
Business Agility: Does the Size Really Matter?

Xavier Bronlet

Lecturer “Organization & Leadership” SUPSI MSc Innovation Management,
University of Applied Sciences and Arts of Southern Switzerland

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Abstract

The context in which organizations are operating is more and more volatile, uncertain, complex, and ambiguous and the Business Agility helps to keep operating in an always more demanding environment, turning constraints such as environmental, social and governance into opportunity. Since 2018, the Business Agility Institute collects data worldwide with a questionnaire based on self-authored model to measure the state of the art on Business Agility across the globe. The model appears to be valid based on a Confirmatory Factor Analysis based on a thousand of observations gathered by the Institute over the last 3 years (Bronlet, 2022). It's therefore interesting to go one step further and explore how a factor like the size of the organization may influence the ability of an organization to adapt swiftly. This paper explores the relationships between the organization size based on headcount and the Business Agility. The methods used for the research are based on analysis of variance (One-way ANOVA) and confirmatory factor analysis for the estimation of the constructs. All the indicators suggest that the size of the organization has a significant influence on the relative Business Agility and the analysis suggests a clear cut between the groups formed by less than 200 staff members and the others formed with more than 200. In essence, the smaller organizations experience, on average, 10% higher Business Agility compare to their larger peers. This paper may therefore contribute to the body of knowledge around the Business Agility and the future of work. It may reinforce ideas of smaller units working in autonomy such as the Autonomous Production Unit or create connections with the studies performed by Dunbar who establish the so call Dunbar's number, 150.

Keywords: Business Agility, Organizational development, Confirmatory Factor Analysis, Structural Equation Modeling, ANOVA, Future of Work.

1. Introduction

The question regarding the relationship between the number of persons in a group and its global performance is not new. It has been already explored by anthropologists and other social scientists. Dunbar's number is the notion that there exists a cognitive limit on human groups of about 150 individuals (Dunbar, 1992). Researchers have disputed the empirical observation of mean human group sizes with other figures by analyzing the phenomenon from a different perspective (Mac Carron, Kaski, & Dunbar, 2016). Other scientists found evidence that speak for groups with a mean of 290 and median of 231 persons by performing field studies using different methods in various populations (McCarty, Killworth, Bernard, Johnsen, & Shelley, 2000).

If the Dunbar's number is defined as cognitive limit with whom one can maintain stable social relationships by knowing enough of the other members of the group, and the Bernard–Kill worth is an estimate through field observations on social network on how many persons the respondents to their enquiries know, it may be interesting to explore the question of the optimal organization size from a different perspective. This study explores the influence of the organization's size on measured Business Agility under the assumption that the higher the Business Agility is, the better the global performance.

Business Agility has been identified as critical to the survival of organizations in turbulent environments characterized by rapid shifts in technologies, customer preferences and competitive landscape (Juneja, Kothari, & Rai, 2018). There are numerous definitions of agility since the subject has been discussed in the literature and there seems to be no single universally accepted definition (Gallager & Worell, 2007). Business Agility has been defined as the set of business initiatives that a company can readily implement with a pre-determined competencies with managed cost and risk (Westerman, Weill, & McDonald, 2006) or as the ability to swiftly change businesses and business processes beyond the normal level of flexibility to effectively manage highly uncertain and unexpected but potentially consequential internal or external events based on the capabilities to sense, respond and learn (Oosterhout, 2010). The concept of Business Agility is now also encompassing sustainability challenges to looks for the greater good of all the involved parties (Ghosh & Barman, 2021).

It may therefore be interesting to study further evidence of the optimal group size through the lenses of the perceived Business Agility reported by the employees leveraging on the observations gathered during the survey campaigns performed by the Business Agility Institute. With the intent of providing a neutral benchmark and state of the art of the Business Agility around the world, the Business Agility Institute is measuring the Business Agility Maturity through a yearly survey since 2018 and publish a yearly report. The model established by the Business Agility Institute fits the 1017 observations gathered during the last 3 years confirming the validity of the model (Bronlet, 2022).

2. The Business Agility Institute's model

The Business Agility Institute is an independent research and advocacy organization who wants to drive industry change through applied research, pragmatic guidance and building networks of individuals and organizations. In that very context and to support its mission, the Institute has elaborated this model with the intent to provide structure in the field through a common referential.

The model has been validated in a previous research done by the author with a Confirmatory Factor Analysis (Bronlet, 2022).

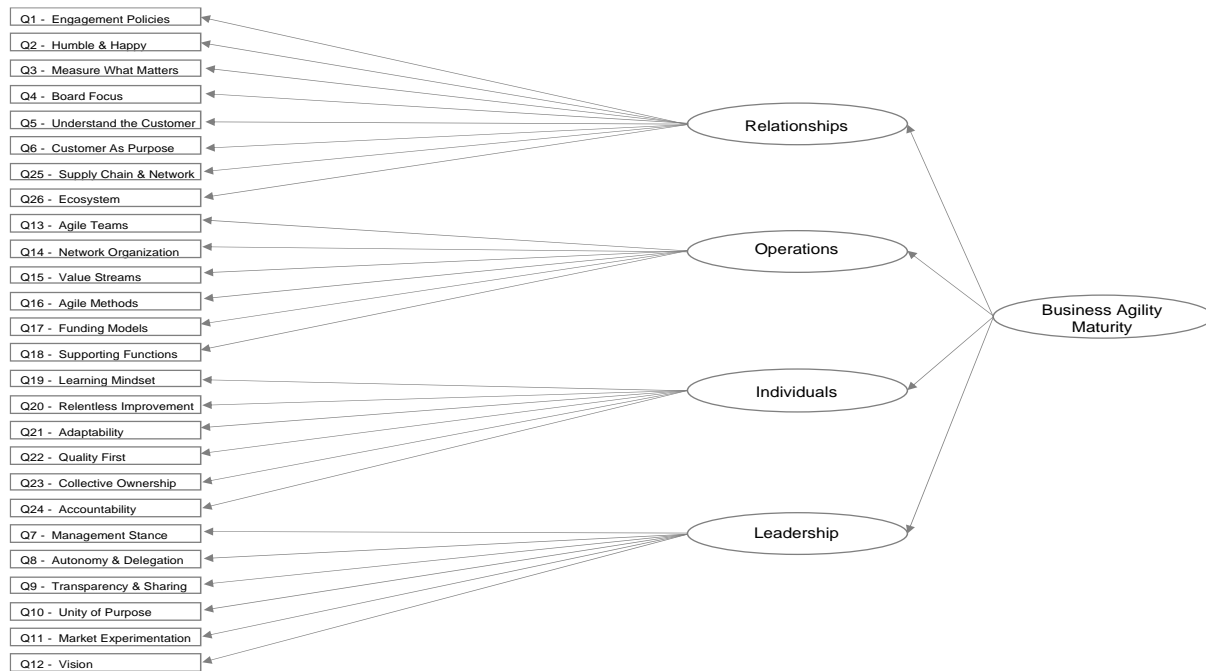


Figure 1: Business Agility Institute’s model under the lenses of Structured Equation Modelling

2.1 The 4 dimensions of the BAI model:

Relationships: is made of Customers, Board of Directors, Workforce and External partner domains.

Operations: is made of Structural Agility, Process Agility and Enterprise Agility.

Individuals: is made of Growth Mindset, Craft Excellence and Ownership & Accountability.

Leadership: is made of People Management, One Team and Strategic Agility.

3. Research question

Smaller organizations may appear to be more agile, but is it so under the lenses of the Business Agility model measurement? In essence, this paper explores the relationships between the organization size (headcount based) and the perceived Business Agility and search for possible frontiers and characteristics of the significant clusters.

4. Methodology

The applied research based on explanatory methods summarized in this paper aimed to analyze the influence that the organization size, measured through its headcounts, may have on perceived Business Agility. The research is based on observations gathered by the Business Agility Institute for the years 2019, 2020 and 2021 during their yearly Business Agility worldwide survey that involve respondents around the globe. Voluntary sampling method has therefore been used to initially collect the observation. During the preparation of the data, the missing observations have been substituted using a series mean approach. Over a total of 28’704 values, 712 were missing and have been therefore replaced. All the observations have been controlled for normal distribution as prerequisite for CFA with a positive outcome. To check for the

presence of multivariate outliers, a comparison of the respective Mahalanobis Distances to a chi-square distribution with the same degrees of freedom has been carried forward leading to the exclusion of 87 observations resulting as multivariate outliers.

To estimate the latent variables (Relationships, Operation, Individuals, Leadership and Business Agility) to be injected into the comparison of means (one-way ANOVA, independent sample t-test), the outcome resulting from the Confirmatory Factor Analysis performed in a previous study has been used (Bronlet, 2022), to generate 5 additional computed fields in the dataset for the Relationships, the Operations, the Individuals, the Leadership and the Business Agility. The data preparation process and the difference in means analysis has been performed in SPSS version 28.0.1.1 (14) and the CFA data calculation in R using Lavaan package 0.6 – 11.

5. Observations used in the research

The observations have been gathered with a questionnaire that collects the perceptions of the respondents on the maturity achieved by their respective organization. Further to the questions reported below, a description of the maturity levels is provided for each of the items to enforce consistency of the observations.

Table 1: questionnaire used to collect maturity observations

Id	Questions
Q1	How would you rate your organization's Engagement Policies maturity?
Q2	How would you rate your organization's Humble & Happy maturity?
Q3	How would you rate your organization's Measure What Matters maturity?
Q4	How would you rate your organization's Board Focus maturity?
Q5	How would you rate your organization's Understand the Customer maturity?
Q6	How would you rate your organization's Customer As Purpose maturity?
Q7	How would you rate your organization's Management Stance maturity?
Q8	How would you rate your organization's Autonomy & Delegation maturity?
Q9	How would you rate your organization's Transparency & Sharing maturity?
Q10	How would you rate your organization's Unity of Purpose maturity?
Q11	How would you rate your organization's Market Experimentation maturity?
Q12	How would you rate your organization's Vision maturity?
Q13	How would you rate your organization's Agile Teams maturity?
Q14	How would you rate your organization's Network Organization maturity?
Q15	How would you rate your organization's Value Streams maturity?
Q16	How would you rate your organization's Agile Methods maturity?
Q17	How would you rate your organization's Funding Models maturity?
Q18	How would you rate your organization's Supporting Functions maturity?
Q19	How would you rate your organization's Learning Mindset maturity?
Q20	How would you rate your organization's Relentless Improvement maturity?
Q21	How would you rate your organization's Adaptability maturity?
Q22	How would you rate your organization's Quality First maturity?
Q23	How would you rate your organization's Collective Ownership maturity?
Q24	How would you rate your organization's Accountability maturity?
Q25	How would you rate your organization's Supply Chain & Network maturity?
Q26	How would you rate your organization's Ecosystem maturity?

5.1 Demographics of the observations

Out of 1104 observations coming from the global assessment survey from 2019, 2020 and 2021, 1'017 have been used to perform the analysis and correspond to the following demographics:

Table 2: distribution of observations by survey's year

Year	Frequency	Percent
2019	345	33.9
2020	402	39.5
2021	270	26.5
Total	1017	100.0

Table 3: distribution of observations respondents' sectors

Sectors	Frequency	Percent
Aerospace	9	0.9
Agriculture	6	0.6
Chemical & Pharma	6	0.6
Computer	22	2.2
Construction	12	1.2
Consulting	261	25.7
Defense	3	0.3
Education	25	2.5
Energy	35	3.4
Entertainment	13	1.3
Fin. services & Insurance	171	16.8
Food	11	1.1
Government	6	0.6
Health care	33	3.2
Hospitality	4	0.4
Information Technology	161	15.8
Internet & Publishing	9	0.9
Manufact.& Automot.	41	4.0
Mass Media	5	0.5
Mining	5	0.5
NFP & Association	7	0.7
Other	67	6.6
Retail	8	0.8
Software Vendor	41	4.0
Telecommunications	36	3.5
Transport	16	1.6
Water	4	0.4
Total	1017	100.0

Table 4: distribution of observations by respondents' regions

Regions	Frequency	Percent
Africa	31	3.0
Asia	127	12.5
Central America	11	1.1
Eastern Europe	41	4.0
Europe	173	17.0
Middle East	17	1.7
North America	178	17.5
Oceania	92	9.0
South America	85	8.4
The Caribbean	1	0.1
Worldwide	261	25.7
Total	1017	100.0

Table 5: distribution of observations by respondents' company size

Company Size	Frequency	Percent
0 - 10 employees	119	11.7
11 - 50 employees	95	9.3
51 - 200 employees	120	11.8
201 – 1'000 employees	130	12.8
1'001 – 5'000 employees	184	18.1
5'001 – 10'000 employees	62	6.1
10'001+ employees	307	30.2
Total	1017	100.0

Table 6: distribution of observations by respondents' roles

Roles	Frequency	Percent
C-Level	141	10.4
Individual Contributor	192	14.2
LOB/Division Leader	88	6.6
Manager	264	18.2
Senior Executive	135	9.4
Supplier/Partner/Consultant	197	14.7
Total	1017	100.0

5.2 Descriptive statistics

The descriptive statistics for the observations are the following (to be noticed that latent variables are calculated using the Confirmatory Factor Analysis model through `lavPredict()` function in R):

Table 7: Descriptive statistics of the items and latent variables

Variables	N	Min	Max	Mean	Std. Dev.
Q1	1017	0.00	10.00	4.5873	2.1275
Q2	1017	0.00	10.00	4.5986	2.4020
Q3	1017	0.00	10.00	4.5460	2.2175
Q4	1017	0.00	10.00	5.1620	2.5153
Q5	1017	0.00	10.00	5.4326	2.3313
Q6	1017	0.00	10.00	4.9695	2.2686
Q7	1017	0.00	10.00	4.4115	2.4349
Q8	1017	0.00	10.00	4.9115	2.2925
Q9	1017	0.00	10.00	4.6352	2.2615
Q10	1017	0.00	10.00	4.8348	2.3343
Q11	1017	0.00	10.00	4.7630	2.4256
Q12	1017	0.00	10.00	4.9223	2.1829
Q13	1017	0.00	10.00	4.6618	2.2848
Q14	1017	0.00	10.00	4.7974	2.2819
Q15	1017	0.00	10.00	4.7837	2.2195
Q16	1017	0.00	10.00	4.6087	2.2259
Q17	1017	0.00	10.00	4.4594	2.2280
Q18	1017	0.00	10.00	4.4946	2.2737
Q19	1017	0.00	10.00	4.3043	2.4076
Q20	1017	0.00	10.00	4.4363	2.3365
Q21	1017	0.00	10.00	4.6561	2.4286
Q22	1017	0.00	10.00	4.5627	2.3895
Q23	1017	0.00	10.00	4.6118	2.1830
Q24	1017	0.00	10.00	4.6050	2.3755
Q25	1017	0.00	10.00	4.4892	2.2842
Q26	1017	0.00	10.00	4.8938	2.1331
Relationships	1017	-4.20	4.89	0.0000	1.7903
Operations	1017	-4.37	4.76	0.0000	1.8246
Individuals	1017	-4.79	5.47	0.0000	2.0909
Leadership	1017	-4.21	4.68	0.0000	1.7540
Business Agility	1017	-4.14	4.59	0.0000	1.7454
Valid N (listwise)	1017				

5.3 Normal distribution analysis

The P-P Plot analysis performed in SPSS confirmed the normal distribution of the answers provided by the respondents for the 26 items with a linear regression of the dots $y=x$.

A Skewness and Kurtosis analysis has also been carried forward with the following results:

Table 8: Skewness and Kurtosis analysis for the 26 observations

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Skewness	0.25	0.29	0.25	0.00	-0.21	0.26	0.37	0.06	0.44	0.23	0.31	0.26	0.33
Std. Err of Skewness	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Kurtosis	-0.48	-0.87	-0.68	-0.73	-0.90	-0.56	-0.52	-0.66	-0.43	-0.68	-0.79	-0.43	-0.59
Std. Err of Kurtosis	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26
Skewness	0.35	0.19	0.41	0.33	0.49	0.44	0.44	0.46	0.41	0.31	0.29	0.29	0.10
Std. Err of Skewness	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Kurtosis	-0.57	-0.59	-0.48	-0.56	-0.36	-0.55	-0.48	-0.70	-0.66	-0.50	-0.71	-0.49	-0.41
Std. Err of Kurtosis	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15

The values for asymmetry and kurtosis between -2 and +2 are considered acceptable in order to prove normal univariate distribution (George & Mallery, 2010). Data is normal if skewness is between -2 to +2(Hair, Black, Babin, & Anderson, 2010).

5.4 Impact of organization size on the constructs of Business Agility

5.4.1 Descriptive statistics

Table 9: Group descriptive statistics

Company Size	N	Relationships (R)		Operations (O)		Individuals (I)		Leadership (L)		Business Agility (BA)	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1 to 10 staff	119	5.826	2.067	5.832	2.193	6.013	2.487	5.831	2.059	5.823	2.069
11 to 50 staff	95	5.725	2.063	5.785	2.158	5.905	2.443	5.744	2.062	5.747	2.050
51 to 200 staff	120	5.443	1.810	5.468	1.803	5.590	2.048	5.472	1.712	5.465	1.723
201 to 1000 staff	130	4.777	1.625	4.734	1.563	4.746	1.803	4.805	1.560	4.774	1.524
1001 to 5000 staff	184	4.492	1.526	4.452	1.555	4.307	1.761	4.483	1.467	4.465	1.474
5001 to 10000 staff	62	4.643	1.552	4.673	1.566	4.576	1.795	4.611	1.497	4.652	1.497
Above 10000 staff	307	4.753	1.630	4.758	1.643	4.705	1.889	4.734	1.603	4.754	1.579
Total	1017	5.000	1.790	5.000	1.825	5.000	2.091	5.000	1.754	5.000	1.745

The graphical analysis suggests that the small companies up to 200 employees are more above the mean for all the constructs while the organizations of a larger size are below the mean.

Especially, the organization in the bucket of 1001-5000 employees who exposes a larger deficit.

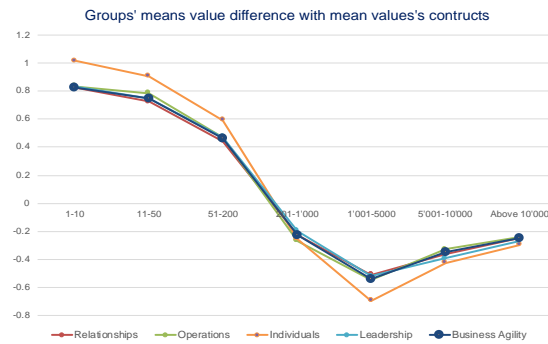


Figure 2: groups mean comparisons

5.4.2 One-way ANOVA analysis on latent variables

Table 10: F Statistic of the constructs

		Sum of Squares	df	Mean Square	F	Sig.
Relationships	Between Gr.	235.215	6	39.202	13.105	0.000
	Within Groups	3021.290	1010	2.991		
	Total	3256.505	1016			
Operations	Between Gr.	256.348	6	42.725	13.804	0.000
	Within Groups	3125.945	1010	3.095		
	Total	3382.293	1016			
Individuals	Between Gr.	376.632	6	62.772	15.596	0.000
	Within Groups	4065.214	1010	4.025		
	Total	4441.847	1016			
Leadership	Between Gr.	246.626	6	41.104	14.419	0.000
	Within Groups	2879.148	1010	2.851		
	Total	3125.774	1016			
Business Agility	Between Gr.	244.767	6	40.794	14.454	0.000
	Within Groups	2850.564	1010	2.822		
	Total	3095.330	1016			

F values and their respective p-value (Sig.) illustrate that there is a statistically significant difference between the means of the different companies' size for all our constructs.

5.4.3 Post hoc test multiple comparison

A Bonferroni multiple comparison has been carried forward to analyze the statistically significant differences amongst the groups. The results of this analysis suggest that there are no consistent and significant differences amongst all the groups but a significant difference between two sets of groups: the ones with less than 200 staff members and the others.

Table 11: Bonferroni post hoc test for multiple comparison
 Values in red are not significant as per associated p-value > 0.05

(I) Compan y Size	(J) Company Size	Relationships		Operations		Individuals		Leadership		Business Agility	
		Mean		Mean		Mean		Mean		Mean	
		dif. (I-J)	Sig.	dif. (I-J)	Sig.	dif. (I-J)	Sig.	dif. (I-J)	Sig.	dif. (I-J)	Sig.
1 to 10 staff	11 to 50 staff	0.101	1.000	0.047	1.000	0.108	1.000	0.087	1.000	0.076	1.000
	51 to 200 staff	0.382	1.000	0.364	1.000	0.423	1.000	0.359	1.000	0.359	1.000
	201 to 1000 staff	1.048	0.000	1.098	0.000	1.267	0.000	1.026	0.000	1.049	0.000
	1001 to 5000 staff	1.334	0.000	1.380	0.000	1.706	0.000	1.348	0.000	1.358	0.000
	5001 to 10000 staff	1.183	0.000	1.160	0.001	1.437	0.000	1.220	0.000	1.171	0.000
	Over 10000 staff	1.073	0.000	1.074	0.000	1.309	0.000	1.096	0.000	1.069	0.000
11 to 50 staff	1 to 10 staff	-0.101	1.000	-0.047	1.000	-0.108	1.000	-0.087	1.000	-0.076	1.000
	51 to 200 staff	0.281	1.000	0.317	1.000	0.315	1.000	0.272	1.000	0.282	1.000
	201 to 1000 staff	0.947	0.001	1.051	0.000	1.159	0.000	0.939	0.001	0.973	0.000
	1001 to 5000 staff	1.233	0.000	1.333	0.000	1.599	0.000	1.261	0.000	1.282	0.000
	5001 to 10000 staff	1.082	0.003	1.112	0.002	1.330	0.001	1.133	0.001	1.095	0.001
51 to 200 staff	Over 10000 staff	0.972	0.000	1.027	0.000	1.201	0.000	1.009	0.000	0.993	0.000
	1 to 10 staff	-0.382	1.000	-0.364	1.000	-0.423	1.000	-0.359	1.000	-0.359	1.000
	11 to 50 staff	-0.281	1.000	-0.317	1.000	-0.315	1.000	-0.272	1.000	-0.282	1.000
	201 to 1000 staff	0.666	0.051	0.734	0.021	0.844	0.019	0.667	0.039	0.690	0.025
	1001 to 5000 staff	0.951	0.000	1.016	0.000	1.284	0.000	0.989	0.000	0.999	0.000
	5001 to 10000 staff	0.801	0.066	0.796	0.082	1.015	0.026	0.861	0.024	0.813	0.043
201 to 1000 staff	Over 10000 staff	0.690	0.005	0.710	0.004	0.886	0.001	0.737	0.001	0.710	0.002
	1 to 10 staff	-1.048	0.000	-1.098	0.000	-1.267	0.000	-1.026	0.000	-1.049	0.000
	11 to 50 staff	-0.947	0.001	-1.051	0.000	-1.159	0.000	-0.939	0.001	-0.973	0.000
	51 to 200 staff	-0.666	0.051	-0.734	0.021	-0.844	0.019	-0.667	0.039	-0.690	0.025
	1001 to 5000 staff	0.285	1.000	0.282	1.000	0.439	1.000	0.322	1.000	0.309	1.000
	5001 to 10000 staff	0.135	1.000	0.061	1.000	0.170	1.000	0.194	1.000	0.123	1.000
1001 to 5000 staff	Over 10000 staff	0.024	1.000	-0.024	1.000	0.042	1.000	0.070	1.000	0.020	1.000
	1 to 10 staff	-1.334	0.000	-1.380	0.000	-1.706	0.000	-1.348	0.000	-1.358	0.000
	11 to 50 staff	-1.233	0.000	-1.333	0.000	-1.599	0.000	-1.261	0.000	-1.282	0.000
	51 to 200 staff	-0.951	0.000	-1.016	0.000	-1.284	0.000	-0.989	0.000	-0.999	0.000
	201 to 1000 staff	-0.285	1.000	-0.282	1.000	-0.439	1.000	-0.322	1.000	-0.309	1.000
	5001 to 10000 staff	-0.151	1.000	-0.221	1.000	-0.269	1.000	-0.128	1.000	-0.187	1.000
5001 to 10000 staff	Over 10000 staff	-0.261	1.000	-0.306	1.000	-0.398	0.708	-0.252	1.000	-0.289	1.000
	1 to 10 staff	-1.183	0.000	-1.160	0.001	-1.437	0.000	-1.220	0.000	-1.171	0.000
	11 to 50 staff	-1.082	0.003	-1.112	0.002	-1.330	0.001	-1.133	0.001	-1.095	0.001
	51 to 200 staff	-0.801	0.066	-0.796	0.082	-1.015	0.026	-0.861	0.024	-0.813	0.043
	201 to 1000 staff	-0.135	1.000	-0.061	1.000	-0.170	1.000	-0.194	1.000	-0.123	1.000
	1001 to 5000 staff	0.151	1.000	0.221	1.000	0.269	1.000	0.128	1.000	0.187	1.000

Over 10000 staff	Over 10000 staff	-0.110	1.000	-0.086	1.000	-0.129	1.000	-0.124	1.000	-0.103	1.000
	1 to 10 staff	-1.073	0.000	-1.074	0.000	-1.309	0.000	-1.096	0.000	-1.069	0.000
	11 to 50 staff	-0.972	0.000	-1.027	0.000	-1.201	0.000	-1.009	0.000	-0.993	0.000
	51 to 200 staff	-0.690	0.005	-0.710	0.004	-0.886	0.001	-0.737	0.001	-0.710	0.002
	201 to 1000 staff	-0.024	1.000	0.024	1.000	-0.042	1.000	-0.070	1.000	-0.020	1.000
	1001 to 5000 staff	0.261	1.000	0.306	1.000	0.398	0.708	0.252	1.000	0.289	1.000
	5001 to 10000 staff	0.110	1.000	0.086	1.000	0.129	1.000	0.124	1.000	0.103	1.000

The results provided by the multiple comparison that show a statistically significant difference between the groups with less than 200 staff members and the other invite for a comparison between those two sets of groups. Furthermore, the Bonferroni multiple comparison shows us the differences exposed in the figure 2 for the last 3 buckets are not statistically significant when we compare those 3 groups together.

5.4.4 Comparison between small (less than 200) and large (more than 200) companies

After the reclassification of the observations, we compare the distribution of the constructs for each group with the global distribution and observe the influence of the sample size of the smaller companies (n=334) and the larger one (n=683).

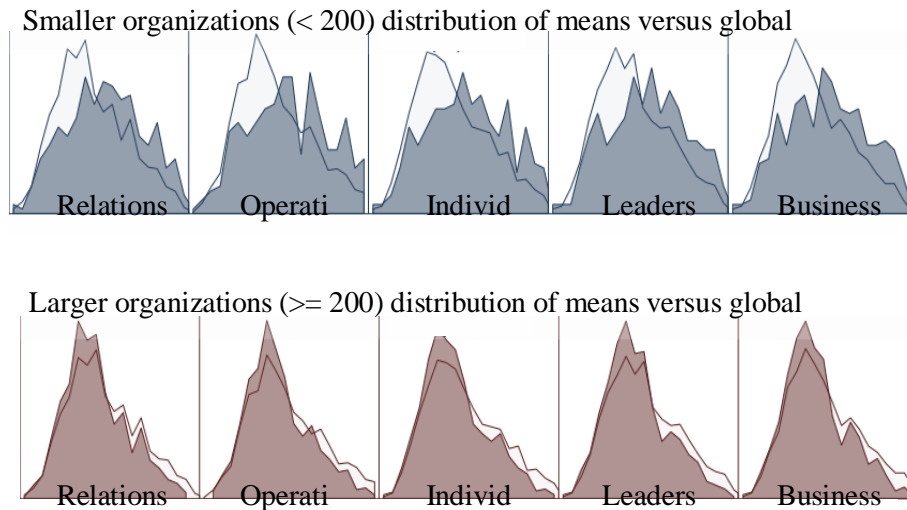


Figure 3: Relation between size distance and difference with the means

The group statistics suggest a difference of 18% between the means of Business Agility in favor of the smallest companies, 17% for Relationships, 18% for Operations, 21% for Individuals and 18% for Leadership.

Table 12: Group statistics for small and large companies

Latent variables	Company Size	N	Mean	Std. Deviation	Std. Error Mean	Delta
Relationships	< = 200	334	5.660	1.978	0.108	17%
	> 200	683	4.677	1.596	0.061	
Operations	< = 200	334	5.688	2.051	0.112	18%
	> 200	683	4.663	1.600	0.061	
Individuals	< = 200	334	5.831	2.326	0.127	21%
	> 200	683	4.594	1.835	0.070	
Leaderships	< = 200	334	5.677	1.943	0.106	18%
	> 200	683	4.669	1.551	0.059	
Business Agility	< = 200	334	5.673	1.947	0.107	18%
	> 200	683	4.671	1.536	0.059	

The independent samples t-test associated with the two groups comparison confirm the statistically significant differences between the groups.

Table 13: Independent sample T test with Levene’s test and T test for equality of means (* Equal variance not assumed, ** Equal variance assumed)

		t-test for Equality of Means									
		Levene's Test for Equality of Variances				Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean diff.	Std. err.diff.	Lower	Upper
Relationships	Eva**	28.676	0.000	8.501	1015	0.000	0.000	0.982	0.116	0.756	1.209
	Evna*			7.904	551.360	0.000	0.000	0.982	0.124	0.738	1.226
Operations	Eva**	37.650	0.000	8.716	1015	0.000	0.000	1.025	0.118	0.794	1.255
	Evna*			8.015	537.315	0.000	0.000	1.025	0.128	0.774	1.276
Individuals	Eva**	35.102	0.000	9.220	1015	0.000	0.000	1.237	0.134	0.974	1.500
	Evna*			8.511	542.219	0.000	0.000	1.237	0.145	0.952	1.523
Leadership	Eva**	32.083	0.000	8.937	1015	0.000	0.000	1.008	0.113	0.787	1.230
	Evna*			8.282	546.997	0.000	0.000	1.008	0.122	0.769	1.247
Business Agility	Eva**	34.839	0.000	8.920	1015	0.000	0.000	1.002	0.112	0.781	1.222
	Evna*			8.233	541.997	0.000	0.000	1.002	0.122	0.763	1.241

As the p-values (Sig.) of all Levene's tests are neglect able, the null hypothesis of Levene's tests must be rejected for all the latent variables and we can therefore consider the EVNA values for the t-test for equality of means. The significant p-values for the 5 constructs favor the rejection of the null hypothesis of Equality of Means test and conclude that the means values for all the 5 constructs are significantly different for smaller and larger companies. The absence of 0 within the confidence intervals confirms the above conclusion.

5.4.5 Impact of organization size on the single items

We know now that there is a significant difference in the means of the constructs for the companies below and above 200 headcounts. It may therefore also be interesting to analyze if the

means of all the items respond the same logic or, if for some of them, there is a significant difference between the original size buckets.

An analysis on all the items has been carried forward to explore the differences between the companies. The Bonferroni post hoc test provides 408 significant differences in means values out of the 1092 possible combinations (26 items x 7 company size to be compared with 6 other company size). In the list of the 408 significant differences in means values exposing a p-value smaller than 0.05, the greater mean values belong consistently to the smaller companies.

The items Q4 (Board Focus maturity) and Q5 (Customer maturity) are not statistically significant for all groups combination.

The correlation between the bucket size's distance between companies obtained as the difference between their respective bucket number and the difference in means values is equal to 0.92.

Positive distance (smaller company's size compared to a larger one) is always associated with a positive difference in the means value and negative distance (larger company compared to smaller one) is always associated with a negative difference in means.

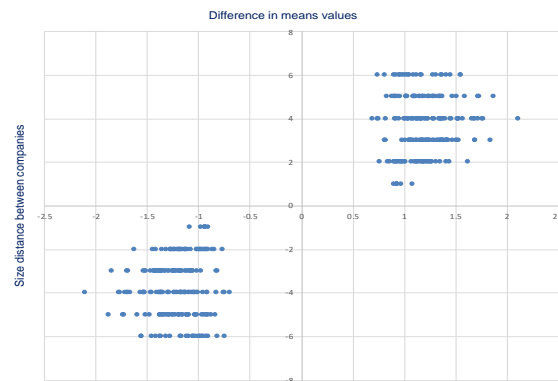


Figure4: Relation between size distance and difference with the means

The 156 comparisons of the smaller buckets up to 200 headcounts (3 groups x 26 items x 2 other groups) do not provide any significant difference in groups and, similarly and, the 312 comparisons of the larger buckets over 200 headcounts (4 groups x 26 items x 3 other groups) do not provide as well any significant difference in groups.

6. Discussion

The research provides significant evidence on how the organization's size influence the perceived Business Agility measured through the lenses of the Business Agility Institute model defining the tipping point at 200 headcounts.

The number of 200 may be considered as arbitrary and inherited from the size of the bucket defined a priori to classify the observations and another approach using thinner bucket or based on real number of headcounts would have potentially help to increase the measurement precision

around the tipping point. It’s fair to search for possible confounding factors that may influence the results of the preceding analysis and the influence of the sector, and the role of the respondent have been analyzed with a sample t-test and compare the difference in means between small and large companies by groups of potential confounding factors such as the sector in which the company is operating or the role of respondent.

6.1 Is the Sector a confounding factor?

The multiple comparison of the one-way ANOVA analysis did not confirm significant difference between the sectorial groups while the sample t-test to compare the means between the respective groups for the small and large companies provide the following results.

Table 14: Independent sample T test for equality of means summary for sector analysis

Sector	< 200		≥200		Delta	Sample t-Test
	BA mean	n	BA mean	n		
Aerospace	4.774	4	4.429	5	0.072	Not significant
Agriculture	4.318	3	3.840	3	0.111	Not significant
Chemical & Pharmaceutical	3.479	2	4.555	4	-0.309	Not significant
Computer	5.598	13	4.468	9	0.202	Not significant
Construction	5.347	5	4.505	7	0.157	Not significant
Consulting	5.905	154	5.218	107	0.116	Significant
Defense	5.413	14	5.032	3	0.070	Not significant
Education	9.327	1	4.569	11	0.510	Not significant
Energy	NA	NA	4.260	34	NA	
Entertainment	3.977	1	4.948	12	-0.244	Not significant
Financial services & Insurance	5.377	13	4.389	158	0.184	Significant
Food	4.457	2	4.572	9	-0.026	Not significant
Government	5.155	2	4.044	4	0.216	Not significant
Health care	4.811	6	3.953	27	0.178	Not significant
Hospitality	8.609	2	4.578	2	0.468	Not significant
Information Technology	5.449	57	5.134	104	0.058	Not significant
Internet & Publishing	5.274	4	4.944	5	0.063	Not significant
Manufacturing & Automotive	4.671	5	5.061	36	-0.083	Not significant
Mass Media	4.383	3	3.417	2	0.220	Not significant
Mining	NA	NA	4.904	5	NA	
NFP & Association	6.473	3	3.467	4	0.464	Not significant
Other	5.689	14	4.329	53	0.239	Significant
Retail	NA	NA	4.509	8	NA	
Software Vendor	6.183	20	5.291	21	0.144	Significant
Telecommunications	3.090	1	4.240	35	-0.372	Not significant
Transport	5.692	5	4.212	11	0.260	Not significant
Water	NA	NA	3.688	4	NA	

Most of the comparison of means does not provide significant differences and for the only one that are significant, the differences in mean range from 12% to 24% in favor of the smaller organizations, what is in line with the sample t-test executed on the overall population. We conclude that the sector has marginal influence on the evidence that emerge from our data to establish that smaller companies have an advantage in comparison to the larger one when it comes to Business Agility and its relative constructs.

6.2 Is the Role of the respondent a confounding factor?

The multiple comparison of the one-way ANOVA analysis only confirms a significant difference between the group of the C-Level and all the other groups while the sample t-test to compare the means between the groups of respondents for the small and large companies provide the following results.

Table 15: Independent sample T test for equality of means summary for role analysis

Sector	< 200		≥200		Delta	Sample t-Test
	BA mean	n	BA mean	n		
Individual Contributor	5.563	45	4.468	146	20%	Significant
Supplier/Partner/Consultant	5.285	72	4.452	125	16%	Significant
Manager	5.324	52	4.777	212	10%	Significant
LOB/Division Leader	5.039	13	4.676	75	7%	Not sign.
Senior Executive	5.726	43	4.967	92	13%	Significant
C-Level	6.195	109	4.866	32	21%	Significant

When removing the respondents from a C-Level group and run a sample t-test to measure the difference in means between small and large companies we obtain a significative difference with respective means of 5.419 and 4.661 for the measure of Business Agility. The Business Agility advantage for smaller organization is establish around 14% when C-Level observations are omitted compared to 18% when all respondents are included in the sample t-test.

We conclude that the C-Level respondents have an influence on the valuation of the Business Agility and magnify the evidence that emerge from our data to establish that smaller companies have an advantage in comparison to the larger one when it comes to Business Agility and its relative constructs.

7. Conclusions

The organization size has an influence on the perceived Business Agility measured through the lenses of the Business Agility Institute model. The smaller companies with a headcount of maximum 200 employees are prone to develop higher Business Agility and this consistently in all the dimensions of the construct (Relationships, Operations, Individual and Leadership).

There is no significant evidence that a larger organization with more than 200 employees has an advantage when it comes to looking at the single items that are reflected into the model’s latent variables. In general, it appears that there are no significant differences between the two groups when it comes to Board Focus Maturity and Customer Maturity.

Because the precision of the tipping point value that emerges in this research has been defined a priori, the true value could be slightly above or below and therefore this could increase the credits to Dunbar's study should the number be lower or to Bernard–Killworth's study should it be higher. As Business Agility is a true topic for companies to keep thriving in today's context, the outcome of this study is of importance for the organizations who want to transform in that very direction.

The outcome of this research may be refined through future research to:

- refine the tipping point value,
- search for the factors associated to the size that explain the difference between smaller and larger companies (governance, central functions, decision process, ...),
- integrate the factors identified by Dunbar and/or Bernard–Killworth to explore their mediation or moderation abilities on outcome.

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