Learning and cooperation for innovation at local level: conceptual aspects and indicators of RedeSist

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Aims

- Aim of the paper:

- 1 - a conceptual discussion of evaluating learning and cooperation in local productive arrangements.

- 2 - develop a set of indicators for measuring cooperation and learning.

Redesist Methodology of Empirical Studies in LPA

- This questionnaire is divided into five sections

- 1- describes some basic characteristics of the firm, such as the size and number of employees.

- 2- discusses more deeply some aspects of the production process and employee's capabilities.

- 3- captures the main issues related to innovation, cooperation and learning

- 4- evaluates the local externalities of the LPA.

- 5- discusses the impact of public policies to the performance of the firm.

Redesist Methodology of Empirical Studies in LPA

- The third section of the questionnaire is the base to the proposal of indicators of learning and cooperation in local productive arrangement.

- Four questions analyze the innovation process of the firms

- One question evaluates the origin of the information to the learning process.

- Other questions discuss the cooperation of the firm in the local productive arrangement.

- All of these questions, ask the firm to show the intensity of the interactions and the strength of the relationship with other agents in LPA.

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Main Features of Indicators

- Cooperation and learning are magnitudes which should be expressed as a measure of intensity

- Cooperation and learning are not countable magnitudes, that is, they cannot be viewed as a absolute measure.

- The result is featured in the interval between 0 and 1.(indicating an intensity measure of the attribute).

- The values are calculated for each firm, so the final result considers the mean of the LPA`s firms.

Section III - Question 8: cooperation activities

class 1	Importance				Formalization		Location			
suppliers	0	1	2	3	1	2	1	2	3	4
clients	0	1	2	3	1	2	1	2	3	4
competitors	0	1	2	3	1	2	1	2	3	4
joint ventures	0	1	2	3	1	2	1	2	3	4
class 2										
Universities	0	1	2	3	1	2	1	2	3	4
Research Centers	0	1	2	3	1	2	1	2	3	4
Institutes for Capacitation	0	1	2	3	1	2	1	2	3	4
class 3										
Unions	0	1	2	3	1	2	1	2	3	4
Financial Institutions	0	1	2	3	1	2	1	2	3	4

Indicators

❑ Indicator of the degree of importance of

cooperation

❑ Indicator of degree of formalization

❑ Indicator of degree of endogenous cooperation

Indicator of importance of cooperation

Classes of agents: $(1) I_j^C = \dfrac{1}{k} \sum_{l=1}^{k} \dfrac{n_l}{3}$; $j = 1,2,...,n$ (class) $i = 1,2,...,n$ (agents)

Firm: (2) $\quad \tilde{I}_i^C = \sum_{j=1}^{n} I_j^C P_j^{S_i}$ (we will assume, for simplification, that $P_j^{S_i} = \dfrac{1}{n}$ where $n=3$)

Arrangement: (3) $\quad \tilde{I}_A^C = \dfrac{1}{n} \sum_{i=1}^{n} \tilde{I}_i^C$

In such a way that, as $\quad 0 \leq \dfrac{n_{l,i}}{3} \leq 1 \quad$ follows that $\quad 0 \leq \tilde{I}_A^C \leq 1$

Indicator of degree of formalization

Class of agents: (1) $\qquad I_j^{FMC} = \dfrac{1}{k} \sum\limits_{l=1}^{k} \dfrac{n_l}{3} \left(2 - n_l^F \right)$

Firm: (2) $\qquad \tilde{I}_i^{FMC} = \dfrac{\sum\limits_{j=1}^{n} I_j^{FMC} P_j^{S_i}}{\tilde{I}_i^C}$

Arrangement: (3) $\qquad \tilde{I}_A^{FMC} = \dfrac{1}{n} \sum\limits_{i=1}^{n} \tilde{I}_i^{FMC}$

Note that, as $\quad 0 \le \tilde{I}_i^{FMC} \le 1 \quad$ follows logically that $\quad 0 \le \tilde{I}_A^{FMC} \le 1$.

$$T_A^{INFC} + T_A^{FMC} = 1$$

Indicator of endogenous cooperation

Class Agents (1) $I_{i,j}^{EC} = \dfrac{\dfrac{1}{k}\sum\limits_{l=1}^{k}\dfrac{n_{i,l}^{j}}{3}\phi(n_{i,l}^{L})}{I_{i,j}^{C}}$ (a)

where $\phi(n_{l}^{L}) = \dfrac{1}{3}\left(4 - n_{l}^{L}\right),$

Firm (2) $\widetilde{I}_{i}^{EC} = \sum\limits_{j=1}^{n} I_{j}^{EC} P_{j}^{S_{i}}$ (b)

Arrangement (3) $\widetilde{I}_{A}^{EC} = \dfrac{1}{n}\sum\limits_{i=1}^{n}\widetilde{I}_{i}^{EC}$ (c);

Note that, as $0 \le \dfrac{n_{l,i}}{3} \le 1$ follows, from (a), (b) and (c), that $0 \le \widetilde{I}_{A}^{EC} \le 1$

Section III - Question 6: fonts of information to learning process

class 1	Importance				Formalization		Location			
suppliers	0	1	2	3	1	2	1	2	3	4
clients	0	1	2	3	1	2	1	2	3	4
competitors	0	1	2	3	1	2	1	2	3	4
joint ventures	0	1	2	3	1	2	1	2	3	4
other firms of the sector	0	1	2	3	1	2	1	2	3	4
subsidiaries	0	1	2	3	1	2	1	2	3	4
consulting firms	0	1	2	3	1	2	1	2	3	4
class 2										
Universities	0	1	2	3	1	2	1	2	3	4
Research Centers	0	1	2	3	1	2	1	2	3	4
Capacitation Institutes	0	1	2	3	1	2	1	2	3	4
class 3										
Conferences	0	1	2	3	1	2	1	2	3	4
Workshops	0	1	2	3	1	2	1	2	3	4
Internet	0	1	2	3	1	2	1	2	3	4

Indicator

☐Indicator which explicates how locally the learning processes are accomplished by the firms: **Indicator of endogenous learning**

Indicator of endogenous learning

Source agent (1) : $\Pi_{i,s}^{L} = \dfrac{\dfrac{1}{p}\sum\limits_{l=1}^{p}\dfrac{n_{i,l}^{S}}{3}\phi(n_{i,l}^{L})}{L_{i,s}^{I}}$

where $\phi(n_{i,l}^{L}) = \dfrac{1}{3}\left(4 - n_{i,l}^{L}\right)$

Firm (2) : $\tilde{\Pi}_{i}^{L} = \sum\limits_{s=1}^{h}\Pi_{i,s}^{L}P_{s}^{S_{i}}$ (18)

Arrangement (3): $\tilde{\Pi}_{A}^{L} = \dfrac{1}{n}\sum\limits_{i=1}^{n}\tilde{\Pi}_{i}^{L}$ (19).

As $0 \le \Pi_{i,s}^{L} \le 1$ and from (18) that $\tilde{\Pi}_{A}^{L} \in [0,1]$.

Conclusion

❑ The indicators proposed in this paper aim at characterizing and evaluating the intensity of cooperation in local productive arrangement.

❑ The future steps of the research will be the proposal of cross indicators (for example intensity of cooperation versus degree of endogenous cooperation).

❑ Moreover, by using these indicators will be possible to evaluate differences among the local productive arrangements studied.