WP 3
Development of an integrated analytical framework

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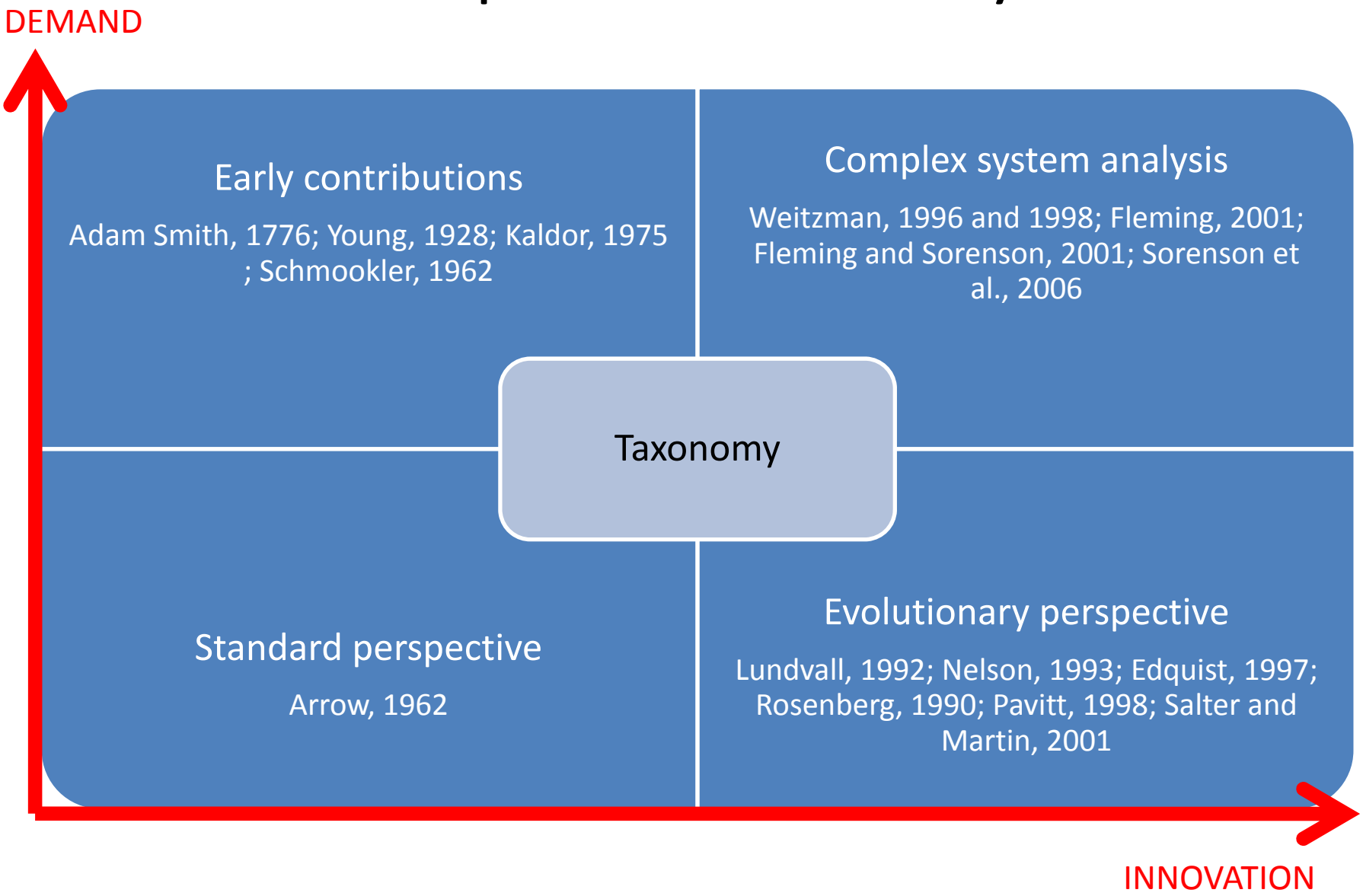
Proposal of taxonomy



Behind the taxonomy: different perspectives on knowledge

- Most of the attention has been paid on the economic effects of the introduction of new technological knowledge as well as on the structural conditions better triggering innovative performances

- Empirically grounded research tradition which considers knowledge as an unbundled stock

- Yet, very little is known about how new knowledge is brought about

  ... and, consequently, about how to provide a representation of knowledge that could be meaningful also from the epistemological viewpoint

Behind the taxonomy: different perspectives on knowledge

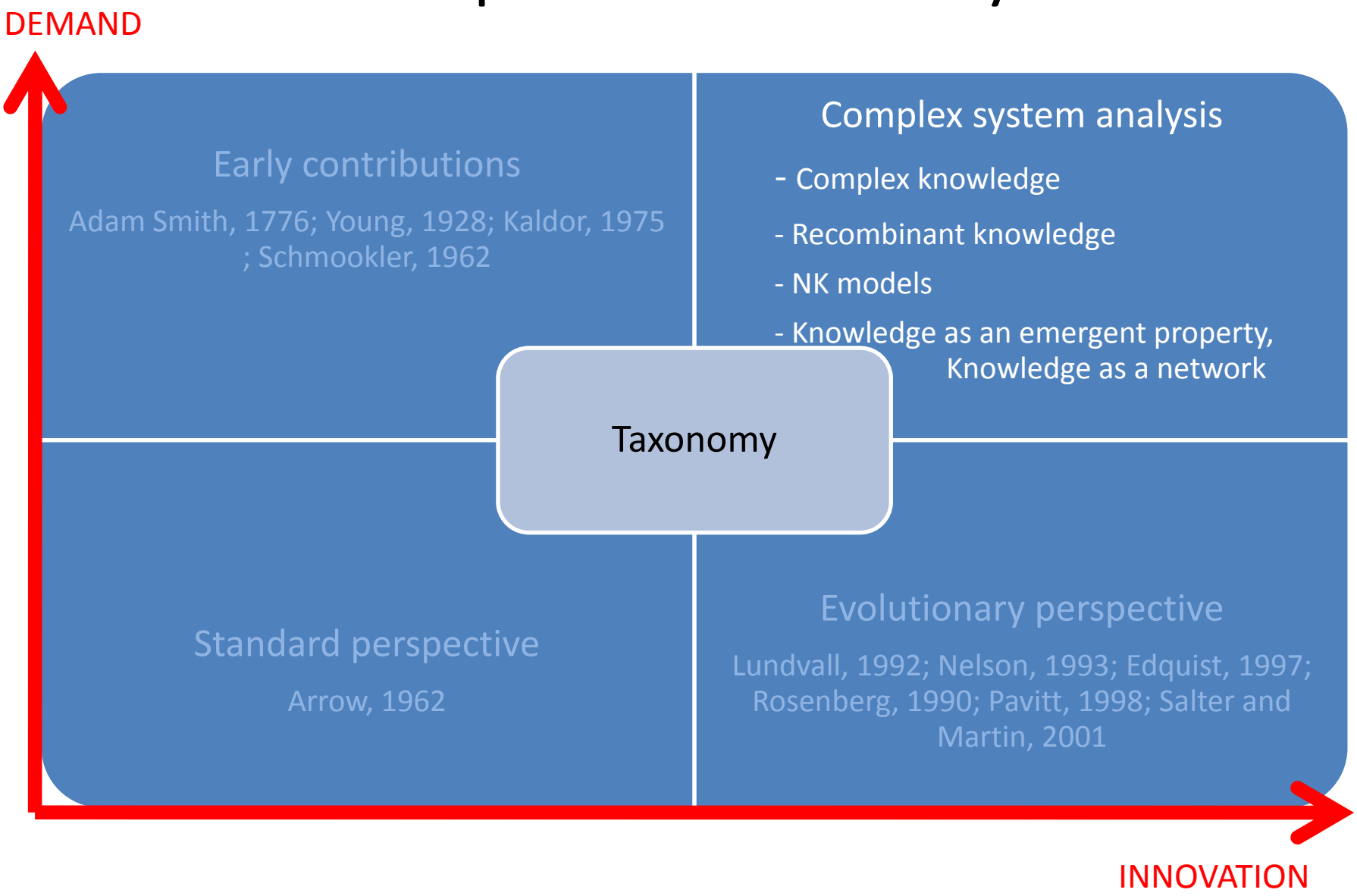
- However, most recent theoretical approaches tend to develop new views of innovation, that stem either from the combination of brand new components or from the combination of existing components in new ways

- Cognitive approach to innovation

- There is an undeniable renewal in theory

  ... but with what consequences at the empirical and policy level?

Proposal of taxonomy



Complex system analysis

- In his seminal works, Schumpeter proposed to view innovation as the outcome of a recombination process
- Most of innovations in the economic system stem from the combinations of existing elements in new and previously untried ways
- Complex system analysis (complex knowledge, recombinant knowledge, NK models, knowledge as an emergent property) all draw on this

Complex knowledge

- Weitzman (1996, 1998) presents one of the first attempt to draw upon such assumptions:

  - Sophisticated analytical framework grafting a micro-founded theory of knowledge production within an endogenous growth model

  - Generation of new knowledge with the following characteristics:

    - the only limiting factor seems to be the bounded processing capacity of economic agents

    - there is no particular focus in the constraints provided by the technological distance between different ideas

Recombinant knowledge

- The recombinant knowledge approach (Fleming, 2001; Fleming and Sorenson, 2001; Sorenson et al., 2006) is based on complementary assumptions:

  - The creation of new knowledge is represented as a search process across a set of alternative components that can be combined one another

  - A crucial role is played by the cognitive mechanisms underlying the search process

  - The set of potentially combinable pieces turns out to be a subset of the whole knowledge space

  - Search is supposed to be local rather than global, while the degree of localness appears to be the outcome of cognitive, social and technological influences

NK models

- NK model were proposed by Kauffman (1993), and led to an increasing number of empirical works, further specifying the generation of knowledge:

  - The search process is conducted across a rugged landscape, where pieces of knowledge are located

  - The focus is on:

    - the concept of interdependence among the pieces that are combined together,

    - while complexity is defined as the relationship between the number of components and the degree of interdependence

Knowledge as an emergent property, knowledge as a network

- Most recent contributions in the field are on knowledge as an emergent property, or knowledge as a network
- May provide common grounds for the integrated analytical framework of PICK ME
- Key characteristics:

  - If knowledge stems from the combination of different elements, then it may be conceived as network, in which each element may or may not be linked to the others

  - Knowledge generation is characterized by a structure, the architecture of which is far from being given once for all, rather it evolves over time

  - There is a recursive process, in which the structure of knowledge changes endogenously

    - The configuration of knowledge architecture is of course influenced by agents' intentional choices out of the search process

    - In turn, the configuration of the knowledge architecture, as described by a number of properties, is likely to affect search behaviours of individuals

Expected outcomes and policy recommandations

- Generation of new technological knowledge as an outcome of systemic dynamics
- Interactions between heterogenous and creative agents
- Intentional action
- Individual action and interaction shape and are shaped by the dynamics of the system

  - If agents decide to enlarge the scope of their search landscape, new elements can enter the structure, which will define new relations and altering the relations already in place

  - Agents may identify over time some elements that are more fertile than others. This may gradually lead from a distributed to a polarized network

Expected outcomes and policy recommandations

- Improving the understanding of the effects of innovation policies from a theoretical and analytical viewpoint
- Grafting the recent advancements in the application of complexity theory to the analysis of innovation dynamics into a demand-oriented framework
- Providing a new interpretation able to give public procurement a long-run time horizon

Tasks

Task 1	Task 2	Task 3
Participant: UNS	Participants: BRICK, UNS, CSIC, UHOH	Participants: UNS, UHOH
1.1. Review of the existing theoretical and analytical contributions analyzing the relationships between demand and innovation 1.2. Taxonomy based on the modelling approach 1.3. Main outcomes and policy recommandations	2.1. Exploration of different possible avenues to develop an integrated model analyzing the role of demand-oriented policies on innovation in a framework based by complex systemic interactions	3.1. Implementation of analytical and numerical models 3.2. Development of two or three analytical and numerical frameworks able to inform empirical analyses