International Journal of Economics, Business and Finance
Vol. 5, No. 1, August 2018, pp. 1-9, ISSN: 2327-8188 (Online)
Available online at http://ijebf.com/

Research article

Empirical Investigation of the Moderating Effects of Organizational Size on Ecommerce Capabilities and Organizational Performance

Dr.Victor Oladapo

Webster University
Department of Business
E-mail: voladapo@aol.com

Dr. Godwin Onyeaso

Shorter University
Adult & Professional Programs
E-mail: gonyeaso@dslextreme.com

Abstract

Conceptually underpinned in the resource-based theory, this paper empirically investigated three research questions subsumed in three hypotheses suggesting that: ecommerce capabilities are positively related to organizational performance, ecommerce capabilities predict organizational performance, and organizational size moderates the relationship between ecommerce capabilities and organizational performance. This study is unique as it used secondary data on U.S. female entrepreneurs to examine these research questions and tested the hypotheses. Managerially, the results of this study offer insights to the U.S. female entrepreneurs who are the U.S. engine of growth and employment, greater than the national average, but sadly a grossly neglected research area and capital starved.

Keywords:ecommerce capabilities, female entrepreneurs, moderator variable, resource-based theory, control variable.

Introduction

Technology has long been known as the transforming factor in all industrial settings and the environments (Carroll, 1994). In light of this, technological changes are the centerpiece of Porter's industrial structure analysis and theories

(Porter, 1985). New technologies alter the competitive landscape of industries by creating new industrial leaders and destroying old industrial leaders (Porter, 1985). In other words, new technological changes create new technology adopters even at the organizational level of analysis (Allison, 2017).New technology adopters at the organization level are profound and prominent in the Internet-driven ecommerce (Lu, Li, Zhang, &Rai, 2014; Porter, 2001).Because of this phenomenon, scholars have declared that technology is the most important element in ecommerce capabilities, and ecommerce related issues (Allison, 2017). Evidently, therefore, this analysis suggests that the level of female entrepreneurs' financial capital deployed into technology infrastructure should be an index of ecommerce capabilities, and ecommerce capabilities should be positivelyrelated to organizational economic performance; hence hypothesis 1 stated in the null:

H1: Ecommerce capabilities do not positively relate to organizational performance

Ecommerce advantages for managers have been well documented (e.g., Lu, Li, Zhang, &Rai, 2014), and these advantages include but not limited to: building websites that can be used as a sales medium, customer relationship platform, advertising medium, distribution channel for sales and sales promotions, and so on. Yet, while these attractive benefits of ecommerce to the adopters of ecommerce are well documented, the road managers must travel to get these benefits is bumpy (e.g., George, Haas, &Pentland, 2014).That is, establishment and upkeep of ecommerce capabilities is a nontrivial issue for organizations and their managers, as attested by calls for academic research to deepen scholarly knowledge of this important phenomenon now linked to the big data production paradigm shift(George et al. 2014). We believe, therefore, that a basic response to this call for research is to empirically investigate the link between ecommerce capabilities and organizational economic performance. That is, to empirically examine the assumption that there is indeed a significant positive link between ecommerce capabilities and economic performance of small firms using the conceptual lenses of the Resource Based Theory(Barney, 1986; Peteraf, 1993). Hence, we conducted this investigation using data on female entrepreneurs in the U.S., for the following reasons.

First, studies focusing on the contributions of ecommerce to businesses owned and operated by female entrepreneurs in the U.S. are almost nonexistent. Second, a study conducted by *American Express* (2018) solidly reveals that the number of women-owned businesses under the umbrella of female entrepreneurship is growing at a rate 2.5 times faster than national average.Third, female entrepreneurs are a subset of the small business population in the U.S. As such, they make contributions to the U.S economy along with all other small businesses that contribute to the U.S. economy in their roles as the engine of growth in the global economy (OECD, 2014).Given the preceding discussion on the contributions of female entrepreneurs to the U.S. economy, it is surprising that empirical studies focusing on the link between their ecommerce capabilities and their firm economic performance is nonexistent, to the best of our knowledge. Hence, our study makes a humble beginning to fill thiscriticalresearch gaps. All in all, the preceding discussion suggests the following hypotheses stated in the null:

H2: Ecommerce capabilities do not predict organizational economic performance

Evidently, our testable proposition stated in H2 appears to be straightforward. However, there is a catch related to whether or not organizational size will moderate the link between ecommerce capabilities and organizational economic performance expressed in H2. Specifically,the testable assumption expressed in H2 that ecommerce capabilities are positivelylinkedto organizational economic performanceand predict it, may be moderated by organizational size. This thesis is buttressed since several decades ago that firm size has long been well established as one of the differentiators between large versus small firms (Fama& French, 1992). Even among large firms organizational size is a factor as it is among small firms including female entrepreneurs businesses in the present study. Overall, therefore, the preceding analysis points to our third hypothesis stated in the null:

H3: Organizational size does not moderate the relationship between ecommerce capabilities and Organizationaleconomic performance

Literature Review

It is well established that the new information technologies have powered the Internet revolution of the modern commercial activities under the ecommerce platform, is a paradigm shift intensified by the surge in the big data

productivity(Nagender, Yadav&Sahu, 2016; Forman and Goldfarb, 2008). Evidently, to see the impact of this paradigm shift, one sees the exponential growth in ecommerce and ecommerce related activities has hit a level of 2.3 trillion U.S dollars in 2017, and this figure is projected to grow to about 18 per cent in 2021. However, this impressive picture of ecommerce raises an empirical question: Are all the industrial groups and categories especially in the U.S. benefiting from this new ecommerce bonanza? The answer to this question is not straightforward for a number of reasons. First, research indicates that while we know much about the contribution of ecommerce to large businesses in the developed world, little is known about the contributions of ecommerce to small businesses even in the developed world (Daniel &Grimshaw, 2002). That is, empirical studies on the contributions of ecommerce to small businesseseven in the U.S. are rarely found. Second, while there may be cross-country studies on the contributions of ecommerce to large businesses, the same cannot be said for small businesses across the globe.

Third, studies focusing on the contributions of ecommerce to businesses owned and operated by female entrepreneurs in the U.S are almost nonexistent. This research gap is surprising and needs to be filled for the following reasons. First, female entrepreneurs are a subset of the small business population in the U.S. As such, they make contributions to the U.S economy along with all other small businesses that contribute to the U.S. economy in their roles as the engine of growth in the global economy (OECD, 2014).

Resource-based theory (RBT) provides a useful theoretical lens that guides the explanation and prediction of superior firm performance based on the analysis of the firm as a collection of resources (Barney, 1986; Peteraf, 1993). According to RBT, a sustainable competitive advantage can be generated only when the resources are valuable, rare, and difficult to imitate(or be substituted)in ways that the firm's managers strategically exploit the resources (Barney, 1986). However, while this theory has been well established in the field of strategic management, scholars have cautioned that testing the theory is empirically challenging because the theory is tautological and hence difficult to parameterize (Priem& Butler, 2001; Hoopes et al. 2003).

For the purpose of the present study, we aimed at presenting an empirical study of ecommerce capabilities as a strategic resource linked to female entrepreneurs' organizational economic performance,as we draw conceptual support from the key elements of the RBT.To attain this purpose, we used a unique secondary dataset from*AtoZdatabases.com.* The centerpiece of our thesis hinges on: It is well established that firms achieve competitive advantage by building capabilities that are created by combining and deploying strategic firm-level resources (Grant, 2010; A.S. Bharadwaj, 2000; Morgan-Thomas &Bridgewater, 2004; Luo, Fan & Zhang, 2016).Following this stream of research, the present study considered ecommerce capabilities to be one such strategic resource that is capable of creating firm-level competitive advantage,even though ecommerce capabilities are a necessary but not sufficient condition to create firm-level competitive advantage (Barney, 1986, 1995).

Specifically, female entrepreneurs' financial capital investmentsto acquire and deploy ecommerce capabilities are not sufficient condition for ecommerce capabilities to yield competitive advantage to their firm (Morgan-Thomas & Bridgewater, 2004). Two interrelated conditions must be fulfilled so that the sufficient conditions for ecommerce capabilities to yield firm-level competitive advantage to occur. First, a stream of research suggests that a firm must uniquely blend its financial, human, physical and other resources in such ways that competitors will find difficult to imitate (Grant, 2010; Barney, 1995, Amit&Schoemaker, 1993), and ecommerce capabilitiesis no exception to this stipulation. Second, a firm must be capable of continuously reconfiguring its resources in response to dynamic changes in its environment and market conditions (Teece, 2014, Teece, 1997).Accordingly, in the present study we used a posterior strategy in asset deployment theory to trace female entrepreneurs' assets deployment patterns that allowed them to acquireecommerce capabilities. To this end,we subjected their secondary data in 2017 to empirical scrutiny to investigate the research objectives of the present study.

Methods

The data for the present study were secondary data collected from the database of *AtoZDatabase.com*.Using this database, data were gathered specifically on "Only women owned businesses." For the purpose of the present study, beginning from 3-3-2017 to 3-4-2017, data on 480 female entrepreneurs were randomly selected from a population of 713, 675 female entrepreneurs in the U.S. contained in *AtoZdatabase.com*. These data were extracted on the variables in Table 1.

The measurement of the variables in Table 1 and equation1 were as follows. The criterion (dependent) variable for the study was total firm revenue in 2017 (natural log). This operationalization follows recent empirical research related to ecommerce (GunwooYoon, Li, Yi Hong, & Liu, 2018). The independent variable is ecommerce

capabilities operationalized as a linear combination the amount of the firm's yearly revenue in 2017 deployed in IT-related infrastructure expenditure on: (a) technology (b)telecom, (c) website capability. Of these three variables, only website capability is a binary variable =1 if the firm has a website, and =0, if the firm has none. There are recent empirical studies that have used the operationalization of ecommerce capabilities exactly or close to that of present study. For example, IT-related organizational financial expenditures on IT infrastructures and functional websites have been used to operationalize components of ecommerce capabilities (Luo, Fan & Zhang, 2016, especially see their Table 1).Measurements of all variables in the present study have previous scholarly research support (e.g., see Allison, 2016; Luo et al. 2016).

Moreover, since decades ago Industrial Organization Economists (IOE) have demonstrated that researchers may know and capture a firm's strategy by following the trajectory of the firm's asset deployment; in the same way that one may know other persons lifestyle if one knows the trajectory of their payments to the things they spend money on (Hofer, 1989). Finally, Survival is a binary variable =1 if the focal firm has survived for three or more years, and it =0 otherwise. Evidently, it is well known that female entrepreneurs are a subset of the U.S. small business population. Being small businesses, some of them are short-lived exiting the industry within a few years of their existence (OECD, 2014; Headd, 2003). Hence, we believe that this phenomenon and its ramifications should be controlled for in the present study (Headd, 2003). Altogether, Table 1 presents and explains a list of the variables and their measurements in the present study.

Table 1
List of Variables Used in the Analysis

Variables	Description
(1) LnARev.	Annual Revenue in 2017 (in natural log)
Ecommerce Capabilities:	Annual Revenue in 2017 deployed in IT-related expenditure on (a) technology and (b) telecom for ecommerce capabilities (natural log). (c)Website as a binary variable =1 if the firm has a website, and =0, if thefirm has none.
Service.	Binary variable =1 if firm is a service firm & =0, otherwise.
Survival	Binary variable=1 if firm is 3 or more years in existence, 0 otherwise.
Fsize.	Number of full time employees in 2017 (natural log).

We used firm size as the moderator variable in the present study mainly because it has long been well established that firm size is a distinguishing factor between large firms and small firms (Fama& French, 1992). Moreover, even among the small firms, the larger their firm sizes the more is their likelihood to have more competitive advantage and greater chances of being successful ventures (Alison, 2017). Hence, following this stream of research, we entered firm size as a moderator variable on the assumption that differences in firm size across female entrepreneurs' businesses in this study may moderate the relationship between the dependent and the independent variable as suggested by the moderator effects theory and research (Hayes, 2014). Hence, the preceding analysis suggests our conceptual model in Figure 1.

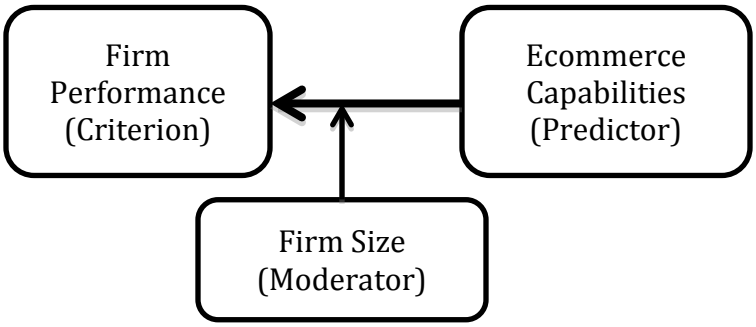

Figure 1. Conceptual Model

Continuing with variables' measurements, as shown in Table 1, we use Service as a binary control variable where Service =1 if the focal firm belongs to the service industry, and Service=0 if otherwise. However, we must add that this industry effect control is not absolutely important in the present study because the present study is theoretically underpinned in the resource-based theory, which is grounded in the assumption that performance differences are fundamentally caused by firms and not by industry effects (Barney, 1991; Hawawini, Subramanian, &Verdin, 2003). However, we still used the Service control variable to err on the side of caution, not that we are unaware that parsimony is the hallmark of science. Still in support of the firm effect not industry effect for the present study, Chan, Bhargava, & Street (2006) compellingly suggested that the major organizational challenges of small firms are not influenced by the types industry they belong to. That is, because female entrepreneurs are a subset of small businesses, industry effect is trivial. Moreover, since ecommerce is an Internet-driven phenomenon, it is well documented that the Internet blurs industry and market boundary (Amit&Zott, 2001). Therefore, thepreceding stream of research suggests that industry effect is indeed trivial for the present study and focus should be on firm effect conceptually underpinned in the resource-based theory (Barney, 1991; Chan et al, 2006; Amit&Zott, 2001).

Econometric Specification

In the framework of our hypotheses, we developed an econometric regression model to investigate the relationship between female entrepreneurs' ecommerce capabilities and their economic performance, and then examined whether their organizational size moderated the relationship between ecommerce capabilities and their economic performance of the firm in 2017. This econometric investigation was theoretically underpinned in Resource-based theory (RBT) of the firm. Equation 1 presents our econometric regression model:

$$YR = b_0 + b_1SV + b_2SL + b_3EC + b_4FS + b_m(EC * FS) + e \qquad (1)$$

YR = Annual Revenue of the firm

b_0 = Constant term

b_1 SV =Service Industry Member or not

b_2 SL=Firm survived 3 or more years or not

b_3EC= Ecommerce Capabilities

b_4FS = Firm Size

$b_m (EC * FS)$ = Interaction Moderation Effect between EC & FS.

e = White Noise Error Term

Analysis

Table 2
Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard Deviation
Firm Year Revenue	480	23.0	65.0	44.3	9.8
Ecommerce Capabilities	480	23.0	59.0	40.6	9.9
Firm Size	480	1.4	59.0	22.4	19.9
Service	480	0.0	1.0	0.3	0.5
Survival	480	0.0	1.0	0.4	0.5

Table 3 A

Moderation Regression of Firm Size on Ecommerce Capabilities and Firm Performance

Model 1.R	R-Square	Adjusted R-square	Std. Error	R-Square	ΔF	ΔSig. F
0.51	0.26	0.25	8.4	0.26	56.1	0.000
Model 2. 0.55	0.31	0.30	8.1	0.05	33.6	0.000

Table 3 B

Multiple Regression of Control Variable & Ecommerce Capabilities on Firm Performance

Model 1	Sum of Squares	d.f	Mean Square	F	Sig.
Regression	1206.8	3	4022.9	56.1	0.000
Residual	34122.2	476	71.6		
Total	46191.0	479			
Model 2					
Regression	14323	4	3580	53.1	0.000
Residual	31876	475			
Total	46191	479			

Multiple Regression Assumptions of Equation 1

First, before estimation of the econometric model in equation 1, the data were examined for any influential outliers, and none was found. Then Q-Q plots and other descriptive statistics were used to test whether the data departed from the parametric model assumptions including the normality assumption. A histogram of each metric variable in the data set was also computed to assess the normality of each variable. The results of these pre-estimation

encouraged us to proceed with estimation. Then, after estimation of the model, the Normal P-P Plot of Regression Standardized Residual of the dependent Variable and the histogram, suggested no serious departure from normality. Moreover, our sample size was large (N=480). Research demonstrated that multiple regression is robust to a large sample size (Lin et al, 2013). Additionally, computed VIF suggested no multicollearity. Altogether, these efforts enhanced our confidence in the results of the study that departure from the assumptions of parametric models did not undermine the results. To save space, the printouts of the above procedures may be obtained from the authors of this study.

Hypothesis 1 (H1): H1 stated in the null saidthat ecommerce capabilities do not positively relate to organizational performance. As can be seen in Table 3B, after entering the control variable, ecommerce capabilities was regressed on firm performance. As can be observed in Table 3B, the F-statistics was positive and statistically significant (F< .001). (Alternatively, a simple t-test could be used to yield the same result).This empirical result appeared to strongly suggest that H1 should not be retained. That is, the relationship between ecommerce capabilities and firm performance was positive and statistically significant.

Hypothesis 2 (H2): H2stated in the null said that ecommerce capabilities will not predict organizational performance. As can be seen in Table 3B, after entering the control variable, ecommerce capabilities was regressed on firm performance. As can be observed in Table 3B, the F-statistics was positive and statistically significant (F< .001). This empirical result appeared to strongly suggest that H2 should not be retained. That is, ecommerce capabilities predicted organizational performance, and did so positively.

Hypothesis 3 (H3): H3stated in the null said that organizational size does not moderate the relationship between ecommerce capabilities and organizational performance. As can be seen in Table 3A, on the first step, ecommerce capabilities was regressed on organizational performance. On the second step, organizational size was entered into the model as the moderator variable. As can be observed in Table 3A, both the change in F-statistics and R-square were positive and statistically significant (F< .001). This empirical result appeared to strongly suggest that H3 should not be retained. That is, organizational size moderated the relationship between ecommerce capabilities and organizational performance.

Results and Discussion

The descriptive statistics of this study are reported in Table 1. We used the theoretical perspective of the resource-based theory (RBT) to empirically investigate our fundamental research objective subsumed in three hypotheses stated in the null. These three hypotheses were: (1) H1: Ecommerce capabilities do not positively relate to organizational performance, (2) H2: Ecommerce capabilities will not predict organizational performance, and (3) H3: Organizational size will not moderate the relationship between ecommerce capabilities and organizational performance. Overall, these three hypotheses statedin the null were rejected so that their alternatives were retained. That is, we found that ecommerce capabilities were positively related to organizational performance. Second ecommerce capabilities predicted organizational performance. Finally, organizational size moderated the relationship between ecommerce capabilities and organizational performance.

Managerially, this studyhas significant critical directions for managers. The findings of this study will assist female entrepreneurs to understand the important link between their strategic capital investments in ecommerce capabilities technology and their organizational economic performance. In addition, this study also adds value to almost nonexistent literature on the use of secondary data to examine the link between ecommerce capabilities and organizational economic performance, focusing specifically on female entrepreneurs in the U. S. as a grossly research-starved area. Along with the above, this study will alert female entrepreneurs in the U.S. to understand that there may be a moderation effect of organizational size on the link between their ecommerce capabilities and their organizational economic performance.

Conclusion

Conceptually underpinned in the resource-based theory, this paper empirically investigated three research questions subsumed into three hypotheses suggesting that: ecommerce capabilities are positively related to organizational performance, ecommerce capabilities predict organizational performance, and organizational size moderates the

relationship between ecommerce capabilities and organizational performance. This study is unique as it used secondary data on U.S. female entrepreneurs to examine these research questions and tested the hypotheses. Managerially, the results of this study offer insights to the U.S. female entrepreneurs as part of the engine of growth and employment greater than the national average to the U.S. economy, but sadly female entrepreneurs in the U.S. area a grossly neglected research area and capital starved (Headd, 2003; Wiederhold, 2014).

References

(1)*American Express* (2018). American Express OPEN, retrieved at http://about.americanexpress.com/news/pr/2017/state-of-women-owned-businesses-2017-report.aspx

(2) Allison, Jerry (2017). E-commerce and the Newspaper Industry: Determinants of First-Movership, Academy of Strategic Management Journal, 16(1), 225-243.

(3) Amit, R. &Schoemaker, P. J. (1993). Strategic assets and organizational rent, Strategic Management Journal, 14, 33-46.

(4) Amit, R. &Zott, C. (2001). Value creation in e-business.Strategic Management Journal, 22(6/7), 453-520.

(5) Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: an empirical investigation. MIS Quarterly, 169-196.

(6) Barney, J.B. (1986). Organizational culture: Can it be a source of sustained competitive advantage? Academy of Management Review, 11 (3), 656-665.

(7) Barney, J. B. (1991). Firm resources and sustained competitive advantage.Journal of Management, 17(1), 99-120.

(8) Barney, J.B. (1995). Looking inside for competitive advantage. Academy of Management Executive, 9, 49-61.

(9) Carroll, G. R. (1994). A Sociological view of why firms differ. In R. P. Rumelt& D. E. Schendel& D. J. Teece (Eds.), Fundamental issues in strategy (p.271-290). Boston, M A: Harvard Business School Press.

(10) Chan, Y.E; Bhargava, N. & Street, C. T. (2006). Having arrived: The homogeneity of high-growth small firms. Journal of Small Business Management, 44(3), 426-440.

(11) Daniel, E.M. &Grimshaw, D. J. (2002). An exploratory comparison of electronic commerce adoption in large and small enterprises.Journal of Information Technology, 17(3), 133-147.

(12) Fama, E. F. & French, K. R. (1992). The cross section of expected stock returns Journal of Finance, 47, 427-466.

(13) Forman, Chris & Goldfarb, Avi (2008). How has E-commerce Research Advanced Understanding of the Offline World? In: Statistical Methods in e-Commerce Research, J &Shmueli (Eds.), John Wiley, New York.

(14) George, G. Haas, M. &Pentland, A. (2014). From the editor: big data and management, Academy of Management Journal, 57(2), 321-326.

(15) Gunwoo, Y; Cong Li; Yi, Ji; Cheng, Hong; &Jiangmeng, Liu (2018). Attracting Comments: Digital Engagement Metrics on Facebook and Financial Performance. Journal of Advertising, 47(1), 24-37.

(16) Grant, R. M. (2010). Contemporary Strategy Analysis and Cases: Texts and cases, John Wiley & Sons.

(17) Hawawini, G.; Subramanian, V &Verdin, P. (2003). Is performance driven by industry or firm-specific factors? New look at the old evidence.Strategic Management Journal, 24(1), 1-16.

(18) Hayes, Andrew F (2013). Introduction to Mediation, Moderation, and Conditional Process Analysis, Guilford Press: New York.

(19) Headd, B. (2003). Redefining Business Success: Distinguishing Between Closure and Failure. Small Business Economic, 21(1), 51-61.

(20) Hofer, Charles W (1989). Classroom Communication in Strategic Management.

(21) Hoopes, D. G. Hadsen, T. L. & Walker, G. (2003). Guest editors' introduction to the special issue: Why is there a resource-based view? Towards a theory of competitive heterogeneity.Strategic Management Journal, 24 (10), 889-902.

(22) Lin, Mingfeng; H. C. Lucas, Jr; GalitShmueli (2013). Too big to fail: Large samples and p-value problem. Information Systems Research, Articles in Advances, 1-12. http://dx.doi.org/101287/isre.2013.0480

(23) Luo, Jifeng, Ming Fan & Han Zhang (2016). Information Technology, Cross-Channel Capabilities, and Managerial Actions: A Longitudinal Study of the U.S. Apparel Industry. Journal of the Association for Information Systems, 17(5), 308-327.

(24) Morgan-Thomas & Bridgewater (2004). Internet and exporting: determinants of success in virtual export channels. International Marketing Review, 21(4/5), 393-408.

(25) Nagender, S; Yadav, M. &Sahu, O. (2016). Consumer Acceptance of Apparel E-Commerce-Ethiopia. Intellectual Economics, 10 (1 April), 55-62

(26) Organization for Economic Cooperation and Development, 2014. Entrepreneurship at a Glance, OECD, 2014, Paris.

(27) Porter, ME (1985). Competitive Advantage, Free Press, New York.

(28) Porter, ME (2001). Strategy and the Internet.Harvard Business Review, 79(3), 63-78.

(29) Peteraf, M. (1993). The cornerstone of competitive advantage: A resource-based view. Strategic Management Journal, 14 (3), 179-191.

(30) Priem, R. L.& Butler, J. E. (2003). Is the resource-based "view" a useful perspective for strategic management research?

(31) Teece, D.J. (2014). The foundations of enterprise performance: dynamic and ordinary capabilities in an (economic) theory of the firm, Academy of Management Perspectives, 28, 328-352.

(32) Wiederhold, Brenda K. (2014). How Can More Women-Owned Technology Businesses Get Funding?