson, come here – I want to see you”
  - Use of mobile phone to schedule meetings
- Increasing accessibility increases engagement in activities that collaterally involve travel
- ICT fosters expectation of instant gratification

# 11. ICT drives increasing globalization of commerce

- Lowered information & transaction costs
  - directly stimulate business
  - release resources for alternative uses
- Leads to growing (broader and deeper) customer base
- Facilitates greater geographic separation of functions, thereby
- Requiring more movement of goods & people

## 12. ICT facilitates shifts to more decentralized, lower-density land use patterns

- It also facilitates *centralization/densification*
- Technology is neutral; we have a personal and collective choice in how it is applied



"Very impressive, but what if the wrong people get their hands on it?"

## 12. ICT facilitates shifts to more decentralized, lower-density land use patterns

- It also facilitates *centralization/densification*
- Technology is neutral; we have a personal and collective choice in how it is applied
- Decentralization has many “causes”, and trends predate internet and other modern ICTs
- The news for telecommuting, however, is largely good



So... is there any hope for  
ICT to reduce travel?

■ Some...

# 1. Sometimes ICT *does* substitute for making a trip

- Telecommuting appears to be a net benefit
- Insignificant effects in some models may be substitution and complementarity canceling
- Substitution effects might, in fact, be substantial (even if often more-than-counteracted by generation effects)

## 2. ICT consumes time/money

- ICT takes time as well as making time
- Some studies have found a “displacement” effect – more time on the internet associated with less time on out-of-home activities and travel
- (But a number of others have found complementarity between ICT use and out-of-home activities/travel)

## 3. If travel costs increased dramatically...

- Previous research assumes “business as usual”
- *Extreme events* affecting work locations or transportation network stimulate substitution of ICT for travel, at least temporarily
- *Travel pricing policies or trends* (congestion pricing, fuel tax/price, carbon tax, market-priced parking, etc.) could stimulate demand for ICT substitutes
- (But gasoline consumption appears to be rather price-insensitive – travel is still an attractive/compelling alternative in many cases)

## 4. ICT can make shared travel modes more attractive

- Enables pre-trip, en-route information about public transit
- Enables real-time ridesharing, carsharing
- Decreases the disutility of travel by making travel time more productive/enjoyable – the more so for “hands-free” shared modes

# The challenge

- The same technological advances that make ICT an attractive substitute for travel also create synergies with travel
- The same ICT-based mechanisms that make public transit more attractive can also make driving more attractive



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building a few more times while  
you send a few more emails.

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# The challenge

- The same technological advances that make ICT an attractive substitute for travel also create synergies with travel
- The same ICT-based mechanisms that make public transit more attractive can also make driving more attractive
- Thus, ICT is inextricably part of the “problem” as well as the “solution”



# Speaking of a dual nature...

- Travel itself is a two-sided phenomenon:
  - Yes, we need to try to mitigate its negative externalities
  - But, mobility has personal, social, economic benefits, and we will pay a societal price when we curtail it

## Perhaps we can agree...

- *Providing attractive alternatives to travel* is a good thing, and
- so is *using the transportation system more efficiently*, so that more travel can be accommodated within the existing network
- ICT has a clear role to play in both of these strategies, and thus
- merits public policy support

# For further reading

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# Questions?



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