ENTREPRENEURIAL START-UP SEQUENCES

An Analysis of the Activities and Characteristics that Lead to New Venture Creation

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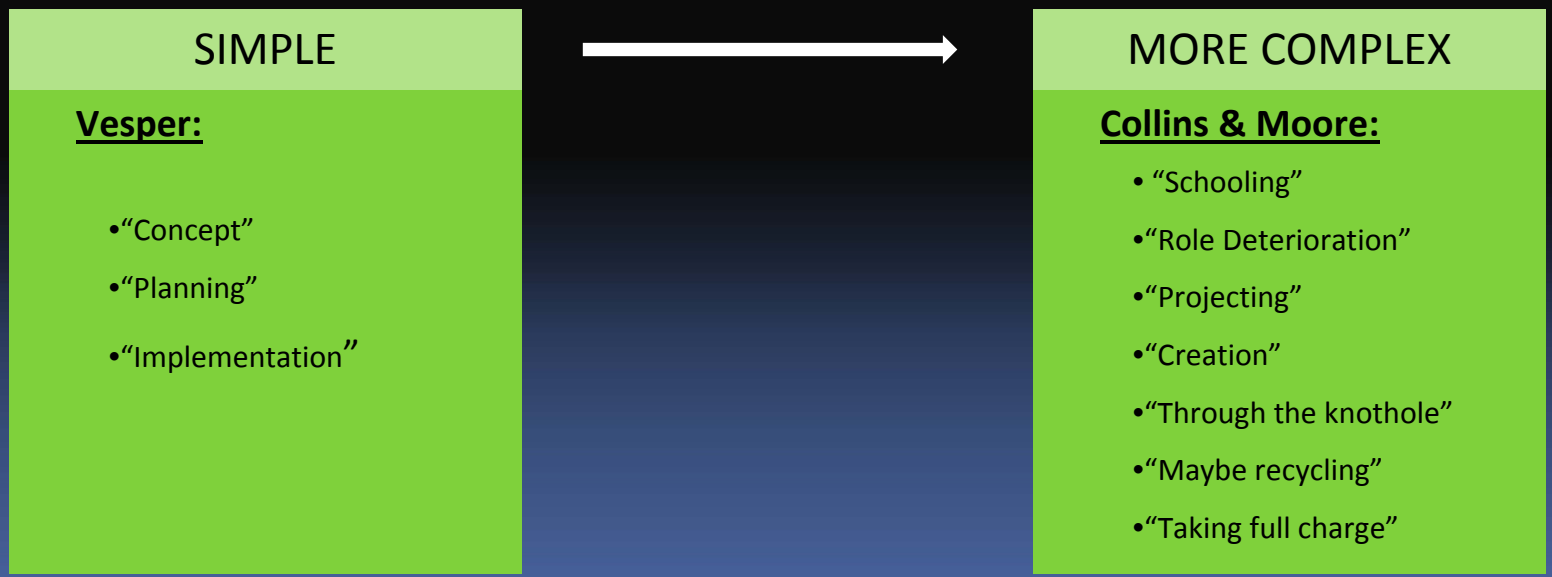
THE QUESTION

- Do “typical” start-up sequences exist?
- Existing literature
  - “Stages” to start up process



Collins, J. and Moore, D. (1970) *The Organization Makers*, Appleton-Century-Crofts, New York, 1970.
Vesper, K.H. (1990). *New Venture Strategies,* 2nd Edition. Englewood Cliffs, NJ: Prentice-Hall.

THE GOAL

- To undertake empirical research on the individual activities undertaken by entrepreneurs, focusing on the orientation of activities among the entire sequence of actions and the characteristics of the entrepreneurs pursuing new venture efforts.

THE DATA

Panel Study for Entrepreneurial Dynamics (PSED2)

- Sample size of 31,845
- 1214 Respondents
- 35 Activities
- 2 Rounds of Interviews
  - 2005
  - 12-24 Months Later

Number	Variable Name	Activity Description
1	AB9	DATE PHYSICAL SPACE FIRST USED
2	AC3	DATE LEGAL FORM REGISTERED
3	AC5	DATE LIABILITY INSURANCE PURCHASED
4	AD3	DATE STARTED PREPARING BUS PLAN
5	AD4	DATE 1ST VERSION OF PLAN COMPLETED
6	AD7	DATE DEVELOPING OF PRODUCT BEGAN
7	AD8	DATE PRODUCT COMPLETED FOR SALE
8	AD10	DATE PROMOTIONAL EFFORTS BEGAN
9	AD12	DATE PROP TECH FULLY DEVELOPED
10	AD14	DATE BEGAN PREPARE PATENT APP
11	AD15	DATE PATENT/COPYRIGHT GRANTED
12	AD17	DATE PURCHASES/LEASES BEGAN
13	AD19	DATE MAT/INV PURCHASES BEGAN
14	AD21	DATE CUST DISCUSSIONS BEGAN
15	AD23	DATE COLLECTING COMPET INFO BEGAN
16	AD25	DATE DEFINITION MARKET OPP BEGAN
17	AD27	DATE FINANCIAL PROJECTIONS BEGAN
18	AD29	DATE REG REQUIREMENTS DETERMINED
19	AE2	DATE FIRST SOUGHT OUTSIDE FUNDING
20	AE4	DATE FIRST OUTSIDE FUNDING BEGAN
21	AE6	DATE SUPPLIER CREDIT ESTABLISHED
22	AE8	DATE FIRST PERSON HIRED
23	AE12	DATE BANK ACCOUNT OPENED/1ST USED
24	AE14	DATE FIRST INCOME RECEIVED
25	AE16	DATE REVENUE 1ST EXCEED EXPENSES
26	AE19	DATE ACCOUNTANT RETAINED
27	AE21	DATE LAWYER RETAINED
28	AE23	DATE BECOME MEMBER TRADE ASSOC
29	AE25	DATE BUS 1ST GOT INTERNET/PHONE
30	AE27	DATE EIN APPLICATION SUBMITTED
31	AE29	DATE DBA FILED
32	AE31	DATE 1ST STATE UNEMP INS PAYMENT
33	AE33	DATE 1ST FICA PAYMENTS MADE
34	AE35	DATE FED INC TAX RETURN FILED
35	AE37	DATE 1ST LISTED W/DUN AND BRADST

THE DATA

- Initial rounds of cleaning
  - Combine Response Dates
  - Rank Activities within sequences
  - Randomly break "ties" between activities
    - Insert "pauses"
      - 1 Pause = "99"
  - Eliminate sequence length bias
    - Interview after first 10 events

IDENTIFYING PATTERNS

- Methods:
  1) Sequence Analysis

  2) Multidimensional Scaling

  3) Clustering Analysis

IDENTIFYING PATTERNS

- **SEQUENCE ANALYSIS** (Optimal Matching)

  Focuses on the correlation between sequences by measuring "distance" between them

- *Distance determined by making **changes** to one sequence in order to transform it into another.*
  - *Substitution*
  - *Insertion/Deletion (INDEL)*

Sequence 1	B	E	A	T	L	E	S
Sequence 2		S	T	O	N	E	S
Change	(Insert)	(Substitute)	(Substitute)	(Substitute)	(Substitute)		
	B	E	A	T	L	E	S
Cost	1	1	1	1	1	0	0
Total	5						

IDENTIFYING PATTERNS

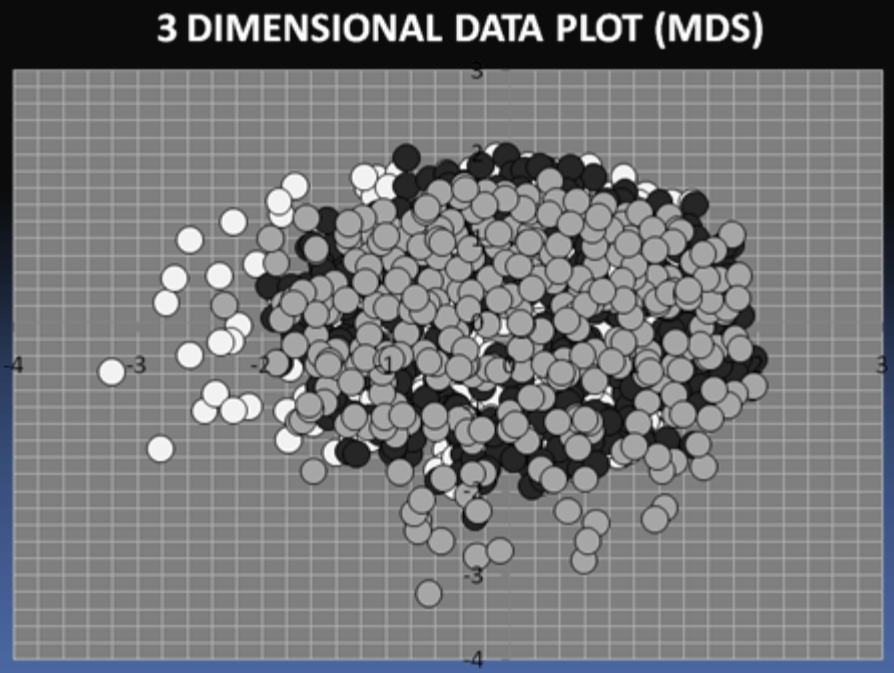
- **MULTIDIMENSIONAL SCALING (MDS)**

  "Set of mathematical techniques that enable a researcher to uncover a "hidden structure" within a set of data.

  - Use *Proximities* - a number which indicates how similar or how different two objects are or are perceived to be
  - Create Output – A spacial representation of points (distances) between each object

Figure 3.1. Dissimilarity Matrix (Portion)

CASEID	0	1	2	3	4	5	6	7	8
50014	1	.	.	.	.	.	.	.	.
50023	2	10.3	.	.	.	.	.	.	.
50029	3	11.8	10.3	.	.	.	.	.	.
50037	4	10.9	10.5	9.4	.	.	.	.	.
50039	5	11.8	11.5	10.7	11.7	.	.	.	.
50043	6	10.7	10.1	11	9.2	11.4	.	.	.
50049	7	10	11.5	11.4	11.1	12.3	11	.	.
50050	8	12.1	12.3	12	11.3	11	10.8	11	.
50052	9	11.7	10.7	11.7	11.6	11.6	11.7	10.7	11.9
50053	10	11.5	11.7	9.8	10.7	11.4	9.2	9.9	11.4
50054	11	10.8	10.7	11.2	12.2	11.4	13	12	12.5
50059	12	10.9	9.8	10.9	10.5	11.7	10.9	11.2	11.3
50060	13	12.8	10.9	10.5	10.1	10	10.6	10.5	11.5
50062	14	11	10.4	11.3	10.6	12.5	11.8	9.2	12
50068	15	12.5	11.6	10.8	11.3	10.8	11.6	10.4	11.4
50070	16	10.2	9.7	10.3	11.2	11.4	11.4	10.8	12.1
50084	17	12.2	12.6	12.1	12.2	11.9	12.3	12.7	11.2
50087	18	10.3	11.3	11	10.7	11.9	12.1	9.3	12.7

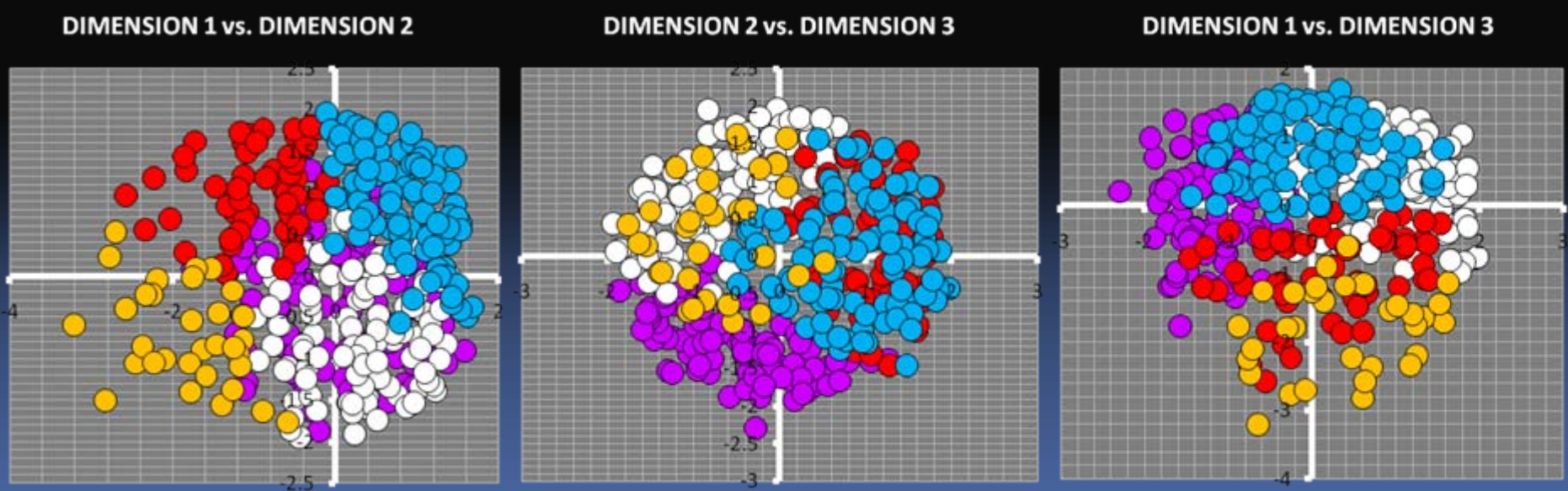


IDENTIFYING PATTERNS

- **CLUSTER ANALYSIS**

  "An exploratory data analysis tool which aims at sorting different objects into groups in a way that the degree of association between two objects is maximal if they belong to the same group and minimal otherwise."

  - ***Scree Test*** used to determine the optimal number of clusters



Statsoft, Inc. <http://statsoft.eu/uk/textbook/stcluan.html>

IDENTIFYING PATTERNS

- **<u>The Chosen Ones</u>:**
  - General Demographic Characteristics
  - Tangible Activities

Most Frequent Characteristics	
Sex	Male
Employed	Full-Time
Education	Some College
Marital	Married
Age	45-54
Income	$100,000 or more
Race	White/Caucasian
Most Frequent Activities	
DATE CUST DISCUSSIONS BEGAN	812
DATE PHYSICAL SPACE FIRST USED	734
DATE FIRST INCOME RECEIVED	598
DATE MAT/INV PURCHASES BEGAN	540
DATE PROMOTIONAL EFFORTS BEGAN	446
DATE BANK ACCOUNT OPENED/1ST USED	378
DATE PRODUCT COMPLETED FOR SALE	364
DATE EIN APPLICATION SUBMITTED	245
DATE ACCOUNTANT RETAINED	235
DATE FED INC TAX RETURN FILED	174
DATE FIRST SOUGHT OUTSIDE FUNDING	172
DATE LAWYER RETAINED	168
DATE DBA FILED	158
DATE 1ST FICA PAYMENTS MADE	127
DATE FIRST OUTSIDE FUNDING BEGAN	109
DATE FIRST PERSON HIRED	97
DATE PROP TECH FULLY DEVELOPED	72
DATE 1ST STATE UNEMP INS PAYMENT	59
DATE 1ST LISTED W/DUN AND BRADST	33
DATE PATENT/COPYRIGHT GRANTED	31
GESTATION MARKERS	

OBTAINING RESULTS

- **Correlations between clusters**
  - Dissimilarity Sums (Characteristics)
  - Frequency Distributions (Activities & Industries)

OBTAINING RESULTS

- **Success**
  - Defined by "Gestation Markers" (Reynolds & Miller)

1) Financial Support
"When the first outside financial support is obtained"

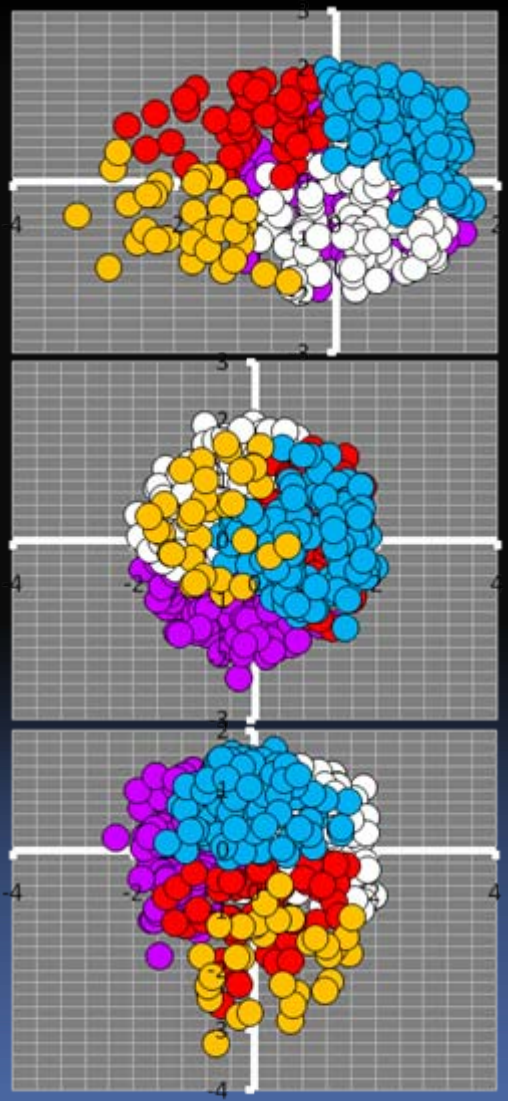
2) Sales
"When the first income (from sales) is received"

3) Hiring
"When the firm first hires anyone"

Frequency of Gestation Markers Among Clusters				
	FIRST OUTSIDE FUNDING	FIRST PERSON HIRED	FIRST INCOME RECEIVED	Total
Cluster 1	**14.00%**	6.00%	**56.00%**	76.00%
Cluster 2	7.27%	9.09%	45.45%	61.82%
Cluster 3	8.79%	9.89%	47.25%	65.93%
Cluster 4	6.06%	**12.12%**	45.45%	63.64%
Cluster 5	11.83%	11.83%	53.76%	77.42%

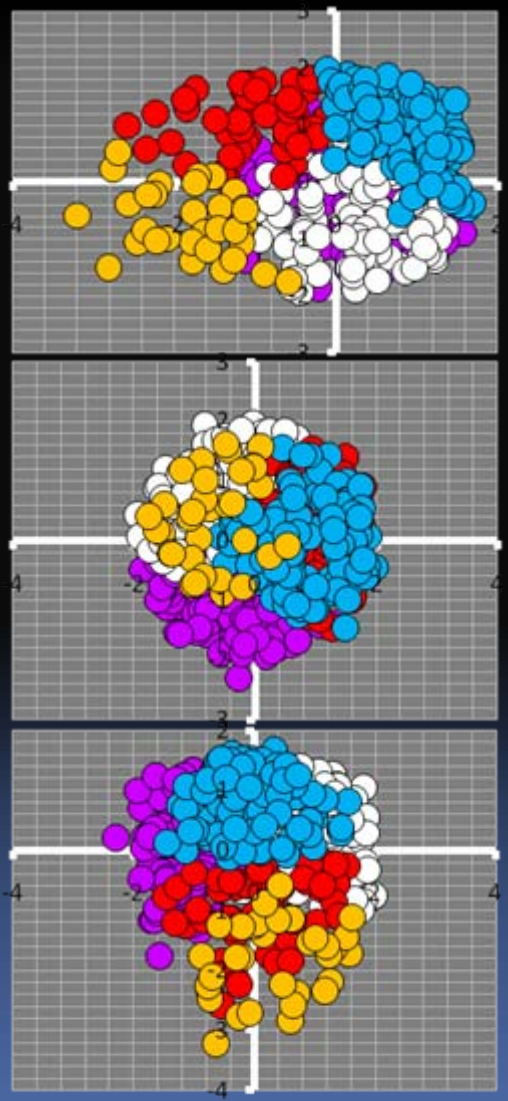
Reynolds, P.D. and B. Miller (1992). New firm gestation: Conception, birth, and implications for research. *Journal of Business Venturing,* 7((5), 405-418.

THE STORY: CLUSTER 1



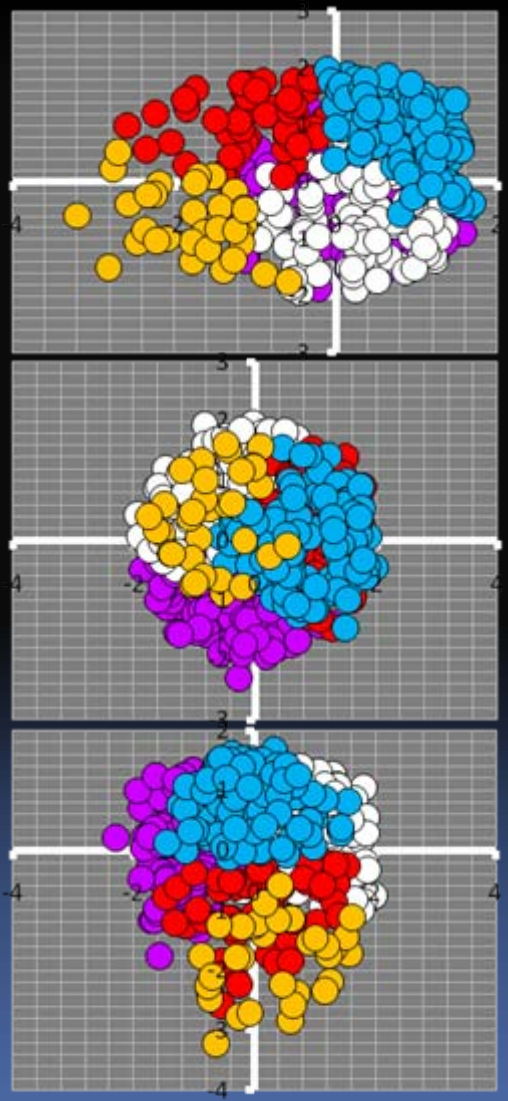
CLUSTER 1	
Sex	Female
Race	Black/African American
Employment	Full-Time
Education	High School-Bachelors
Marital Status	Living as married/Separated
Average Age	20-60
Income	Under $15,000
	$30,000-$34,999
	$50,000-$59,999
Primary Activities	**FIRST INCOME RECEIVED**
	MAT/INV PURCHASES BEGAN
	PROMOTIONAL EFFORTS BEGAN
	FED INC TAX RETURN FILED
	FIRST SOUGHT OUTSIDE FUNDING
	FIRST OUTSIDE FUNDING BEGAN
	PATENT/COPYRIGHT GRANTED
Primary Industries	Gift, novelty, and souvenir shops
	Administrative management and general management consulting services

THE STORY: CLUSTER 4



CLUSTER 4	
Sex	Male
Race	White/Caucasian
Employment	Retired & Unemployed
Education	Bachelors & Associates
Marital Status	Single
Average Age	18-44
Income	Under $15,000
	$70,000-$79,999 & $100,000 and up
Primary Activities	**FIRST PERSON HIRED**
Primary Industries	Custom computer programming services
	Offices of real estate agents and brokers
	Used merchandise stores
	Residential Remodelers
	Full-service Restaurants

THE STORY: CLUSTER 5



CLUSTER 5	
Sex	Male/Female
Race	White/Caucasian & Black/African American
Employment	Full-Time
Education	High School (moderate)
Marital Status	Divorced
Average Age	45-49
Income	$40,000 or more
	$40,000-$49,999
Primary Activities	ACCOUNTANT RETAINED
	LAWYER RETAINED
Primary Industries	All other specialty trade contractors
	Art dealers

RESULTS: Speed of Activity

- **SPEED OF ACTIVITY**
  - •Short Sequences
  - •Fast Sequences
  - • Average of 2.76 Activities/Year in "busiest years"
    - •*2005, 2004, 2003*

NUMBER OF GESTATION MARKERS PER YEAR					
Year	FIRST OUTSIDE FUNDING	FIRST PERSON HIRED	FIRST INCOME RECEIVED	Total	Total %
2006	2	2	16	20	2.49%
2005	69	60	352	481	59.83%
2004	18	21	111	150	18.66%
2003	9	9	50	68	8.46%
2002	5	2	26	33	4.10%
2001	0	0	8	8	1.00%
2000	2	0	6	8	1.00%
					95.52%

AVERAGE YEAR FOR GESTATION ACTIVITIES					
	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
FIRST OUTSIDE FUNDING	2004	2005	2005	2005	2002
FIRST PERSON HIRED	2004	2004	2005	2002	2004
FIRST INCOME RECEIVED	2004	2004	2004	2003	2004
Total	2004	2004	2005	2003	2003

Average Activities 2005-2001				
Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
1.83	1.85	1.75	1.38	1.92

Average Pauses Per Cluster				
Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
2.98	4.65	2.43	6.06	3.28

RESULTS: RECAP

- **Overall Goal:** To undertake empirical research on the individual activities undertaken by entrepreneurs, focusing on the orientation of activities among the entire sequence of actions and the characteristics of the entrepreneurs pursuing new venture efforts.
    - Study patterns.

- **Overall Results:**
  - Start-Up Sequences are messy.
  - No distinct "blue print" to entrepreneurial activities/success
  - Not Entirely Random
    - Three distinct "stories"
      - *Cluster 1, Cluster 4, and Cluster 5*

FURTHER RESEARCH

- Just the beginning.
- Further considerations should include:
  - PSED
    - Different lengths of sequences
    - Using different definitions of "success"/failure
  - Other Factors
    - Ex. *Specifics on income made over time of sequence from venture, context in which venture is being pursued, the importance of sequence length, etc*.
- Lots of possibilities to explore from other angles.

PRACTICAL CONCLUSIONS

- Context is a factor.

- Intrinsic characteristics
  - The length of a sequence = secret ingredient

- No obvious blue prints or patterns, within the efforts of entrepreneurs, that obviously lead to new venture creation.