

## Online Sales in Startups<sup>1</sup>

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### Abstract

Research in online channels indicates the derived benefits are positively related to the size of a firm. A conceptual framework based on flexibility is proposed to explain the effect of size. As in the case of startups, a high percentage of them is faced with geographic restrictions. This study examines the factors leading to online channel adoption and percent online sales after adoption among a sample of 2,016 startups that have participated in the Kauffman panel survey. Performance outcomes of channel adoption and percent online sales show that startup firms are more concerned about sales growth than cost reduction.

**Key words:** online channel, startups, online sales, Kauffman

**JEL:** M30, M31

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## 1. Introduction

In advent of the prevailing of internet, online channel has been adapted widely. Many manufacturers, distributors and alike have relied solely or partially on online channels. Much academic research efforts have been devoted to E-tailing (Ahrholdt 2011; Lander, et al. 2015; Moore, Kinard and Moore, 2005; Singh and Sharma, 2010). The impact of online channel on startup business performance has not been studied. Startups business has some unique characteristics that are different from the large/mature business. Wolk and Skiena (2009) pointed out that size of a firm is positively correlated with performance of online sales. Benefits of online channel are typically only accrued to relatively large companies that already command a strong reputation in its markets. Consumers are hesitant about switching to an unknown entity. This study will shed light on how online channel impact the performance of small startups.

This study has three research objectives. First, we propose the general conceptual framework based on resource based view (RBV) of a firm for explaining online sales performance has to be modified for startup companies. RBV typically relies on the production efficiency argument. Here, we introduce the concept of flexibility for small firms –startups to operate effectively in the marketplace. Second, we examine empirically the factors leading to the adoption of online channel among startups in the U.S. Third, after the online channels are added, we identify factors that lead to the growth of percent online sales. These three objectives will be studied simultaneously by way the Heckman Selection model that will discuss in more details in a later section of the paper. This study addresses the performance implications of the adoption of online channel and percent increase/decrease of online sales on the overall performance of a firm.

This study makes unique contributions to the academic literature in the following ways. Earlier studies have already indicated firm size is an important factor yet only large/mature companies are included in these studies. Our study is the first that looks at adoption and percent online sales among startups. Results from this study will not only shed light on how startups would utilize online channels and sales, the differences between startups and mature firms will be addressed. Theoretical argument based on flexibility will be employed to explain why startups behave differently with respect to adoption of online channels and the performance implications. The framework will be illustrated with data obtained from the Kauffmann Foundation. Second, most studies looked at the adoption or the performance implication of online sales separately. Xia and Zhang (2010) may be the only study that addresses both adoption and performance outcomes. Here in this study online channel adoption and percent online sales are to be studied in an integrated manner. The use of the Heckman econometric approach accounts for sample selection bias, thus more meaningful insights can be attained through improvement in parameter estimates.

## 2. Conceptual Basis

The resource-based view of the firm has been used to explain the adoption of online channels and its effects on firm performance (Xia and Zhang, 2010). Wernerfelt (1984) proposed this theoretical basis to study a firm' ability to deploy its resources to create value. The fundamental tenet of RBV is that the competitive advantage of a firm and its performance are directly related to its resources. Given customer demand specifications, a firm has to develop a specific resource configuration in a way to meet these specifications while attempting to gain competitive competence. To achieve a sustainable competitive advantage, these resources must be heterogeneous and of economically valuable. (Barney 1991). Resource complementarity leads to synergy and enhancement of total value when the resources are combined as a whole.

For online and off-line channels, there can be a number of complementarities. Online channels offer convenience of search, can feature more product/service information, and accessibility without time and geographic restrictions. Information secured through online shopping will allow retailers to improve on their target marketing and attract customers to shop at the stores. Successful integration and coordination of online and offline channels from the supply chain and consumer demand perspectives leads a distinct capability that will command competitive advantage.

Teece, Pisano and Shuen (1997) further extend the RBV by introducing the concept of dynamic capabilities which are defined as “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (p. 516). This dynamic perspective emphasizes the importance of continuous upgrading capabilities to achieve competitive advantage in an ever changing environment. The ability to continually develop and acquire new technological, organizational and managerial resources in way of achieving performance competence is the central focus of the dynamic capability perspective.

Within a particular market, using the RBV argument, a firm would like to come up with a configuration of resources that will allow it to meet market demand while establishing a distinctive competitive position. Efficiency in the utilization of resources can be derived from the supply chain and market perspectives. A firm may have to invest not only in the acquisition of online channel. Capital investments leading to integration of this channel with the traditional channel and with other components of the supply chain is deemed necessary. Promotional efficiency entails greater market coverage given fixed level of inputs. Production efficiency means more unit output for a given set of input factors. As a result, average cost of production/delivery of one unit of product to the market will go down, leading to improvement in gross margin. Efficiency is based on economy of scale. A firm has to be sufficiently large in order to be able to invest in these areas. Given the requirements for efficiency, it is not likely for a small firm to command a competitive position in the market place. Thus, it is quite conceivable that efficiency based aspect of RBV framework should only be used for medium/large companies and not for small startups. Aidis et al (2012) also examine the effect of size on entrepreneurial entry and government and conclude that size does matter.

In discussing reasons for the coexistence of large and small firms in markets, Caves and Porter (1977) focus on strategies that distinguish rivals. Smaller firms operate differently than their technically superior larger cohorts and depend on their flexibility in meeting demand in order to survive (Schmalensee 1985). Similarly, Mills and Schumann (1985) point out that large rivals own the advantage of lower minimum average costs while small competitors possess an offsetting advantage in their superior responsiveness to cyclical or random swings in demand. Greater flexibility is achieved by smaller firms because of their greater reliance on variable factors of production.

Strategists, like Harrigan (1985), include the role of firm level flexibility plays in improving profit performance. Small firms particularly in the case of startups have to be nimble, flexible in terms of entry and exit from a market; and be responsive to fluctuations in market demand. These firms typically appear in niche or local markets thus avoiding head-on competition with the major players in the core product markets. Ingredients for success are quite different for small firms. Instead of riding on customer demand in the core product markets and be competitive with dominant players, small firms emphasize flexibility in exploring potentials in niche markets and in responding to fluctuations in demand. One would expect the factors that lead to adoption

of online channels, percent online sales and the performance outcomes for startups to be different from those for large firms.

In applying the RBV argument for small startups, Mickiewicz et al (2017) argue for the inclusion of opportunity costs in addition to individual level and entrepreneurial resource endowment particularly at the local environment. The whole framework is empirically tested using multinomial logit estimator with the 2006-2009 Global Entrepreneurial Monitor database. Their results largely support the hypotheses being put forth in their study.

### 3. Literature Review

A large number of previous literature has been studied the impact of online channel in supply chain by weighting the advantages and disadvantages. Benefit of introducing direct channel has been found in some research. Chiang et al. (2003) examine a price-competition game in a dual channel supply chain and demonstrate that the notable strategic use of a direct channel is to increase efficiency of a supply chain. Dumrongsiri et al. (2008) also find that the manufacturer is likely to be better off in the dual channel supply chain than in a single channel under condition that the retailer's marginal cost is high and the wholesale price, consumer valuation and the demand variability are low.

Online channels allow a firm to reach out to new markets. This is particularly true for firms that serve only local markets. Online channels free such a firm from geographical restrictions, affording the opportunities to serve in distant if not global markets. Online channels provide shopping opportunities not only along the spatial dimensions. They make shopping available 24 hours a day, seven days a week. Its interactivity and the possibility of personalized offers enhance consumer loyalty (Geyskens et al. 2002, Lee and Grewal 2004, Kumar and Venkatesan 2005).

While it is easy to identify sales benefits of online channels, benefits to be accrued at a firm level sometimes are less obvious. Online sales channels induce competition particularly in a multichannel structure. Ease of price comparison not only increases price competition among product offerings on the internet, oftentimes tends to a decrease in prices in other channels. In general, multichannel retailers offer lower prices than do traditional retailers. Even if online channels do well, they may do so at the expense of lower price levels in the other channels. Greater internet sales may not always contribute to the overall financial performance of a firm. Cannibalization of sales that is existing customers switching from traditional channels to internet is always a serious concern unless the profit margin of internet channel is higher than that of traditional channels (Ansari et. al. 2008). The overall performance impact of online channels on a firm is quite mixed.

In addition, Gatignon and Xuereb (1997) address the issue of size in the acquisition of an online channel. They argue that large size company experience greater innovation performance and thus they are more likely to attain greater success with the acquisition of an internet channel. Moreover, a large company commands a strong position in its market, making it easier for consumers to recognize its brands and purchase online. Research in general has shown the size of a company has a positive influence on internet channel performance (Wolk and Skiena 2009).

Numerous research studies have examined the effects of adding an online channel on sales and performance outcomes at the firm level. Xia and Zhang (2010) conduct a thorough review of the literature and empirically examine its effects among 100 publicly traded companies using the event study methodology. The authors conclude that online channel adoption in general provide significant improvements in overall sales, cost, inventory and return on investments. Selling directly to customers has a number of advantages, such as enhancing the efficiency of supply chain,

reducing margin sharing with intermediaries and reaching a wider segment of customers. (Xia and Zhang 2010) For instance, Dell Computers sells PCs directly to customers via online channel and enjoys more margins comparing with other traditional PC manufactures. Adding a direct online channel also has potential disadvantages. Competition is introduced into system, which will lead to lower prices and reduction in margins. Profits for both channels may decrease. This can explain why many manufacturers are hesitant to add online channel to distribute their products.

To the best of our knowledge, no study has focused on online channel adoption and its performance outcomes among startups. The Kauffman Foundation is the predominant funding organization for startups and new ventures in the U.S. The annual surveys conducted by the Foundation provide a unique opportunity to examine these research issues among startups in the U.S. over time. Performance of online channels among startups will be compared where possible with results reported in Xia and Zhang (2010) to highlight the effects of difference in size between the sample of startups in the Kauffman survey and publicly traded firms.

#### **4. Data and Summary Statistics**

The Kauffman Firm Survey (KFS) is a longitudinal survey of 4,928 firms that started business in 2004 and the follow-up surveys that are done on the annual basis through 2012. These data include detailed information on firms' industry, physical location, employment, financial information, types of financial capital (equity and credit) used, intellectual property, and business owners, both at start-up and over time. More information about the KFS data is available in Robb et al. (2009) and [www.kauffman.org/kfs](http://www.kauffman.org/kfs). This dataset has been used previously in marketing research (e.g., in Robb and Robinson 2012 and Cole and Sokolyk 2012).

From 2007 so on, each firm was asked to respond to the following question "During the calendar year, were any of the firm's sales made to customers through the internet, such as through the business website or an online retailer site.". If the owner responds "yes" to this question, then the firm is identified as using online channel. Furthermore, each owner also needs to respond to the question "What percent of business's total sales were sales made to customers through the internet? Would you say, less than 5%, 5% to 25%, 26% to 50%, 51% to 75% or 76% to 100%?". The midpoint of each range is used to gauge the proportion of sales from an online channel.

#### **5. Sample Construction**

The industries included in this study are agriculture, construction, manufacturing, wholesale, retail, and service. Firms in the mining and public administration industry are excluded from the sample because only a few observations fall into these two industries, and those two industries do not use online sales at all. Since the question for online sales was added into the questionnaire in 2007, thus we only keep data after 2007. In addition, we require observations to have non-missing total assets, sales, profitability, operating expense and owner's information such as work experience and location of business. This requirement further reduces the sample to 2,016 firms from the original total of 4,928, yielding 7,573 firm-year observations. These constitute the base sample in this study.

The variables investigated in this study are shown in Appendix A. A description of the KFS dataset can also be found in Robb and Robinson (2012). Among all the variables, "Online channel" and "Sales from Online Channel" deserves special mention, as those two are the key variables in this paper. We will use Sales from Online Channel to gauge a firm's reliance on online channel.

The number of firms with online sales channel ranges from a low of 26% in 2007 to a high of 43% in 2011 in the base sample. All the variables are winsorized at 1% level except for

sales growth rate and financial leverage. Due to large outliers in those two variables, we winsorize sales change at 5% level and the leverage ratio is capped at value 1.0.

**Table 1: Sample composition by year and industry**

Panel A: Sample Composition by Year

year	N	Online channel (Proportion)	Percent online sales
2007	1,903	0.27	0.31
2008	1,607	0.29	0.30
2009	1,435	0.28	0.33
2010	1,369	0.30	0.33
2011	1,259	0.31	0.33
Total	7,573	0.29	0.32

Panel B: Sample Composition by Industry

Industry	N	Online channel (Proportion)	Percent online sales
Agriculture	62	0.34	0.28
Construction	609	0.13	0.12
Manufacture	1,032	0.34	0.28
Transportation & Utility	160	0.33	0.31
Wholesale	376	0.45	0.29
Retail	731	0.48	0.39
Service	4127	0.25	0.33
Finance & Real Estate	476	0.24	0.23
Total	7,573	0.29	0.32

A breakdown of the sample by year and industry is shown in Table 1. Panel A shows the gradual attrition of firms/observations over the study period from 2007 through 2011. The sample starts with 1,903 observations and ends with 1,259 in 2011. In 2007, 27% has online channels with 31% of sales derived from these channels. These percentages increase to 31% and 33% correspondingly in 2011. Panel B indicates that the overwhelming majority of startups in the sample are from the service sector. Only 25% of these service-based startups use online channels with a slightly above average, 33% as compared to the sample average of 32%, percent online sales.

## 6. Heckman Selection Model

In a panel study, multiple responses are taken from each entity sequentially over time. Sometimes the later responses are said to be dependent or nested within the responses taken previously. This phenomenon is being referred to self-selection bias. In this study percent online

sales can only be observed when a firm responded ‘yes’ to the adoption question. The two-step Heckman method (Heckman 1979) is used to account for the selection bias in way of improving the estimation of the second stage responses. Wiles, Morgan and Rego (2012) employed the two-stage Heckman model to model this potential systematic selection bias between firms that have/have not been engaged in brand acquisition/disposal. The second stage model was used to predict the abnormal returns associated with those firms that have brand acquisition or disposal. They found the use of the two-stage Heckman model was useful in the prediction of abnormal returns. The mathematical derivation of the Heckman model is included in Appendix B.

We applied a probit selection model to the full sample of 7,573 observations to estimate the probability that a firm engage in adoption of online channel in that year. The resulting parameters from the first stage model served to calculate the Mills lambda, which was then included as an additional regressor in the second-stage regression to account for selection bias. In the first stage of the Heckman model for this study, a probit model is used with the value of the dependent variable being 1 if the firm adopted an online channel in year  $t$  and 0 if it did not. In this selection model, we included factors likely to affect the firm’s decision to engage in online channel. The second stage of the Heckman procedure was an ordinary least squares regression on the percent online sales incorporating the Mills lambda and the independent variables previously described. Since the dependent variable is percent online sales, the  $\ln(p/1-p)$  transformation is applied to correct for unequal variance and out-of-range predictions, before subjecting it to the OLS estimation.

## 7. Results

Table 2 shows the descriptive statistics of variables used in this study. The sample contains 7,573 firm-year observations. The sample size for percent sales from online channel is 2,179. According to Table 2, those startups are very small in term of sales, on average, the annual sales are only \$408,420, and the total assets values has an average of \$198,890. Thirty-five percent of the firms are local. These firms are reported to have their primary target customer base located within the same neighborhood or city. Eighteen percent of the firms in our sample have exports to overseas, and 17 percent has research and development expense. On average, 29% of our firm has online sales channels. Among these firms, the average sales from online is 32 percent. Furthermore, 50% of the firms in our sample are home-based business, which means that they do not have a store or retail location. These firms rely heavily on internet channels to reach their markets.

Table 2 also shows that firms with online channel tend to have higher Expense/TA ratio, 0.81 as compared to 0.77 for firms that do not rely on internet. This difference is significant at the 0.01 level. Firms with internet channel experience higher sales growth 48% versus 36% for the group not using internet. Significant differences are also detected along Debt/TA, Trade Credit, Export and R&D where the averages for firms with online channel far exceeded those that do not; and along Work Experience and Local Firm where the averages of online firms are lower than offline firms. Perhaps it is surprising to find that there is little difference in size measured in terms of Sales between the two groups.

**Table 2 Summary Statistics**

Variables	N	Mean	Std. Dev.	With online	N (w/ online)	W/o online	N (w/o online)	t-statistic
OI/TA	7573	0.92	1.46	0.89	2176	0.94	5397	-1.47
Sales/TA	7573	4.46	5.47	4.28	2176	4.53	5397	-1.82
Expense/TA	7189	0.78	0.58	0.81	2081	0.77	5108	2.58**
Sales growth	7573	0.40	1.71	0.48	2176	0.36	5397	2.76**
Percent online sales	2179	0.32	0.32	.32	2176			
TA	7573	198.89	325.49	204.84	2176	196.49	5397	1.01
Sales (000's)	7573	408.42	631.65	423.89	2176	402.18	5397	1.35
Debt/TA	7573	0.38	0.86	0.47	2176	0.35	5397	5.63***
Work Experience (years)	7573	14.20	10.77	12.72	2176	14.80	5397	-7.67***
Trade credit (Proportion)	7573	0.28	0.45	0.31	2176	0.27	5397	3.73***
Operate at home (Proportion)	7573	0.50	0.50	0.49	2176	0.50	5397	-1.12
Online channel (Proportion)	7573	0.29	0.45	1.00	2176	0.00	5397	
Local firm (Proportion)	7573	0.35	0.48	0.24	2176	0.39	5397	-12.56***
Export (Proportion)	7573	0.18	0.38	0.34	2176	0.11	5397	24.83***
R&D (Proportion)	7573	0.17	0.37	0.25	2176	0.13	5397	13.12***
College degree (Proportion)	7573	0.23	0.42	0.22	2176	0.23	5397	-1.08

\*\*\*Significant at the 0.001

\*\*Significant at the 0.01

\*Significant at the 0.05

We run two models with Heckman selection regression. The first model is a probit choice model – whether firms have online channels. In this model, we examine the impact of independent variables on adoption. The second model examines among the firms that have adopted the online channels, the effects of independent variables on percent of sale from online channel.

Table 3 presents the results of Heckman selection model. The overall model is highly significant (Chi-square = 363.97, significant at the 0.001 level). In model one as given in Column (A), the sample size is 7,573. In model two (Column (B)) the sample size is 2,197, including only firms with online channels.



**Table 3. Heckman Selection Model**

	(A) Online	(B) Ln(p/1-p)	Mills ratio
Ln(Sales)	-0.03*** (0.01) <sup>a</sup>	-0.11*** (0.02)	
Sales growth	0.03*** (0.01)	0.07** (0.02)	
College degree	-0.07 (0.04)	-0.06 (0.10)	
Operate at home	0.03 (0.03)	0.73*** (0.09)	
Local firm	-0.29*** (0.04)	-1.19*** (0.13)	
Export	0.75*** (0.04)	1.45*** (0.22)	
Trade credit	0.04 (0.04)	-0.57*** (0.09)	
Debt/TA	0.10*** (0.02)	0.06 (0.05)	
Wholesale/Retail <sup>b</sup>	0.54*** (0.04)	0.57*** (0.16)	
Work Experience	-0.01*** (0.00)	-0.02*** (0.00)	
R&D	0.37*** (0.04)		
Intercept	-1.22** (0.43)	0.28** (0.09)	
Lambda			0.95* (0.37)
N	7573	2179	
Chi-Square	363.97***		

\*\*\*Significant at the 0.001

\*\*Significant at the 0.01

\*Significant at the 0.05

<sup>a</sup> Standard error in brackets<sup>b</sup> Firms in wholesale or retail

Table 3 Column (A) suggests that in the probit model with online adoption being the dependent variable, firms with higher sale tend not to adopt online channels. The coefficient of Ln(Sales) takes on a value of -0.03 (significant at the 0.001 level). These firms may be attempted to protect their market position in their existing channels to avoid the possibility of cannibalization of sales by the online market. The result also shows that firms with high sales growth rate (coefficient = 0.03; significant at the 0.001 level) and higher financial leverage ratio (debt/total asset, coefficient = 0.10; significant at the 0.001 level) tend to adopt online channel. High sales growth firms need to add sales channels to capture valuable business opportunities to fuel their

growth. These firms need online channels to reach, communicate and serve their customers. Column (A) also shows that local firms which only serve local communities are less likely to adopt an online sales channel. These firms are service-oriented and thereby are restricted by geographic distance defined for their markets being served. Firms that have export sales are more likely to have an online sales channel (coefficient = 0.75; significant at the 0.001 level) as it can help them reach out to overseas markets. Industry practice and owner's industry experience are also important drivers of online sales channel usage and adoption. The firms in wholesale and retail industries already are in the distribution business, see the online channel as a means to strengthen their channel position and reap benefits from this acquired channel. The owners' industry experience is defined as the number of years of experience the owner has in the industry. An experienced owner might have built a strong business network and have established supplier-customer relationship and is thus more likely to rely on their current traditional sales channel and is less likely to use an online sales channel. R&D is an instrumental variable in the Heckman selection model. R&D is likely to affect whether a firm adopts an online channel. The coefficient of R&D is significant at the 0.001 level, signifying that the R&D firms are more likely to adopt online channel. Firms with high R&D expenditures are more innovative in product development and are more likely to adopt a new channel.

In the second stage of the model (column (B)), the dependent variable is the percent of sales from online channels. The results suggest that firms with high sales (from traditional sales channels) tend to have lower percentage of online sale (coefficient = -0.11; significant at the 0.001 level). According to the first stage estimation results, firms with high sales volume tend not to adopt online channel. As a result, online channel is not the main channel in these firms. It is interesting to note that Sales Growth Rate is found to be positively related to percentage of sales from online channel (0.07, significant at the 0.01 level). As the overall sales increases, online sales tend to increase at a faster rate. Firms that are home-based tend to have higher percentage of sales from online channel (coefficient = 0.73; significant at the 0.001 level). Online channel is important when they do not have a physical retail store. Firms receive trade credit from their suppliers have lower percentage of sales from online channel as they might have well-established supply chain system which is not related on online sales channel. Among the wholesalers and retailers, online channel provides a clear opportunity for sales growth (coefficient = 0.57; significant at the 0.001 level). Given their expertise in the channel of distribution, integration of online channel into their distribution system probably is easier and effective.

Table 4 captures the effects of using the Heckman Selection model on the prediction of percent sales from online. The dependent variables in Column (A) and (B) are  $\text{Ln}(p/1-p)$  with sample of 2,179. Column (A) results are from the second stage Heckman model while Column (B) corresponds to a direct estimation without evoking the Heckman model. It is interesting to note that the coefficients in Column (A) with Heckman model are consistently higher and are more significant than those as reported in Column (B), thus providing support that Heckman Selection model is indeed appropriate and effective in accounting for selection bias.

Table 4. Validation of Percent of Sales from Online

	(A) Heckman Ln(p/(1-p))	(B) OLS Ln(p/(1-p))
Ln(Sales)	-0.11*** (0.02)	-0.10*** (0.02)
Sales growth	0.07** (0.02)	0.05* (0.02)
College degree	-0.06 (0.10)	-0.04 (0.15)
Operate at home	0.73*** (0.09)	0.71*** (0.13)
Local firm	-1.19*** (0.13)	-0.97*** (0.11)
Export	1.45*** (0.22)	0.95*** (0.12)
Trade credit	-0.57*** (0.09)	-0.62*** (0.12)
Debt/TA	0.06 (0.05)	-0.00 (0.05)
Wholesales/Retail <sup>a</sup>	0.57*** (0.16)	0.26 (0.16)
Work Experience	-0.02*** (0.00)	-0.01 (0.01)
Intercept	0.28** (0.09)	-0.35 (0.27)
N	2179	2179
R-Square		0.21

\*\*\*Significant at the 0.001    \*\*Significant at the 0.01    \*Significant at the 0.05

<sup>a</sup> Firms in wholesale or retail

## 8. Performance and Online Sales

This section investigates the effects of adoption of online channel and percent online sales on performance. Performance is measured in terms of expense/sales, asset turnover and return on asset (ROA).

Table 5 (A), (B), (C) and (D) show the regression results of firm performance on Online Sales and Percent of Online Sales with other controls. Column (A) has Ln(Sales) being the performance variables. Online firms have higher sales volume than offline firms (coef. = 0.48 and significant at the 0.001 level). It may seem disturbing to observe the negative, significant effect of Percent Online Sales on Ln(Sales). The rate of increase in Percent Online Sales far exceeds that of the overall sales of a firm. As shown in Column (B), adoption of online channel leads to an increase in overall expense of a firm. As Percent of Online Sales increases, total Expense also increases. Column (C) uses the assets turnover ratio (sales over total assets ratio) as the dependent variable. Firms with online sales channel have a lower asset turnover compared to

firms without online sales channel. At the same time, the coefficient of Percent of Sales from online sales channel is positive and statistically significant suggesting firms with an online sales channel are more efficient in generating sales. Column (D) has return on assets (ROA) ratio as the dependent variable. Firms with online sales channel are less profitable. The coefficient of percent of sales from online sales channel is positive and statistically significant suggesting the firm with more sales from online sales channel will be more profitable. The effects are not trivial in terms of economic significance. A firm with a 10% increase in sales from online channel, its ROA will increase by 3% and its assets turnover ratio will increase by 13%.

Table 5. Performance of Online Sale

	Ln(Sales)	Ln(Expense)	Assets Turnover	ROA
Online Sale	0.48*** (0.12)	0.20** (0.08)	-0.58** (0.20)	-0.12* (0.06)
% of online sales	-1.60*** (0.27)	0.42*** (0.02)	1.14** (0.41)	0.26* (0.12)
Ln(Sales)		0.70*** (0.07)	0.57*** (0.02)	0.17*** (0.01)
R&D	1.01*** (0.11)	0.70*** (0.07)	-0.80*** (0.19)	-0.27*** (0.05)
Debt/TA	-0.21*** (0.05)	0.06 (0.03)	1.71*** (0.10)	0.11*** (0.03)
S corporation	1.11*** (0.11)	0.95*** (0.07)	0.48* (0.19)	-0.16** (0.05)
Constant	9.75*** (0.62)	6.43*** (0.31)	-3.672*** (0.85)	-1.45*** (0.15)
Industry control	Yes	Yes	Yes	Yes
N	7573	7573	7573	7573
R-Square	0.07	0.41	0.19	0.15

\*\*\*Significant at the 0.001

\*\*Significant at the 0.01

\*Significant at the 0.05

## 9. Conclusion and Limitations

Even though startup firms are not a new phenomenon, they are highly diverse and ever evolving. Economic theories are lacking in this area. Resource-based view of a firm is proposed to explain the adoption of online channel. Arguments are presented for the use of an online channel in single and multiple channel contexts. Possession and acquisition of capabilities are the key to gaining competitive advantage in the marketplace. Economic efficiency leads to lower costs of production and eventually allows a firm to compete effectively in terms of price. Size is a major driver in way of attaining high level of production efficiency. A conceptual framework based on flexibility is proposed for startups since these firms are small. An economic argument is also put forth for local startups to rely on internet channel to increase sales through geographic market expansion while easing the concern of sales cannibalization of traditional channel. A startup firm has to position itself in an emerging product market and continually adapt to demand volatility. Evidence gathered in this study lends support to the flexibility argument being put

forth. The large number of startups that have participated in the KFS allows us to shed light on the three key issues related to the online channels among these firms.

The study found that startup firms with a more established conventional channel tend not to adopt online channels, while firms with limited access to customers are more likely to acquire online channels to increase sale. The percent of sales from online has a significant impact on firms' performance as well. As the percent of sales from online channel increases, the firms will have higher overall sales and become more profitable. There is limited evidence to support the argument that online sales channel will lower operating cost.

One key point needs to be noted. Xia and Zhang (2010) reported online channel provides significant improvement in sales, cost, inventory, and return on investments. Our study of startups showed similar findings with the possible exceptions in costs and expenses. It has been previously argued that startups place more emphasis on sales and sales growth and not cost containment. Startups have to continually explore opportunities and react to market demand. They have to be nimble and be willing to invest further or retrench from the market place.

Since online percent sales is nested within the use of online channel, we employ the Heckman Selection model to account for selection bias. Evidence provided in Table 4 substantiates the fact that the Heckman model does lead to improvement in parameter estimation and testing, yielding evidence that selection bias is largely reduced.

The primary objective of KFS is to provide general information about startup firms in the U.S. over time. The survey was not designed specifically to study online channel acquisition. As a result, the explanatory variables used in this study may lack strong conceptual flavor.

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## Appendix A

### Variable description

Variables	Variable definition
OI/TA	Operating income/ total assets
Sales/TA	Sales/total assets
Expense/TA	Operating expense/total assets
Sales growth	$(Sales_t - Sales_{t-1}) / Sales_{t-1}$
Percent online sales	$(\text{Online sales} / \text{total sales}) * 100\%$
TA	Total assets (000's)
Sales	Annual sales (000's)
Debt/TA	Total debt/total assets
Work experience	Owner's work experience in industry in years
Trade credit	Trade credit from supplier = 1, 0 otherwise
Operate at home	Home based business = 1, 0 otherwise
Online channel	Online sales channel = 1, 0 otherwise
Local firm	Firm serving local market = 1, 0 otherwise
Export	Firm having export activities = 1, 0 otherwise
R&D	Firm investing in R&D = 1, 0 otherwise
College degree	Primary owner holding a college degree = 1, 0 otherwise
S corporation	Designated by IRS to process tax advantages=1, 0 otherwise