Επιχειρηματικότητα έντασης γνώσης σε νέες επιχειρήσεις στον κλάδο των ΤΠΕ: Αποτελέσματα έρευνας πεδίου σε 10 ευρωπαϊκές χώρες

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A broad definition of knowledge-intensive entrepreneurship

- Knowledge-intensive entrepreneurship can be considered as a necessary mechanism and an agent of change mediating between the creation of knowledge and innovation and its transformation into economic activity.

Survey Design

- **Newly** established firms
  - Established from **2001** to **2007** with a primary activity in **pre-selected** sectors (High-tech, Low-tech, KIBS).
- **Actually** new firms but **not** new legal entities resulting from any type of legal transformation of already existing firms (screening questions)
- **No subsidiaries** of existing companies, or mergers acquisitions, or joint ventures (screening questions)

The AEGIS survey

- Could be considered as a **pilot exercise** for the design of a new instrument aiming at the identification and monitoring of Knowledge-Intensive Entrepreneurship in Europe on a **regular** basis.

The survey arithmetic (numbers)

- Initial population 338,000 firms based on Amadeus Database (enriched with data from two other sources, i.e. D&B and Kompass).
- 10 countries (Sweden, Denmark, UK, Germany, France, Italy, Greece, Portugal, Czech Republic, Croatia)
- 22,000 contacts
- Large questionnaire (around 300 variables).
- 4,004 completed questionnaires (The survey was officially launched in Sep. 2010 and was completed in March 2011)
- Field research executed by GDCC (Global Data Collection Company), CATI type.

ICT firms in the AEGIS sample

Sector distribution

Sector (NACE 1.1)	Count	Percent (%)
30	20	3.6
64.2	24	4.3
72	518	92.2
Total	562	100

Country distribution

Country	Count	Percent (%)
Croatia	**26**	4.6
Czech Republic	**25**	4.4
Denmark	50	8.9
France	76	13.5
Germany	79	14.1
Greece	**40**	7.1
Italy	86	15.3
Portugal	32	5.7
Sweden	41	7.3
UK	**107**	19.0
Total	562	100

Classification of KI ventures following the AEGIS theoretical framework (1)

KIE is associated with four basic characteristics:

- it concerns new ventures,
- new ventures that are innovative,
- new ventures engaging in activities that are knowledge intensive,
- and finally, new ventures that are not to be found solely in high-tech industries

The first and last conditions are satisfied a priori in our sample.

Classification of KI ventures following the AEGIS theoretical framework (2)

Variables used from the AEGIS survey to determine **innovative ventures**:

- Introduction of new or developed goods/services
- Degree of novelty of innovation
- Introduction of process and organizational innovation
- Intellectual property protection methods

Variables used to determine the firm's **knowledge assets**:

- Knowledge-seeking activities
- Average educational attainment of the founding team
- Percentage of funding coming from venture capital
- Human capital & innovation input

A proposed taxonomy of KI ventures in the AEGIS firm sample

- The first group, "all-around innovators", shows a more balanced emphasis on different dimensions of innovation and relies basically on external knowledge seeking.
- The second, "world-class product innovators", emphasizes new-to-world innovation drawing from in-house knowledge which in turn draws from high quality human capital (both in terms of founders and workforce).
- The third group, "followers", clearly lags behind in all dimensions of knowledge-intensive activities and innovation; it represents what might be called "standard" entrepreneurship.

Do the ICT firms follow the proposed taxonomy?

KIE type	ICT Firms		Total AEGIS sample	
	Count	%	Count	%
Followers	233	49.8%	2012	62.4%
All-around innovators	115	24.6%	727	22.5%
World-class innovators	120	25.6%	487	15.1%
Total	468	100%	3226	100%

Key distinguishing features of KI ICT ventures: Knowledge-seeking activities (1)

	% Followers (N=233)	% All-around innovators (N=107)	% World-class innovators (N=115)	% Total sample of ICT firms (N=455)
Knowledge/External-Industry	32.6	49.5	22.6	34.1
Knowledge/External-Science	1.7	18.7	7.0	7.0
Knowledge/In-house R&D	46.8	78.5	74.8	61.3
Knowledge/External-Open sources	13.7	29.9	21.7	19.6
Knowledge/Participation in collaborative activities	5.2	30.8	12.2	13.0

Key distinguishing features of KI ICT ventures: Initial conditions, human capital and innovation input (2)

Initial conditions	% Followers (N=233)	% All-around innovators (N=107)	% World-class innovators (N=115)	% Total sample of ICT firms (N=455)
F-team edu attainment (post-grad or upper)	32.2	25.2	57.4	36.9
Funding from venture capital	0.43	0.93	6.09	1.98
Human capital and innovation input				
ft employees: graduate degree	18.5	10.3	17.4	16.3
ft employees: Ph.D degree	5.2	13.1	28.7	13.0
Employee training	39.5	66.4	47.0	47.7
R&D intensity	25.3	60.7	64.3	43.5

Key distinguishing features of KI ICT ventures: Innovation performance (3)

	% Followers (N=233)	% All-around innovators (N=107)	% World-class innovators (N=115)	% Total sample of ICT firms (N=455)
Introduced process innov last 3 years	20.2	82.2	33.0	38.0
Introduced logistics innov last 3 years	21.0	64.5	8.7	28.1
Introduced innov in support activities last 3 years	46.4	94.4	40.9	56.3
Improved knowledge mngnt systems last 3 years	42.5	89.7	40.9	53.2
Changes in mngnt structure last 3 years	21.5	61.7	24.3	31.6

Key distinguishing features of KI ICT ventures: Innovation performance (4)

IPR protection methods	% Followers (N=233)	% All-around innovators (N=107)	% World-class innovators (N=115)	% Total sample of ICT firms (N=455)
IPR last 3 years: patents	1.3	20.6	24.3	11.6
IPR last 3 years: trademarks	8.6	51.4	57.4	31.0
IPR last 3 years: copyrights	8.6	39.3	47.0	25.5
IPR last 3 years: confidentiality	23.2	76.6	91.3	53.0
IPR last 3 years: secrecy	9.9	50.5	78.3	36.7
IPR last 3 years: lead time	12.4	72.9	67.8	40.7
IPR last 3 years: complexity	9.0	71.0	72.2	39.6

ICT firms per KIE type and country

	Followers (N=233)		All-around innovators (N=115)		World-class innovators (N=120)	
	Count	%	Count	%	Count	%
Croatia	7	3.0	9	8.4	4	3.5
Czech Republic	13	5.6	6	5.6	3	2.6
Denmark	22	9.4	7	6.5	17	14.8
France	32	13.7	9	8.4	15	13.0
Germany	30	12.9	10	9.3	22	19.1
Greece	11	4.7	10	9.3	12	10.4
Italy	31	13.3	33	30.8	7	6.1
Portugal	13	5.6	7	6.5	11	9.6
Sweden	23	9.9	4	3.7	6	5.2
UK	51	21.9	12	11.2	18	15.7

Further assessment of the validity of the proposed clusters

We exploit questionnaire variables not used to form the clusters, but are more or less expected to vary across them:

- (a) basic demographics,
- (b) characteristics of the founding team,
- (c) sources of funding at start-up,
- (d) important factors for firm formation,
- (e) dynamic capabilities and strategy,
- (f) firm performance.

Firm demographics→ AAIs tend to be larger in terms of size both in terms of full-time employees and sales volume

Firm demographics	Followers	All-around innovators	World-class product innovators	Total	Observations (significant differences)
Company age (years)	6.69	7.24	6.99	6.90	455 (ns)
Size: full-time employees	5.91	**17.81**	11.71	10.18	**455 (**)**
Avrg Turnover (2007-2009)	1.93	**2.55**	2.26	2.16	**425(***)**

Founding team characteristics (mixed picture)

	Followers	All-around innovators	World-class innovators	Total	Observations (significant differences)
Size of founding team	2.15	**2.67**	**2.56**	2.38	468 (**)
F-team avrg age	2.77	2.63	2.78	2.74	455 (ns)
F-team avrg experience in sector (years)	10.87	9.94	10.53	10.57	451(ns)
F-team avrg edu attainment	3.04	3.02	**3.58**	3.17	455 (***)

Sources of initial funding→ WcPIS are clearly benefiting significantly more from VC funding, however avrg % is quite small

% of funding	Followers	All-around innovators	World-class product innovators	Total	Observations (significant differences)
Own resources	79.42	82.76	80.92	80.58	455 (ns)
Family	4.22	2.43	1.45	3.10	455 (ns)
Prev. employer	2.21	0.93	1.26	1.67	455 (ns)
Venture capital	0.69	0.93	**5.50**	1.96	**455 (***)**
Bank	7.67	8.55	5.78	7.40	455 (ns)
National source	1.77	1.42	3.00	2.00	455 (ns)
EU funds	0.77	0.07	0.17	0.46	455 (ns)

Important factors for firm formation→ technical knowledge and exploitation of opportunities are found to be more strongly associated with KI ventures

	Followers	All-around innovators	World-class product innovators	Total	Observations (significant differences)
Technical /engineering and design knowledge	3.66	**4.06**	**4.01**	3.66	**455 (***)**
Market knowledge and personal networks	3.74	3.94	3.72	3.78	455 (ns)
Arising market , technological and institutional opportunities	3.67	**4.05**	**4.01**	3.85	**455 (***)**

Internal factors: dynamic capabilities → KI firms have build more strongly their dynamic capabilities and spend significantly more on R&D

	Followers	All-around innovators	World-class product innovators	Total	Observations (significant differences)
Product development capability	3.67	**4.05**	**4.01**	3.85	**455 (***)**
R&D and alliance related capability	2.53	**3.33**	**3.26**	2.90	**455 (***)**
Market adaptation	3.80	**4.01**	3.82	3.86	**455 (+)**
Technical adaptation	2.15	**3.15**	**3.05**	2.62	**455 (***)**
Networking	2.63	**3.15**	**2.99**	2.84	**455(***)**
Participation in collaborations	1.88	**2.44**	**2.37**	2.14	**455 (***)**
RD intensity: %sales last 3 years	10.89	**25.33**	**27.77**	18.55	**455(***)**

Internal factors: Strategy→ KI ventures tend to pursue differentiation and focus strategies more than followers, who show more emphasis on low cost

Strategy type	Followers	All-around innovators	World-class product innovators	Total	Observations (significant differences)
Low cost	**21.9%**	9.3%	7.8%	15.4%	**468 (**)**
Differentiation	55.4%	**58.9%**	**61.7%**	57.8%	
Focus	22.7%	**31.8%**	**30.4%**	26.8%	
Total	100%	100%	100%	100%	

Performance measures (1)

	Followers	All-around innovators	World-class innovators	Total	Observations (significant differences)
% Sales in International market	8.74	13.92	**22.16**	13.35	**455(***)**
% of new goods to sales	24.49	24.37	**34.28**	28.00	**312 (**)**
% of new services to sales	30.32	38.28	35.94	34.80	310 (ns)

Performance measures (2)→In general, KI ventures seem to enjoy higher performance than followers

	Followers	All-around innovators	World-class innovators	Total	
Avrg profit (2007-9)	2.23	**2.78**	2.41	2.41	**417(***)**
Avrg. Growth Sales (2007-9)	5.35	6.11	**6.21**	5.76	**419(**)**
Avrg. Growth Employment	2.02	**2.55**	2.25	2.20	**437(**)**

Conclusions

- Following the proposed taxonomy of KI ventures it appears that 50% of the ICT firms examined can be characterized as “followers”, despite the fact that they belong to seemingly KI sectors
- The specific taxonomy appears to be valid in the ICT sample of firms as KI ventures exhibit expected differences compared to less knowledge intensive ones especially in terms of dynamic capabilities, strategic behaviour and performance.