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# A META-ANALYSIS ON THE ENTREPRENEURIAL BEHAVIOUR AND GROWTH MEASURMENTS

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*ABSTRACT*

*Firm's growth has always been the center of attention in the field of business. Economist tries to measure the growth of the firm by sales, a number of employees or turnovers, which could be the case in past years, since most of the firms, were industrial firms. However, in recent years, scholars like Wiklund, Penrose, and PerDavisdsson to show that qualitative measurements are also needed to address different approaches of growth measurements have done efforts. We used Meta-analysis as a statistical approach to show the difference of using qualitative measurements versus quantitative measurements for entrepreneurial firm growth. Our findings confirmed our hypothesis that in samples of innovative/ entrepreneurial firms, the impact of qualitative measurements such as rate of technology changes, are more significant. Therefore, firm growth in entrepreneurial firms cannot captured using only quantitative measurements.*

***Keywords:*** *Business Growth, Smes, Growth Measurement, Meta-Analysis.*

## INTRODUCTION

Firm growth has always been a center of attraction for scholars (Shepherd & Wiklund, 2003, p115). A great part of the literature is focused on the growth of the firm considering quantitate approaches and measurements. However, entrepreneurial firms are different from other firms in their nature. Their growth process is through innovation. In these firms, role of human agent is prominent. Human agent in entrepreneurial firms are in charge of moderating uncertainties (Carland et al, 1984) and using their judgments to make decisions (Langlois, 2003). Furthermore, entrepreneurial firms are actively seeking opportunities and trying to gain competitive advantage through their knowledge-based resources (Shepherd & Wiklund, 2005; Wiklund et al., 2009). Since growth might be through different processes in entrepreneurial firms, growth measurements also might not use the common standards (Talebi et al, 2016). Hence, many different measurements from size of the firm, sales volume, number of employees, market share and etc. to firm owners' attitude, behavior and intentions toward growth (Delmar et al., 2003; Ostgaard and Birley, 1995; Siegel et al., 1993).

Recently, researchers tried to consider more qualitative factors in the process of firm's growth and measure it by new measurements related to the entrepreneurs, risk, and decision and opportunity factors.

Growth phenomenon was introduced in work of researchers like Schumpeter, Barnard, Say and Simon. Others, like Penrose, classified the growth definitions (Penrose & Pitelis, 2002). Recently, scholars like Wiklund and PerDavidsson reviewed firm's growth and updated it with new

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perspectives (e.g., role of the entrepreneur in the firm). Despite a huge effort in this field, little succeed was achieved in determining the growth measurement, especially in the case of entrepreneurial firms (Birely & Westhead, 1990). The main reason for this might be the precipitance of the scholars to answer the question " how much" instead of answering the question " how". In other words, recognizing the firm growth measurements is a critical question that needs to be answered before attempting to measure the firm's growth.

### *Challenges in growth measurement*

A long history of research on enterprise growth give insight into the growth triggers as one of the key dimensions of performance and economic growth in economies (Shepherd & Wiklund, 2003, p115) It is fair to say that the progress in the study was limited to the recent years. In the past, the dominant vision of growth was mainly in the form of quantitative criteria. This is mostly due to the time conditions, the lack of restrictions and dominant of industrial enterprises. But in recent years, with the arrival of more influential factors and variables as well as advances in economics (Zarj et al, 2012), and entering a different attitude toward the role of the individual, knowledge management and entrepreneur as a factor of economic growth, qualitative growth measurements became the center of attention (Talebi et al, 2016).

A glance on the growth as a phenomenon started in the works of economists including Barnard, Say and March, Simon, Schumpeter and then was raised by pie who categorized growth topics and finally were completed in the work of Perdivedson and Wiklund, who integrated this vision with the knowledge requirements and technological changes and updated this concept. The new concept of growth has different moods; organic, hybrid and acquisitive, the mechanism of the growth of business and growth measurement in each of these moods is different (Penrose, 1959). Despite all these studies, improvements in the assessment of growth in firms have been scarce (Birely & Westhead, 1990). The most important reason for this lack of development might be as Wiklund says, because of "scholar impatience for an early response to the question" how much "before answering the question" how to evaluate". "How to grow" is the most fundamental question that must be met before responding to "How much to grow". In other words, a wide range of research focused on explaining the differences of growth in different kinds of firms but they neglected to address the qualitative differences among firms obtaining the growth (e.g. Opportunity seeking, cognition, decision making under uncertainty and entrepreneurial factors of the firm or the individual). In other words, the range of their research to describe the differences in the various enterprises have shifted without acknowledging that there may be differences between the quality of how to achieve the growth or growth path. If we can answer the question of how to evaluate the growth or how growth happens, then we can understand the nature of this congruent phenomenon and better response to the question of how much the firm grows (McKlevie & Wiklund, 2010; Naldi & Davidsson, 2014).

### *Theoretical inconsistencies*

There are some inconsistencies in the literature arise from how researchers view growth in firms (Birley & Westhead, 1990; Davidsson, 1991; Kazanjian, 1988; Whetten, 1987).

Even being aware of possible contradictions, there are different research approaches for how to define and evaluate the growth in the firm. Such inconsistencies in the process and the definition of growth in the firm , hindrances theorizing in this field. So often, when we talk about growth, there is an ambiguity that what theorists are talking about or how they built the concept of the growth in the firm (e.g. sales or a number of employees) or how firm growth has

been operationalized. Hence, some of the critics of small businesses studies are suspicious about the reliability and validity of the concepts they used in their researches and how they conceptualized growth (Koeller &Lechler, 2006).

As a result, previous literature existing on the firm's growth is mainly focused on economic measurements of growth and rarely considered the especial characteristics of entrepreneurial firms or innovative firms (e.g. Creativity, risk-taking, and decision-making, opportunity-seeking).Hence, the main contribution of this study is to provide a big picture on entrepreneurial firm's growth and introduce new measurements for assessing growth that are consistent with the unique characteristics of this kind of firms from previous related literature. To do this, in this study, we tried to test our hypothesis as below:

***Hypothesis 1- firm growth in entrepreneurial businesses cannot be estimated only by quantitative measurements.***

***Hypothesis 2- in samples of innovative/ entrepreneurial firms, the impact of qualitative measurements such as rate of technology changes, are significant.***

## SURVEY METHOD

We used meta-analysis in this study to show the share of qualitative growth measurements in literature. Meta-analysis is a statistical research integration technique (Hunter and Schmidt, 1990). This method applies statistical procedures that are designed to integrate the results of a set of primary empirical studies. That is why meta-analysis captures all the existing literature not only most influential or best-known studies (Stewart and Roth, 2001, 2004).

Search strategy: We limited our search to the scientific information databases including ELSEVIER, SAGE, WILEY, Web of Science, JSTOR, Springer and Scopus within last 50 years.

Sample selection and selected studies: We searched our literature from the most reputable journals in the field of business. Keyword we used is firm, growth, measurements, enterprise, index, growth assessment, growth evaluation. Eventually, 20 papers were selected that met the search criteria.

Paper selection criteria: We saved all papers that we found using the keywords. 639 papers were saved. Then, we reviewed them to select which of them meet below criteria: (1)Within last 50 years, (2) Used data analysis. (3) tried to define and measure concept of firm's growth. 26 papers were selected. 6 of them did not contain required information, therefore they did not obtain the required score in STROBE checklist. This checklist allocates different scores to different sections of each paper. Scholars can score each section based on its importance; papers with scores below 7.75 were omitted, between 7.76 and 15.5 were low quality, between 15.6 and 23.5 were fair quality and above 23.6 were high quality. STROBE scores are included in table 1. Eventually, 20 papers were selected.

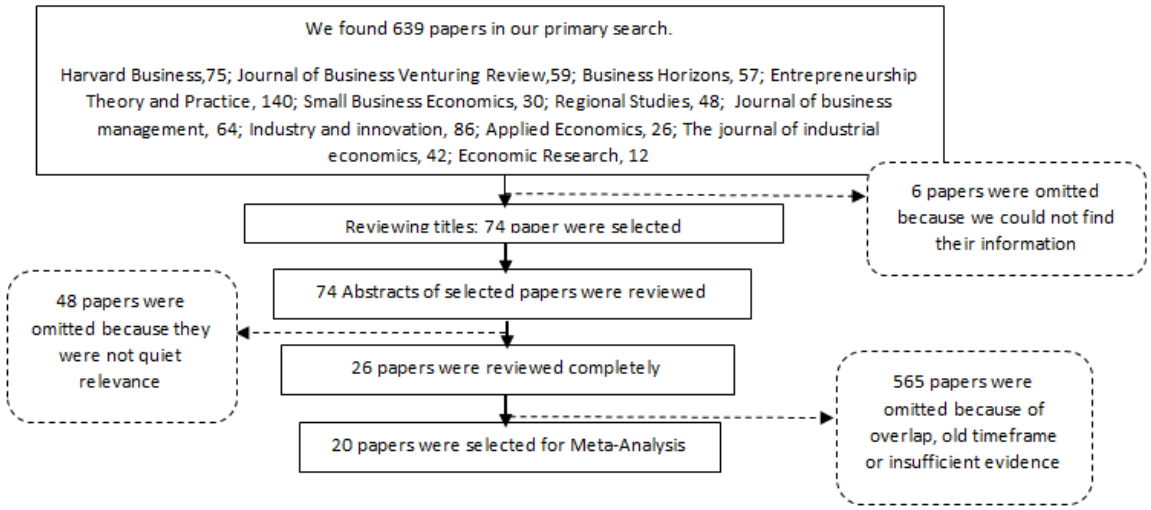


Figure 1: process of selecting papers for meta-Analysis

### *Meta-analysis methods*

We followed the Meta-analysis approach recommended by Lipsey and Wilson (2001). First, we needed to aggregate individual findings of each study and estimate an effect size statistic. Meta-analysis offers two method to estimate the effect size: the standardized mean difference effect size and the correlation coefficient size. We chose the standardized mean difference statistic as a measure since it is more consistent with our sample of studies. To compute the standardized mean difference of the effect size we used information including size of sample and sub-samples, means, standard deviations, correlations, t-test- statistics, Chi-square statistics and p-value. We calculated separate effect sizes for each reported growth measure, deriving a total of 78 effect size.

In the second step, we analyzed the distribution of effect sizes. We exclude one of our sample studies based on statistical related reasons (Robinson et al., 1984). Based on the remaining 19 studies with total 77 effect sizes, we constructed an independent set of effect sizes using the most frequently encountered growth measure. Our final independent set of data points includes 51 effect sizes on 11046 firms.

Third step was examining the relationships between effect sizes and contingency variables. We used bivariate analysis.

## RESULTS

We reviewed 20 experimental and conceptual articles published in the management, business and entrepreneurship journals. Characteristics of selected papers are shown in the following table:

Table 1: Characteristics of selected studies

| Authors and year of publication | Title | Citation | Journal | Survey Method | STROBE Score |
|---|---|---|---|---|---|
| Churchill & Lewis (1983) | The five stages of small business growth | 787 | Harvard Business Review | Questionnaire | 24 |

| | | | | | |
|---|---|---|---|---|---|
| Cliff (1998) | Does one size fit all? Exploring the relationship between the attitudes towards growth, gender, and business size | 180 | Journal of Business Venturing | Interviews | 23.6 |
| Steinmetz (1969) | Critical stages of SME growth: when they occur and how to survive them | 123 | Business Horizons | Experimental data | 23.9 |
| Davis, Haltiwanger, Jarmin & Miranda (2006) | Volatility and dispersion in business growth rates: publicly traded versus privately held firms | 87 | NBER Macroeconomics Annual | COMPUSTAT method | 17.8 |
| Wiklund, Davidsson & Delmar (2003) | What do they think and feel about growth? An expectancy-value approach to small business managers' attitudes towards growth | 76 | Entrepreneurship Theory Practice | Phone interviews | 24.1 |
| Roper (1997) | Product innovation and small business growth: a comparison of the strategies of German, UK and Irish companies | 79 | Small Business Economics | Investigating product development | 22.5 |
| Robson & Bennett (2000) | SME growth: the relationship between business advice and external collaboration | 71 | Small Business Economics | Questionnaire | 16.3 |
| Keeble, Bryson & Wood (1991) | Small firms, business services growth and regional development in the United Kingdom | 66 | Regional Studies | Questionnaire | 15.8 |
| Davidsson, Kirchhoff, Hatemi-J & Gustavsson (2002) | Empirical analysis of growth factors using Swedish data | 64 | Journal of Small Business Management | Firm's Financial data | 24.4 |
| Upton, Teal & Felan (2001) | Strategic and business planning practices of fast growth family firms | 61 | Journal of Small Business Management | Questionnaire | 20.5 |
| Roper (1999) | Modeling small firm growth and profitability | 55 | Small Business Economics | CAM data | 19.8 |
| Donckels & Lambrecht (1995) | Networks and small business growth: an explanatory model | 53 | Small Business Economics | Phone interview | 23.6 |

| | | | | | |
|---|---|---|---|---|---|
| Weinzimmer (1997) | Top management team correlates of organizational growth in a small business context: a comparative study analysis | 50 | Journal of Small Business Management | Adoptive Partial Correlation | 21.9 |
| Garnsey, E., Stam, E., & Heffernan, P. (2006) | New firm growth: Exploring processes and paths | 287 | Industry and Innovation | Firm's Financial Data | 15.9 |
| Engel, D. (2002) | The impact of venture capital on firm growth: an empirical investigation | 147 | Economic Research | Empirical Data | 19.1 |
| Reichstein, T., & Dahl, M. S. (2004) | Are firm growth rates random? Analysing patterns and dependencies | 67 | International Review of Applied Economics | Firm's Financial Data | 22 |
| Niskanen, M., & Niskanen, J. (2007) | The determinants of firm growth in small and micro firms-Evidence on relationship lending effects | 37 | Economic Research | Empirical data | 20.8 |
| Coad, A. (2007) | Firm growth: A survey | 167 | Economic Research | Survey | 23.9 |
| Evans, D. S. (1987) | The relationship between firm growth, size, and age: Estimates for 100 manufacturing industries | 2100 | The journal of industrial economics | Empirical data | 21.2 |
| Coad, A., & Broekel, T. (2012) | Firm growth and productivity growth: evidence from a panel VAR | 23 | Applied Economics | Non-parametric frontier analysis | 17.6 |

We studied the definitions of growth in these studies, so we could conclude that many different approaches have been used for the growth conceptualization. In this section, we categorized these studies using three indicators: 1) the choice of the index 2) analysis method and 3) the timeframe that the research has been done on it.

Table 2: dimensions of growth and their percentages

| index | % |
|---|---|
| Turnover/sales | 30.9 |
| Number of employees | 25.1 |
| Multiple indicators | 18.2 |
| operation | 12.7 |
| Market share | 5.5 |
| Assets | 3.1 |

| | |
|---|---|
| Technology change rate | 1.8 |
| Innovation | 1.3 |
| Self-satisfaction | 0.6 |
| Not reported | 1.8 |
| Total | 100 |

Based on Table-1, almost 60% of the literature, measured growth by turnover/sales and number of employees. Based on table 2, more than 50% of researches have estimated firms' growth by relative formula.

**Table 3: measurements of the periods of growth to the number of years and their percentage**

| index | % |
|---|---|
| 5 | 23.6 |
| 1 | 21.8 |
| 3 | 16.4 |
| 2 | 7.3 |
| 4 | 3.6 |
| 6 | 1.8 |
| 7 | 1.8 |
| 8 | 1.8 |
| Missing | 21.8 |
| Total | 100 |

**Table 4: Descriptive statistics of mean effect sizes**

| % | index |
|---|---|
| 50.9 | Relative |
| 29.1 | Absolute |
| 10.9 | Absolute logarithm |
| 5.5 | Relative logarithm |
| 3.6 | Not reported |
| 100 | Total |

As shown in the above tables, estimating the relative change in sales in the five-year timeframe, is the most common type of growth measurement. Relative changes in the number of employees or sales in the three-year period and eventually changes to employees during the period of one year are in the second and third positions. These observations confirm that qualitative growth measurements had a small share in the firm's growth assessments.

An overview of all 19 studies included in meta-analysis is provided in Table 1. Descriptive statistics of mean effect sizes, including all studies, represented in Table 4. For the set including all effect sizes, the mean effect size is .20 ($p < .000$). Thus, our findings confirm our hypothesis proposing that firm growth in entrepreneurial businesses cannot be estimated only by quantitative measurements.

**Table 5: Overall average for the standardized mean difference effect size statistics**

| | Total set of effect sizes | Independent set of effect sizes |
|---|---|---|
| No of studies | 19 | 19 |
| No of effect sizes | 77 | 51 |
| No of firms | 12,141 | 11,046 |

| | | |
|---|---|---|
| Average effect size | 0.18 | 0.19 |
| Std.deviation | 0.06 | 0.02 |
| Lower limit CI | 0.16 | 0.16 |
| Upper limit CI | 0.22 | 0.23 |
| p-Value | 0.000 | 0.000 |
| Critical value | 97.35 | 67.51 |

Table 6 shows the bivariate analysis. We divided effect size groups based on variables (Lipsey and Wilson, 2001). Our results show that the difference between the two group (sample used quantitative measurement vs. qualitative measurements) is statistically significant (p-value <.05). This indicates that in samples of innovative/ entrepreneurial firms, the impact of qualitative measurements such as rate of technology changes, are more significant. This is a confirmation for our second hypothesis.

**Table 6: bivariate moderator analysis**

| | Number of firms | Number of ES | Mean ES | Std.dev. | 95% CI Lower limit | Upper limit | p-value | Q-value |
|---|---|---|---|---|---|---|---|---|
| Innovative firms vs. industrial firms | | | | | | | | |
| | 2,687 | 16 | 0.14 | 0.04 | 0.05 | 0.16 | 0.000 | 36.65*** |
| | 8,359 | 35 | 0.23 | 0.2 | 0.15 | 0.26 | 0.000 | 98.84*** |
| | 11,046 | 51 | 0.20 | 0.2 | 0.16 | 0.23 | 0.000 | 151.54*** |
| Homogeneity explained by variable | | | | | | | | 5.48* |

### *Robustness Check*

Although checking the robustness of the business performance in a meta-analysis study is not easy due to not having a consistent set of firms' growth measurements and even with a consistent set of measurement, the quality and completeness of data affects our results, we tried to use the method of treating each outcome of our study as an observation and creating multiple observations. This will give us a larger sample however, variances are not consistent and this might lead to biased results due to heteroskedasticity in the distribution terms and insufficient parameter (White, 1980). Hence, we used Huber-White test to correct the standard deviation. We used SAS and implement it through *Proc Mixed.* The coefficients for all the independent variables were in the expected direction and also were statistically significant at the 1 % and 10% level. These results provided further reassurance.

## CONCLUSION AND IMPLICATION

This study provides a quantitative synthesis of empirical studies analyzing the firm's growth measurements. We looked into the growth as a phenomenon and tried to understand different measurements of the growth. We believe estimating the growth of the firm needs more than only quantitative measurements because other factors like uncertainty, decision-making and entrepreneurial factors and opportunity recognition playing a crucial role in this field. So far, this is the first study that tries to analyze the firm's growth measurements and integrate the results. The results are presented in three tables; index, period and assessment method. Results show estimating the relative change in sales in the five-year timeframe, is the most common type

of growth measurement. Relative changes in the number of employees or sales in the three-year period and eventually changes to employees during the period of one year are in the second and third positions. Results suggest there are many different measurements in many fields of study, reflecting widespread interest in firms' performance. Our findings confirmed our theory that qualitative growth measurements have no share in growth assessments. These findings could change the prevailing view on firms' performance and its measurements. Results emphasis on considering different types of firms' growth (e.g. organic, acquisition or internal) each of them needs its specific measurement for growth. While internal growth usually takes place in form of new product or service introduction and is easy to measure by sales increase, external growth can be measured both in terms of sales growth and market share or labor force growth. Therefore, not considering the nature of growth in firms especially in entrepreneurial or more innovative firms might fail to measure firm's growth and its performance.

### *Limitations*

One limitation concern arises from the number of studies and also sample size of entrepreneurial firms that were analysed. Empirical studies with entrepreneurial firms are scare.

Another limitation is due to the nature of meta-analysis. This is a powerful method but it cannot determine causality of relationships.

Finally, our last concern is about the sampling or publication bias of the studies in our sample. It can be related to the potential upward bias of the mean effect size due to the exclusion of unpublished and therefore more difficult to find studies. All these issues expected to be addressed in future studies.

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