

Features of (socio-technical) transformations

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and
Future Earth

Defining what we mean

Transformation

Transition

Threshold

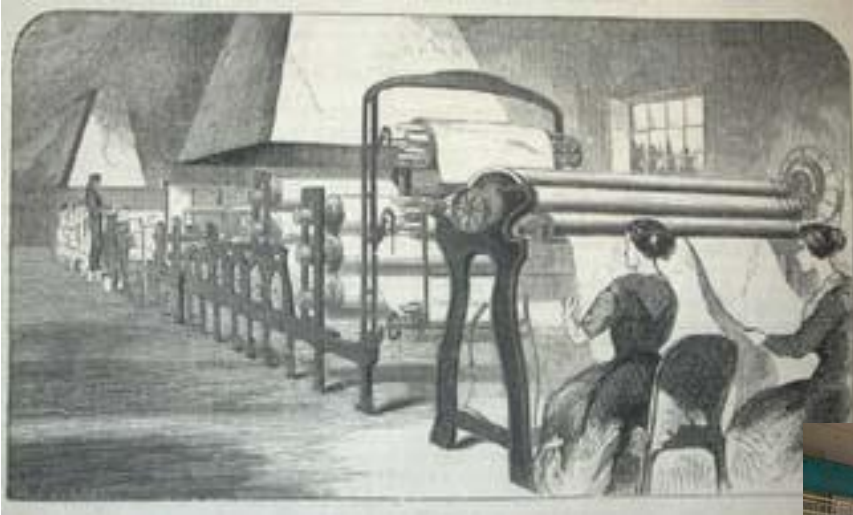
Tipping point

How much change?

Incremental

Radical

Making paper



1850

2010



Moving about



1913

2013



Messaging



What changes?

Structures

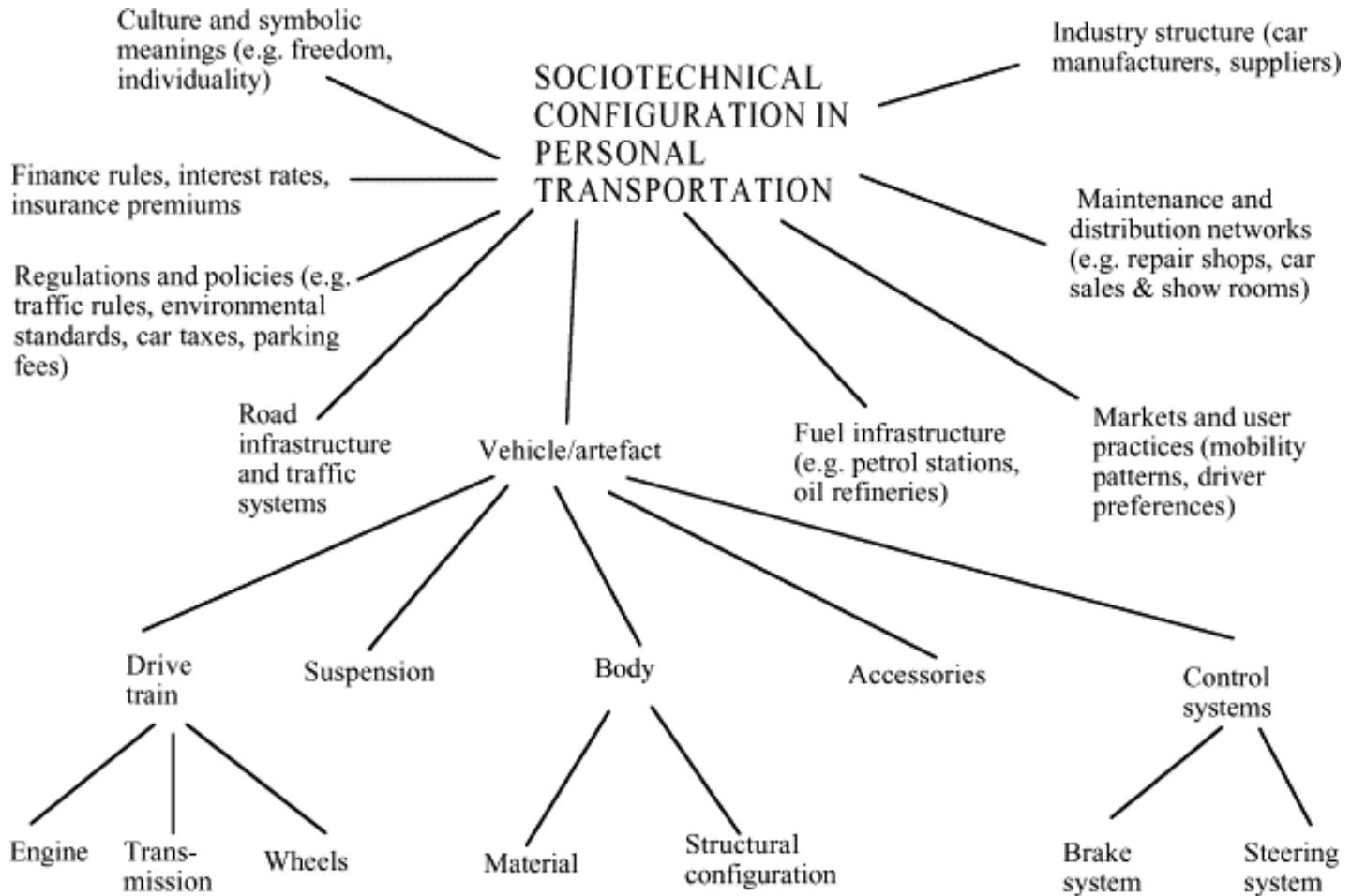
Performance/Functions

Actors/Relationships

Rules

Norms

What changes?

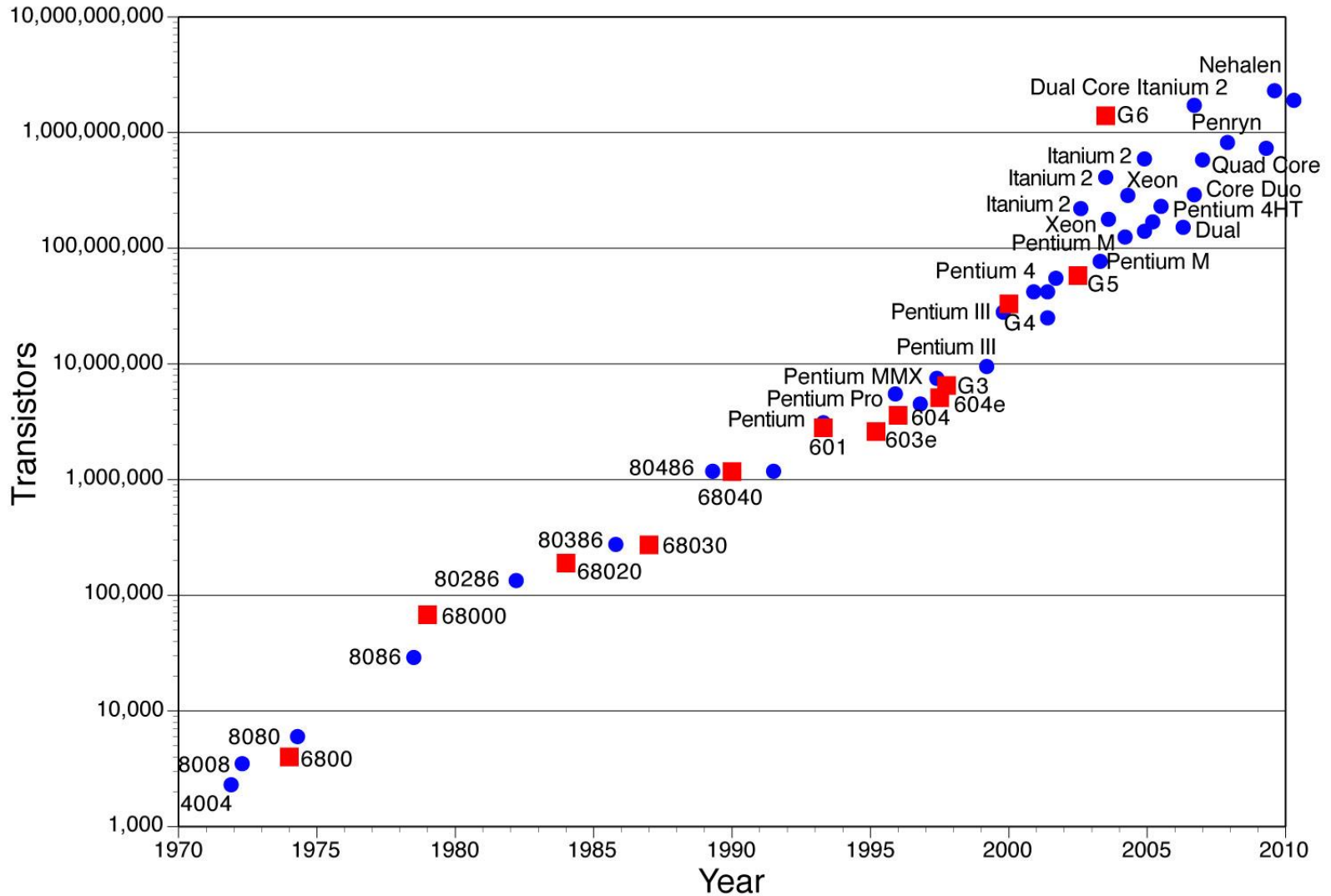


Source: Geels, 2002

What changes?

Performance

Moore's Law



What changes?

Actors/Relationships

Incumbents/newcomers

What changes?

Rules/Orders

Deep/shallow

What changes?

Norms

How quick is change?

Slow/Gradual

Fast/Abrupt

Maize yields

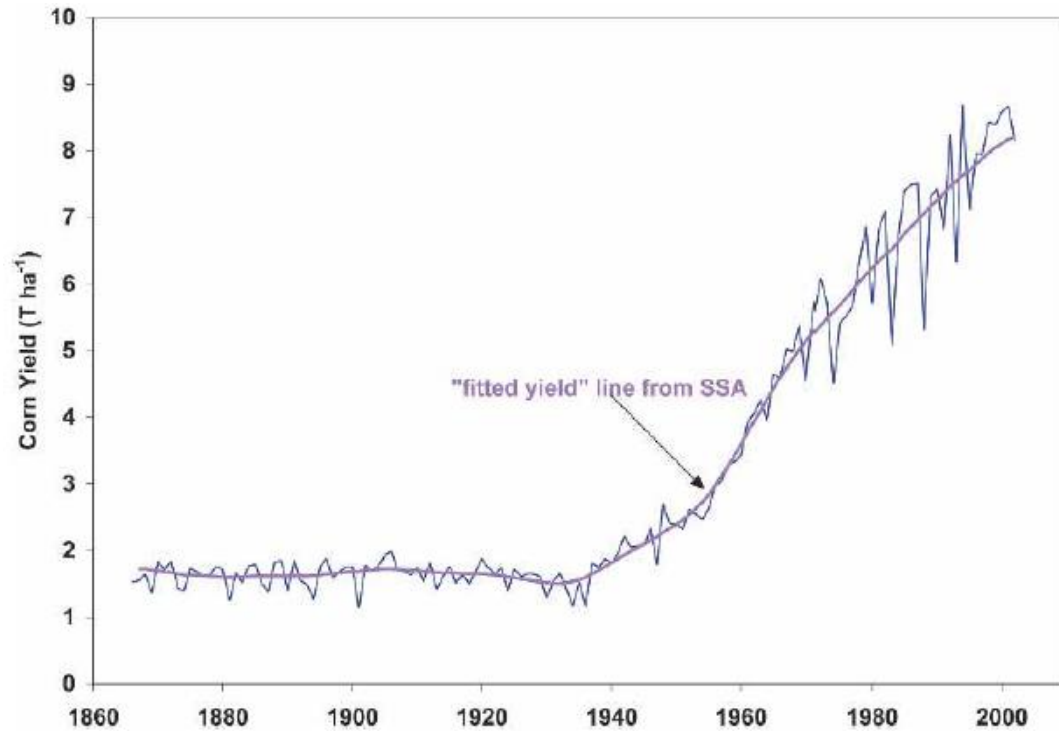
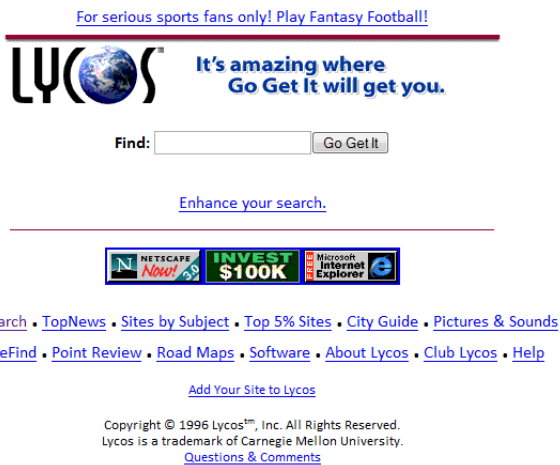
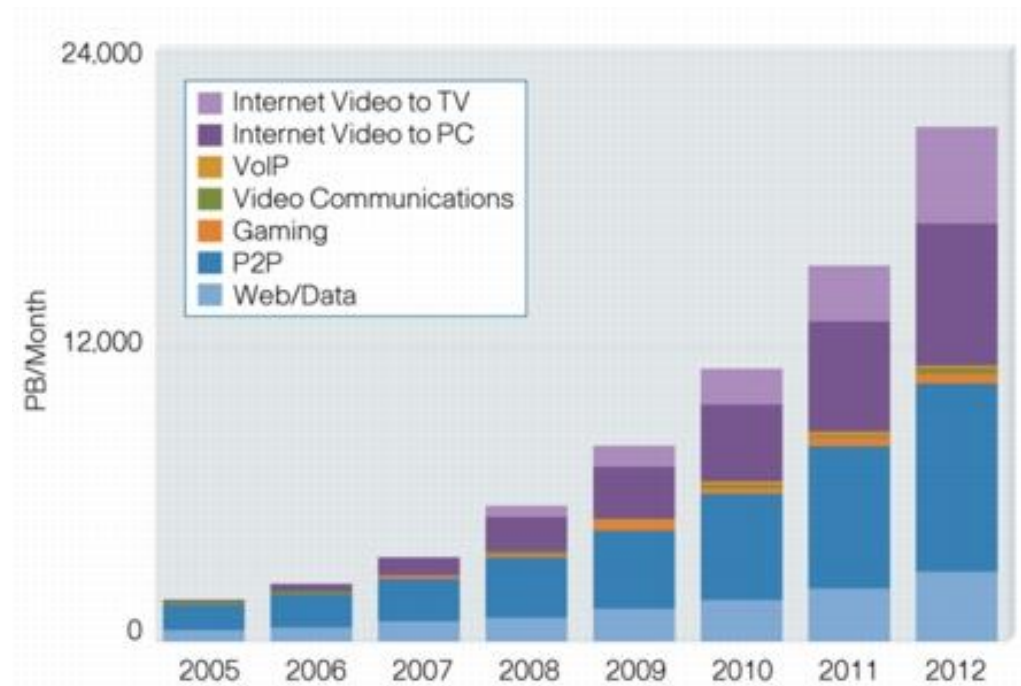


Figure 1. The U.S. national corn yield average data from the USDA (blue line) and "fitted yield" line (pink line) using SSA.

Internet traffic



Lycos 1996



How broad is the change

Narrow

Wide

Scope



Smart Microgrid

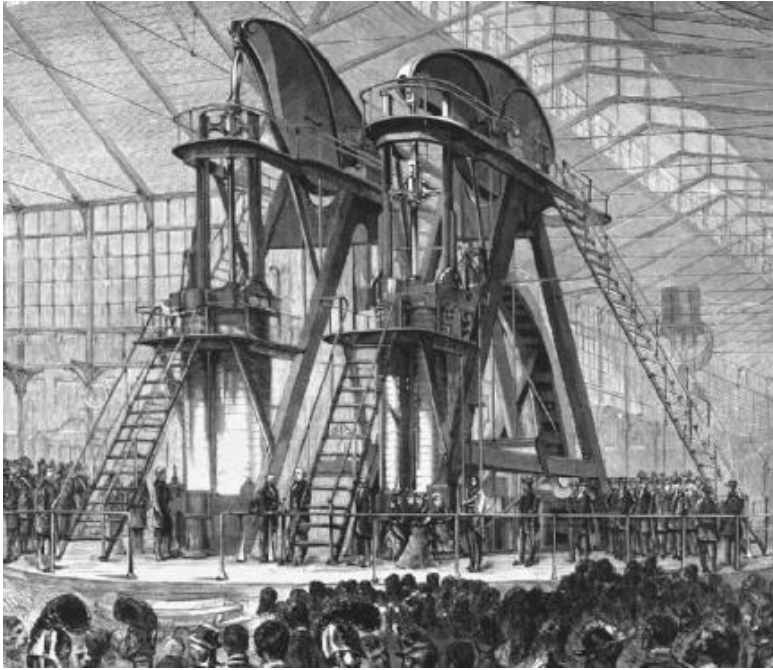


Intentionality?

Emergent

Purposive

Emergent/Purposive



Steam power

Nuclear power



Theories of transformation

Evolutionary – continuities

Revolutionary – discontinuities

Cyclical – adaptive cycle

Narratives of transformation

Growth/development

Creative destruction

Growth/conservation/release/reorganisation

Disordering/ordering

....

Features of transformation

Scale

Nature

Speed/momentum

Scope

Intentionality

'theory of change'