

**FHV**  
Vorarlberg University  
of Applied Sciences

# A lecture on „Who let the entrepreneurs out?“

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**RUN-EU InnoBoost**

InnoBootCamp Series

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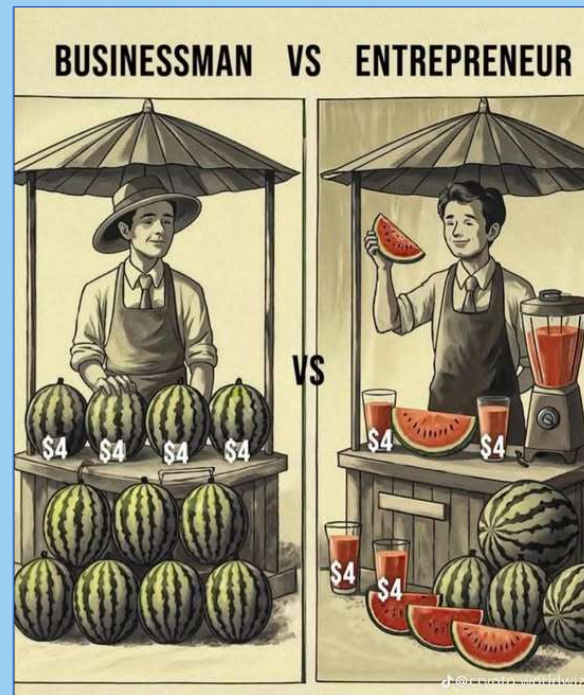


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# What is an entrepreneur?



Symbolic picture; found in Facebook



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## Special kind of labour

- Special type of entrepreneurs – maintain distinct skills and capabilities
- Strong ability to be innovative
- Disrupt existing / economic equilibria – innovation:  
never ending process of renewal, and adaption ... imitation, invention ...

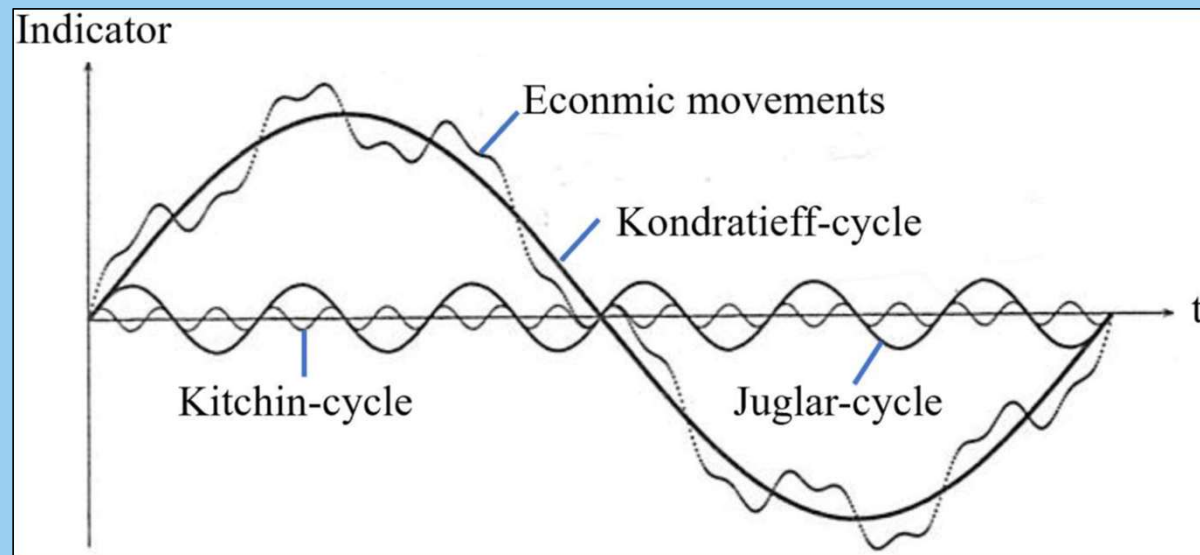
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## Module 1: Entrepreneurship – Macro-economics & business cycle theory: disrupt economic equilibria



**Source:** F. Maurer, "On a theoretically cup of inspiration with Schumpeter and von Foerster - creative destruction and emergence as means to prevent system lethargies: conceptual paper," *2021 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC)*, Cardiff, United Kingdom, 2021, pp. 1-6, doi: 10.1109/ICE/ITMC52061.2021.9570119.

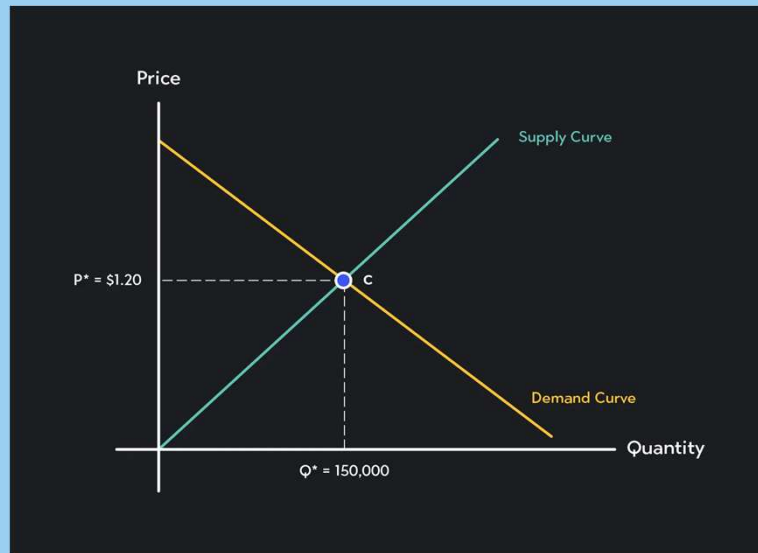
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## Module 1: Entrepreneurship – Micro-economics: disrupt economic equilibria.



Influenced by, i.e.,

- Price
- Costs
- Technology
- Consumer preferences
- Consumer's income

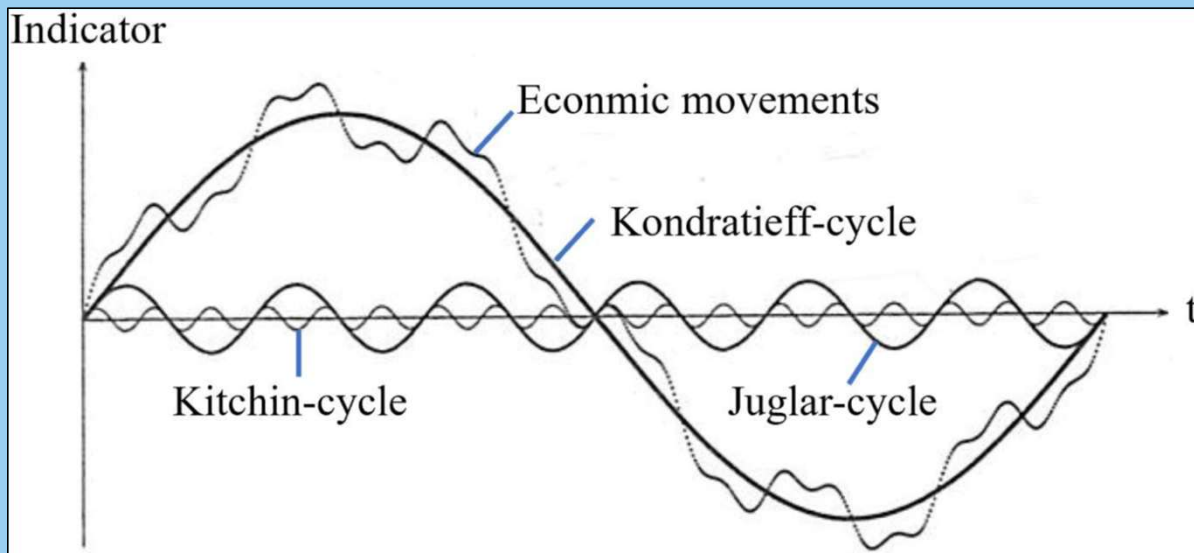
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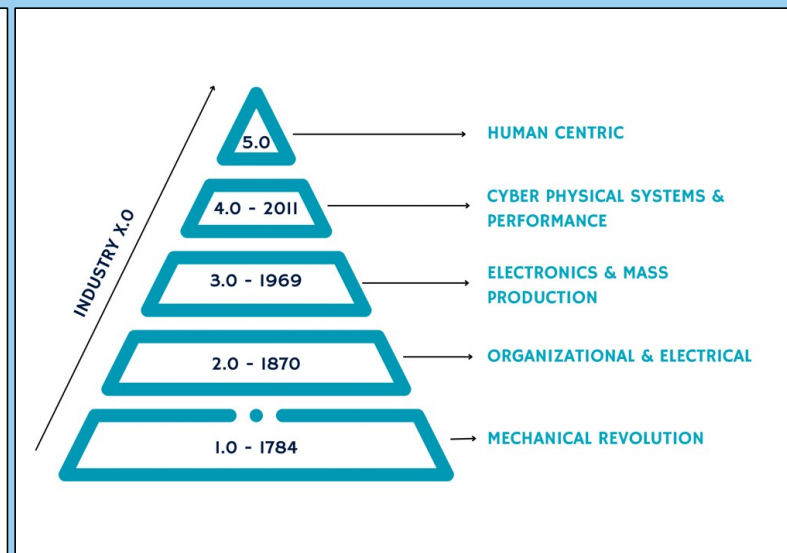
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## Module 1: Entrepreneurship – Macro-economics & business cycle theory: disrupt economic equilibria



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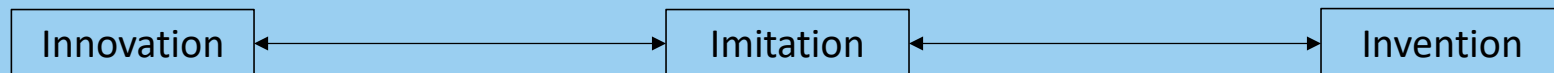
**Source:** <https://www.maintworld.com/Asset-Management/Maintaining-the-Future-Industry-5.0-Triumphs-Over-Industry-4.0-s-Challenges>

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# What is innovation?



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## Module 1: Entrepreneurship – Trigger for disruption: creative destruction – innovation.

### Product innovation



### Development of new sales markets



### Process innovation



### Development of new sources of raw materials and semi-finished products



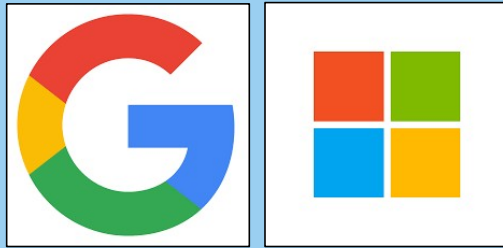
**Source:** Schumpeter, J. A. (1934). Theorie der wirtschaftlichen Entwicklung: Eine Untersuchung über Unternehmerrgewinn, Kapital, Kredit, Zins und den Geldmarkt (Development) (7th edition (unmodified reprint of the 1934 published 4th edition)). Duncker & Humblot.

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## Module 1: Entrepreneurship – Trigger for disruption: creative destruction – innovation.

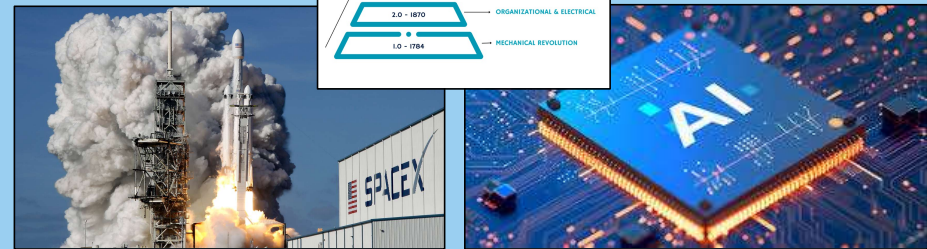
Re-organization, monopolistic organization



Breaking monopoly



Technology



Organizational measures  
(e.g., restructuring of a company or industry)



**Source:** Schumpeter, J. A. (1934). Theorie der wirtschaftlichen Entwicklung: Eine Untersuchung über Unternehmerrgewinn, Kapital, Kredit, Zins und den Geldmarkt (7th edition (unmodified reprint of the 1934 published 4th edition)). Duncker & Humblot.

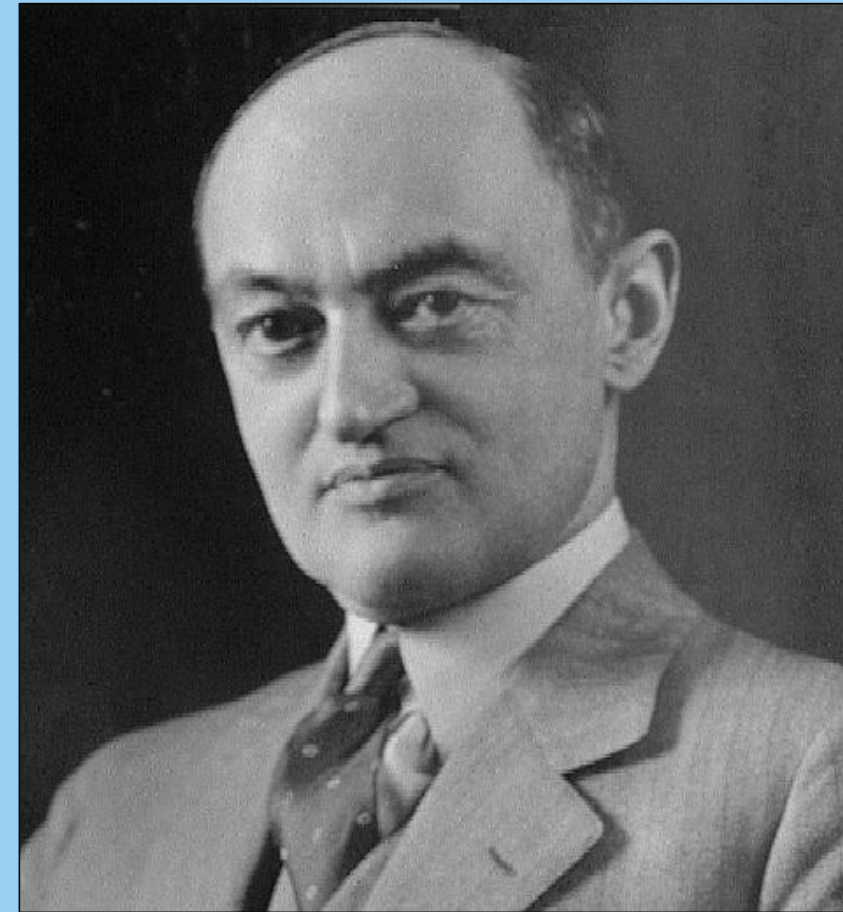
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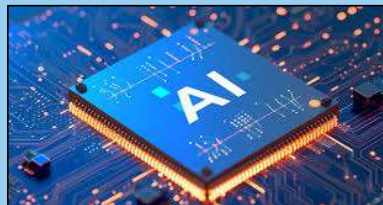
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... conquering the air is far more important than the conquering of areas, limited by economic or geographical boundaries



Examples ...



....

Source: Schumpeter, J. A. (2005). *Kapitalismus, Sozialismus und Demokratie (Capitalism, Socialism and Democracy)* (8th edition). A. Francke Verlag.

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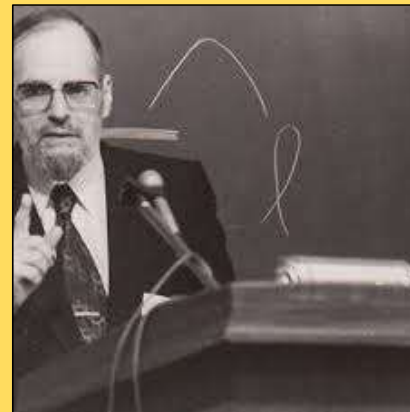
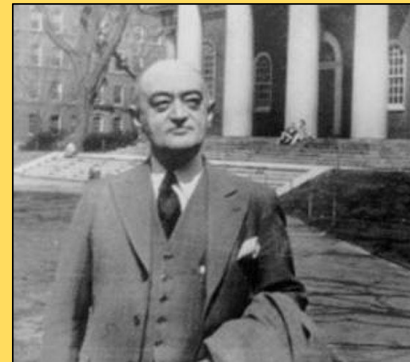
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## Module 2: Entrepreneurial characters according to ...



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## Module 2: Entrepreneurial characters according to ... Adam Smith



Scottish ethicist & economist

Professor at the University of Glasgow: Logics & Moral Philosophy

Educational tour to France – retirement

- The History of Astronomy (1759/1795)
- The Theory of Moral Sentiments (1759)
- ★ The Wealth of Nations (1776)

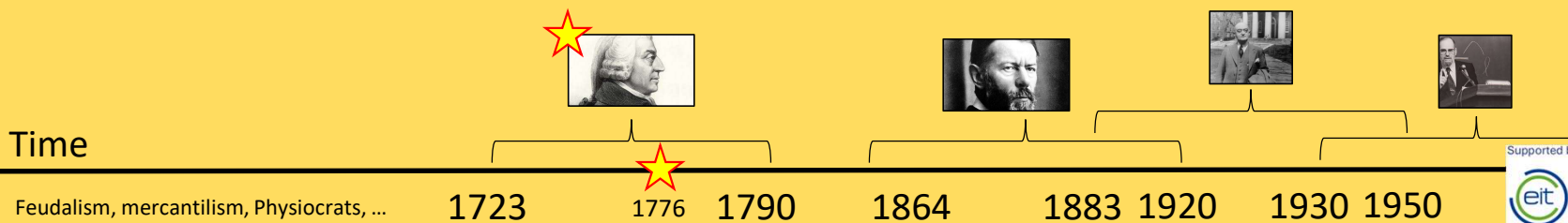
The invisible hand –  
the market regulates itself

Entrepreneurs are equivalent to capital owners; in the sense of Smith

- Static & calculation: arithmetic processing of (financial) data
- Landowners, tenants, master craftsmen, manufacturers, merchants
- To manage and monitor (their) economic actions: pursuit of self-interest; division of labor

Characterized by

- Lifelong diligence, thriftiness, constant efforts
- High levels of attention, order, and economic efficiency



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## Module 2: Entrepreneurial characters according to ... Max Weber



German sociologist & economist

Professor at the Universities of Berlin (FWU) (1892–1894), Freiburg (1894–1896), Heidelberg (1897–1903)\*, Vienna (1918), and Munich (1919–1920)

\* Interruption of university teaching due to illness – publication activities

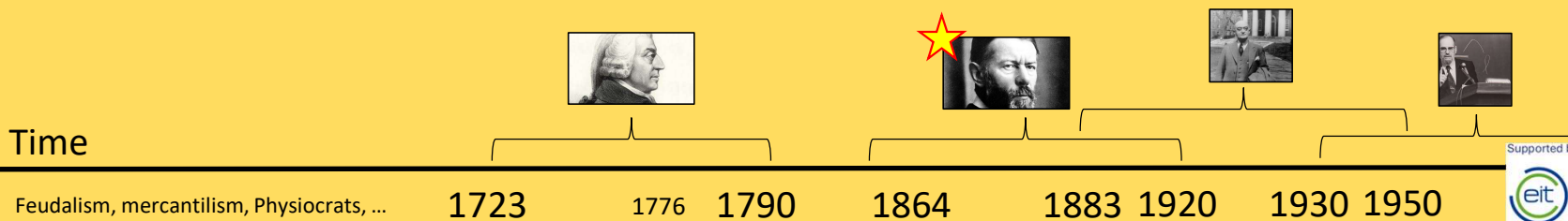
- The Protestant Ethic and the Spirit of Capitalism (1905; translated into English, 1930, by Talcott)

Strictly separates between capitalism and the spirit of capitalism; Entrepreneurs, in the sense of Weber ...

- Modern bourgeois society: liberally enlightened and tradition-overcoming
- Born into a commercial middle class: rational business-driven lifestyle
- Rational and systematic: sober, sharp and completely devoted to the cause

Characterized by

- Work as a profession (unchangeable construct): it is a certain/stated calling
- Industriousness and thriftiness – results into wealth



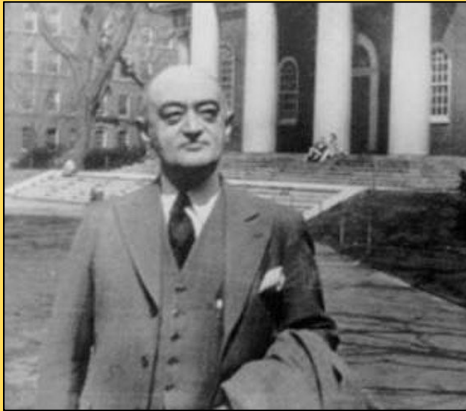
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## Module 2: Entrepreneurial characters according to ...



Austrian economist & politician  
(i.e., *Minister of Financial Affairs of the first Austrian Republic (1919)*)

Professor at Czernowitz (today: UKR), Graz, Bonn, Columbia (NY), Harvard

Dynamic entrepreneur – creative destruction: ... is the essential fact about capitalism

- Capitalism, Socialism, and Democracy

Entrepreneurs of earlier times do not show entrepreneurship in its fullest form and purity.

Entrepreneurs, in the sense of Schumpeter ...

- Consider the economy as a dynamic field
- Have to implement renewal and change by force; interrupt existing equilibria and business cycles
- The vision and the will to create an economic empire, or a dynasty

Characterized by

- Leadership function: leads through economic environments where the borders of business routines end
- Different roles

Time



1723

1776

1790

1864

1883

1920

1930

1950

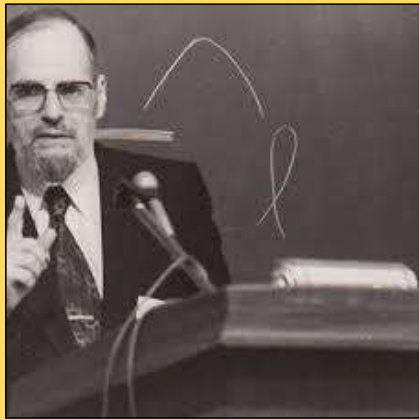
Feudalism, mercantilism, Physiocrats, ...

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## Module 2: Entrepreneurial characters according to ...



U.S. economist  
Professor at New York University

Concept of Human Action: market an entrepreneurially driven process  
Alertness: an eye for undervalued resources – economic behavior cannot be explained on the basis of rationality

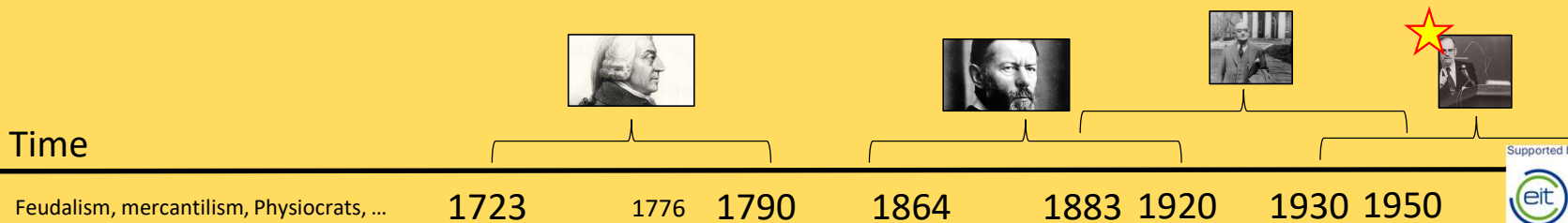
- Competition and Entrepreneurship

Entrepreneurs of earlier times maintain sheer ignorance and „false and misleading pictures of real markets“  
Entrepreneurs, in the sense of Kirzner ...

- Imperfect knowledge – reduced by creative acts of dynamic processes of discovery and (pure) alertness
- Roots in dynamic economic environments – tends towards equilibrium

Characterized by

- Strongly focused on market opportunities and entrepreneurial profits
- Wise evaluation and assessment of (present and future) realities



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## Module 3: Decision-making



Decisions! Rational choices and the pursuit of self-interest (Samuelson, 2016).

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# GAME THEORY

Normative decision theory (Harsanyi (1977), Rapoport (1985)):  
how to ... how to act ...

		Player: Column	
Strategies↓→		A2	B2
Player: Row	A1	a1 a2	b1 b2
	B1	c1 c2	d1 d2

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## Module 3: Decision-making – Game Theory: examples + >6.000 more

### No conflict game

		Player Column	
	Strategies↓→	Innovation	Calculation
Player Row	Innovation	4 4	3 3
	Calculation	2 2	1 1

### Battle of Sexes

		Player Column	
	Strategies↓→	Innovation	Calculation
Player Row	Innovation	2 2	4 3
	Calculation	3 4	1 1

### Pure conflict game – cycle game

		Player Column	
	Strategies↓→	Innovation	Calculation
Player Row	Innovation	2 3	4 1
	Calculation	3 2	1 4

### Prisoner Dilemma

		Player Column	
	Strategies↓→	Innovation	Calculation
Player Row	Innovation	2 2	4 1
	Calculation	1 4	3 3

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## Module 3: Decision-making – Game Theory

Strict ordinal or the taxonomy of (Rapoport & Guyer, 1966) & (Rapoport et al., 1976)

Game	Payoff set(s)		Number of corresponding payoff arrays
	Original	Further illustrations	
Strict ordinal	a, b, c, d	b, c, d, a; ...	24 (= 4!)
	a, a, c, d	b, b, c, d; ...	12 (= 4! / 2!)
	a, c, c, d	b, c, c, d; ...	12 (= 4! / 2!)
	a, c, d, d	b, c, d, d; ...	12 (= 4! / 2!)
	a, a, d, d	b, b, d, d; ...	6 (= 4! / 2! / 2!)*
	a, a, a, d	b, b, b, d; ...	4 (= 4! / 3!)
	a, d, d, d	b, d, d, d; ...	4 (= 4! / 3!)
	d, d, d, d	a, a, a, a; ...	1 (= 4! / 4!)
Total			75, resulting into 732 payoff sets and 6.525 different 2x2 games

Payoff set	(4321)	(3321)	(3221)	(3211)	(2211)	(2221)	(2111)	(1111)
(4321)	78	72	72	72	36	27	27	6
(3321)		21	36	36	18	12	12	3
(3221)			21	36	18	12	12	3
(3211)				21	18	12	12	3
(2211)					8	6	6	3
(2221)						3	4	1
(2111)							3	1
(1111)								1

Everything else: ordinal or the taxonomy of (Guyer & Hamburger, 1968)

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## Module 3: Decision-making – Game Theory: solution concepts

### Solution concepts

- **Dominance**

- Security
- Optimum / Efficiency
- Stability – Nash
- Shapley
- Selten
- ...

		Player: Column	
		A2	B2
Player: Row	A1	a1 a2	b1 b2
	B1	c1 c2	d1 d2

Player 1:  $b1 > d1 > a1 > c1$

Player 2:  $c2 > d2 > a2 > b2$

		Player Column	
		Innovation	Calculation
Player Row	Innovation	2 2	4 1
	Calculation	1 4	3 3

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## Module 3: Decision-making – Game Theory: solution concepts

### Solution concepts

- **Dominance**

- Security
- Optimum / Efficiency
- Stability – Nash
- Shapley
- Selten
- ...

	Strategies↓→	Player Column	
		Innovation	Calculation
Player Row	Innovation	2 ↑ 2	4 ↑ 1
	Calculation	1 ↓ 4	3 ↓ 3

Player 1:  $b1 > d1 > a1 > c1$

Player 2:  $c2 > d2 > a2 > b2$

	Strategies↓→	Player Column	
		Innovation	Calculation
Player Row	Innovation	2 2	4 1
	Calculation	1 4	3 3

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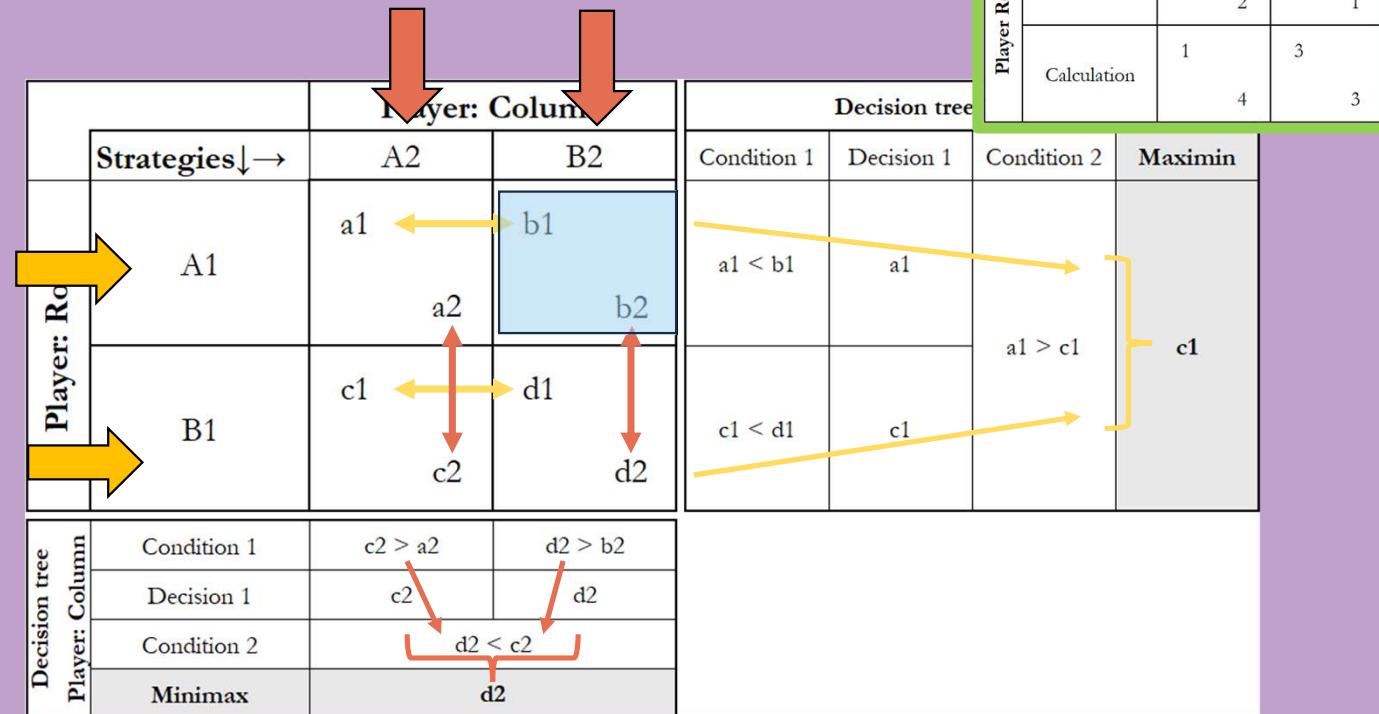




## Module 3: Decision-making – Game Theory: solution concepts

### Solution concepts

- Dominance
- **Security**
- Optimum / Efficiency
- Stability – Nash
- Shapley
- Selten
- ...



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## Module 3: Decision-making – Game Theory: solution concepts

### Solution concepts

- Dominance
- **Security**
- Optimum / Efficiency
- Stability – Nash
- Shapley
- Selten
- ...

		Player: Column		Decision tree		Player R		
		Strategies↓→	A2	B2	Condition 1	Decision 1	Condition 2	Maximin
Player: Row	A1	2	4	2	2 < 4	2	2 > 1	2
	B1	1	3		1 < 3	1		
Decision tree		Condition 1	4 > 2	3 > 1				
Player: Column		Decision 1	4	3				
		Condition 2	d2 < c2					
Minimax		3						

Player 1:  $b1 > d1 > a1 > c1$

Player 2:  $c2 > d2 > a2 > b2$

		Player Column		
		Strategies↓→	Innovation	Calculation
Player Row	Innovation	2	4	
	Calculation	1	3	

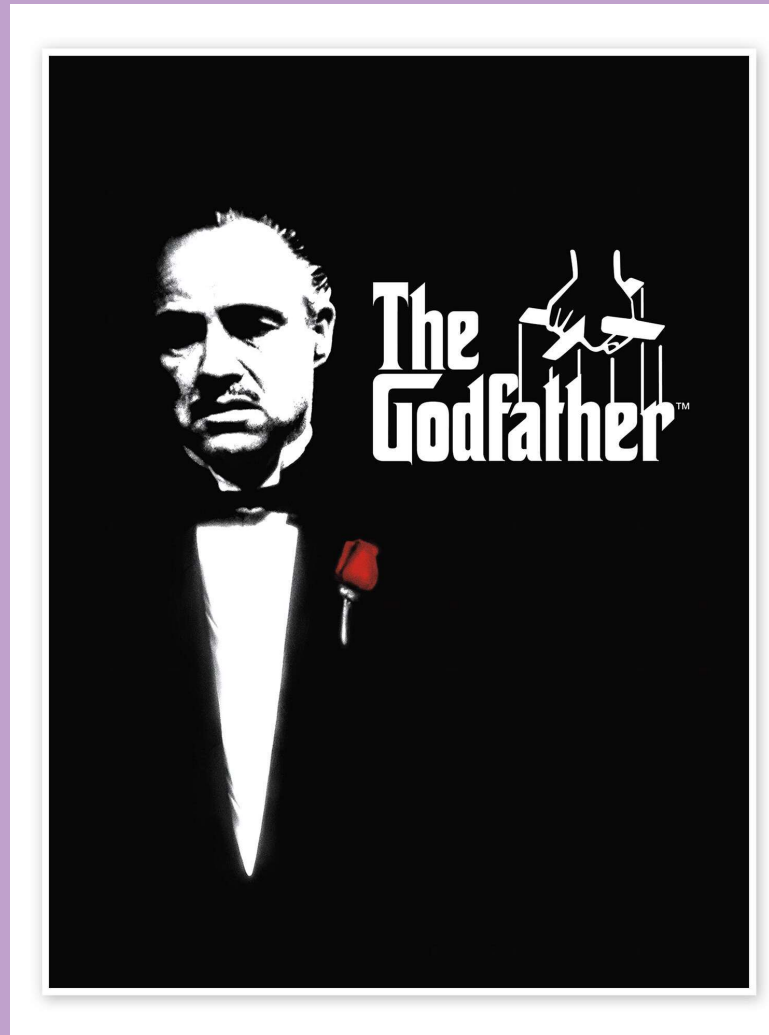
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## Module 3: Decision-making – Game Theory: Prisoners Dilemma

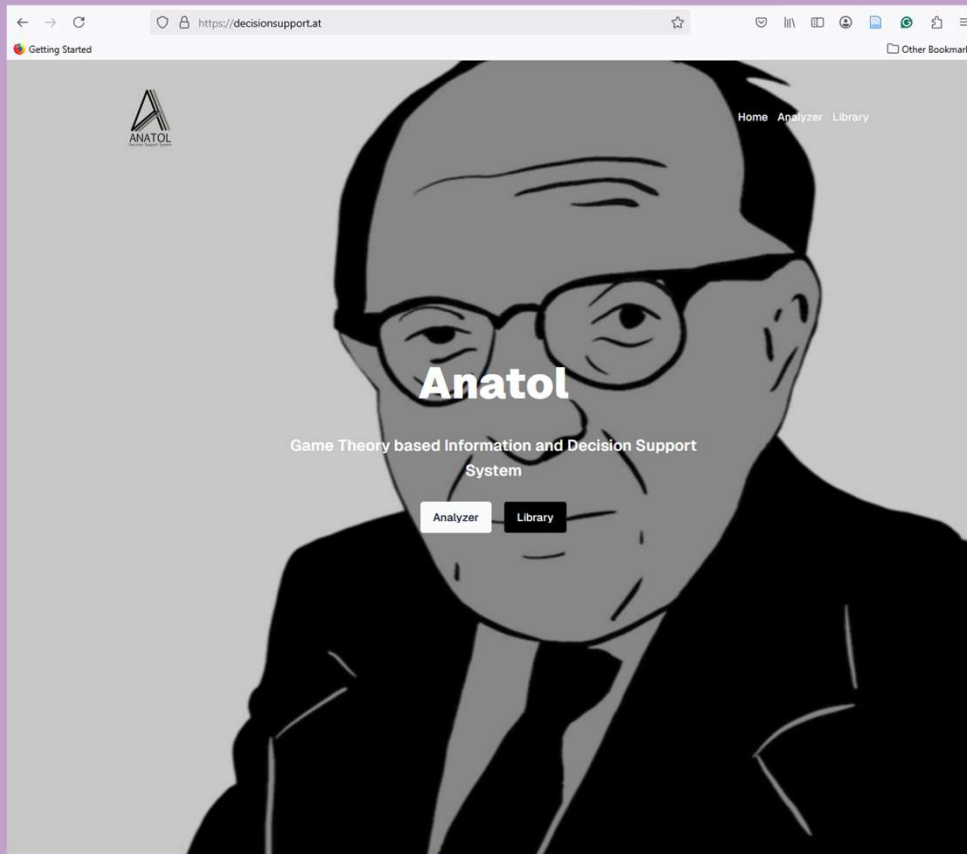


		Player Column	
		Innovation	Calculation
Player Row	Innovation	2 2	4 1
	Calculation	1 4	3 3

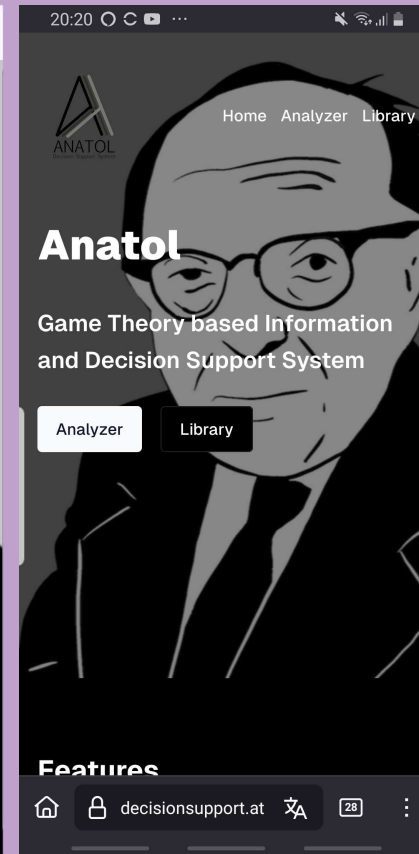
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## Module 3: Decision-making – Game Theory: call for contributors ...



[www.decisionsupport.at](https://www.decisionsupport.at)



Mobile



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## Module 4 / Task 1: Weak monopolist

		Player: Smith	
		Innovation	Calculation
Player: Weber	Innovation	2 2	1 1
	Calculation	1 3	1 3

### Task 1:

- Find the solution according to the concept of dominance
- Find the solution according to the concept of MaxiMin/MiniMax
- Explain your conclusion.

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## Module 4 / Task 2: Strong monopolist

		Player: Smith	
Strategies↓→		Innovation	Calculation
Player: Weber	Innovation	2  1	1  2
	Calculation	1  3	1  3

### Task 2:

- Find the solution according to the concept of dominance
- Find the solution according to the concept of MaxiMin/MiniMax
- Explain your conclusion.

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### Module 3 / Task 3: Battle of Bismarck Sea

		Player: Smith	
		Strategies↓→	
Player: Weber	Innovation	<div>3</div> <div>1</div>	<div>2</div> <div>2</div>
	Calculation	<div>1</div> <div>3</div>	<div>2</div> <div>2</div>

#### Task 3:

- Find the solution according to the concept of dominance
- Find the solution according to the concept of MaxiMin/MiniMax
- Explain your conclusion.





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