RE-EXAMINING THE INDUSTRY-EXPERIENCE VENTURE-SURVIVAL RELATIONSHIP

APPENDIX A

TABLE A1 – List of 19 sectors

Agriculture, forestry, and fishing

Mining and quarrying

Manufacturing

Electricity, gas, steam, and air conditioning supply

Water supply, sewerage, and waste management

Construction

Wholesale and retail trade

Transportation

Accommodation and food service activities

Information and communication

Financial and insurance

Real estate activities

Knowledge-based services

Travel agent, cleaning, and other operational services

Public administration, defense, and compulsory social security

Education

Human health and social work

Arts, entertainment, and recreation activities

Other service activities

TABLE A2 – List of industries that fall into the KBS sector

Legal activities

Accounting, bookkeeping, and auditing activities; tax consultancy

Activities of non-financial head offices

Activities of financial head offices

Public relation and communication activities

Business and other management consultancy activities

Architectural activities

Consulting engineering activities within construction

Consulting engineering activities within production and machinery technique

Mounting and delivery of ready-made production plants

Geologic surveying activities and prospecting, chartered surveyors, etc.

Other technical consultancy

Testing and control activities in the field of food hygiene

Technical testing and control

Other measuring and technical analysis

Research and experimental development on biotechnology

Other research and experimental development on natural sciences and engineering

Research and experimental development on social sciences and humanities

Advertising agencies

Other advertising activities

Media representation

Market research and public opinion polling

Industrial design and product design

Communications design and graphic design

Activities of interior decorators and room design

Photographic activities

Translation and interpretation activities

Agronomy consulting

Other professional, scientific, and technical activities n.e.c.

Veterinary activities

APPENDIX B: DESCRIPTION OF THE RELATEDNESS MEASURES

In the main analysis, we operationalize industry relatedness based on the Euclidean Distance of occupation codes between any two industries. This operationalization has several advantages that we point out in the article. However, it is only one of many possible operationalizations and it may not be perfect. Already Neffke and Henning (2013, p. 298) pointed out that "the definition of relatedness, and the methods for measuring relatedness are often surprisingly imprecise." We construct two alternative measures of industry relatedness—using sector definitions and labor flows—to reduce potential concerns regarding the measure used in the main analysis and to verify our findings.

One concern may be that the detailedness of the occupation codes used for calculating the Euclidean Distance cause some industries to be more related than others simply because the name of some occupations may differ across industries while others are universal (e.g., electrical engineer versus general office work). Therefore, any two industries that employ many employees in occupations that are more universal will be more related—even though the employees may have different knowledge and tasks. Although this is in line with the assumption that general skills are more transferable across industries than more specific skills, it may affect the conclusions drawn from the analysis. To address this concern, we define an alternative measure of industry relatedness based on the industry classifications' sector definitions.

While we find differences in terms of which industries are considered related compared to industry aggregation at the sector level, the percentage of employees from a related industry is similar. The results are presented in Appendix Table B1 using sector-based relatedness for comparison. The conclusions drawn from those results are consistent with the findings presented here.

However, the accuracy of the hierarchy of the industry classifications has been questioned in terms of its ability to capture industry-relatedness. As Bryce and Winter (2009, p. 1572) write:

> *the fact that two four-digit industries share the same three-digit code (and on up the line) supplies no clear message about strategically significant relationships among activities. Relatedness simply cannot be reliably or directly inferred from the hierarchical structure of the SIC system (cf. Davis and Duhaime 1992, Robins and Wiersema 1995).*

Therefore, we prefer the operationalization of industry-relatedness based on the Euclidean Distance of occupation classifications between industries.

** Table B1 about here **

Besides sector-level relatedness, another industry relatedness measure builds on the idea that employees move to jobs that require similar skills (but which may be classified differently). Initially used to predict firm diversification (Neffke et al., 2011; Neffke & Henning, 2013), any two industries are considered to be related the higher the cross-industry labor flows between these two industries. Since we focus predominantly on employee mobility across and within industries (which defines the relatedness of industries), we consider this operationalization less appropriate for our purposes. However, for completeness and comparability, we calculate industry relatedness based on employee flows using data on the entire working population in Denmark (see Appendix C). Construction of the flow measure follows Neffke and Henning (2013, and subsequent work). Tabulation of the origin of employees broken down into occupation categories similar to Table 3 is provided in Appendix Table B2.

** Table B2 about here **

As expected, the number of employees from related industries is higher using the flow measure compared to either of the other two relatedness measures. The percentage of new ventures with related (but not the same) industry experience follows similar patterns across measures (see Tables B3 and B4 for a comparison of the Euclidean Distance, sector, and flow measures). Notably, the sector-based measure has the lowest numbers of related (but not the same) industry experience across new establishments. The overall conclusions based on these results using the labor-flow measure are consistent with the results section.

** Table B3 and B4 about here **

Table B5 shows models replicating Model 3 in Table 4 using the two other relatedness measures. To ease comparability, Model 1 shows the results using the ED measure as presented in Table 4. Using the flow measure (Model 2) and the sector measure (Model 2) we find that having at least one focal employee with related industry experience does not affect new venture survival. The coefficient of having at least one focal employee with industry experience remains stable across models, although slightly increased in magnitude and significance in Model 2.

** Table B5 about here **

Table B6 confirms the findings that our results do not reflect a process where talent redeploys to a new industry (replicating Table 8). The rate of focal employees from a related industry leaving for employment in the same industry is slightly higher using the flow-based or sector-based measure (14% and 19%) than the ED measure (12%), while the rate of focal employees from an unrelated industry or from outside the workforce remaining in the same industry after leaving the new establishment is lower using either of these measures (7% and 9%) than the ED-measure (10%). The rate of employees leaving for employment in the same sector (but not the same industry) is considerably lower than when using the ED or flow measure (17%

vs 41% and 51%, respectively). Using the sector measure, most employees leave for employment in a different sector (68%). These rates are lower using the ED measure (44%) or flow measure (33%). Although we observe differences, the conclusions drawn do not change.

** Table B6 about here **

TABLE B1 – Origin of employees in new ventures using sector-relatedness

Worker type	From same industry	From different industry—but same sector	From different sector	From other	Total
High-knowledge	13.07%	23.71%	51.67%	11.55%	100%
Intermediate-knowledge	11.18%	16.77%	61.49%	10.56%	100%
Manager	14.29%	22.08%	55.84%	7.79%	100%
Other	9.28%	9.47%	48.24%	33.00%	100%

n = 2161 (employees) in 309 new ventures

TABLE B2 - Origin of employees in new ventures using labor-flow relatedness

Worker type	From same industry	From related industry	From unrelated industry	From other	Total
High-knowledge	13.07%	48.63%	26.75%	11.55%	100%
Intermediate-knowledge	11.32%	45.28%	32.70%	10.69%	100%
Manager	14.47%	59.21%	18.42%	7.89%	100%
Other	13.07%	48.63%	26.75%	11.55%	100%

n = 2140 (employees) in 309 new ventures (21 observations are excluded as no relatedness measure was calculated for the respective industry combinations)

Table B3 – New venture related experience

Related (but not same) industry experience	ED-measure	Sector measure	Labor flow measure
At least one high-knowledge worker with related industry experience	22.33%	14.89%	26.86%
At least one intermediate-knowledge worker with related industry experience	11.00%	6.80%	16.83%
At least one manager with related industry experience	8.41%	4.53%	10.36%
At least one focal employee (i.e., high-knowledge, intermediate knowledge, or manager) with related industry experience	29.45%	21.36%	39.48%
At least one other employee with related industry experience	32.69%	21.04%	44.34%
At least one employee with related industry experience	58.90%	29.77%	51.78%

n = 309 new ventures

Table B4 – New subsidiary related experience

Related industry experience (but not same industry)	ED-measure	Sector measure	Labor flow measure
At least one high-knowledge worker with related industry experience	18.26%	10.67%	19.94%
At least one intermediate-knowledge worker with related industry experience	10.11%	4.78%	12.64%
At least one manager with related industry experience	4.49%	1.69%	6.18%
At least one focal employee (i.e., high-knowledge, intermediate knowledge, or manager) with related industry experience	33.43%	13.20%	26.97%
At least one other employee with related industry experience	27.25%	14.04%	36.24%
At least one employee with related industry experience	54.21%	22.19%	39.61%

n = 356 new subsidiaries

Table B5 – Related industry experience and industry survival

.	Model 1	Model 2	Model 3
At least one focal employee with IE	0.186*	0.208**	0.182*
.	[2.49]	[2.70]	[2.50]
At least one focal employee with related IE (but none from same industry) - ED measure	0.072	.	.
.	[1.14]	.	.
At least one focal employee with related IE (but none from same industry) - FLOW measure		0.101+	.
.	.	[1.67]	.
At least one focal employee from same sector (but none from same industry)	.	.	0.087
.	.	.	[1.30]
Nr. employees (ln)	-0.099	-0.109	-0.103
.	[-1.45]	[-1.62]	[-1.52]
Rural area	0.011	0.012	0.005
.	[0.18]	[0.20]	[0.09]
Establishment year controls	YES	YES	YES
Constant	0.652***	0.650***	0.664***
	[3.80]	[3.80]	[3.92]
R-squared	0.087	0.092	0.088
F	3.819	4.267	3.946
Log likelihood	-203.205	-202.42	-203.05
No. of observations	309	309	309
t statistics in brackets	.	.	.
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$	.	.	.

Table B6: Origin and destinations of focal employees in new establishments

Panel A: Flow measure

	To same industry	To related industry	To unrelated industry and other	Total
From the same	44.44%	39.51%	16.05%	100%
From related	13.57%	65.89%	20.54%	100%
From unrelated and other	6.79%	38.91%	54.30%	100%
	15.36%	51.43%	33.21%	100%
N	560			

Panel B: Sector measure

	To same industry	To same sector, but different industry	To different sector and other	Total
From the same	43.59%	11.54%	44.87%	100%
From related	19.00%	33.00%	48.00%	100%
From unrelated and other	8.64%	14.14%	77.23%	100%
	15.36%	17.14%	67.50%	100%
N	560			

APPENDIX C – INDUSTRY RELATEDNESS MEASURE USING CROSS-INDUSTRY LABOR FLOWS

To construct the industry relatedness measure, we follow Neffke and Henning (NF) (2013) and use flow of employees to measure relatedness between two industries. NF use register data provided by Statistics Sweden for the years 2004 to 2007; we use similar register data provided by Statistics Denmark for 2008 to 2016. The measure is based on the entire population and not just the study sample.

Specifically, our data include information on all employees in Denmark active in the labor market in a focal year. We excluded self-employment, employment as a spouse, secondary employment, and non-primary November employment, and individuals aged less than 17 years. We impose these restrictions because people that fall into the excluded categories may exhibit different mobility between jobs and industries compared to other employees. NF do not impose these restrictions however, they were inspired by NF's exclusions, as explained below. After imposing the restrictions, our data include information on 3,765,544 individuals working in more than 267,000 firms.

We use Denmark Statistic's DB07 industry classification (corresponding to the European NACE Rev. 2 classification) to calculate the number of employees in each industry-year. Following NF, we exclude industries with an average number of employees in the industry less than 250, which pertains to 144 industries. Our remaining sample of 449 industries is slightly larger than NF's (415 industries). Among these 449 industries, 445 are observed across all years in the period 2008-2016.[1]

[1] Initially, 145 industries did not satisfy the size criterion and 455 did satisfy it. Of the 455 industries with at least 250 employees per year on average 13 industries were not observed in every year. In addition, 17 industries that did not meet the size cut-off were not observed in every year in the period 2008 to 2016. Among these not

We identify all employees changing employer from one year to the next.[2] We exclude mobility events due to ownership changes (e.g., acquisitions) or employees moving out of the Danish labor market (e.g., to unemployment, (early) retirement, or abroad). On average, nearly 330,000 (328,468) employees per year (12.9%) change jobs. If we did not exclude mobility due to acquisitions, mergers, and other ownership changes, the number of employees changing jobs in a year would be around 1 percent higher (13.9%).

To reduce causality issues with respect to diversification, NF omit moves to newly founded establishments. We do this to reduce the mobility induced by firm growth in form of expansion. These excluded moves represent 22.32 percent of all moves with known destinations.

Of the 2,030,802 moves to existing establishments observed in 2009 to 2016, 80.0 percent are between 5-digit industries, and 57.2 percent are between industry sectors. These numbers are substantially higher than those reported by NF (23% change industries in the Swedish context).

To restrict the observed mobility to moves of employees with relevant human capital (e.g., employees with firm or industry specific knowledge), we follow Tate and Yang (TY) (2016) and exclude moves of employees who worked for less than two years in their former employer. This applies to 52.8 percent of all moves to existing establishments observed in the period 2009 to 2016 (1,072,593 of 2,030,802). Following NF, we exclude low-wage earners

continuously observed industries, 3 industries split up in 2013: the code 42.10.0 was further differentiated in 42.11.0, 42.12.0, and 42.13.0; 42.20.0 was split into 42.21.0 and 42.22.0; and 42.90.0 was split between 42.91.0 and 42.99.0. These industries are part of the construction sector. To avoid observing inter-industry mobility because of a change in industry categorization, we use the industry codes specified in 2012 (i.e., prior to splitting). Correcting for this by re-aggregating formerly joined industries, only 4 industries that employ an average of 250 employees or more per year are not observed in every year. These are: 01.16.0 Growing of fiber crops, 01.22.0 Growing of tropical and subtropical fruits, 11.04.0 Man. of other non-distilled fermented beverages, 24.34.0 Cold drawing of wire. The descriptions in the text and the measures are based on the 2012 classification.

[2] The following descriptive statistics are based on all employees that move to one of the 449 industries with at least 250 employees per year on average.

based on their characteristics in the year prior to the move. While NF use the median as the cut-off, we follow TY and use the 25th percentile which is a less restrictive cut-off enabled by our initial restrictions which exclude from the sample employees with weaker labor market ties such as secondary employment. Excluding employees with short tenure in the year prior to the move also should reduce the noise observed in the moves. Across industry-years, employees in the 25th percentile on average earn 179,455 DKK (or 26,000 USD) or less.[3] The correlation between these two restrictions (low-wage and short tenure) is .32 for the full sample and .36 for all movers. These restrictions reduce the number of moves observed from 2,030,802 to 762,232 (thus, 62.5% of moves are excluded).

The mobility among low-wage earners (20.8%) and employees with short tenure (20.5%) is significantly higher than among other types of employees (b = -.112, t = -595.295, p <.001; b = -.128, t = -782.720, p <.001; respectively); employees earning lower wages and on short tenure move more often to another sector than other employees (61.0% versus 51.8%, t = -1444.591, p <.001). Excluding these employees from the sample reduces the observed mobility to 7.64% (762,232 moves out of 9,982,184 observations).

NF argue also that managers are less likely to possess industry-specific skills and show that managers are more likely than other employees to change industry sectors. To account for the differences between managers and other employees, they exclude managers from the analysis.

Our sample (with the above restrictions) includes 517,184 manager-year observations (5.5% of the sample). Managers move about 0.3% less than other employees (t = 8.103, p < .001). These differences are smaller than those documented by NF; the number of managers

[3] Estimation includes employees with short tenure.

changing industry and/or industry sector is not substantially larger than the numbers of other employees (76.9% versus 75.7%, 50.0% versus 50.8%, respectively). In fact, the number of managers changing industry sectors is smaller than the numbers of other employees changing sectors (b = -.0077, t = -2.9414, p = .0033).

One explanation for these differences between the Swedish and Danish data may stem from overall higher inter-industry mobility. Flexible labor contracts, which make hiring and firing easier in Denmark than in other European countries, may enable the observed inter-industry mobility.[4] Although we do not find substantial differences between managers and other employees, for consistency we exclude managers from the analysis.

We calculate flows from one industry to another in the years 2009-2016 for 198,025 potential industry combinations which results in 1,584,200—mostly zero—values.

To establish a baseline, we estimate the predicted mobility across industries, in line with NF who follow Neffke, Henning and Boschma (2011). To do this, we first calculate the number of employees and average salary in an industry in each year, and industry growth from the last year to the focal year measured as numbers of employees. We calculate number of employees and industry growth for the 445 industries observable in the years 2008-2016. Following NF, we pool the variables by summing them over eight years (2008-2015 and 2009-2016).

Our data include 445 origin industries and 444 destination industries during the period 2009 to 2016. The option for an employee to move within the same industry is omitted; the year

[4] The high overall inter-industry mobility seems not to be driven by location inside or outside the greater Copenhagen area where most businesses are located. While employees in the greater Copenhagen area are more likely to stay in the same industry if they move (20.69% versus 19.79%), they are equally likely to stay in the same industry sector (b = - 0.00092, p = .405). If we exclude managers, this difference becomes insignificant (24.46% versus 24.27%, b = - 0.00186, p = .09997), i.e., employees are equally likely to stay in the industry but are less likely to stay in the same industry sector (48.40% versus 49.54%, b = 0.0114, p < .001). However, these differences are small.

2008 is omitted because we observe no moves in that year. We can predict 198,025 (455 x 444) unique flows. Since most flows observed between industries valued zero, we follow NF and use a zero-inflated negative binominal model. The model is similar to the one used by NF, see Table C1. Table C1 Model 1 shows the results for employees including managers, and Model 2 shows the results excluding managers. Overall, the models are similar. The coefficients of origin and destination industry size are positive which is in line with NF. Growth of the origin has a negative coefficient while growth of the destination industry has a positive coefficient indicating movement from lower growth to higher growth industries. Labor flows are less likely to originate in high-wage industries, but high-wage industries receive higher cross-industry labor inflows.

The relatedness measure (SR) is calculated as the observed flow divided by the predicted flow–both pooled across years.

*** Table C1 about here ***

Descriptive statistics and transformation of the relatedness measure (SR)

We calculated two different relatedness measures: one including managers (based on Model 1, SR) and one excluding managers (based on Model 2, SR_2). We first present the results for SR.

SR including managers. Most values are zero; specifically, 64.85 percent of industry combinations have no labor flows—a smaller percentage than found by NF (81.3%). Also, only 25 percent of values are greater than 0.6, 10 percent are greater than 2.346, and 1 percent of values are greater than 15.335 (mean = 1.02, SD = 5.618). For the 69,606 industry combinations with non-zero value, the mean is 2.956 (SD = 9.164, median = 1.143). Following NF and Hartog and Neffke (2017), values of SR greater than 1 reflect industry relatedness. Around one in five

combinations (37,908, 19.186%) meet this criterion. Since SR is highly skewed, Hartog and Neffke (2017) propose mapping the measure on the interval [-1, 1]:

$$\widetilde{SR}_{ij} = \frac{SR_{ij} - 1}{SR_{ij} + 1}$$

Consequently, if $\widetilde{SR}_{ij}$is greater than 0 industries *i* and *j* are related. Compared to the asymmetric measure SR_{ij}, the number of related industries increases when we use the transformed measure SSR_{ij} (42,332, 21.425%).

Hartog and Neffke (2017) argue also that the measure should be symmetric. We therefore calculate the average relatedness of industry *i* to industry *j* and vice versa.

$$S\widetilde{SR}_{ij} = \frac{\widetilde{SR}_{ij} + \widetilde{SR}_{ji}}{2}$$

Using the symmetric, transformed measure $S\widetilde{SR}_{ij}$, fewer industries are considered related compared to when we use the asymmetric measure (23,450 versus 37,908 or 11.867% versus 19.186%), indicating that some industries have greater inflows than outflows (or vice versa) of employees from an industry. The symmetric non-transformed measure has the same number of related industries as the asymmetric measure.

To further explore how the transformed and non-transformed symmetric measures differ, we tabulate the number of NACE level 1 industries classified as related and their relatedness. Among the industries in the same industry sector, 68.04% (3,432 of 5,044) are related according to the SSR specification, and 51.88% according to the $S\widetilde{SR}_{ij}$ specification. We assume a greater overlap between the labor flow-related measure and the NACE-based measure at least at the sector level. The correlation between the NACE-based measure and the mapped measure is higher than the correlation between the NACE-based and non-mapped measures (r = .200, r = .184, respectively). Thus, while the overall percentage of related industries is lower using the

mapped measure (likely due to the smaller number of related industries), the correlation indicates that the mapped measure is closer to the in the literature most frequently used measures of industry relatedness based on NACE classifications.

SR excluding managers. For the *SR*_2 measure excluding managers, we observe a similar pattern. Most values are zero. The percentage of industry combinations with no reciprocal labor flows (63.62%) is as expected, slightly lower than when managers are included. Only 25 percent of values are greater than 0.633, 10 percent are greater than 2.364, and 1 percent of values are greater than 14.960 (mean = 1.03, SD = 5.353). For the 71,873 industry combinations with non-zero values, the mean is 2.841 (SD = 8.582, median = 1.117). Again, about one out of five combinations (38,571, 19.52%) have a value greater than 1, reflecting industry-relatedness. The transformation has no effect on the percentage of related industries. However, in the case of a symmetric transformed measure, the number of related industries decreases by 7 percent (12.30% versus 19.52%). This decrease is similar to the decrease observed for the measure including managers (see above). However, when managers are excluded, the non-transformed measure shows that the number of related industries is not independent of it being symmetric. The number of related industries increases if the measure is symmetric but not transformed (21.60% versus 19.52%).

The strong effect of making the measure symmetric after transformation suggests that some industries have very large mono-directional in- or outflows to/from a specific industry. This effect is amplified by managers' mobility.

Again, we tabulate the number of industries classified as related and sector relatedness at the NACE 1 sector level. Among the industries in the same industry sector, 69.07 percent (3,484

of 5,044) are related in the *SSR_2* specification and 53.37 percent are related in the $\widetilde{SSR}\_2_{ij}$ specification. The correlation between the NACE-based measure and the symmetric mapped measure is higher than the correlation with the symmetric non-mapped measure (r = .202, r = .187, respectively). These values are almost the same as the r-values of the measures including managers. Any non-symmetric measure (transformed or not) has a lower r-value (incl. managers r = .172, excl. managers r = .175).

In the analysis, we use industry relatedness based on the measure excluding managers which is consistent with prior studies. Examples of industries deemed related, at the margin, and unrelated are shown in Table C2.

Table C1: Zero-inflated negative binominal regression of labor flows

	Model 1	Model 2
Count data equation		
Growth(destination)	0.286	0.270
	[11.11]	[10.69]
Growth(origin)	-0.233	-0.225
	[-9.66]	[-9.51]
Ln(employment(origin))	0.760	0.756
	[157.86]	[159.89]
Ln(employment(destin.))	0.833	0.828
	[155.93]	[154.09]
Ln(wage(origin))	-0.247	-0.193
	[-17.87]	[-14.13]
Ln(wage(destination))	0.654	0.693
	[45.16]	[48.38]
Constant	-21.82	-23.02
	[-79.96]	[-85.09]
Regime selection equation		
Employment(origin)	-0.000145	-0.000154
	[-11.25]	[-10.86]
Employment(destination)	-0.0000163	-0.0000170
	[-7.63]	[-7.09]
Constant	0.460	0.468
	[7.10]	[7.09]
Overdispersion parameter		
Ln(alpha)	0.863	0.863
	[133.30]	[136.49]
Observations	197,580	197,580
Observations flow = 0	127,974	125,707

t statistics in brackets

For industry i (origin), employment and wages are over the 2008-2015 period. For industry j (destination), employment and wages are over the 2009-2016 period. Growth is calculated over the entire period. Model 1 includes managers in the analysis, Model 2 excludes managers.

Table C2: Examples of Related and unrelated industries based on Flow-measure

Industry A (in Manufacturing, ICT or KBS)	Industry B	SR_2	Same sector
Unrelated (no labor flows)			
26.20 Man. of computers and peripheral equipment	84.24 Public order and safety activities	-1	no
23.62 Man. of plaster products for construction purposes	47.71 Retail sale of clothing in specialized stores	-1	no
16.22 Man. of assembled parquet floors	19.20 Man. of refined petroleum products	-1	yes
32.99 Other manufacturing n.e.c.	11.07 Man. of soft drinks; prod.n of mineral waters & other bottled waters	-1	yes
73.11 Advertising agencies	77.40 Leasing of IP & similar products, except copyrighted works	-1	yes
63.12 Web portals	28.12 Man. of fluid power equipment	-1	no
22.19 Man. of other rubber products	10.84 Man. of condiments and seasonings	-1	yes
60.10 Radio broadcasting	28.11 Man. of engines & turbines, except aircraft, vehicle & cycle engines	-1	no
58.12 Publishing of directories and mailing lists	47.24 Retail sale of bread, cakes, flour confectionery and sugar confectionery in specialized stores	-1	no
22.23 Man. of builders' ware of plastic	29.10 Man. of motor vehicles	-1	yes
63.99 Other information service activities n.e.c.	01.41 Raising of dairy cattle	-1	no
58.11 Book publishing	55.20 Holiday and other short-stay accommodation	-1	no
23.32 Man. of bricks, tiles and construction products, in baked clay	20.59 Man. of other chemical products n.e.c.	-1	yes
32.40 Man. of games and toys	66.21 Risk and damage evaluation	-1	no
25.30 Man. of steam generators, except central heating hot water boilers	47.25 Retail sale of beverages in specialized stores	-1	no
60.10 Radio broadcasting	55.30 Recreational vehicle parks, trailer parks & camping grounds	-1	no
17.12 Man. of paper and paperboard	58.11 Book publishing	-1	no
58.12 Publishing of directories and mailing lists	47.29 Other retail sale of food in specialized stores	-1	no
18.11 Printing of newspapers	01.62 Support activities for animal production	-1	no
13.93 Man. of carpets and rugs	65.30 Pension funding	-1	no
23.13 Man. of hollow glass	46.74 Wholesale of hardware, plumbing and heating equipment and supplies	-1	no
59.12 Motion picture, video and television program post-production activities	79.11 Travel agency activities	-1	no

Unrelated (some labor flows)

71.12 Engineering activities and related technical consultancy	96.02 Hairdressing and other beauty treatment	-0.9666256	no
21.20 Man. of pharmaceutical preparations	86.21 General medical practice activities	-0.9608127	no
28.99 Man. of other special-purpose machinery n.e.c.	87.10 Residential nursing care facilities	-0.9572899	no
26.30 Man. of communication equipment	86.10 Hospital activities	-0.9545004	no
62.01 Computer programming activities	01.46 Raising of swine/pigs	-0.9539816	no
21.10 Man. of basic pharmaceutical products	88.91 Child day-care activities	-0.9528102	no
72.19 Other research & experimental dev.t on nat. sc. & engin.g	43.32 Joinery installation	-0.9522729	no
62.03 Computer facilities management activities	85.20 Primary education	-0.9517642	no
23.99 Man. of other non-metallic mineral products n.e.c.	85.20 Primary education	-0.9499358	no
28.93 Man. of machinery for food, beverage & tobacco processing	86.10 Hospital activities	-0.9469523	no
28.29 Man. of other general-purpose machinery n.e.c.	64.19 Other monetary intermediation	-0.9460919	no
26.30 Man. of communication equipment	85.20 Primary education	-0.9455044	no
72.11 Research and experimental development on biotechnology	85.20 Primary education	-0.9451958	no
32.40 Man. of games and toys	86.10 Hospital activities	-0.9448817	no
62.03 Computer facilities management activities	88.10 Social work activities without accom.n for elderly & disabled	-0.9446093	no
70.10 Activities of head offices	96.02 Hairdressing and other beauty treatment	-0.9431314	no
62.02 Computer consultancy activities	86.23 Dental practice activities	-0.9425756	no
25.11 Man. of metal structures and parts of structures	86.90 Other human health activities	-0.9423472	no
62.02 Computer consultancy activities	25.62 Machining	-0.941782	no
25.62 Machining	62.02 Computer consultancy activities	-0.941782	no
27.12 Man. of electricity distribution and control apparatus	85.20 Primary education	-0.9407864	no
70.22 Business and other management consultancy activities	81.29 Other cleaning services	-0.9403039	no

Unrelated (<0)

26.40 Man. of consumer electronics	11.07 Man. of soft drinks; prod.n of mineral waters & other bottled waters	-0.1556089	no
11.07 Man. of soft drinks; prod.n of mineral waters & other bottled waters	26.40 Man. of consumer electronics	-0.1556089	no

20.11 Man. of industrial gases	06.10 Extraction of crude petroleum	-0.1556006	no
14.12 Man. of workwear	46.38 Wholesale of other food, including fish, crustaceans & mollusks	-0.1555968	no
16.29 Man. of other products of wood; Man. of articles of cork, straw and plaiting materials	43.91 Roofing activities	-0.1555593	no
23.14 Man. of glass fibers	46.18 Agents specialized in the sale of other particular products	-0.1554867	no
33.20 Installation of industrial machinery and equipment	35.22 Distribution of gaseous fuels through mains	-0.1554461	no
28.15 Man. of bearings, gears, gearing & driving elements	43.29 Other construction installation	-0.155429	no
10.89 Man. of other food products n.e.c.	19.20 Man. of refined petroleum products	-0.155343	yes
19.20 Man. of refined petroleum products	10.89 Man. of other food products n.e.c.	-0.155343	yes
22.21 Man. of plastic plates, sheets, tubes and profiles	22.23 Man. of builders' ware of plastic	-0.1553423	yes
22.23 Man. of builders' ware of plastic	22.21 Man. of plastic plates, sheets, tubes and profiles	-0.1553423	yes
18.11 Printing of newspapers	91.04 Botanical & zoological gardens & nature reserves activities	-0.155303	no
16.29 Man. of other products of wood; Man. of articles of cork, straw and plaiting materials	46.45 Wholesale of perfume and cosmetics	-0.1552405	no
10.51 Operation of dairies and cheese making	94.11 Activities of business & employers membership organizations	-0.1552025	no
23.51 Man. of cement	20.59 Man. of other chemical products n.e.c.	-0.1551912	yes
20.59 Man. of other chemical products n.e.c.	23.51 Man. of cement	-0.1551912	yes
27.11 Man. of electric motors, generators & transformers	27.32 Man. of other electronic & electric wires & cables	-0.1551734	yes
27.32 Man. of other electronic & electric wires & cables	27.11 Man. of electric motors, generators and transformers	-0.1551734	yes
22.19 Man. of other rubber products	46.72 Wholesale of metals and metal ores	-0.1550985	no
18.14 Binding and related services	79.12 Tour operator activities	-0.1550656	no
27.51 Man. of electric domestic appliances	25.99 Man. of other fabricated metal products n.e.c.	-0.1550007	yes

Medium-level relatedness

16.29 Man. of other products of wood; Man. of articles of cork, straw and plaiting materials	53.20 Other postal and courier activities	0.5483949	no
75.00 Veterinary activities	91.04 Botanical & zoological gardens & nature reserves activities	0.5484449	no
28.30 Man. of agricultural and forestry machinery	01.47 Raising of poultry	0.5486473	no
28.99 Man. of other special-purpose machinery n.e.c.	32.50 Man. of medical & dental instruments & supplies	0.5487545	no
22.22 Man. of plastic packing goods	28.25 Man. of non-domestic cooling and ventilation equipment	0.5489732	yes

25.92 Man. of light metal packaging	95.29 Repair of other personal and household goods	0.5489738	no
59.14 Motion picture projection activities	90.01 Performing arts	0.5492676	no
27.90 Man. of other electrical equipment	77.32 Renting and leasing of construction and civil engineering machinery and equipment	0.5493973	no
22.22 Man. of plastic packing goods	17.29 Man. of other articles of paper and paperboard	0.5495781	yes
10.92 Man. of prepared pet foods	78.20 Temporary employment agency activities	0.5502093	no
58.11 Book publishing	70.21 Public relation and communication activities	0.5502943	no
28.92 Man. of machinery for mining, quarrying & construction	27.11 Man. of electric motors, generators and transformers	0.550391	yes
25.62 Machining	30.92 Man. of bicycles and invalid carriages	0.5503959	yes
20.14 Man. of other organic basic chemicals	20.30 Man. of paints, varnishes & similar coatings, ink & mastics	0.5507355	yes
Highly related			
73.11 Advertising agencies	73.12 Media representation	0.9726303	yes
27.90 Man. of other electrical equipment	26.12 Man. of loaded electronic boards	0.9745672	yes
23.62 Man. of plaster products for construction purposes	23.14 Man. of glass fibers	0.9759469	yes
60.20 Television programming and broadcasting activities	59.11 Motion picture, video and television program production activities	0.9771681	yes
58.14 Publishing of journals and periodicals	58.13 Publishing of newspapers	0.9778394	yes
58.19 Other publishing activities	73.12 Media representation	0.9785253	no
59.13 Motion picture, video & television program distribution	59.11 Motion picture, video and television program production	0.9786387	yes
32.12 Manufacturing of jewelry and related articles	46.48 Wholesale of watches and jewelry	0.9805878	no
32.12 Manufacturing of jewelry and related articles	47.77 Retail sale of watches and jewelry in specialized stores	0.9819761	no
59.12 Motion picture, video & television program post-prod.n	59.11 Motion picture, video and television program production	0.9822665	yes
18.12 Other printing	18.14 Binding and related services	0.9832053	yes

Note that industries in column A fall within the Manufacturing, ICT, or KBS sectors. The industries do, however, not need to be part of the sample investigated in the study to appear in the table.

APPENDIX D – EXAMPLES OF RELATED AND UNRELATED INDUSTRIES BASED ON THE EUCLIDEAN DISTANCE MEASURE

Industry A (in Manufacturing, ICT or KBS)	Industry B	ED	Same sector
Least related			
24.41 Precious metals production	20.51 Man. of explosives	1.247	yes
20.51 Man. of explosives	01.16 Growing of fiber crops	1.247	no
23.43 Man. of ceramic insulators and insulating fittings	24.41 Precious metals production	1.247	yes
10.73 Man. of macaroni, noodles and similar farinaceous products	08.91 Mining of chemical and fertilizer minerals	1.267	no
10.73 Man. of macaroni, noodles and similar farinaceous products	01.22 Growing of tropical and subtropical fruits	1.267	no
10.73 Man. of macaroni, noodles and similar farinaceous products	01.16 Growing of fiber crops	1.267	no
24.41 Precious metals production	10.73 Man. of macaroni, noodles and similar farinaceous products	1.267	yes
24.41 Precious metals production	53.10 Postal activities under universal service obligation	1.281	no
10.12 Processing and preserving of poultry meat	08.91 Mining of chemical and fertilizer minerals	1.285	no
24.41 Precious metals production	10.12 Processing and preserving of poultry meat	1.285	yes
10.12 Processing and preserving of poultry meat	01.22 Growing of tropical and subtropical fruits	1.285	no
10.12 Processing and preserving of poultry meat	01.16 Growing of fiber crops	1.285	no
24.41 Precious metals production	96.02 Hairdressing and other beauty treatment	1.298	no
24.41 Precious metals production	77.22 Renting of video tapes and disks	1.318	no
24.41 Precious metals production	08.91 Mining of chemical and fertilizer minerals	1.414	no
24.41 Precious metals production	01.22 Growing of tropical and subtropical fruits	1.414	no
24.41 Precious metals production	01.16 Growing of fiber crops	1.414	no
Just unrelated (> .298136)			
32.30 Man. of sports goods	18.11 Printing of newspapers	0.298	yes
21.20 Man. of pharmaceutical preparations	03.22 Freshwater aquaculture	0.298	no
10.81 Man. of sugar	46.52 Wholesale of electronic and telecom. equipment and parts	0.298	no
30.99 Man. of other transport equipment n.e.c.	28.25 Man. of non-domestic cooling and ventilation equipment	0.298	yes

25.72 Man. of locks and hinges	82.19 Photocopying, document prep. & other specialised office support	0.298	no
20.59 Man. of other chemical products n.e.c.	46.13 Agents involved in the sale of timber and building materials	0.298	no
26.11 Man. of electronic components	28.94 Man. of machinery for textile, apparel and leather production	0.298	yes
13.96 Man. of other technical and industrial textiles	35.23 Trade of gas through mains	0.298	no
10.71 Man. of bread; Man. of fresh pastry goods and cakes	47.91 Retail sale via mail order houses or via Internet	0.298	no
27.33 Man. of wiring devices	77.40 Leasing of IP and similar products, except copyrighted works	0.298	no
61.90 Other telecommunications activities	25.50 Forging, pressing, stamping and roll-forming of metal; powder metallurgy	0.298	no
62.03 Computer facilities management activities	68.32 Management of real estate on a fee or contract basis	0.298	yes
26.11 Man. of electronic components	33.14 Repair of electrical equipment	0.298	yes
28.95 Man. of machinery for paper and paperboard production	10.91 Man. of prepared feeds for farm animals	0.298	yes

Just related (< .298136)

28.99 Man. of other special-purpose machinery n.e.c.	46.74 Wholesale of hardware, plumbing & heating equip.t & supplies	0.298	no
28.41 Man. of metal forming machinery	38.22 Treatment and disposal of hazardous waste	0.298	no
28.13 Man. of other pumps and compressors	46.62 Wholesale of machine tools	0.298	no
33.19 Repair of other equipment	01.49 Raising of other animals	0.298	no
72.11 Research and experimental development on biotechnology	46.77 Wholesale of waste and scrap	0.298	no
21.20 Man. of pharmaceutical preparations	77.32 Renting & leasing of construction & civil engineering machinery & equip.t	0.298	no
72.19 Other research and experimental dev.t on natural sc. & engin.	24.20 Man. of tubes, pipes, hollow profiles and related fittings, of steel	0.298	no
26.20 Man. of computers and peripheral equipment	47.79 Retail sale of second-hand goods in stores	0.298	no
20.42 Man. of perfumes and toilet preparations	46.36 Wholesale of sugar and chocolate and sugar confectionery	0.298	no
17.29 Man. of other articles of paper and paperboard	46.21 Wholesale of grain, unmanufactured tobacco, seeds & animal feeds	0.298	no
10.81 Man. of sugar	82.11 Combined office administrative service activities	0.298	no
58.19 Other publishing activities	10.82 Man. of cocoa, chocolate and sugar confectionery	0.298	no
58.29 Other software publishing	96.04 Physical well-being activities	0.298	no
16.23 Man. of other builder carpentry and joinery	95.24 Repair of furniture and home furnishings	0.298	no
26.30 Man. of communication equipment	46.45 Wholesale of perfume and cosmetics	0.298	no
32.13 Man. of imitation jewelry and related articles	30.11 Building of ships and floating structures	0.298	yes

20.41 Man. of soap & detergents, cleaning & polishing preparations	95.29 Repair of other personal and household goods	0.298	no
63.12 Web portals	10.39 Other processing and preserving of fruit and vegetables	0.298	no

Average (among related industries)

20.41 Man. of soap and detergents, cleaning & polishing preparations	32.99 Other manufacturing n.e.c.	0.148	yes
59.20 Sound recording and music publishing activities	46.19 Agents involved in the sale of a variety of goods	0.148	yes
63.99 Other information service activities n.e.c.	94.99 Activities of other membership organizations n.e.c.	0.148	yes
70.22 Business and other management consultancy activities	82.11 Combined office administrative service activities	0.148	yes
28.22 Man. of lifting and handling equipment	28.30 Man. of agricultural and forestry machinery	0.149	yes
24.53 Casting of light metals	24.51 Casting of iron	0.149	yes
32.99 Other manufacturing n.e.c.	23.14 Man. of glass fibers	0.149	yes
59.20 Sound recording and music publishing activities	77.39 Renting * leasing of other machinery, equipment and tangible goods n.e.c.	0.149	yes
70.10 Activities of head offices	62.09 Other information technology and computer service activities	0.149	yes
28.92 Man. of machinery for mining, quarrying and construction	28.41 Man. of metal forming machinery	0.149	yes
14.19 Man. of other wearing apparel and accessories	46.12 Agents involved in the sale of fuels, ores, metals and industrial chemicals	0.149	no
14.19 Man. of other wearing apparel and accessories	46.44 Wholesale of china and glassware and cleaning materials	0.149	no
17.12 Man. of paper and paperboard	17.22 Man. of household and sanitary goods and of toilet requisites	0.150	yes

Most related

28.93 Man. of machinery for food, beverage and tobacco processing	28.92 Man. of machinery for mining, quarrying and construction	0.084	yes
28.92 Man. of machinery for mining, quarrying and construction	28.22 Man. of lifting and handling equipment	0.086	yes
11.07 Man. of soft drinks; prod.n of mineral waters & other bottled waters	10.84 Man. of condiments and seasonings	0.087	yes
10.84 Man. of condiments and seasonings	11.07 Man. of soft drinks; prod.n of mineral waters and other bottled waters	0.087	yes
28.99 Man. of other special-purpose machinery n.e.c.	28.92 Man. of machinery for mining, quarrying and construction	0.090	yes
28.22 Man. of lifting and handling equipment	28.93 Man. of machinery for food, beverage and tobacco processing	0.090	yes
28.29 Man. of other general-purpose machinery n.e.c.	28.93 Man. of machinery for food, beverage and tobacco processing	0.094	yes
70.10 Activities of head offices	36.00 Water collection, treatment and supply	0.100	no
22.29 Man. of other plastic products	22.22 Man. of plastic packing goods	0.101	yes

26.51 Man. of instr.ts & appliances for measuring, testing & navigation	27.90 Man. of other electrical equipment	0.105	yes
25.92 Man. of light metal packaging	24.53 Casting of light metals	0.110	yes
70.22 Business and other management consultancy activities	94.99 Activities of other membership organizations n.e.c.	0.111	yes

Note that industries in column A fall within the Manufacturing, ICT, or KBS sectors. The industries do, however, not need to be part of the sample investigated in the study to appear in the table.

APPENDIX E – RESULTS USING 4-YEAR AND 10-YEAR BASED MEASURES OF INDUSTRY EXPERIENCE

Table E1: Origin of employees in new ventures (4-year definition)

Panel A: ED-measure

Worker type	From same industry	From related industry	From unrelated industry	From other	Total
Focal	19.75%	40.92%	34.39%	4.94%	100%
Other	14.05%	22.52%	43.04%	20.39%	100%
Total	15.55%	27.35%	40.77%	16.34%	100%

Panel B: Flow-measure

Worker type	From same industry	From related industry	From unrelated industry	From other	Total
Focal	19.75%	54.50%	20.11%	5.64%	100%
Other	14.05%	37.95%	26.22%	21.77%	100%
Total	15.55%	42.30%	24.62%	17.54%	100%

Panel C: Sector measure

Worker type	From same industry	From same sector, but different industry	From different sector	From other	Total
Focal	19.75%	25.40%	49.91%	4.94%	100%
Other	14.05%	13.80%	51.76%	20.39%	100%
Total	15.55%	16.84%	51.27%	16.34%	100%

Table E2: Origin of employees in new ventures (10-year definition)

Panel A: ED measure

Worker type	From same industry	From related industry	From unrelated industry	From other	Total
Focal	23.46%	46.74%	26.28%	3.53%	100%
Other	15.68%	26.47%	39.27%	18.57%	100%
Total	17.72%	31.79%	35.86%	14.62%	100%

Panel B: Flow measure

Worker type	From same industry	From related industry	From unrelated industry	From other	Total
Focal	23.46%	58.20%	14.11%	4.23%	100%
Other	15.68%	42.22%	21.96%	20.14%	100%
Total	17.72%	46.41%	19.90%	15.96%	100%

Panel C: Sector measure

Worker type	From same industry	From same sector, but different industry	From different sector	From other	Total
Focal	23.46%	29.98%	43.03%	3.53%	100%
Other	15.68%	15.75%	50.00%	18.57%	100%
Total	17.72%	19.48%	48.17%	14.62%	100%

Table E3: New venture industry experience

Industry Experience	1-year	4-year	10-year
At least one focal employee with IE in t0	15.86%	22.01%	25.57%
At least one employee with IE, but no focal employee with IE	19.09%	23.30%	23.95%
ED: At least one focal employee with related IE, but no focal employee from the same industry	29.45%	30.74%	29.77%
FLOW: At least one focal employee with related IE, but no focal employee from the same industry	39.48%	39.48%	37.22%
SECT: At least one focal employee from same sector, but no focal employee from the same industry	21.36%	22.33%	22.65%
At least TWO focal employee with IE	5.18%	8.09%	9.06%
At least TWO focal employee with IE (among those with IE, n = 49)	32.65%	46.94%	48.98%

n = 309 new ventures unless specified differently

Table E4: Venture survival within the first three years (4-year based definition)

Mobility in the first 3 years	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
At least one focal empl. with IE	0.083	0.095	0.092	0.104	0.091	.
.	[1.27]	[1.39]	[1.34]	[1.49]	[1.34]	.
At least one other empl. with IE but not a focal empl. with IE	.	0.043	.	.	.	.
.	.	[0.62]	.	.	.	.
ED: At least one focal employee with related IE (but none from same industry)	.	.	0.045	.	.	.
.	.	.	[0.71]	.	.	.
FLOW: At least one focal employee with related IE (but none from same industry)	.	.	.	0.069	.	.
.	.	.	.	[1.15]	.	.
SECTOR: At least one focal employee with related IE (but none from same industry)	.	.	.	.	0.062	.
.	.	.	.	.	[0.92]	.
At least **two** focal empl. with IE	.	.	.	.	.	0.220^{+}
.	.	.	.	.	.	[1.71]
Nr. employees (ln)	-0.11	-0.116^{+}	-0.106	-0.113	-0.108	0.063
.	[-1.59]	[-1.69]	[-1.51]	[-1.62]	[-1.55]	[0.41]
Rural area	-0.002	-0.007	0.004	0.005	0.001	0.034
.	[-0.04]	[-0.12]	[0.06]	[0.09]	[0.01]	[0.20]
Establishment year dummies	YES	YES	YES	YES	YES	YES
Constant	0.703***	0.703***	0.680***	0.676***	0.686***	0.606*
.	[4.06]	[4.05]	[3.82]	[3.79]	[3.88]	[2.14]
R-squared	0.074	0.075	0.075	0.078	0.076	0.197
F	3.408	3.097	3.148	3.43	3.226	1.668
Log likelihood	-205.427	-205.224	-205.158	-204.72	-205	-22.813
Sample	V	V	V	V	V	V with IE
No. of observations	309	309	309	309	309	49
t statistics in brackets	.	.	.	.	.	.

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table E5: Venture survival within the first three years (10-year based definition)

Mobility in the first 3 years	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
At least one focal empl. with IE	0.080	0.084	0.083	0.090	0.082	.
.	[1.30]	[1.28]	[1.32]	[1.41]	[1.32]	.
At least one other empl. with IE but not a focal empl. with IE	.	0.011	.	.	.	.
.	.	[0.16]	.	.	.	.
ED: At least one focal employee with related IE (but none from same industry)	.	.	0.035	.	.	.
.	.	.	[0.57]	.	.	.
FLOW: At least one focal employee with related IE (but none from same industry)	.	.	.	0.058	.	.
.	.	.	.	[1.00]	.	.
SECTOR: At least one focal employee with related IE (but none from same industry)	.	.	.	.	0.053	.
.	.	.	.	.	[0.81]	.
At least **two** focal empl. with IE	.	.	.	.	.	0.175
.	.	.	.	.	.	[1.35]
Nr. employees (ln)	-0.11	-0.111	-0.106	-0.112	-0.108	0.075
.	[-1.59]	[-1.60]	[-1.52]	[-1.60]	[-1.54]	[0.50]
Rural area	-0.002	-0.003	0.002	0.003	0.000	0.05
.	[-0.03]	[-0.05]	[0.03]	[0.05]	[-0.00]	[0.29]
Establishment year dummies	YES	YES	YES	YES	YES	YES
Constant	0.703***	0.703***	0.687***	0.683***	0.690***	0.606*
.	[4.07]	[4.06]	[3.90]	[3.87]	[3.93]	[2.20]
R-squared	0.074	0.074	0.075	0.077	0.076	0.174
F	3.441	3.086	3.157	3.39	3.233	1.608
Log likelihood	-205.381	-205.368	-205.214	-204.858	-205.059	-23.504
Sample	V	V	V	V	V	V with IE
No. of observations	309	309	309	309	309	49
t statistics in brackets	.	.	.	.	.	.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$	.	.	.	.	.	.

Table E6: Industry experience in new subsidiaries

At least one focal employee from same industry	New subsidiaries	New ventures
1-year	23.60%	15.86%
4-year	27.81%	22.01%
10-year	29.78%	25.57%
Observations (n)	*356*	*309*