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# MEASURING WEALTH GENERATION IN EARLY-STAGE ENTREPRENEURIAL ORGANIZATIONS: AN ALTERNATIVE TO THE CAPITAL ASSET PRICING MODEL

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## ABSTRACT

*There is no generally accepted measure of wealth created by new ventures, as most early-stage firms do not have positive cash flows, and early-stage discount rates cannot be estimated with sufficient accuracy as required by the Capital Asset Pricing Model (CAP-M). Through regression analysis of organizational economic value, as assessed by a sample of 145 CPAs, this research supports using a new economic evaluation methodology involving the use of early-stage organizational structure itself as a construct and predictor of economic value. The current research employs a Validated Nascent Organizational Structure Sequence (VNOSS) model as an alternative to CAP-M in establishing the perceived economic value of early-stage entrepreneurial firms. The small business owner that utilizes the strategy of taking the firm through the VNOSS stages will create greater economic wealth. There is a substantial discussion and implications of the applied research results.*

**Keywords:** wealth, organization structure sequence, capital asset pricing model (CAP-M)

## INTRODUCTION

Nominally, entrepreneurs start business ventures to generate economic wealth. To adequately study wealth creation, it must first be measured. The Capital Asset Pricing Model (CAP-M) is commonly used to estimate the economic value of assets that produce positive cash flow. Although expected cash flow and computed discount rates can be used, serious doubt exists that a CAP-M valuation of very new firms is sufficiently accurate because of the margin of error found in prospective cash flow estimation and the fact that CAP-M mathematics are extremely sensitive to the accuracy of inputs (Smith & Smith, 2000). More importantly, there is no accepted method to produce an accurate discount rate, as required by CAP-M. Hence, two key questions are:

- How can nascent firms be valuated without using cash flow or discount rates?
- What are the characteristics of economic growth as these firms grow and in what period of growth are the

rates of return on invested capital generally highest?

Such questions and answers are pertinent to entrepreneurial small business owners and managers, their investors (banks, angels, and venture capitalists), small business educators, and consultants interested in new venture wealth creation.

It is hypothesized that the value of organizational structure in response to market opportunity and the ability of the venture group to build structure to exploit opportunity is a measure of success. The change in organizational structure is created through, and contributes to, successful growth. Thus, the very structure of the organization—and growth in that structure—may itself be a predictor or indicator of firm value. This exploratory study examines the Validated Nascent Organizational Structure Sequence (VNOSS) developed by Fiore and Lussier (2007), an early-stage organizational structure model that describes how the value of a successful venture rises together with the complexity of the venture's organizational structure. Within the current study, the VNOSS is proposed as an alternative to CAP-M in establishing the perceived economic value in entrepreneurial firms as the venture group exploits market growth opportunities.

## LITERATURE REVIEW

Entrepreneurs and financiers want to know their chances of successfully creating wealth, and there is a need for better measures (Lussier & Pfeifer, 2000). Minniti and Bygrave (2001) stated that "Our entrepreneur wishes to maximize the subjective expected discounted value from his choices consistently with his intent" (p. 29). Deeds, DeCarolis, and Coombs (1998) stated that "market value added is a particularly appropriate measure of entrepreneurial performance because of its focus on wealth creation, which is the essence of entrepreneurship; the generally accepted accounting principles (GAAP) are inadequate measures of entrepreneurial effectiveness, as it is apparent that accounting-based measures of performance fail to accurately reflect the amount of shareholder wealth being created by the firm" (p. 56).

Organization structure is the result (the legacy), and the tool (used to capture or harvest value), of the entrepreneur (an economic agent). As a construct, organizational structure may be a predictor of managerial intent and market opportunity as perceived by the venture team. Since the purpose of the entrepreneurial process is value creation, the process could be defined and measured in terms of value output, or more accurately, the extent of economic value created. Thus, it is proposed that organizational structure is an alternative indicator of value of the firm even if there is no current cash flow. Organizational structure may be a measurable construct to these predecessor factors (Fiore & Lussier, 2007). Since entrepreneurship is the act of building the new organization, important questions arise. What is the most appropriate way to conceptualize the construct of economic value? In what manner can emerging, entrepreneurial economic value be measured?

### The Capital Asset Pricing Model (CAP-M)

Normally, the economic value of a capital asset can be estimated by the Capital Asset Pricing Model (CAP-M). The CAP-M approach is such that the price (present value) of an economic asset can be derived by the application of a risk adjusted discount rate (k) to expected future cash flow. Deeds et al. (1998)

outlined the use of discounted cash flow for valuation purposes. The basis for Market Evaluation and Market Value Added begins with the concept of discounted free cash flow (FCF) first developed by Modigliani and Miller in 1958 and corrected in 1963. Since a new entrepreneurial organization is an economic asset, the CAP-M is used to evaluate its worth or value. Key factors required for the assessment of economic value of an organization are forecasts of the expected FCF, the expected growth rate (g) of the FCF, and the appropriate discount rate (k) for the time value and riskiness of that future cash flow.

A critical question now arises as to whether the application of expected future free cash flows, beta coefficients, risk correlation indices, and CAP-M-derived discount rates are appropriate for "entrepreneurial" situations. Can the CAP-M be accurately employed well before cash flow exists? Since creation of economic value is the objective of the behavior; these are important questions for entrepreneurs, investors, and speculators. Smith and Smith (2000) summarized the controversy: "Is CAP-M the correct description of the rate of return investors require for waiting and for bearing risk? In particular, is it the correct description of the required rate of return for investing in a new venture?" (p. 249). Similarly, Harper (1993) stated, "Considerable controversy surrounds the choice of the discount rate used to capitalize earnings of cash flows..." (p. 22), and earlier Fama (1996) warned, "...with perfect certainty and perfect capital markets, pricing by discounting has an airtight economic story. The market value of a future payoff is its present value calculated using 1-period simple interest rates (e.g., Fama & Miller). In a world of uncertainty, the rigorous justification for estimating values by discounting expected payoffs with CAP-M ... expected 1-period simple returns is fragile" (p. 426). Clearly, there is nothing certain about the "expected returns" of entrepreneurial ventures.

Hence, we agree with many authors who note that for the emerging or pre-operational firm, the inputs of cash flow and risk-adjusted discount rates are indeterminate and gross estimations. CAP-M is an important tool for economic valuation but the model was not developed for "high-uncertainty" applications such as new firms. These facts, along with recognition of the sensitivity of the CAP-M valuation to input assumptions and forecast estimation, lead to the proposed conclusion that the accuracy of any economic valuation of new firms is doubtful. This, in turn, leads to the proposal that an appropriate indicator for the economic value of new organizations may be the structure of the organization itself or a sequence of change in that structure. Hence, the current research correlates "assessed economic value" based on the organizational structure of an emerging organization.

**General Findings from the Literature**

General findings based on the literature review are as follows:

1. An episodic stage model of early organizational development has yet to be fully developed in the organizational development or entrepreneurship literature.
2. CAP-M may not be the most appropriate analytical tool for the economic valuation of nascent organizations.
3. Many authors refer to "take-off" points in a new firm's early life, implying that one or more growth stages may produce "unusual" or

"disproportionate" amounts of wealth.

4. No known study specifically points to a stage of organizational growth (if any) that signifies sustainability, durability or the emergence of "permanent" economic value.

5. No known study has specifically linked the emerging economic value of an organization to its very early or nascent hierarchical organizational development.

## A VALIDATED NASCENT ORGANIZATIONAL STRUCTURE SEQUENCE MODEL

A model of entrepreneurial organizational structure was required in order to test the relationship of economic wealth creation on the construct of organizational structure. Previous research by Fiore and Lussier (2007) indicated that there may be general standard stages of early organizational growth. Their proposed Nascent Organizational Structure Sequence (NOSS) model was statistically tested resulting in a validated model. The "validated" or refined model was termed "VNOSS." The VNOSS model is not contributed as the only possible entrepreneurial model, simply as one of many possible archetypes. The episodic, early-stage organizational-growth model is forged on a behavioral, resource exchange paradigm centered on the entrepreneur as a prime economic agent. The model is presented in Figure 1. An explanation of each of the 9 stages in the VNOSS model is outlined below:

1. The Entrepreneur (E) participates in the conceptual or thinking stage about the business.

2. The Entrepreneur seeks "advice and knowledge". A formal or informal advisory (A) board develops. Since the Entrepreneur usually gains financing approval through board approval, the Entrepreneur is subordinate to them.

3. The Entrepreneur goes into business by exchanging required resources (R) with the environment.

4. The first management (M) team is developed, and "departments" or functions are formed, but the Entrepreneur retains the responsibility to obtain required Resources.

5. With further growth, staff (S) is added.

6. As further growth occurs, the Entrepreneur assigns "resource exchange functions" (R) to the management team.

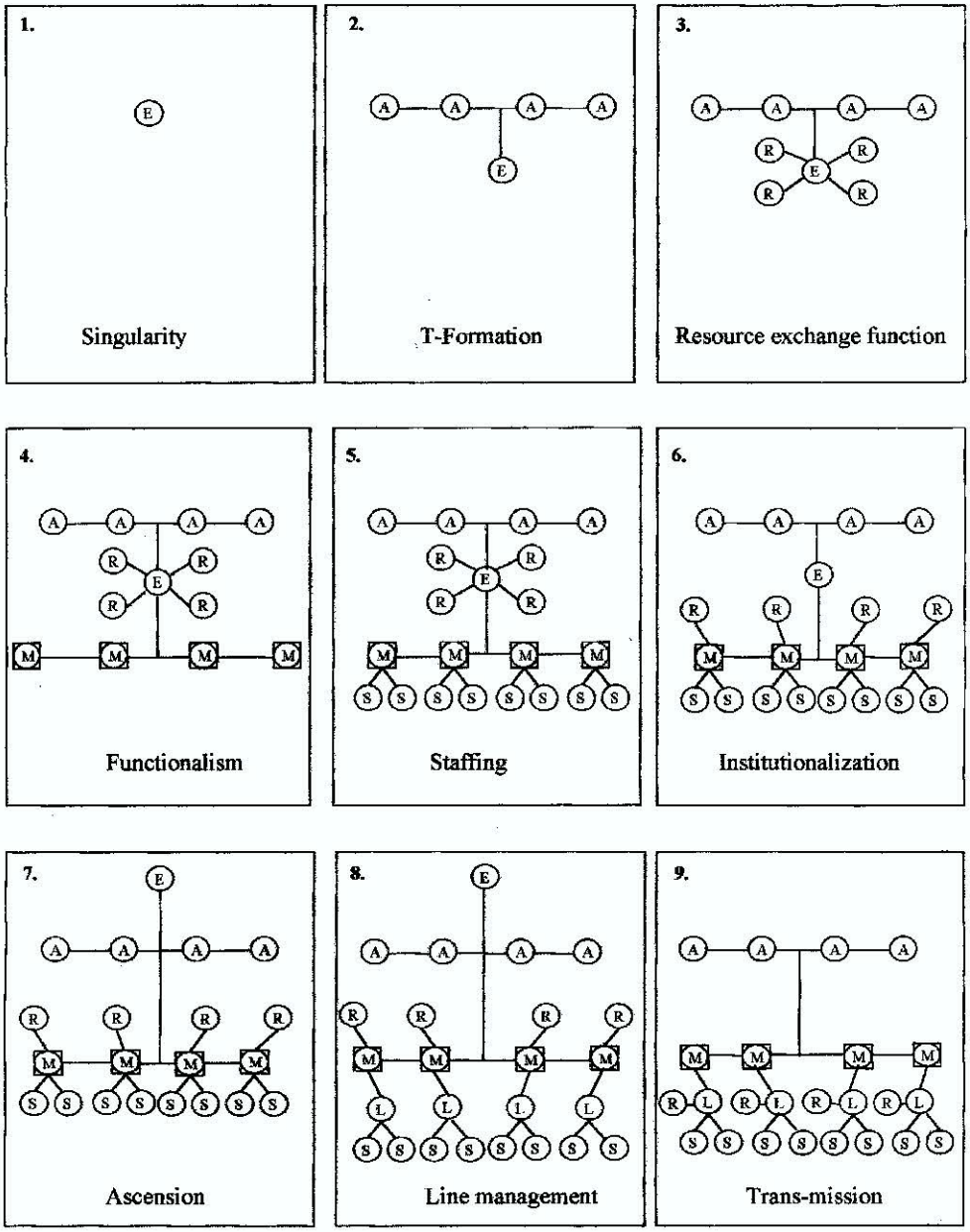
7. Based on continued successful growth, the Entrepreneur arises in real power over the Advisory board of directors.

8. A Validated Nascent Organization Structure Sequence (VNOSS) Model (see Figure 1)

9. As growth continues, additional layers of organization are added and levels of line managers (L) are added.

10. The Entrepreneur leaves the firm and the Entrepreneur's mission and values are transmuted into, and maintained as part of, the culture of the firm.

**Figure 1**
**A Validated Nascent Organization Structure Sequence (VNOSS) Model**



**Possible Patterns of Growth In Economic Value**

The literature researched suggested a change in the economic value of an emerging organization may not be linear as the organization grows. Value may be created spontaneously at some point, as the future cash flow become real and as belief in the sustainability of the organization becomes manifest.

The questions arise: when does economic value or value-creation first occur in organizational formation, and to what extent is the growth in value linear or nonlinear? Disproportionate amounts of value may be created in a short period of time as the organization *coalesces* or first becomes systemized. Early in organizational development literature, Follett (1941) outlined the idea of a *holistic* or circular response as the basis for a theory of organizing, implying that the organization becomes a unity or entity at some level of complexity. Follett identified processes that become circular or on-going at some point in a firm's life. Stages of sustainability may be an organization coming into fruition as a "self-creating" coherence. Follett (1941) wrote, "Whether you have [an organization] with all its parts so coordinated, so moving together in their closely knit and adjusting activities, so linking, interlocking, interrelating, that they make a working unit—that is, not a congeries of separate pieces, but what I called a functional whole or integrative unity" (p. 71). Bhide as quoted in Sahlman et al. (1999) stated, "the failure to attain sustainability matters...an enterprise that is perceived to be self-sustaining can enter a virtuous cycle: expectations of longevity attract customers and other resources that further consolidate its position and open new opportunities" (p. 392). When is the organization first considered "sustainable" as assessed by the market? Attainment of such sustainability is a major goal of the entrepreneur. This construct of organizational "unification" is described by Russell (1999): "Maruyama has described 'morphogenetic' systems whose elements are linked by mutual reinforcing positive feedback loops...the positive feedback between the norms and participation in the entrepreneurial process itself may create an 'autocatalytic' subsystem within an entrepreneurial organization in which new ideas are continuously generated and processed without the necessity of external motivation" (p 79).

McMullan and Long (1990) pointed to a "special period" in a venture's early life: "our idealized entrepreneurial strategy involves a systematic evolution of a venture medium into a living system over time. The end point of the entrepreneurial process is, then, the end of an entrepreneur's attempts at strategic development—the point at which a venture becomes a living system no longer needing the entrepreneur's contribution to survive and prosper. The living system is, by definition, a self-sustaining entity" (p. 138). Issues of time-frame, decay, and decline are left undefined.

Many other authors point to sustainability or systemization as a particularly valuable organizational event. The logic of a period of organizational growth and the occurrence of "super" returns lies in the logic that when sustainability occurs, the present value of the future cash flows becomes a reality. Within that period, the present economic value will increase, and rate of return should be high. It is hypothesized that a "disproportional" amount of an organization's initial value may be created during a specific period of organizational growth. It is proposed that this critical phase may be identified by a high rate of growth in economic value. Hence, the current study applies curve-linear regressions to test if these patterns exist.

### Research Questions

The following questions have been developed:

1. Using an episodic model of early-stage organization development, what is the perceived economic value based on the existence of the organizational structure itself within the domain of a market opportunity?
2. What, if any, stage or growth episode produces extraordinary or disproportionate amount of economic value and high rates of return?
3. What are the typical characteristics of the growth pattern of increasing economic value as a firm grows through early stages?

The present research surveyed the "perceived assessed economic value" of new organizations at each stage of a VNOSS model development.

## METHODOLOGY

A survey was designed to conduct the research. Survey research, particularly mail surveys, has been a standard in quantitative research on small business and entrepreneurship (Dennis, 2003). In fact, an examination of important journals (*ET&P, ISBJ, JBV,* and *JSBM*) revealed that one-third of the articles were based on mail survey (Newby, Watson, & Woodliff, 2003). The purpose of the valuation survey was to determine the economic value a "market" would assign to an organization as it grows in accordance with the VNOSS model when presented with a fixed economic opportunity.

### Sample and Data Collection

Samples of certified public accountants (CPAs) were chosen as valuation experts in small or nascent business valuation. These professionals regularly valuate the economic worth of businesses for estate, tax, transfer, legal proceedings and other purposes. The CPAs represent a group of market makers, or market proxy, for emerging firms.

CPAs were chosen at random from CPAs practicing in Massachusetts as listed by the Massachusetts Society of Certified Public Accountants. The CPAs were asked to assess the economic value of the organization in various stages of emerging formulation in accord with the VNOSS model. To prevent the assessment of economic value of one stage influencing other stages, the respondents were asked to valuate only one VNOSS stage at a time. To give the CPAs some indication of the size of the market opportunity, they were asked to valuate the firm while in the presence of a potential $1,000,000-market-sized opportunity.

Each respondent was asked to valuate the firm at two stages of VNOSS growth. The stages were chosen at random. The sample was told that the firm was capable of capturing the market when the company was fully developed. Therefore, the economic value assessed by the survey participants is thought to be equal to the ability of the organization to capture current economic value, and the ability of the venture to continue its growth and survive. Furthermore, the economic value assigned by the sample suggests an indication of the professional's assessment of future survivability since present value exists when future cash flow is expected. Hence, the economic value assigned is an indication of the worth of organization based on *the perceived ability of such a structure to continue operations and grow,* and may be interpreted as the value of organization as distinct from the value of an organization.

A total of 534 valuation questionnaires were mailed and 145 were returned for a response rate of 13.6%. This is an acceptable response rate as the typical business study response rate is 10.5% (Grunbagen & Mittelstaedt, 2005). The survey included two valuation requests, as each CPA participant was sent two VNOSS stages on separate pages, and asked for their economic valuation opinion of each stage for a total of 1,068 economic valuation opinions requested. The 145 returned valuations yielded data points of assessed economic value and were used for regression analysis. The CPAs were asked about their professional experience. The CPA sample indicated their average professional experience as a CPA and valuating businesses was 27 years, 87% consider a firm's hierarchical structure an important component in assessing value, and 93% stated they use discounted expected cash flow as a criterion for assessing the value of a firm.

**Measures**

The valuation survey was specifically designed to collect data regarding the relationship of assessed value to the VNOSS stage. The dependent variable is the assessed value, which was matched as a data point with the independent variable VNOSS stage. A pilot testing of the valuation survey instrument was conducted before mailing.

To perform curve linear regression, SPSS requires an estimate of upper and lower boundaries of a dependent variable be input. An approximate economic value was computed, based on averaging generally accepted pricing multiples based on multiples found in finance textbooks.

$$Value = Price\ Multiple \times Cashflow$$

A low-end price multiple of 2 times cash flow was arbitrarily applied. Here, we have a theoretical minimum value of:

$$Value = \$\,2{,}000{,}000 = \$\,1{,}000{,}000 \times 2$$

A pricing multiple of 6.5 times cash flow was applied; the present value of the mature organization could be as high as:

$$Value = \$6{,}500{,}000 = \$1{,}000{,}000 \times 6.5$$

These are approximate estimates of value, computed and used only to restrict the curve linear regression algorithm to yield a solution as required by SPSS.

The sample of CPAs was asked to assess the value of organization at various randomly chosen VNOSS stages. It was hypothesized that "economic value" may emerge at some point and grow in a non-linear form and, in particular, in a non-linear "S" form with the lower asymptote near zero and the upper asymptote somewhere between the Pricing Multiple derived assessment of between $2,000,000 and $6,500,000. These values were utilized as limiting parameters in the non-linear regression procedures performed within this study.

**Statistical Analysis**

One linear and two nonlinear regression procedures (S-curve and cubic) were applied to determine the relationship between the dependent variable (assessed value) at each independent variable (VNOSS growth stage) and the characteristics of growth in economic value tested the goodness of fit for each model.

The "S" curve is a function having one "inflection point" and two "bends" or differential growth periods. One "S" function testable by SPSS, as a nonlinear fitting procedure is the Gompertz expression. The Gompertz function is expressed as follows:

$$Y = A + Ce^{-e^{-B(X-M)}}$$

Where:

Y = Assessed Value
X = VNOSS stage
A controls the lower asymptote
C controls the upper asymptote
M controls the time of maximum growth
B controls the growth rate

The Gompertz equation outlined above was rewritten as a model expression for input to SPSS as:

$$Y = A + C * \exp(-\exp(-B * (X - M)))$$

The Gompertz growth function is thought to generally describe an exponential growth situation where limiting factors naturally occur, slowing the rate of growth after an initial high-growth period. This type of growth pattern is seen in biology and economic markets where some natural limit of growth exists (i.e., competition occurs).

The aim of the specific modeling strategy was to determine the impact of the treatment of VNOSS stage on the dependent variable, "assessed value" growth as an entrepreneurial organization grows. The data was graphed and visually examined. The F-test for testing linearity of regression was noted. Multicollinearity is not a concern as there is only one independent variable. The $R^2$ for the simple linear regression was noted and the standardized residuals were examined.

Additional polynomial functions were tested and the total variance (adjusted $R^2$) explained by each curvilinear model was noted for determination of improved model specification. Since economic value is the output of the entrepreneurial process, it is proposed that the function of "entrepreneurship" as "creative innovation" has successfully occurred when sustainability has been reached. This definition of entrepreneurial success, as based on the measurable output of sustainability, would be significant to the investment and venture capital fields where venture investors are searching for new paradigms to assess, identify, and predict emerging value.

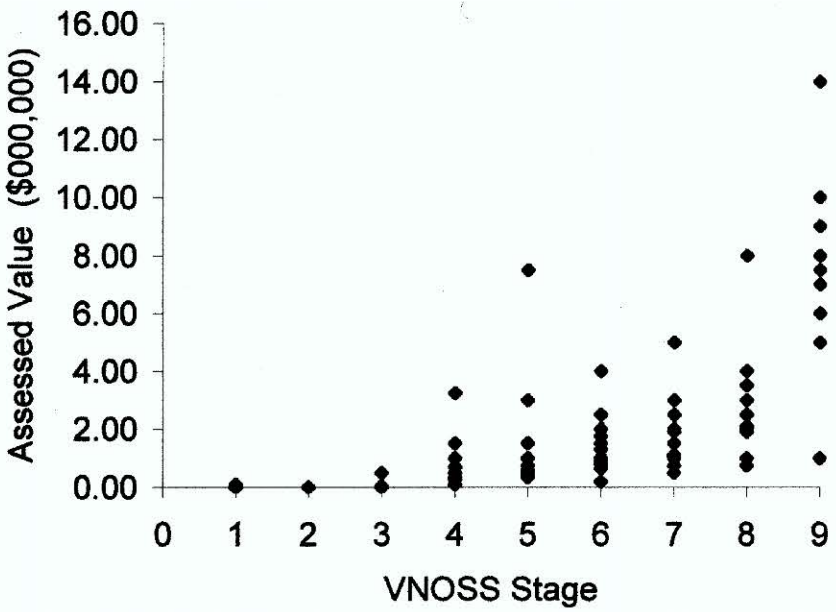
It is believed the requirement of independence for each Assessed Value observation is met, as the respondents did not influence each other. The cases represent a random selection from the population. The 534 sample CPAs were selected at random from the population of approximately 5,500 CPAs practicing in Massachusetts.

## RESULTS

A visual inspection of the scatterplot as presented in Figure 2 indicated a significant relationship might be prescribed by one of the regressions tested. According to the SPSS manual, "For a nonlinear model, the tests for linear models are not appropriate...the residual mean square is not an unbiased estimate of the error variance, even if the model is correct...the F statistic cannot be used for testing hypothesis." However, the adjusted $R^2$ can be employed to determine the total variance explained by the model, so the adjusted $R^2$ coefficients can be directly compared.

The nonlinear regression module of SPSS was employed to determine the parameters of the best fitting model of the variables. A linear model was analyzed first for use as a baseline to judge the fit of more complex curvilinear functions. Model expressions for various "S" curves were employed because these models were thought to generally portray the growth of naturally occurring organisms and systems where there is initially slow growth, a period of high growth, and then a subsequent slowing of growth as some capacity constraint begins to take place. It is thought that the economic value of a

**Figure 2**
**Scatter plot***




**The relationship of an organization's perceived economic value ($000,000) as assessed by a sample of CPAs based on a Validated Nascent Organization's Sequence of Structures (VNOSS). (As N = 145, each point may represent multiple data values).*

**Table 1**
**Linear Regression Results**

| Variable | B | SE B | $R^2$ | p |
|---|---|---|---|---|
| Constant | -1.914 | 0.369 | - | |
| VNOSS | 0.717 | 0.063 | 0.47 | .000 |

nascent firm may grow exponentially from a near-zero asymptote, exhibit high growth, and then experience a slow-down in the rate of growth, due to the ending of the entrepreneurial phase, the introduction of competition, or possibly the capture of the total market opportunity.

**Linear Regression**

A linear regression analysis was first conducted to determine the fit of assessed value to the VNOSS stage. The scatter plot of the two variables, as shown in Figure 2, indicates the two variables could be considered linearly related since, as the VNOSS stage proceeds from stage 1 to stage 9, the overall assessed value increases. The regression results of the

assessed value and the VNOSS stages yielded a R2 of .47 (p = .000). Thus, 47% of the variance of the assessed value is accounted for by its linear relationship with the VNOSS stage. The linear regression results are presented in Table 1.

Using these parameters, the linear regression equation for predicting the overall Assessed Value regressed on VNOSS stage is:

*Assessed Value* =
− $1,914,000
+ $717,000 VNOSS Stage

Hence, this *linear* model does not yield a positive value until the third stage [Resource exchange] of the VNOSS has been achieved. This result is outlined here:

*Assessed Value* =
− $1,914,000
+ $717,000
× 3
= $237,000

As hypothesized, the assessed value increases as the VNOSS stage increases. The slope of 717,000 suggests that the perceived value of the new organization grows by $717,000 as the organization progresses to the next VNOSS stage. Assuming the relationship between assessed value and the VNOSS stage is prescribed linearly, the predicted values for the first two VNOSS stages would be negative. This finding may indicate that the early stages of "thought," "conceptual" or "pre-organizational," have little or no economic value to the market. Positive assessed value first appears at the VNOSS stage 3 [Resource Exchange Function], or when the entrepreneur first shows the action/behavior of gathering resources. The economic evaluation of early (yet critical) entrepreneurial organization activity is thought to be important to the field.

**S-Shaped Curve Linear Regression**

In an attempt to more fully define the relationship of assessed value and the VNOSS stage, regression-curve-fitting procedures were conducted utilizing the Gompertz (an S-shaped) curve. The overall fit of the data slightly improved

**Table 2**
**Curve Linear Gompertz Regression Results**

| Parameter | Estimate | Asymptotic Std. Error | 95% Confidence Interval Lower | 95% Confidence Interval Upper |
|---|---|---|---|---|
| B | 0.2013 | 0.2852 | -0.3625 | 0.7652 |
| M | 14.5066 | 15.9988 | -17.1219 | 46.1353 |
| C | 132.6622 | 669.3429 | -1190.5828 | 1455.9073 |
| A | 0.4618 | 0.2246 | 0.01782 | 0.9059 |

Where: B = The growth rate
M = Time of maximum growth
C = Upper asymptote
A = Lower asymptote

as an "S" shaped curve was fit to the data. The Gompertz non-linear regression yielded $R^2$ = .65 and the "S" function did appear to show some correlation of assessed value to VNOSS stage. The fit of the "S" curve explained approximately 18% more variance than the linear regression. However, the SPSS-curve-fitting procedure failed to converge on a well-prescribed "S" solution. The parameters obtained from the fit of the Gompertz function are outlined in Table 2.

Based on the results in Table 2, for parameter estimates and their standard errors, the general pattern cannot be well described as an S-shaped Gompertz function. The projected M (time of maximum growth) parameter of 14.5 indicates that the inflection point or time of highest local slope was placed at stage 14.5, which is beyond the time frame of the current study. The upward sloping curve did not "level off," and the C parameter of 132.6 indicates an upper asymptote—or maximum assessed value —of $132.6 million dollars is well beyond the reasonable CAP-M value of $6.5 million. Hence, it is concluded the "S" curve is not well fitted. This problem is confirmed by the high standard error (669.3429) for the upper asymptote, which indicates the SPSS procedure was unable to converge on a solution.

A visual inspection of the data in Figure 2 shows that the general increase in assessed value seems to continue upward at an accelerating pace. Hence, these findings suggest the perception of the market is such that the firm generally becomes sustainable after the entrepreneur leaves the firm, and a period of "abnormal" or "unusual" economic growth is not necessarily identifiable in the time frame as posed within the current study.

**Cubic Curve-Linear Regression Results**

Use of the curve fitting procedure of SPSS regression analysis outlined a cubic function: a non-linear curve defined by the independent variable with third, second, and first power exponents. Cubic functions describe high growth in the dependent variable. While the linear regression provided an $R^2$ of 47%, and the Gompertz function found that the fit of a cubic function would explain 66% of the variance ($p$ = 000). The results of a cubic fit are presented in Table 3.

Each of the variables shows significance. The "cubic" equation found is delineated as follows:

**Table 3**
**Cubic Regression Analysis Results**

| Variable | B | SE B | T | Sig T | $R^2$ |
|---|---|---|---|---|---|
| Constant | -1.8883 | 0.8389 | -2.251 | 0.0259 | |
| VNOSS | 2.1013 | 0.6962 | 3.018 | 0.0030 | |
| $VNOSS^2$ | -0.5539 | 0.1588 | -3.488 | 0.0006 | |
| $VNOSS^3$ | 0.04750 | 0.0104 | 4.529 | 0.0000 | 0.66 |

*Assessed Value* =
- $1,888,300
+ $2,101,300 *VNOSS*
- $553,900 *VNOSS*$^2$
+ $47,500 *VNOSS*$^3$

Assuming a cubic function fit, a valuation of this equation shows value first "emerges" or becomes non-negative at VNOSS stage 2 [T-Formation] where:

*Assessed Value* =
- $1,888,300
+ $2,101,300 (2)
- $553,900 ($2^2$)
+ $47,500 ($2^3$)

*Assessed Value* = $478,700

The increase in assessed value did not appear to slow or "level off" as the VNOSS stage progressed. This finding may be explained by the "framing" or limitation of the study in imposing a limit in the assessment of value of the organization to when the entrepreneur leaves the firm. It is possible the growth in value begins to slow *after* that phase and hence, a slowing of growth period was not included in the data of the current study. A subsequent study encompassing a longer developmental time frame and larger samples may exhibit a slowing of assessed value which may better prescribe an "S" function shape.

## DISCUSSION

The method for determining the association of assessed economic value regressed on VNOSS growth stage was examined within three regression functions. SPSS-based linear regression, an S-type curve-linear regression and a cubic type curve-linear regression were applied to the data. Based on the regression results, the assessed value was found to be related to the VNOSS stage of growth.

A curve-linear Gompertz "S" type regression function was not found to be well specified as the parameter estimates did not converge on reasonably expected values. Based on the failure of the "S" functions to converge on reasonably expected values and stage numbers within the model, a specified "S" shaped curve linear relationship was not found.

A linear correlation ($R^2$ = 47%, $p$ = .000) between the assessed value and the VNOSS stage was found. A "cubic" or third-powered exponential growth function was also detected ($R^2$ = 66%, $p$ = .000) in the relationship between assessed economic value and VNOSS stage. Thus, the linear and cubic regression does help explain the relationship between firm growth stage and economic value.

The current study suggests economic valuation experts perceive a change in economic value for episodic stages of development in new organizations in the presence of market opportunities. The results also suggest the economic value of two early stages, VNOSS 1 [singularity] and VNOSS 2 [T-formation], are nil or low. The organization whose entrepreneur has grown to the "thought", "discussion," or "advising" stage of development has little identifiable economic value.

The results also suggest valuation experts first attribute value to an entrepreneurial organization when the entrepreneur has begun the "advising" [T-Formation, VNOSS 2] stage or "resource acquisition" [VNOSS 3] stage, depending on the assumption of a cubic or linear function. The firm's economic assessed value seems to grow substantially as the entrepreneur advances the company beyond these stages to multiples of about four to seven times free cash flow.

The most interesting finding is a cubic or exponential growth function did fit the

data well ($R^2$ = 66%) and provided a significant result (F= 89.83, $p$ = .000), indicating the value of the firm increases at an increasing rate and becomes positive at the second VNOSS stage [Resource Exchange] of growth. This finding indicates high rates of return may be found when an entrepreneurial firm is progressing through the stages of "resource exchange" or later stages. This may provide venture capitalists with a new paradigm to identify appropriate investment targets.

### Limitation and Further Research

The authors acknowledge the current research is exploratory in nature and further work in experimental refinement needs to be accomplished. Readers realize that all economic value is based on perceptions of expected cash-flow and risk; however, an organizational structure is first required to capture market opportunity and produce cash-flow. Hence, the advent of organizational structure, and the speed in which the structure is formulated, may be primary indicators of economic value. It is suggested future research be conducted using a longitudinal structured interview analysis. Possible future research based on the *velocity* in which an entrepreneur builds an organization may yield interesting results. Further, more robust episodic hierarchical development models should be developed based on unbiased observation rather than the self-reporting of the entrepreneur. Research initiatives should be based on a broader scale, with a greater sample size, and targeted to a more diverse sample group. Also, researchers may use angel investors as a sample since they are normally involved early in the investment process, deal with emerging firms regularly, and must value these firms. Additional study should also be applied to low-growth and medium-growth organizations. This type of study could be applied across nations to detect possible differentiation of episodic growth patterns per nation, possibly based on cultural or economic differences. A study conducted by industry may yield additional insights. Further empirical identification of episodic stages in organizational growth needs to be accomplished.

## IMPLICATIONS

Earlier research (Fiore & Lussier, 2007) suggested an episodic growth stage model of organizational development (the VNOSS model) may exist for emerging firms. In this study, stages of growth beyond the first VNOSS stage (the phase where the entrepreneur is simply formulating conceptual plans) exhibited increasing perceived economic value according to a sample of 145 CPAs. Thus, the use of the VNOSS is supported through this regression research. The results are of interest to small business educators, small business owners and managers, small business consultants, and investors in business ventures.

An important implication is an "S" or non-linear regression function did not fit the data well. The existence of any "disproportionate" growth in perceived economic value was not located by the presence of any "local maximum slope" or inflection point in an "S" curve. It is suggested a period of "high rate of return" and "gazelle" growth may exist, yet such a period may be beyond the timeframe as accessed in the current study. This may indicate that CPA evaluators perceived the firm has substantial value-growth potential beyond the stage where the originating entrepreneurial small business owner leaves the firm, which was defined as Stage 9 [Trans-mission] of the VNOSS model.

Although a linear increase in assessed economic value verses VNOSS stage

growth was detected in the data, a "cubic" relationship was found to better describe the relationship of assessed value and VNOSS stage, with greater economic value. Since the cubic regression was found significant, evidence was found which supports the idea that the economic value of a developing entrepreneurial firm could grow exponentially, in a cubic manner, and the growth in economic value may normally level off after the time frame of this study.

Based on the regression findings supporting the use of the VNOSS, the most relevant implication of the current research is the evidence that entrepreneurial firms that progress through the VNOSS stages show economic value tends to grow exponentially. Thus, a growth strategy to move through the VNOSS stages may result in exponential growth and a period of high rates of return. Slow linear growth may be suited for the small business owner, but entrepreneurial gazelles, and venture capitalists searching for gazelles, would prefer cubic growth. For example, FedEX, Google, EarthLink, and Monster.com all grew exponentially in early stages resulting in extra-market returns and cubic increases in economic value.

Verification of commonly occuring episodic stages of growth may help entrepreneurs, small business owners, and managers track the progress of their growth and assist investors in maximizing capital allocation and returns. The VNOSS model may be used to increase entrepreneurial success rates and provide growth guidelines. Business consultants can help small business owners and mangers to use the VNOSS. These improvements would help maximize resource allocation and returns on investments.

Clearly, there are classes of entrepreneurial endeavors with varying degrees of intensities and potential return. It would be beneficial to the small business owner and manager to have organizational development goals and plans in mind to lead the organization towards increased value-creation and, ultimately, harvest. The present study suggests the episodic VNOSS growth model may serve as a set of important milestones to investors and small business owners and managers of such organizations, and to consultants who advise investors and entrepreneurs. Small business educators can also teach the VNOSS model to students for use in entrepreneurial ventures.

It is recommended that investors who are searching for high rates of return consider identifying target firms that are capable of rapidly developing along a model of organizational emergence similar to the VNOSS episodic sequence of organizational structure. Assessing the potential of organizational structure growth and the velocity of change in that structure, in the presence of a substantial market opportunity, may prove to be an effective investment strategy, as investment may be possible before the emergence of cash flows. Such a valuation methodology may yield superior rates of return to the use of multiples applied to historical cash flow when valuating investment opportunities of entrepreneurial ventures.

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