Origin of car culture and victory of gasoline car

Mats Bladh

PhD economic history

Docent technology and social change

Employed at the Swedish Energy Agency

In short

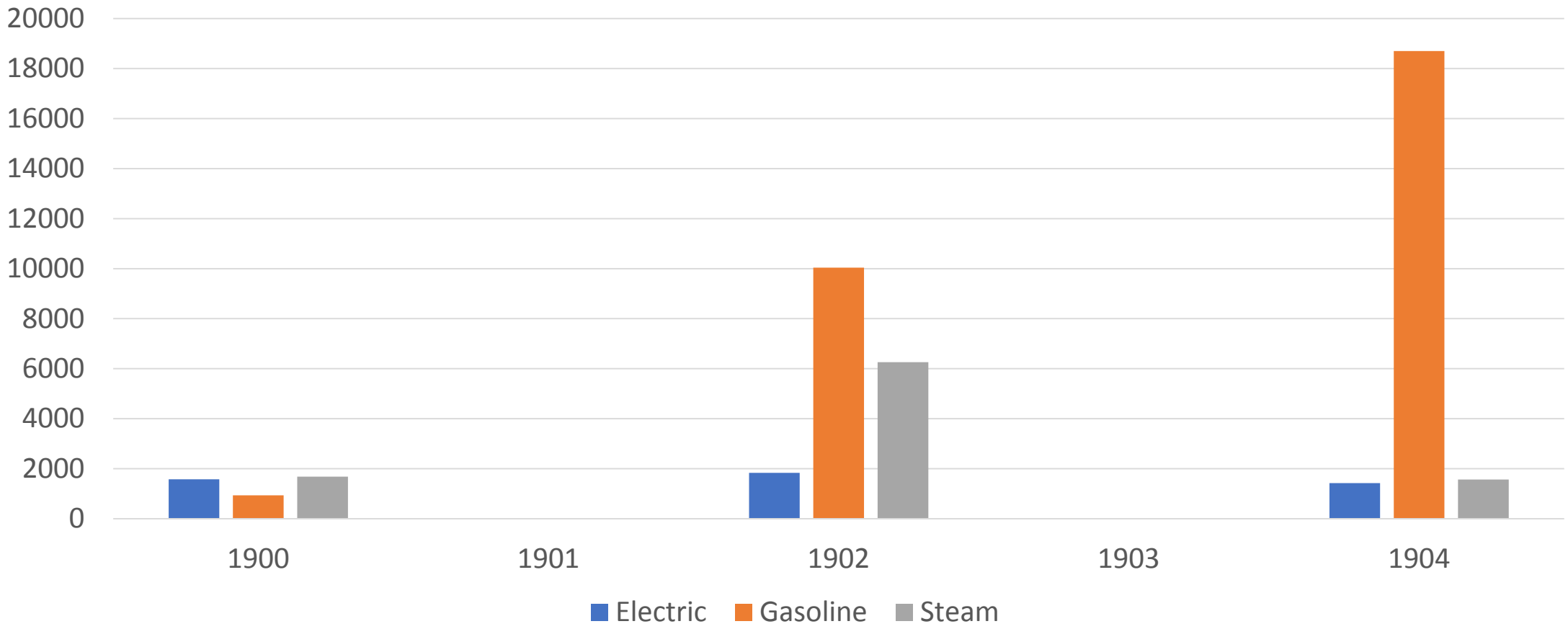
- Why did the internal combustion car win?
  - Not pure technical performance, but in relation to social innovation
  - Bicycle craze and touring, emerging car culture
  - Touring, commuting and much more: the universal car
  - Restrictions on steam
  - Short range and battery
- Still, a car culture without petrol (gasoline) possible
  - Early IC engines adaptable, tax on alcohol 1862 and 1864
  - Kerosene and electric light, gasoline and ”cracking”, blends and ”knocking”
  - Alliance with farmers or oil industry.

Literature synthesis +

- Berger (1979) The rural auto
- Carolan (2009) Ethanol gasoline
- Flink (1970) America adopts
- Flink (1990), Auto age
- Geels (2005) From horse to car
- Kirsch (2000) Electric vehicle
- Kovarik (1998) Ethanol gasoline
- McShane (1994) Asphalt path
- Mom (2004) Electric vehicle
- Reid (2015) Roads cyclists
- Schallenberg (1982) Batteries
- Volti (1990) Why IC?
- Yergin (1991) Oil industry

- Historical statistics of the US

Three types, production



Restrictions on steam power

- Restrictions in urban areas
- Fear of boiler explosions
- Protection of the slow tempo of pedestrians and horses
- Choice of path 1:
  - No steam powered public transport
  - Horse-drawn: Omnibuses, cars on rails
- Droppings and urine.

From New York 1892 and 1899

Trolleys and batteries

- Replacing horses:
  - Cable car (expensive, suited hilly areas)
  - Conduit rail (expensive, complicated, trouble-prone)
  - Battery street car (grades, stop-and-go, batteries heavy)
  - Overhead transmission (less dangerous, cheaper)
- Overhead system dominant
  - Interurban lines, tourism
- Choice of path 2:
  - Many wires in the air: Telegraph, telephone, arc-lights, incandescent lights
  - But battery insufficient: Only 2 per cent battery street car

Electrobat 1 and 2

The battery and the EVC

- The idea of an urban short range taxi service
  - An adaptation to the shortcomings of the lead-acid battery
- Morris & Salom and ESB
  - EC&WC: Taxi on Manhattan, Spring 1897
  - EVC, Fall 1897, 100 vehicles
- A metropolitan conglomerate 1899
  - Street cars, taxis and electric utilities
  - Eight cities
- Battery test and campaign: EVC collapsed 1900
  - New York Transportation Company continued, switched to IC 1906
  - Even Thomas Edison failed to come up with a “miracle battery”

Bicycles and Wheelmen

The bicycle as forerunner

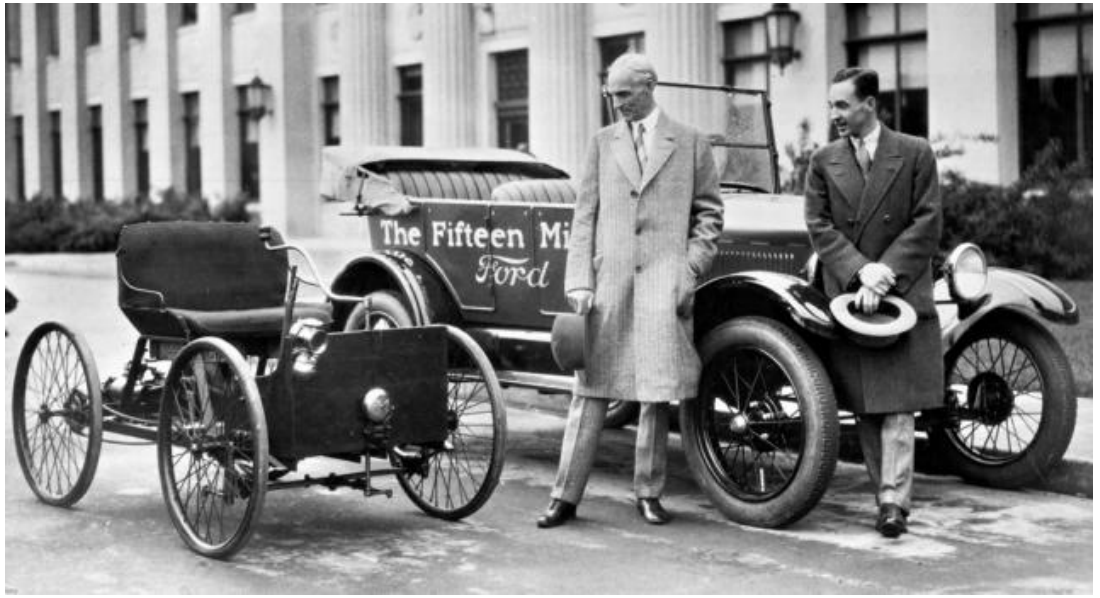
Here was a revolutionary change in transportation. My bicycle was propelled at a respectable speed by a mechanism operated by my muscles. It carried me over a lonely country road in the middle of the night covering the distance in considerably less than an hour. A horse and carriage would require nearly two hours. A railroad train would require half an hour, and it would carry me only from station to station. And I must conform to its time-table, which was not always convenient.

Hiram Percy Maxim (1937, memory from 1892)

Bicycle craze: Cycle paths

Oldsmobile and Ford N-model

Cadillac 30 and Ford T-model



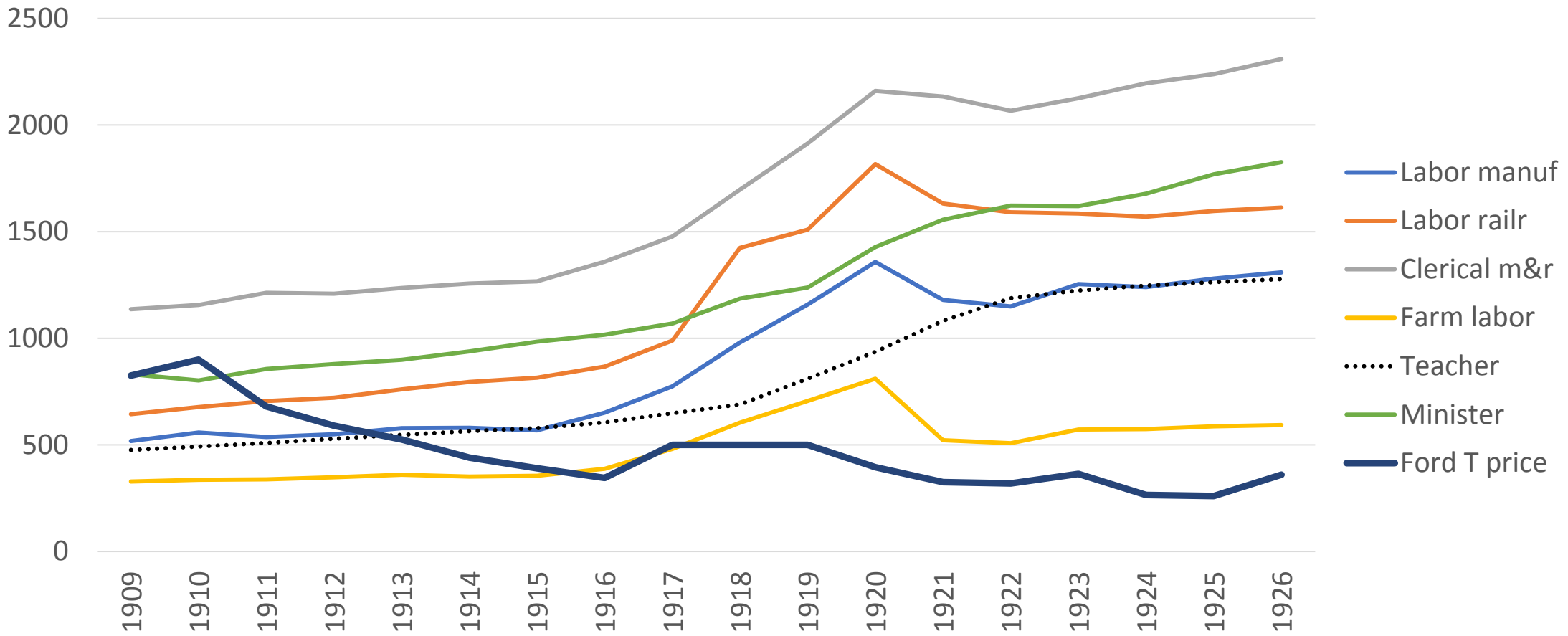
A change of attitude

- The car, a play thing for the rich
  - Picnics, country home, open cars
  - Long-distance reliability runs (e.g. 1901 Olds Detroit-New York in 8 days)
- Restrictions
  - Speed limits
  - Bad, or lack of, paving
- *New York Times* as an indicator
  - After 1904 less negative reporting, more car ads
- San Francisco earthquake 1906
  - The car very helpful
  - Standard Oil donated gasoline

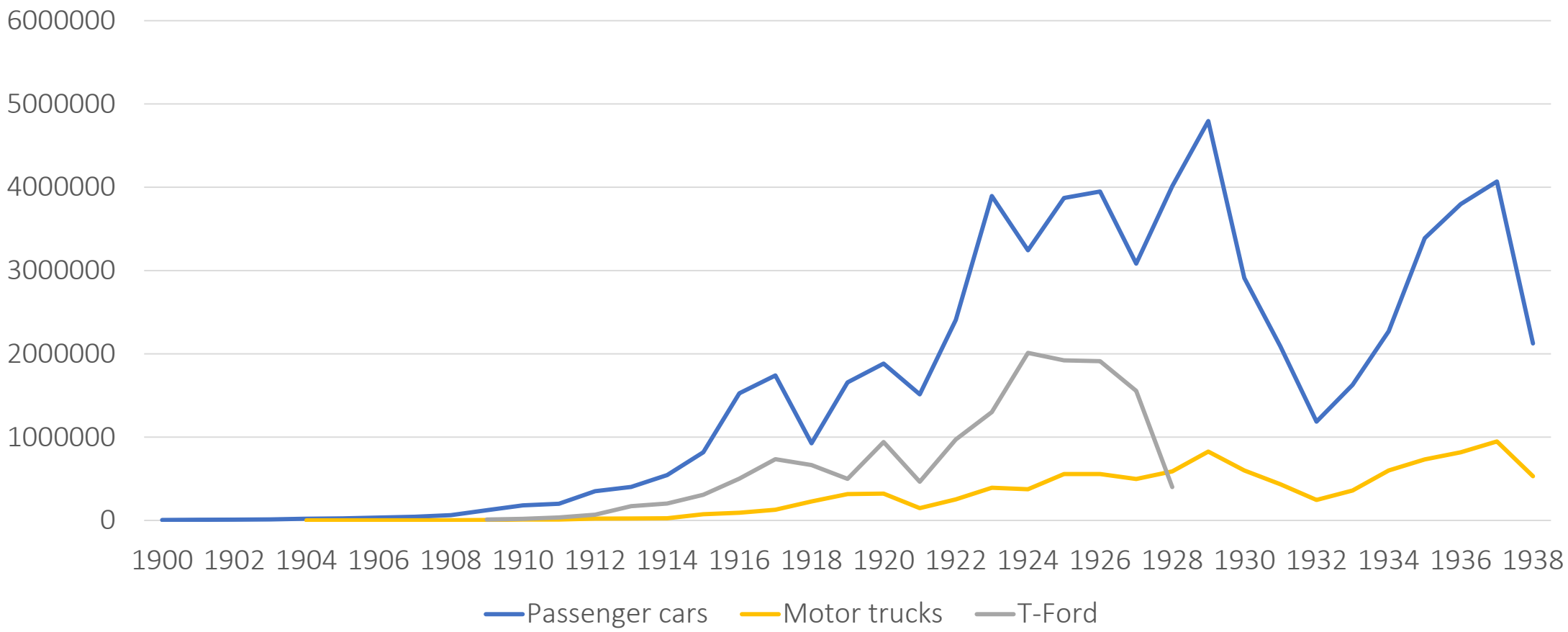
A change of habits

- Commuting
  - City dwellers bought closed cars
  - Parked cars common
- The T-Ford and rural America: The universal car
  - Stationary gasoline engines
  - T-Ford simple, high, standardized parts
  - Used as machine for driving saws, pumps, generate electricity etc
  - Leisure-time pursuits, going to town, cinema, concerts
  - Low price, installment, used cars, priority
  - In 1920 rural areas 31%, urban areas 33%.

Annual earnings and price for T-Ford ($)



Production 1900-1938



Ethanol or gasoline? (1)

- Fuel for light
  - Alcohol: Drink, and fuel for light since 1830's
  - Kerosene: Fuel for light (from oil since 1859)
  - Tax on ethanol during the civil war
- Growth of the oil industry, but:
  - Electric light a threat in 1890's
  - Fear of oil running out
  - Repeal of the tax on ethanol in 1906
  - Anti-trust legislation

Ethanol or gasoline? (2)

- IC engines adaptable to both ethanol and gasoline
  - New oil fields (Texas 1901)
  - Increasing number of automobiles with IC
  - Gasoline still cheaper than ethanol (denaturing cost)
  - Cracking increased the supply of gasoline from crude oil 1913
  - Leaded gasoline 1921 despite health risks (1926)
- Ethanol, an alternative that could have succeeded
  - Allowed more efficient high-compression IC engines
  - A mixture of ethanol and gasoline was possible
  - A fuel that would save many farmers from ruin

Ethanol as additive

- Continued to be sold in the USA until 1938

Two different innovations

- The car popular because it was a device for social innovations
  - Similar to the cell phone a hundred years later
  - Touring, freedom of mobility, but also instrumental transportation
  - The user could develop daily life
  - The love of the car is still with us today
- Choice of fuel purely instrumental for the driver
  - Gas and ethanol easy to buy in stores, but no such infrastructure for electrics
  - No real gas stations until 1920’s
- Policy implications
  - Easier to change fuel or propulsion than restricting car use.

T-Fords

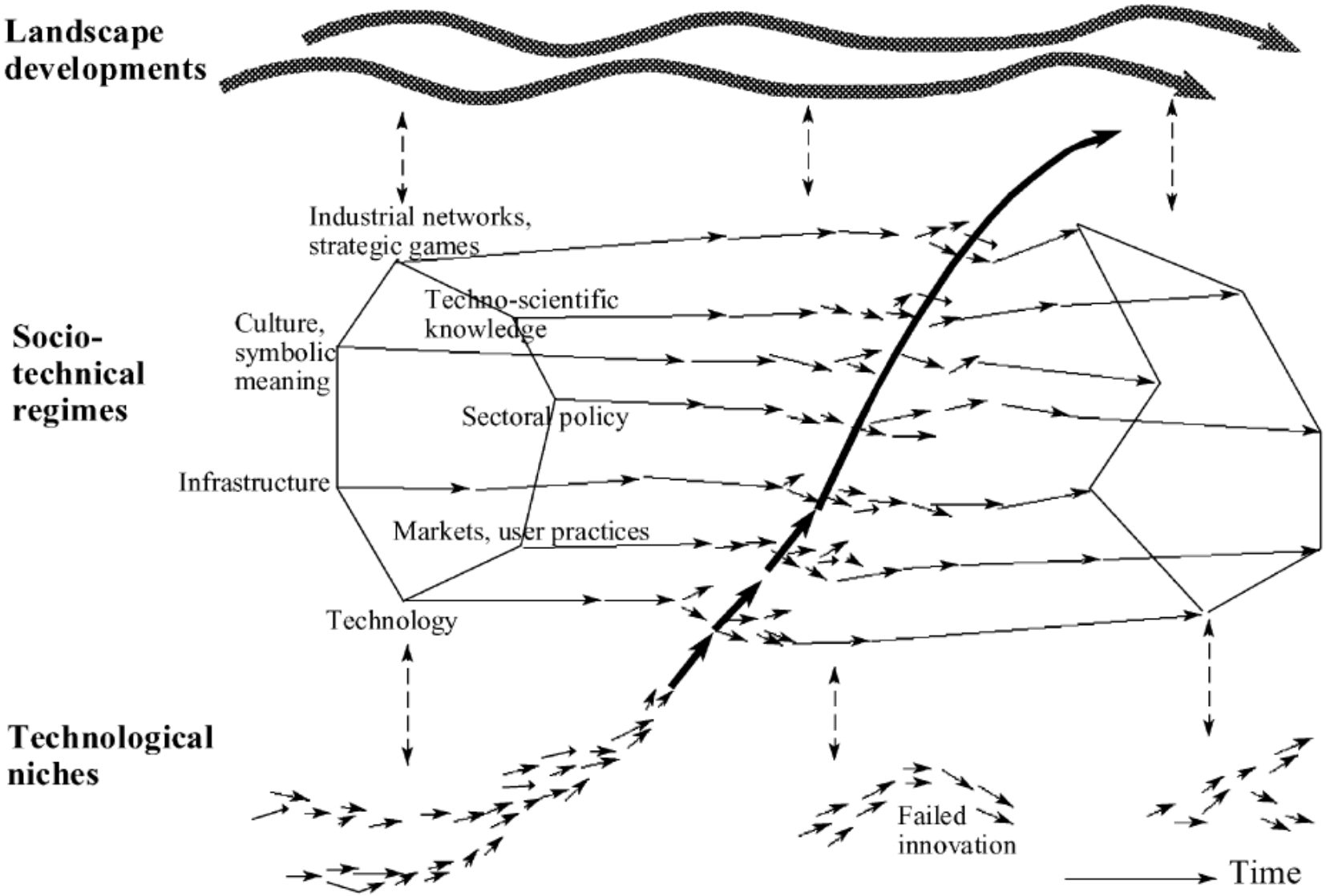
Lanier family, Polk, Florida, 1916

NYC-Seattle race 1909

Car as engine and early T-Ford in Sweden

Car for saw, 1912?

T-Ford Touring (1911) Sweden, 1913


Landscape developments
Socio-technical regimes
Technological niches
Industrial networks, strategic games
Techno-scientific knowledge
Culture, symbolic meaning
Sectoral policy
Infrastructure
Markets, user practices
Technology
Failed innovation
Time

From New York 1900