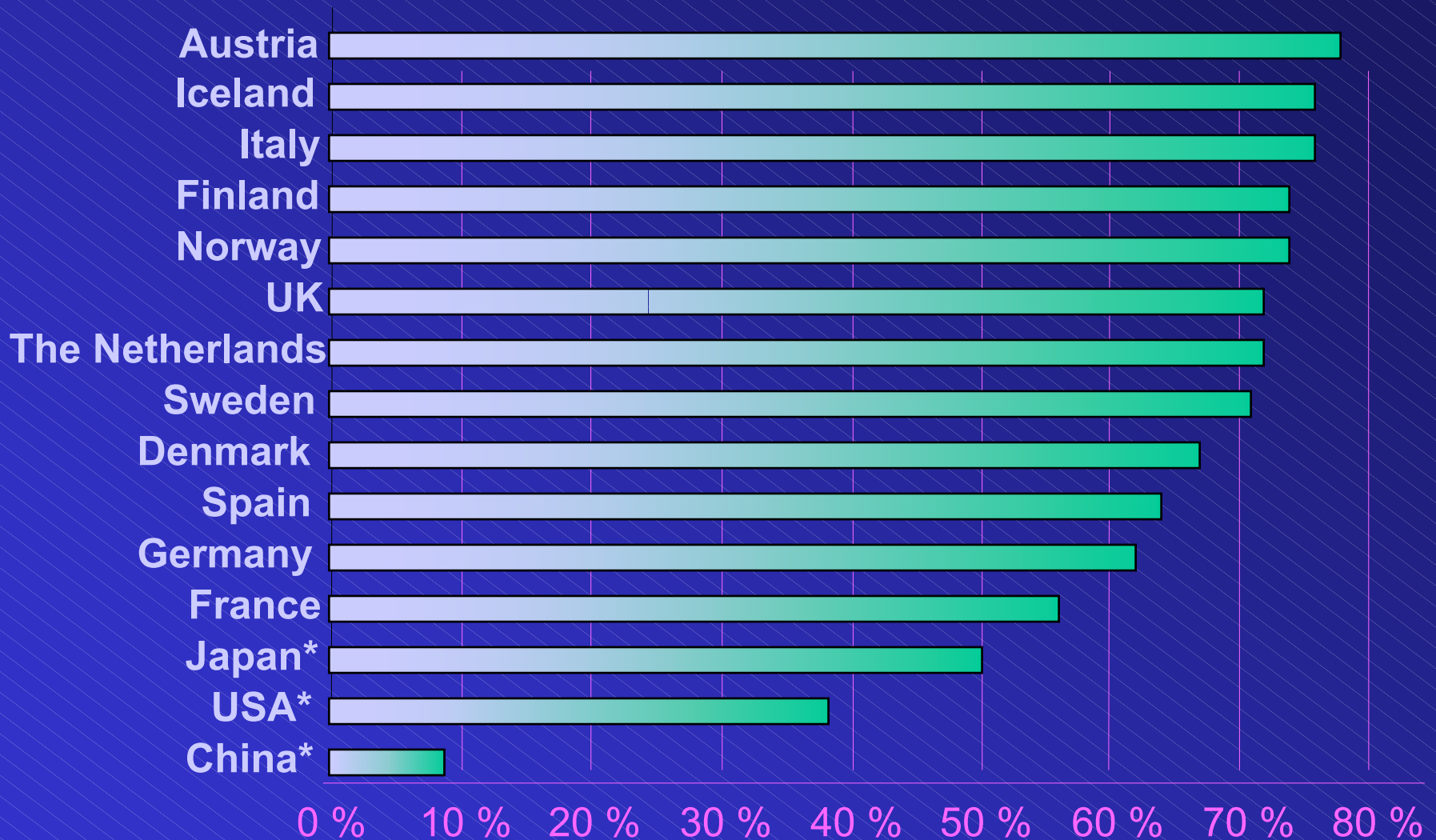




MINISTRY OF TRANSPORT  
AND COMMUNICATIONS FINLAND



# Mobile phone penetration



Source: *Mobile Communications, Public Network – 1.3.2001, 1.1.2001\**

# Basic user needs

Where am I ?

how shall I communicate it?

Where is destination ?

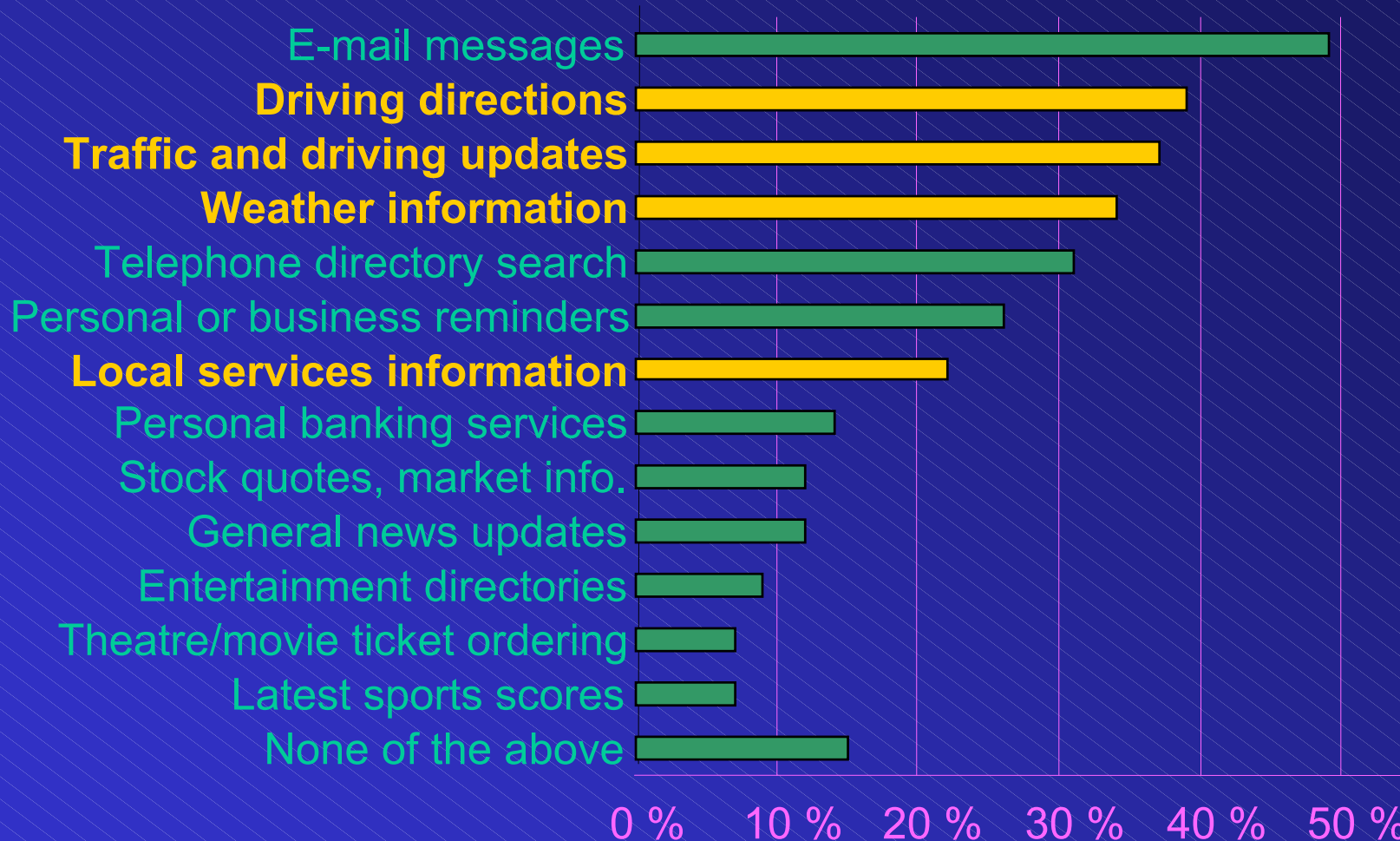
ie services, products, moving targets etc.

How to get there ?

means, routes, timetables etc.

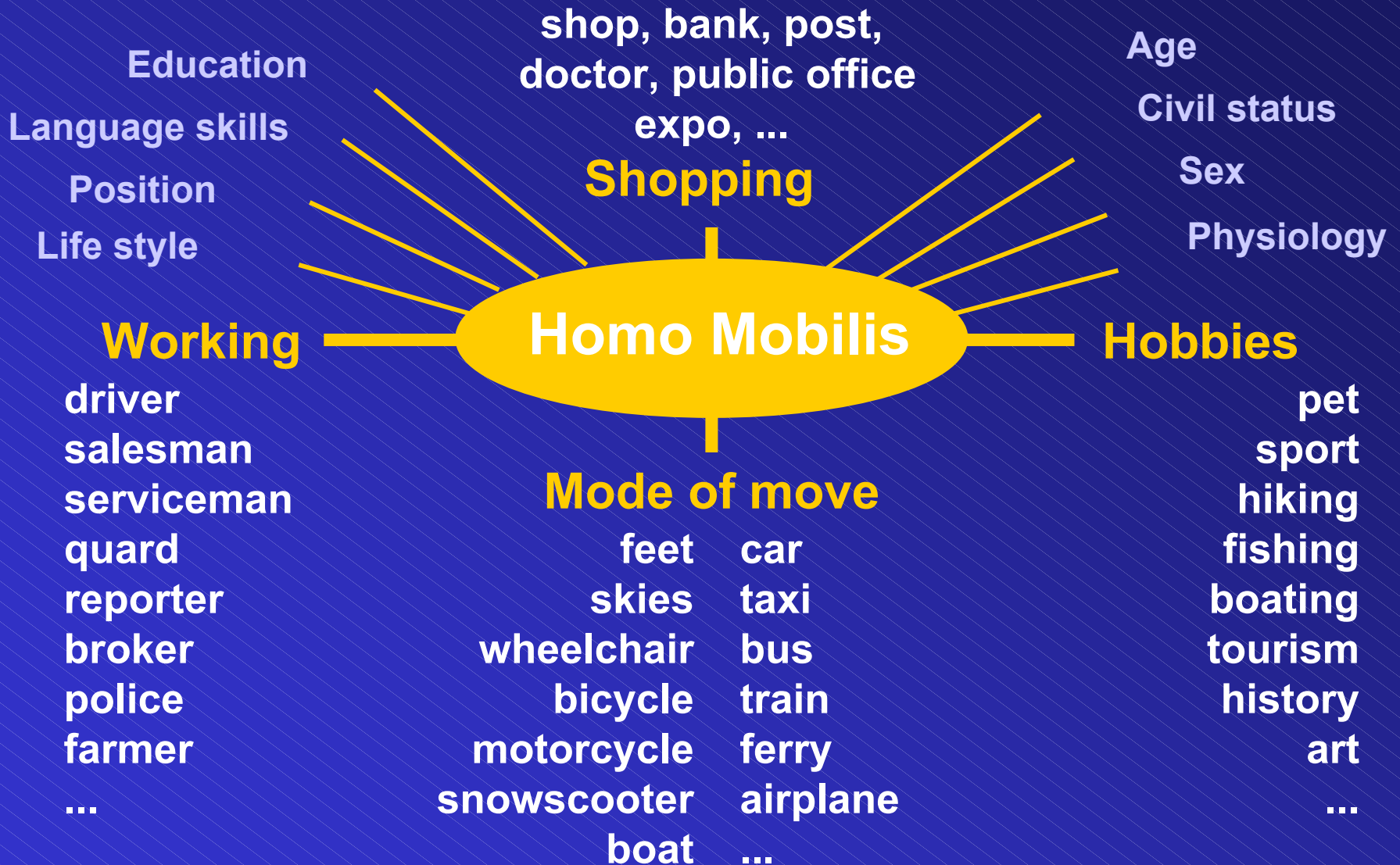
Big brother ?

# Customer need for LBS



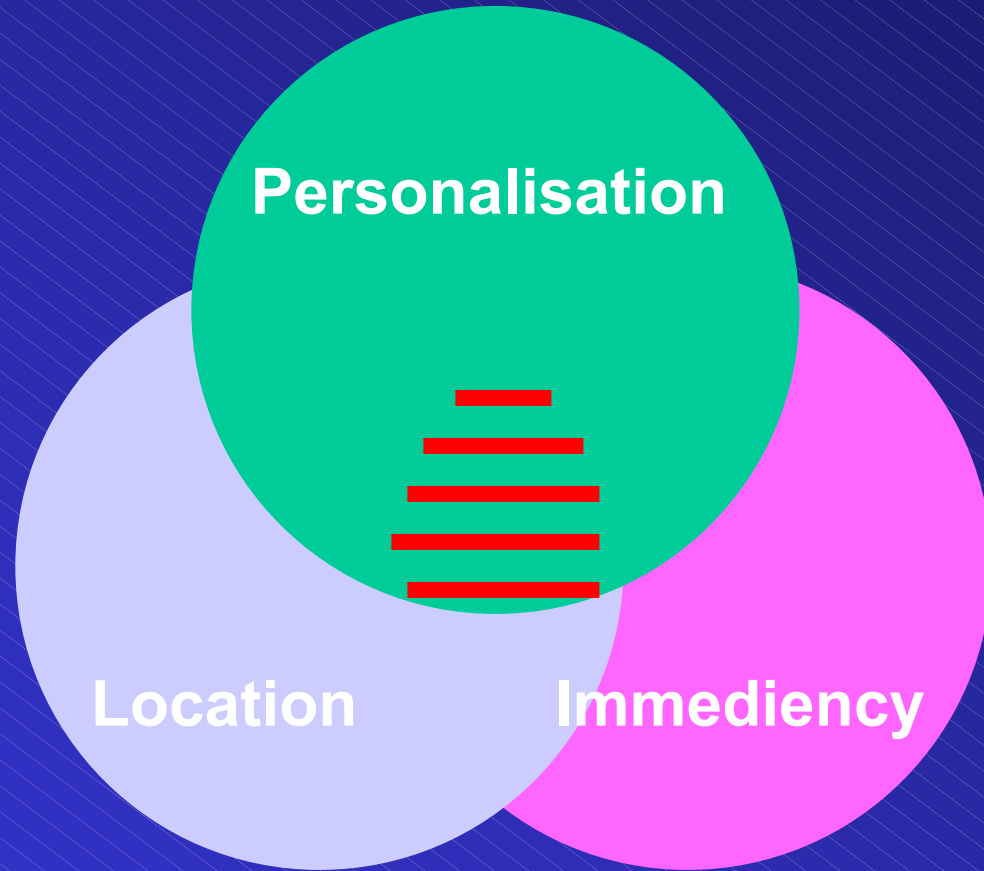
Source: Jupiter 1999 (device-owning US online users)

# Mobile person



...and do not underestimate social navigation and mobile games

# Success factors of mobile service



# Mobile location technology

Satellite positioning

GPS, Assisted-GPS

Cellular positioning

Cell of origin

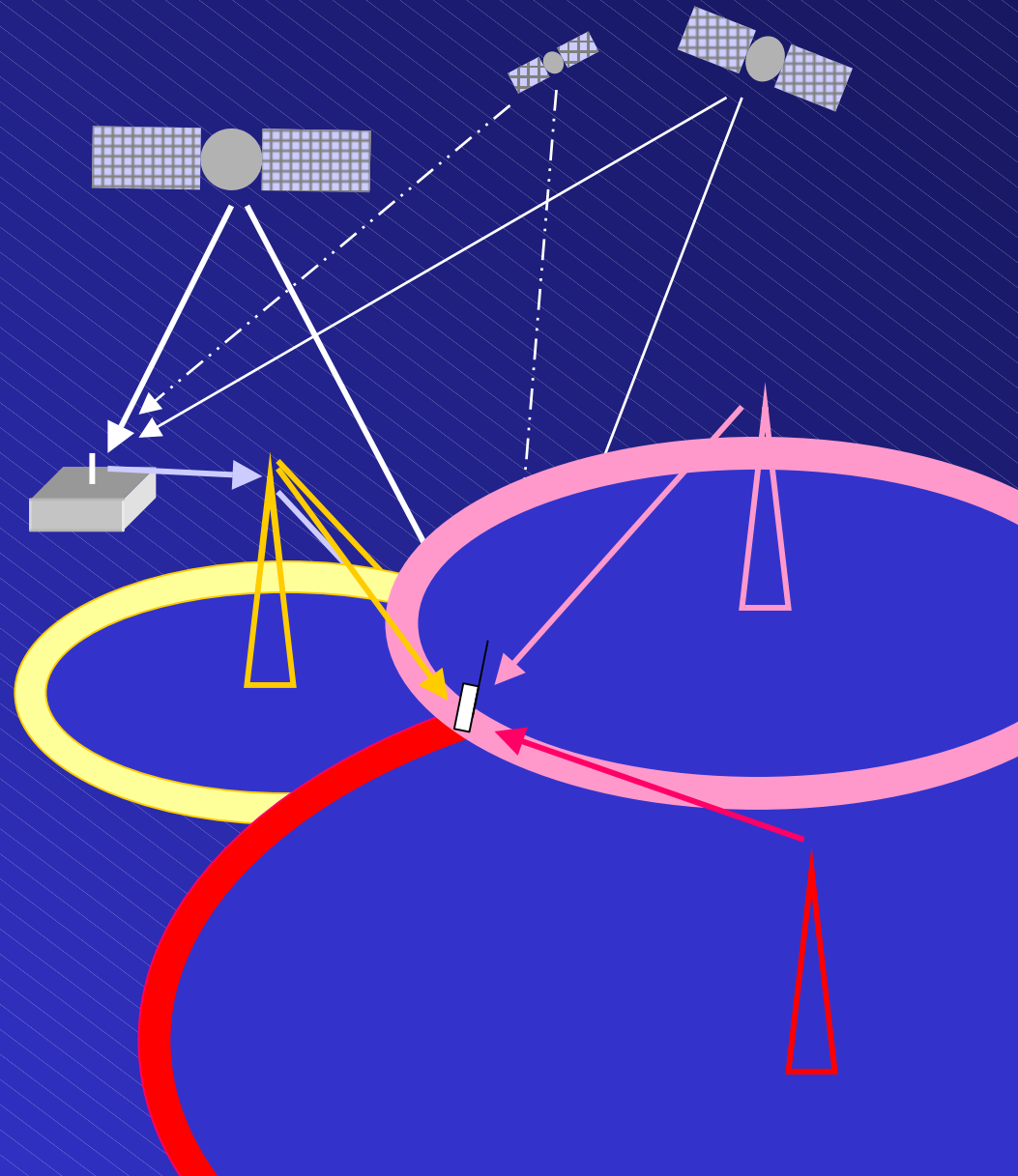
Signal time

Signal strength

Local area positioning

WLAN fingerprint

Bluetooth link



# Mobile location services

Availability

remote

rural

sub-urban

urban

city

indoor

1m

3

10

30

100

300

1km

3km

10km

Accuracy

GPS

DGPS

GPS

AGPS

BT

WLAN

3G

CI+RTT

IPDL-  
OTDOA

2G+

EOTD

TOA

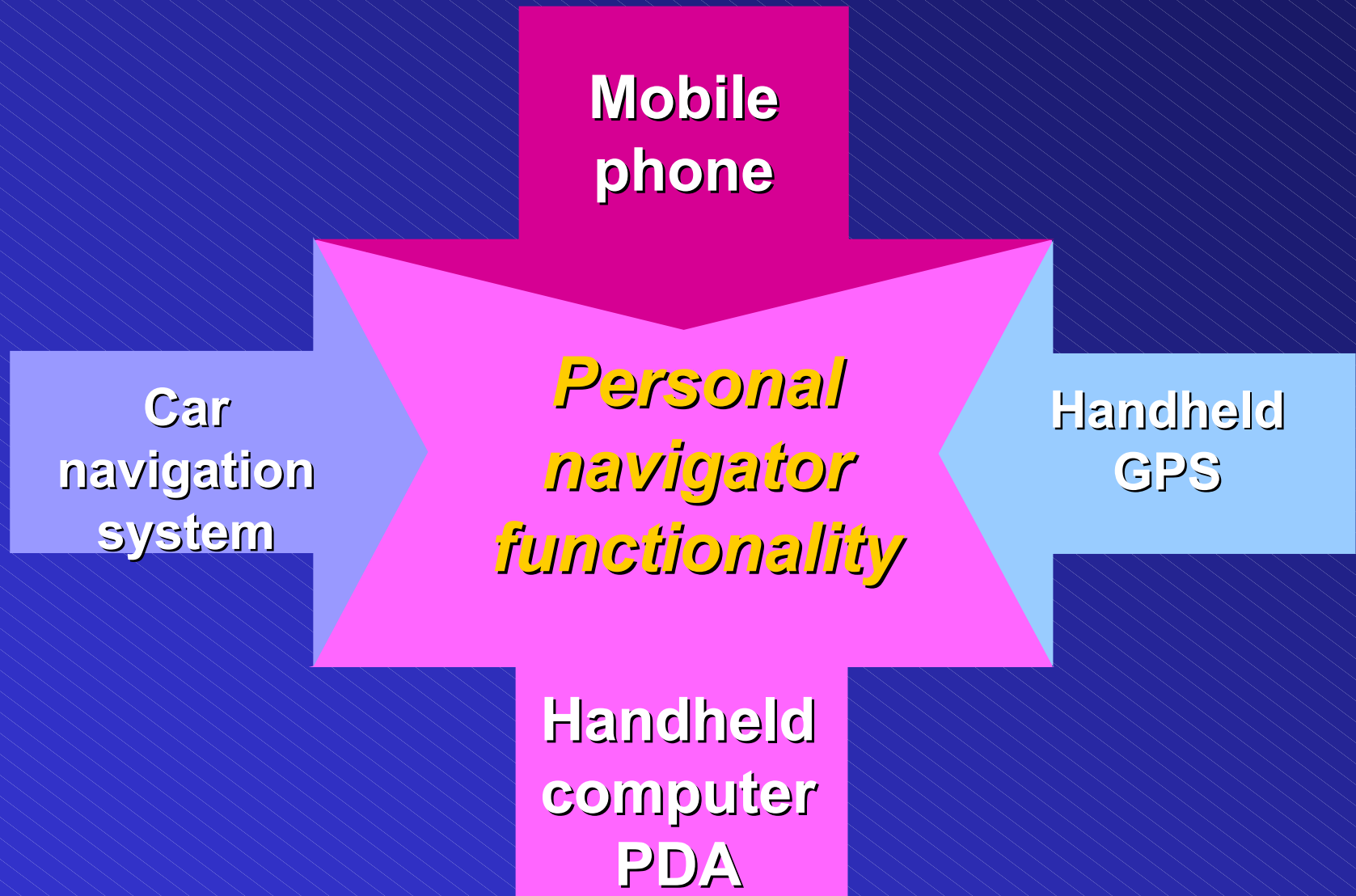
2G

CI

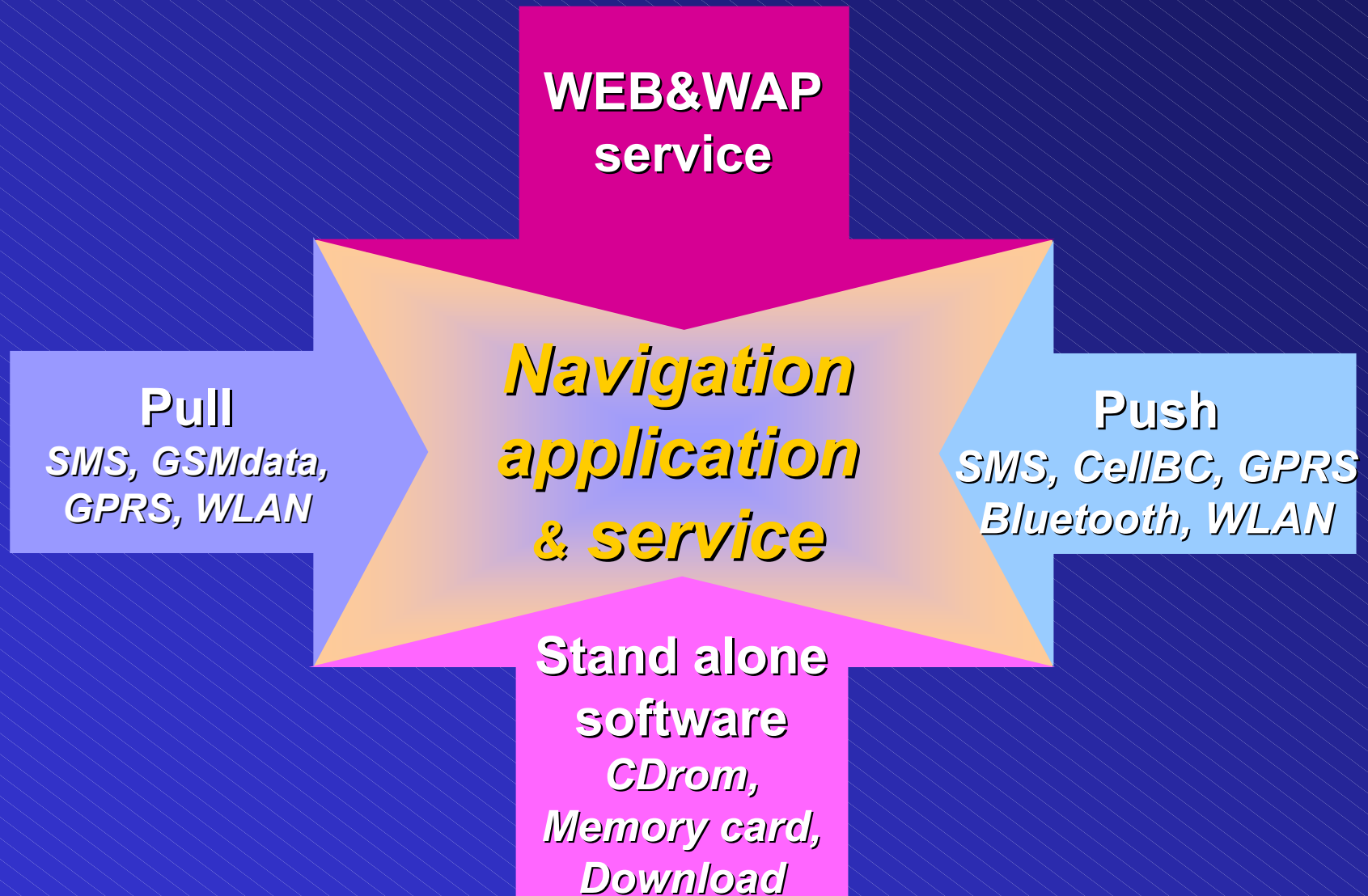
CI+TA

CI+RX

# Personal navigation device



# Personal navigation service



# Evolution of personal navigation

CI & EOTD & AGPS  
WLAN & Bluetooth  
GSM & GPRS & UMTS  
SMS & CBS & WAP & WEB  
eMAP & GIS & VR

CI & EOTD & GPS  
GSM & GPRS  
SMS & CBS & WAP & WEB  
eMAP & GIS

GPS  
eMAP  
(CDrom & DVD)

Car  
navigation

Personal  
navigation

Out&in-  
door  
guidance

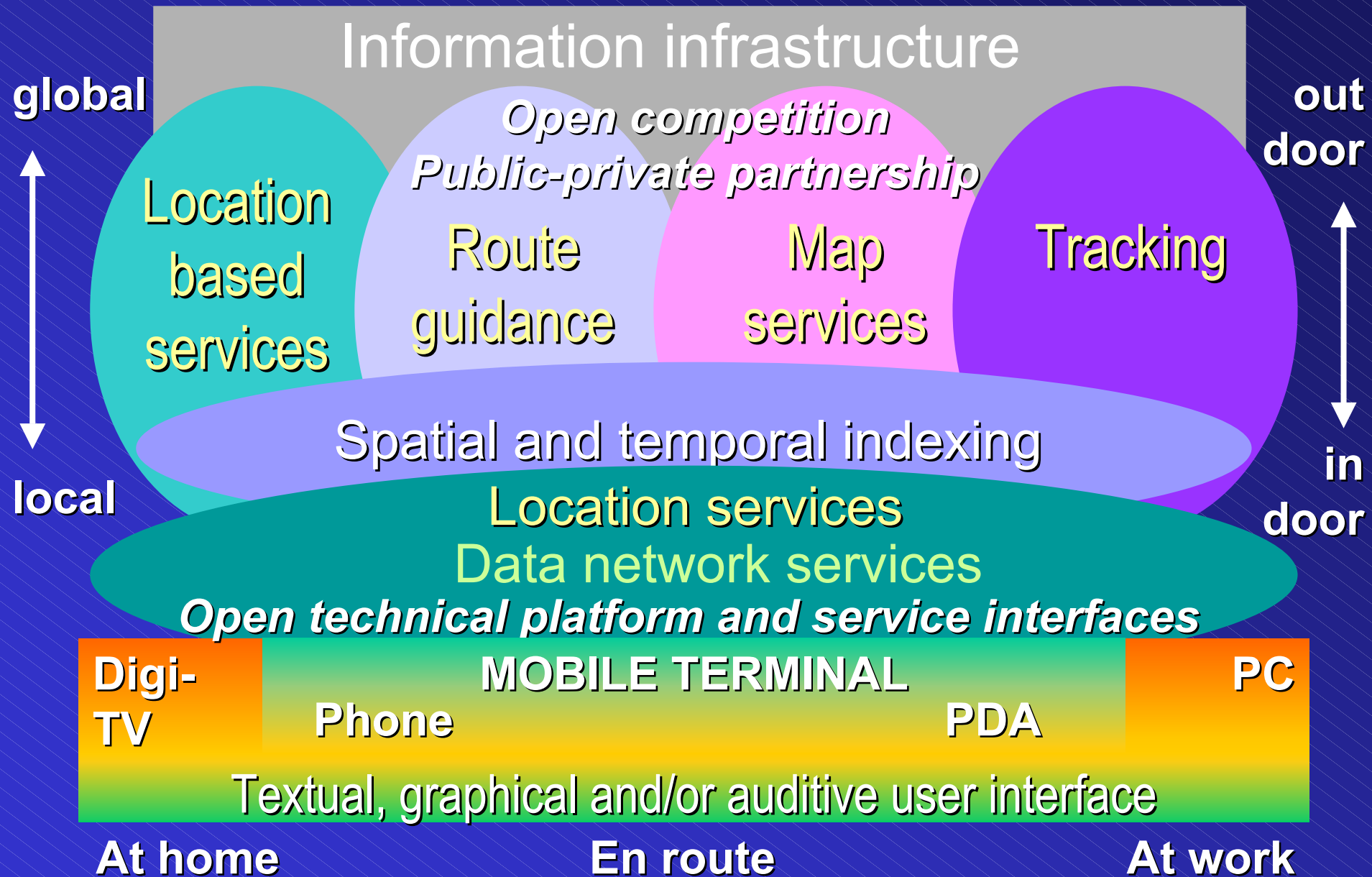
1st wave

2dn wave

3rd wave



# Navigation services



# Personal navigation (NAVI)

*National programme in Finland 2000-2002*

Horizontal support

Vertical Applications

Mobile Work  
Shopping & Delivery  
Hobbies & Sports  
Tourism  
Public Transport  
Safety  
Health care

Regulation  
Useability  
Interfaces

Map&Route Services

Indoor Guidance

Positioning Services

Navigation Terminals

Generic technology

overall budget estimate is 15-20 Meuro

# NAVI Management Board

- Ministry of Transport and Communications
- National Technology Agency, Tekes
- National Fund for Development and Research – Sitra
- Benefon, Hewlett&Packard, Nokia Mobile Phones, Suunto  
(*device vendors*)
- Radiolinja, Sonera (*mobile operators*)
- Digia, Genimap, Satama Interactive (*application suppliers*)
- ICL Invia, Novo Group, TietoEnator(*system integrators*)
- Fortum
- Ministry of Agriculture and Forestry, Ministry of Education and Culture, Ministry of Defense, Ministry of the Interior, Ministry of Social Affairs and Health
- National Road Authority

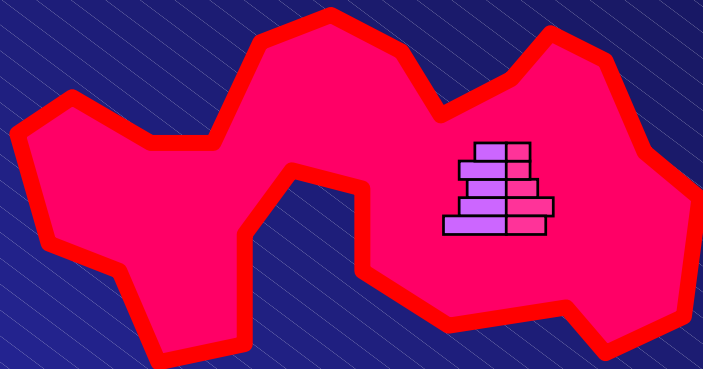
**... in addition many more in NAVI network**

- total number more than 80 organisations

# Location-aware statistics etc.



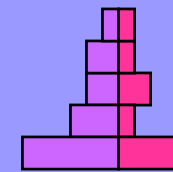
Sonera Pointer  
cellular positioning  
sms,  
wap,  
gprs



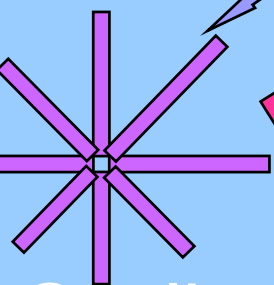
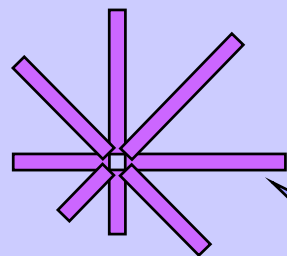
Sonera Pointer  
**Facta**  
by **Statistics Finland**  
basic demographics  
public service points  
(kindergarten, pharmacies)

# Cellular statistics

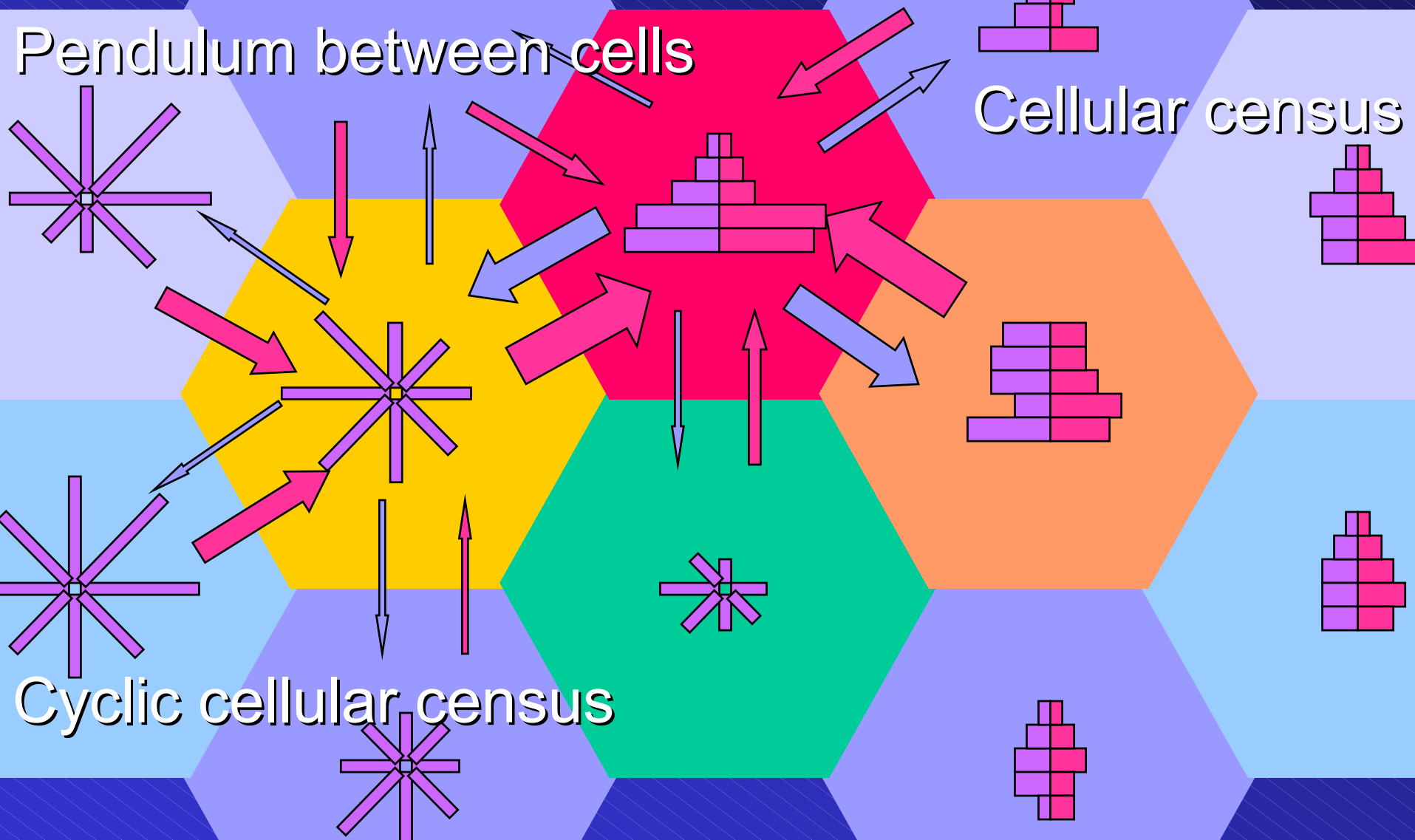
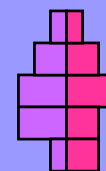
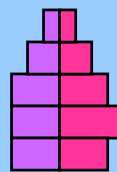
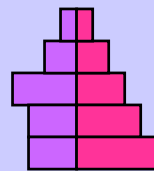
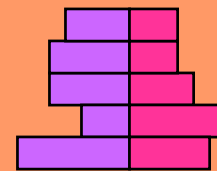
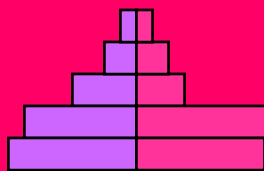
Pendulum between cells



Cellular census



Cyclic cellular census





<http://www.navi-ohjelma.fi>

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