

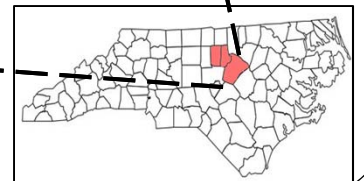
The tortoise, the hare and the hybrid: Regional effects of entrepreneurial apprenticeships

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Larger question: How are places transformed?



The Research Triangle Park

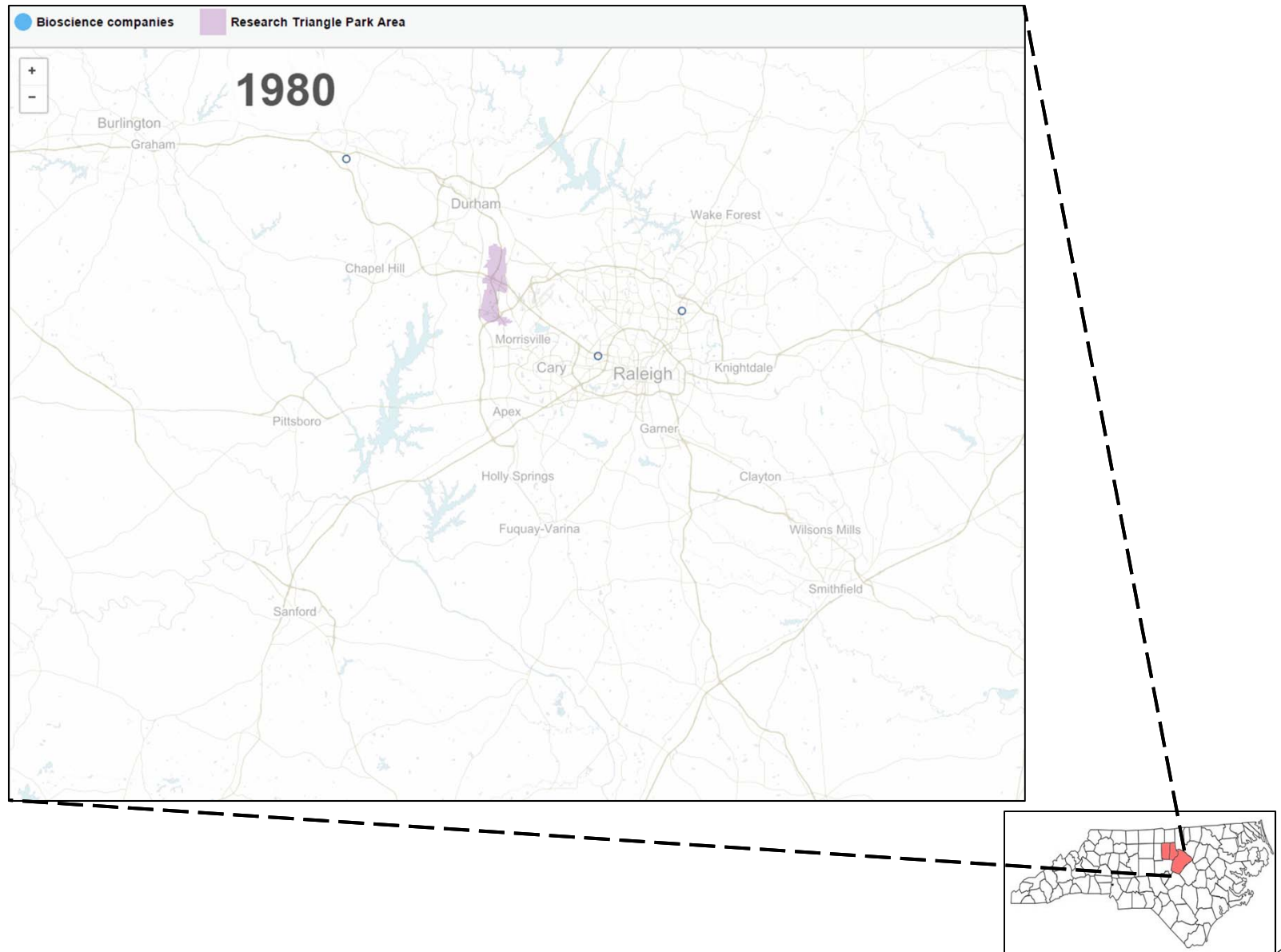


Bioscience in the Park



BURROUGHS WELLCOME CO.
Corporate Headquarters and Research Laboratories
Research Triangle Park, North Carolina

Entrepreneurial bioscience firms



Apprenticeships: The backbone of new firm formation

- Jacobs' (1972)
“breakaway firms”
 - Medieval apprenticeship system
 - Locally-oriented
 - Tied to regional vibrancy



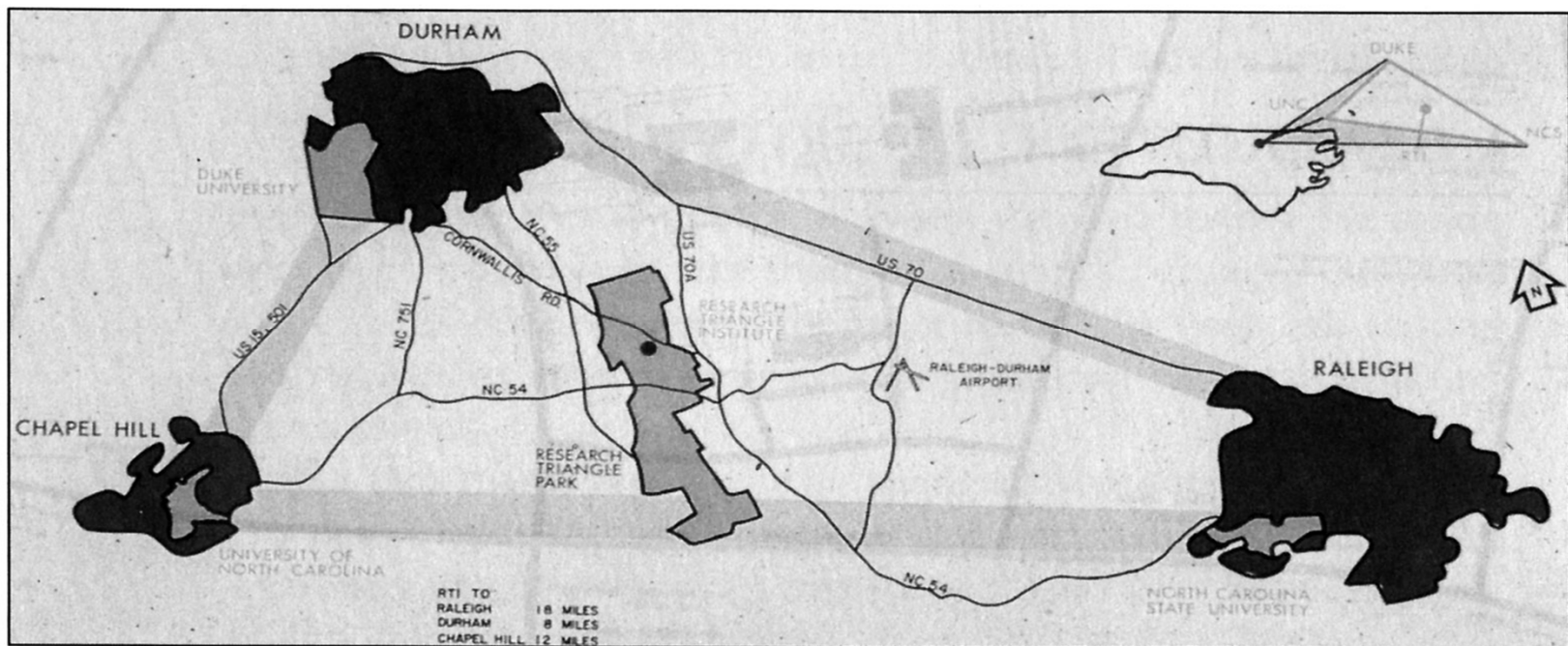
Apprenticeships:

The backbone of new firm formation, cont.

- Scholarship largely divided into two strains:
- Corporate spawns
 - Business experience and professional networks
 - Silicon Valley Fair-Children
 - Old Motor Works
- Academic entrepreneurship & university spinouts
 - Translation of research findings

Contextualizing apprenticeships

Diverse academic and corporate apprenticeship models,
within the same region and within the same industry

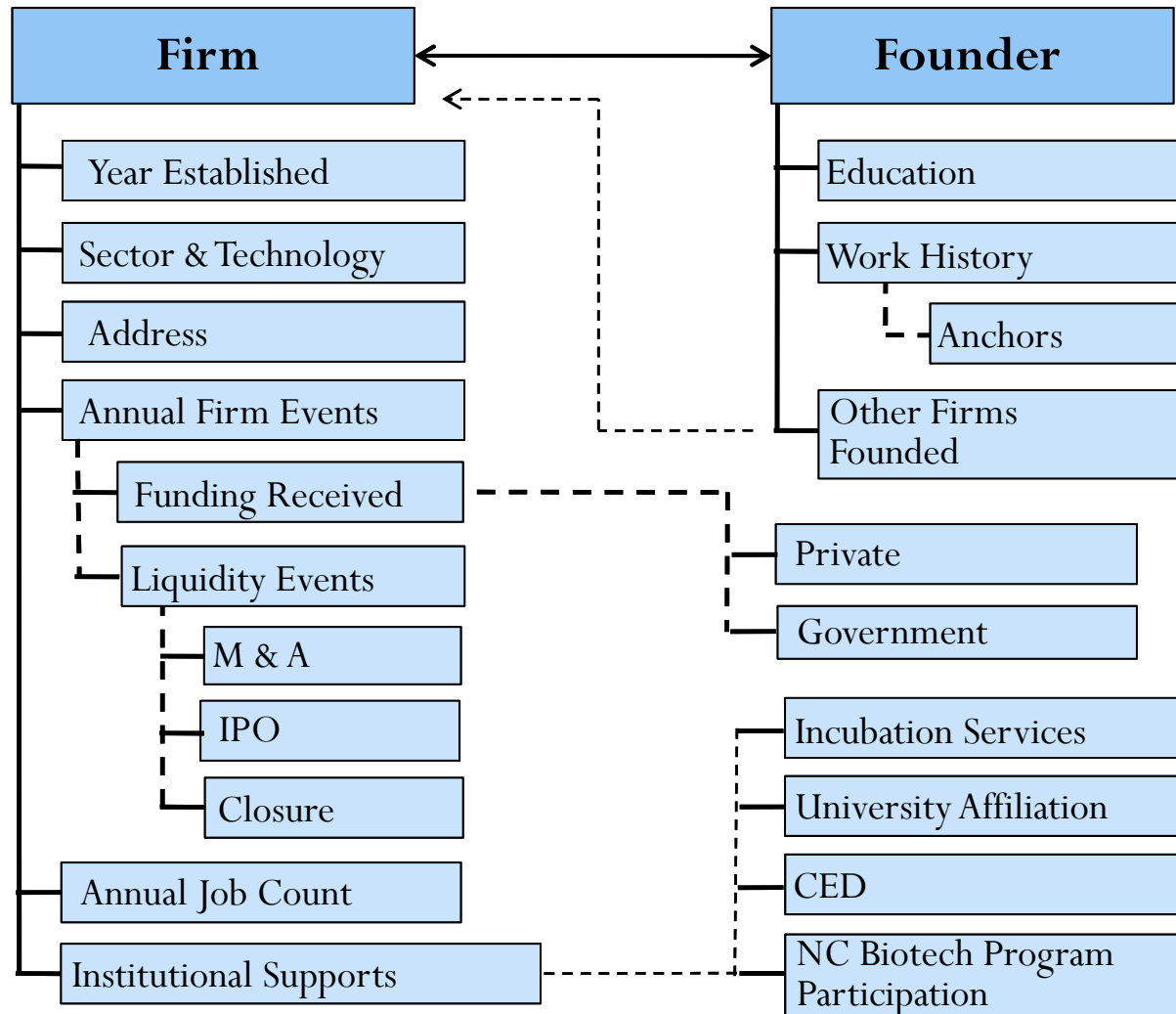


Data Used in Analysis

- Feldman-Lowe *Circling the Triangle* database
 - 425 *de novo* entrepreneurial life sciences firms (1990 to 2012)
 - Continually updated
 - Draws from primary and secondary sources
- National Establishment Time Series database (NETS)
 - Birth and death years
 - Employment data

Feldman-Lowe database:

Firm forensics



Founder team types: Prior experience in the region

- Academic apprenticeships:
Duke, UNC, North Carolina State
- Prominent corporate apprenticeships:
GSK, Pfizer, Ciba-Geigy, DuPont, Eli Lilly
- Other entrepreneurial firms

Founder team types:

Prior experience in the region, cont.

- Academic: All founders have experience at region's universities, and only at these universities
- Big pharma: All founders have experience at region's prominent corporations, and only at these corporations
- Second generation entrepreneurs (SGE): All founders have experience at entrepreneurial companies in the region, and only at these companies
- Hybrid: A founding team with combined Academic, Big pharma, and SGE experience, and only with these backgrounds
- Other: Founders don't fit in the previous categories

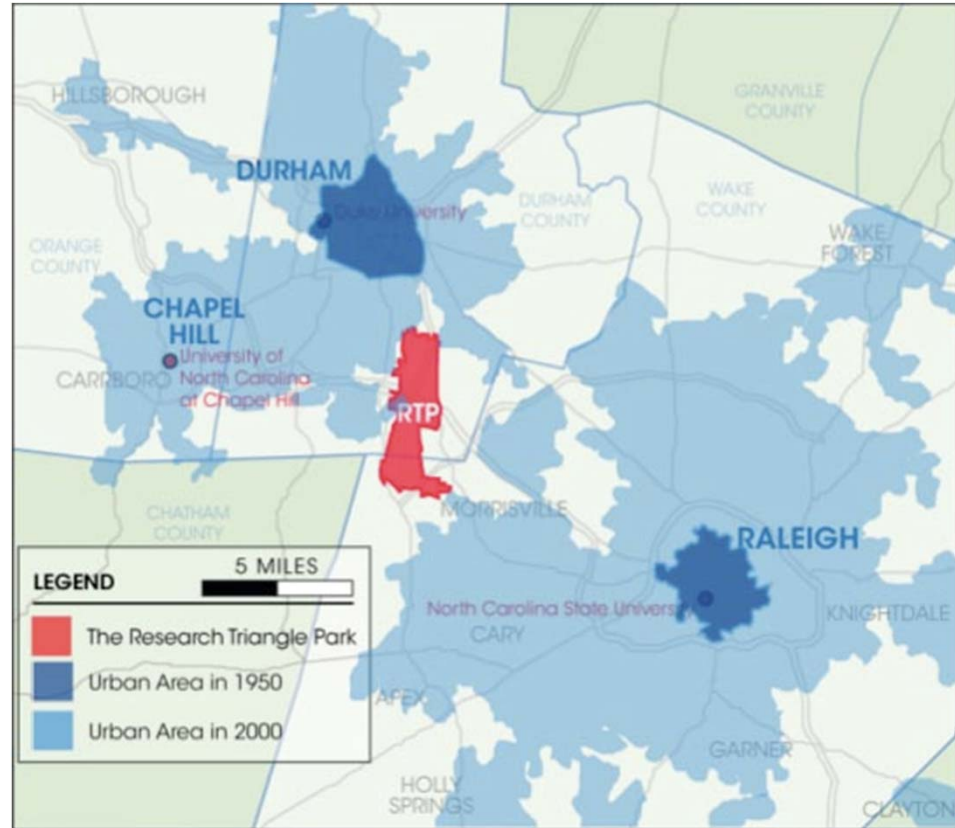
Firm attributes and outcomes

Key differences in firm attributes

- Birth year, subsector, founding team size, institutional supports

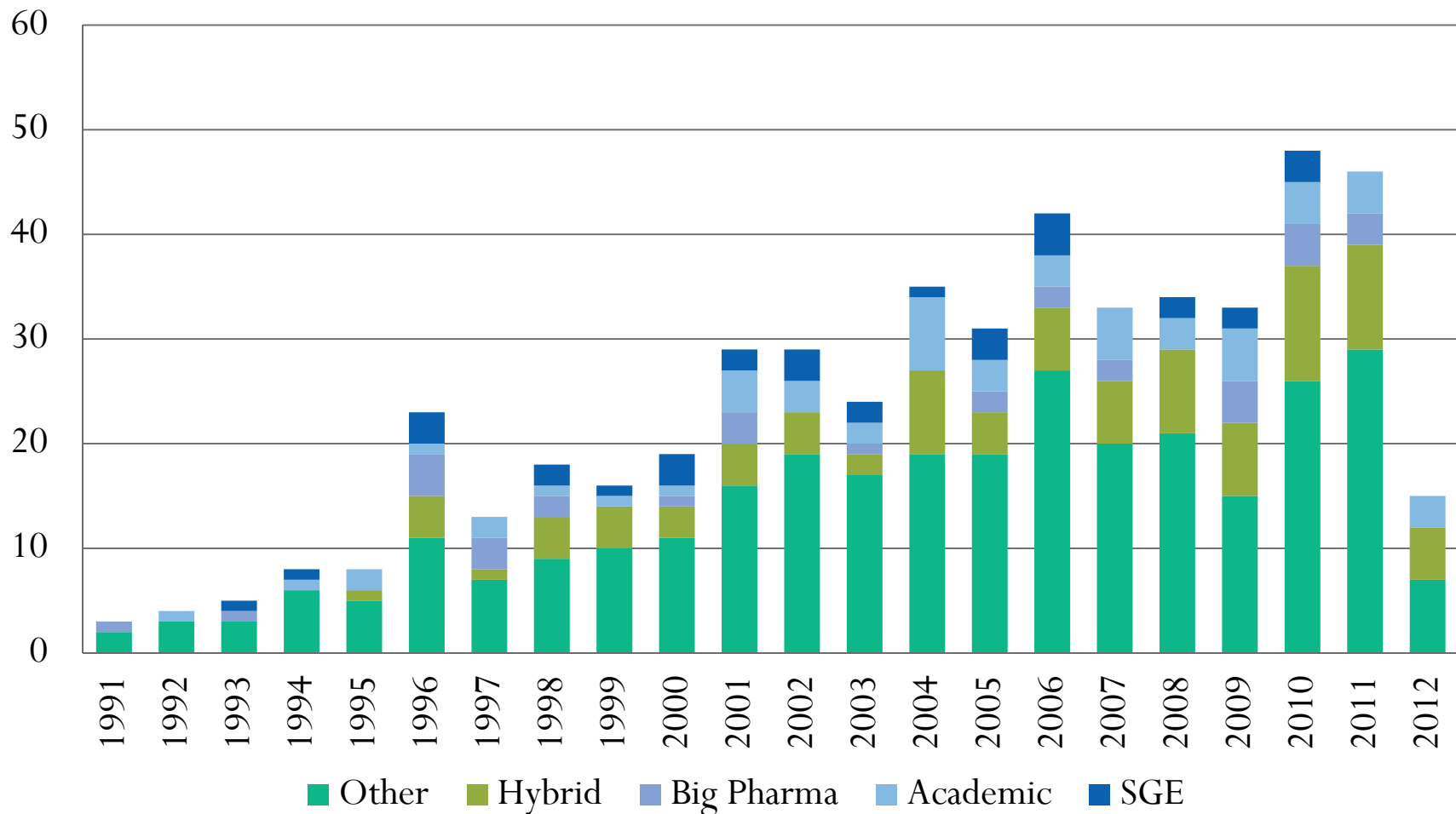
Relationships between founder team type and:

- Survival
- Labor market impact
- Funding



Entrepreneurial life science firms in the RTP, 1990-2012

Number of Companies by Type and Year of Establishment



Founding teams

Firm type	Number of firms	Mean number of founders	Founders per company		
			Number & percent of firm type subtotal		
			1	2	3+
All	425	1.87	198 (47)	127 (30)	100 (24)
Academic	56	1.48	38 (68)	11 (20)	7 (13)
Big pharma	33	1.36	23 (70)	8 (24)	2 (6)
SGE	33	1.15	29 (88)	3 (9)	1 (3)
Hybrid	104	2.10	39 (38)	32 (30)	28 (32)
Other	211	2.08	108 (36)	105 (35)	90 (43)

Life science subsectors

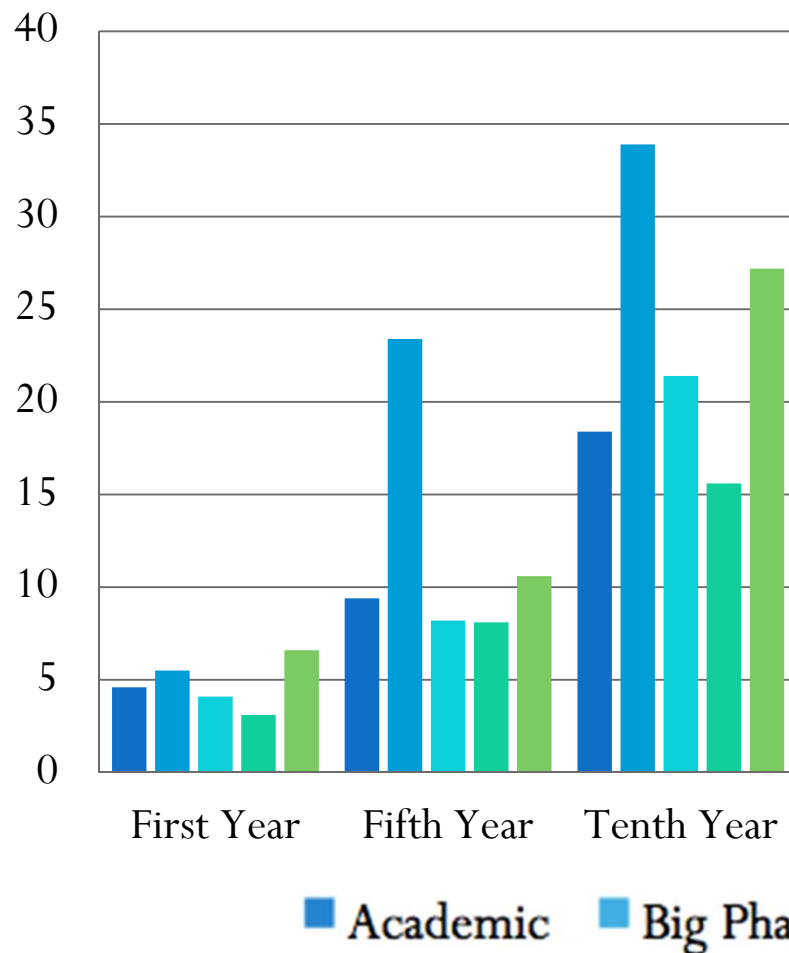
Firm type	Number of firms	Life science subsectors			
		Number of firms and percent of firm type subtotal			
		Contract research (CRO)	Medical devices	Drug development & biotech	Other sectors
All	425	72 (17)	73 (17)	213 (50)	67 (16)
Academic	56	9 (16)	12 (21)	29 (52)	6 (11)
Big pharma	33	9 (27)	2 (6)	19 (58)	3 (9)
SGE	33	8 (24)	2 (6)	10 (30)	13 (39)
Hybrid	104	19 (18)	17 (16)	59 (57)	9 (9)
Other	211	32 (15)	40 (19)	103 (49)	36 (17)

Institutional supports

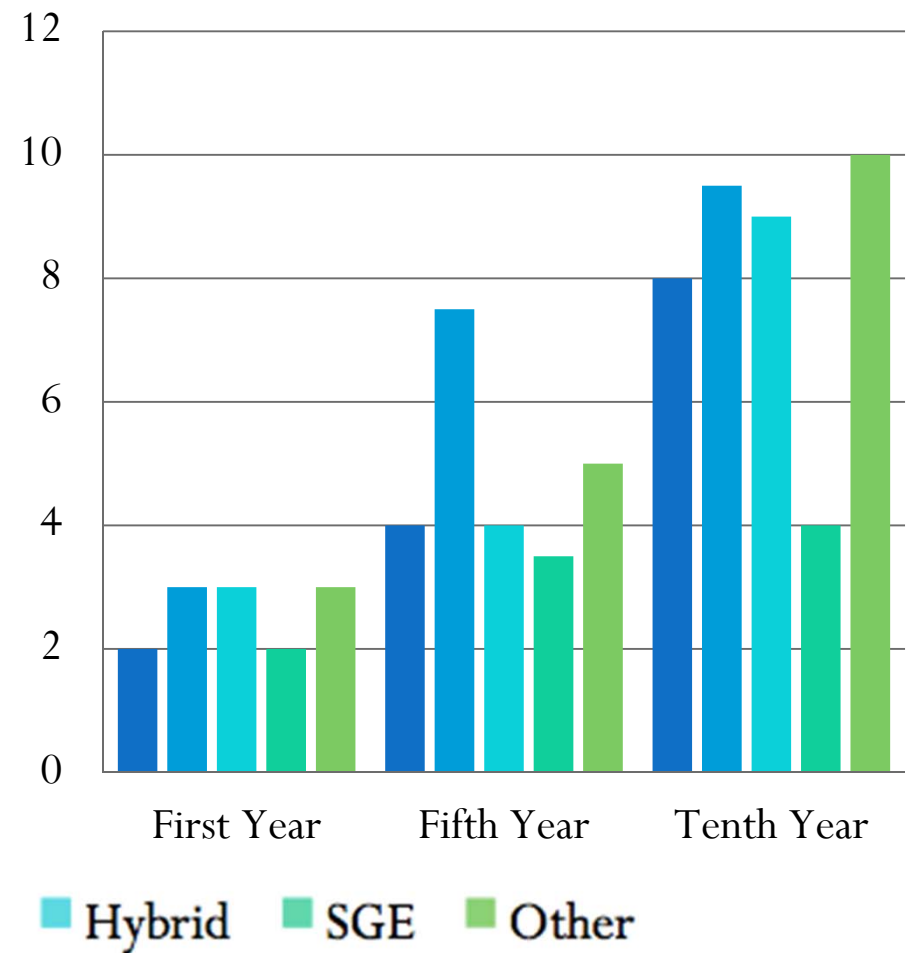
Firm type	Number of firms	Average number of supports	Institutional Supports				
			Number and percent of firm type total				
			0	1	2	3-9	10+
All	425	1.62	236 (56)	74 (17)	36 (9)	66 (16)	12 (3)
Academic	56	2.52	26 (46)	8 (14)	5 (9)	14 (25)	3 (5)
Big pharma	33	1.61	22 (67)	4 (12)	1 (3)	5 (15)	1 (3)
SGE	33	0.69	24 (72)	5 (15)	0 (0)	3 (9)	1 (3)
Hybrid	104	1.73	56 (54)	14 (14)	13 (13)	19 (18)	1 (1)
Other	211	1.48	114 (54)	46 (22)	20 (10)	25 (12)	6 (3)

Employment

Mean employment,
by firm type and by year



Median employment,
by firm type and by year



Survival

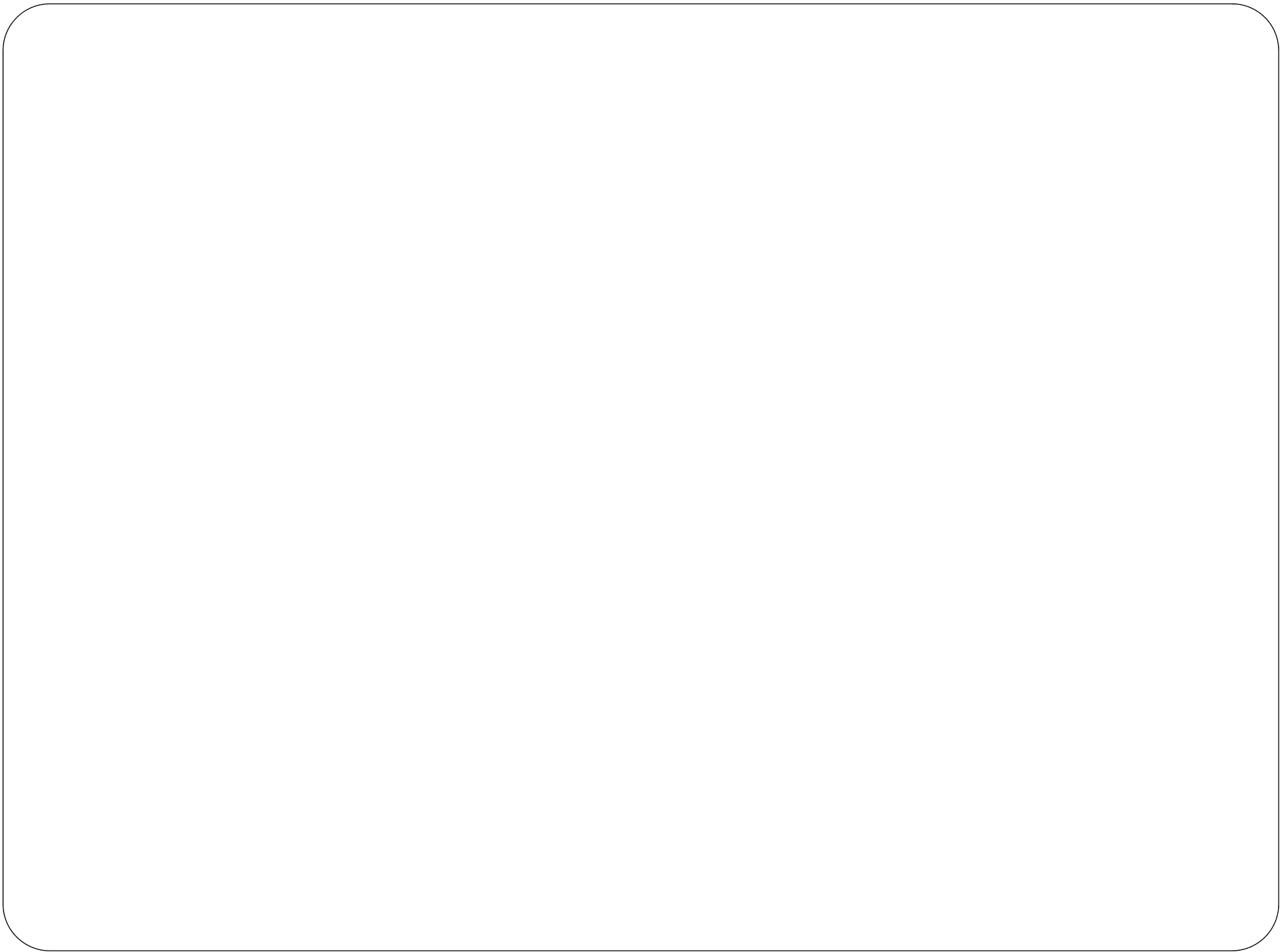
Firm type	Firms	Survival to Year 3		Survival to Year 5		Survival to Year 10	
		Potential	Actual, number and %	Potential	Actual, number and %	Potential	Actual, number and %
All	425	375	357 (95)	313	291 (93)	172	139 (81)
Academic	56	49	48 (98)	40	39 (98)	19	18 (95)
Big pharma	33	30	28 (93)	22	20 (91)	16	16 (100)
SGE	33	30	28 (93)	26	24 (92)	18	15 (83)
Hybrid	104	87	85 (98)	67	60 (90)	33	23 (70)
Other	211	189	178 (94)	166	155 (93)	92	70 (76)

Funding

Firm type	Number of firms	Firms receiving funding, number & percent	
		Public funding	Private funding
All	425	137 (32)	127 (30)
Academic	56	28 (50)	11 (20)
Big pharma	33	8 (24)	8 (24)
SGE	33	6 (18)	5 (15)
Hybrid	104	42 (40)	40 (40)
Other	211	58 (28)	67 (32)

Regional apprenticeships: The tortoise, the hare and the hybrid

- Success isn't consistently dominated by one apprenticeship type
- Big pharma firms—our hares—jump ahead in employment
 - Academics—our tortoises—catch up, as do hybrids
 - Others are very strong
- Academic and big pharma firms survive longer
- Funding is where hybrids shine
- SGE lags, but this is likely due to
 - High overlap with Other
 - Further distance from core bioscience activities



Firm founding years

Firm type	Firms		Firm establishment year	
	Number	Percent of total	Median	Mean (sd)
All	425	100%	2005	2004.3(5.2)
Academic	56	13%	2005	2004.7(5.1)
Big pharma	33	8%	2005	2003.2(6.1)
Hybrid	104	24%	2006	2005.5(4.7)
SGE	33	8%	2003	2003.2(5.3)
Other	211	50%	2005	2003.8(5.2)

Events

Firm type	Number of firms:	Merger or acquisition:	IPO:
		Number and percent	Number and percent
All	425	19 (5)	8 (2)
Academic	56	2 (4)	1 (2)
Big pharma	33	3 (9)	3 (9)
SGE	33	1 (3)	1 (3)
Hybrid	104	4 (4)	1 (1)
Other	211	10 (5)	2 (1)