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Identifying Early Adopters to reduce New Venture Risk

Abstract

This conceptual paper addresses the entrepreneur's problem of identifying those target customers who will adopt the new product more quickly and thereby reduce the risk of new venture failure. Whereas the marketing literature explains diffusion of new products into markets by the 'innovativeness' of customers, we propose that customers follow a logical temporal sequence in a new-product-adoption process. This paper explains the logistic new product diffusion pattern by the progressive decay of six barriers that inhibit early adoption, these being named awareness, appreciation, aversion, alternatives, affordability, and accessibility. As each impediment to adoption is overcome, the consumer moves forward towards purchase of the product and does so only when the six stages are completed. This approach allows the entrepreneur to more readily identify the early adopters, and thus to reduce mortality risk by focusing marketing efforts towards those customers who are ready to purchase.

1. Introduction

Entrepreneurial new ventures are subject to extraordinary mortality risk that arises due to liabilities of newness (Stinchcombe, 1965) and the ignorance of consumers, producers and managers (Shepherd, Douglas & Shanley, 2000). Frequently their sales projections are optimistic (Cassar, 2009) and instead they experience a slow take-up of their new product(s) by uninformed or wary target customers leading to revenue shortfalls which threatens their survival. The entrepreneurship literature has paid scant attention to the pattern of sales growth for new ventures despite a vast literature in the marketing discipline examining the pattern of new product sales growth. This paper attempts to integrate findings from these two literatures to allow the entrepreneurial new venture to better identify early adopters and predict early sales growth and thereby reduce their mortality risk.

The diffusion curve phenomenon (Rogers, 1962) has galvanized interest among marketing researchers concerned with finding and refining the theoretical logic and empirical evidence for the "S-curve" pattern by which consumers adopt new products. Following Bass (1969) there has been a long stream of research which demonstrates that over a wide range of product categories, sales diffuse through a market first at an increasing rate over time, and thereafter at a decreasing rate as total sales approach market saturation, or decline due to obsolescence (see, for example Midgley, 1976; Midgley &

Dowling, 1978; Mahajan & Muller, 1979; Hirschman, 1980; Norton & Bass, 1987; Goldsmith, 1990; Goldsmith & Hofacker, 1991; Mahajan, 1995; Goldsmith, d'Hauteville & Flynn, 1998; Steenkamp, Hofstede & Wedel, 1999; Im, Bayus & Mason, 2003; Roehrich, 2004; Alexander, Lynch & Wang, 2008; Tellis, Yin & Bell, 2009; Peres, Muller & Mahajan, 2010; and Chao, Reid & Mavondo, 2012). This recurring pattern of sales diffusion is best approximated by a cumulative normal probability density (or logistic) function and reflects the approximately normal distribution of time lag after the product is introduced to the market and before it is adopted by individual consumers.

Marketing scholars argue that this pattern is due to the unobserved higher-order construct “consumer innovativeness”, which is argued to be a human trait that is normally distributed among the population of potential buyers for a new product, (see, e.g. Rogers, 1962; Midgley & Dowling, 1978). It is argued that consumer innovativeness is observed as the inverse of time to adoption (Rogers, 1962; Bass, 1969) or by the number of new products from a wider list of new products that an individual has in fact adopted (Midgley & Dowling, 1978). Early interest in the diffusion curve phenomenon focused on fine-tuning marketing communications to suit the consumer category that is currently adopting the product (Mahajan, Muller & Bass, 1990). Much effort has been expended to measure consumer innovativeness and a variety of scales have been suggested to better capture the essence of innovativeness (see, for example, Hurt, Joseph & Cook, 1977; Goldsmith & Hofacker, 1991; Roehrich, 2004; Tellis et al., 2009).

More recently much research has focused on the ability of measures of consumer innovativeness to predict the time to adoption by particular consumers, and most measures of innovativeness have displayed poor predictive ability (Roehrich, 2004; Meade & Islam, 2006; Tellis et al., 2009; Peres, et al., 2010; Chao et al., 2012). Better prediction is critical for planning purposes, since firms must build a productive facility of appropriate size, raise adequate financial capital, and put in place sufficient distribution arrangements, to avoid the financial stress that is associated with under- or over-estimation of consumer demand for their new product. Tellis et al., (2009, p.2) state “Thus the field could benefit from a new parsimonious measure of consumer innovativeness that can predict

consumers' adoption of new products." Most recently, Chao et al., (2012: 216) conclude that "further research needs to be carried out to more fully assess what exactly drives adoption".

This paper responds to these calls for individual-level research into the adoption decision by building an alternative model that generates the diffusion curve phenomenon but does not rely on the innovativeness construct to explain consumer adoption. Our model effectively replaces the unobservable higher-order innovativeness construct with six more-readily-observable barriers in an adoption-decision process – the potential customer must overcome these six barriers before adopting the new product. In the following sections we first outline the diffusion curve phenomenon as explained in the marketing literature. Next, drawing on the management literature more widely, we view the S-curve adoption pattern for a new venture as being the result of potential customers sequentially overcoming the six impediments to adoption. This allows us to conceptualize customers in terms of their apparent susceptibility to these impediments, and this becomes the basis for their identification by the entrepreneur or marketing manager who can then focus marketing communications on those most likely to purchase sooner rather than later. This is followed by a statement of propositions for future research and a discussion section including a reconciliation of the innovativeness construct with the six stages of the adoption-decision process. Finally we conclude with claimed contributions to the literature and directions for further research.

2. The Diffusion Curve

Rogers (1962) investigated the adoption of innovative technologies and demonstrated that time to adoption of a new technology by individuals or firms in the market is approximately normally distributed across customers, such that aggregate adoption of the technology follows a cumulative probability density function. Rogers (1962) named the adopter categories the "innovators" (approximately 2.5% of the market) who adopt between two and three standard deviations (SDs) before the mean time to adoption (MTA); the "early adopters" (13.5%) who adopt between one and two SDs before the MTA; the "early majority" (34%) who adopt between zero and one SD before the MTA; the "late majority" (34%) who adopt between zero and one SD *after* the MTA; and finally the

“laggards” (16%) who adopt more than one SD after the MTA. In this paper we redefine the laggards as those who adopt between one and two SDs after the MTA (13.5%), and introduce the “hermits” category who adopt more than two SDs after the MTA to represent the remaining 2.5% of the market. This distinction is not critical to our argument, but hermits are potentially interesting as the antithesis of the innovators: they remain unaware and/or unresponsive for a relatively long time to the firm’s efforts to induce them to adopt the new product.

Marketing scholars typically explain the customer’s time to adoption as an inverse function of his/her innovativeness, this being an individual trait that manifests itself in the propensity to embrace new products (see, for example, Bass, 1969; Midgley, 1976; Midgley & Dowling, 1978; Mahajan & Muller, 1979; Mahajan et al., 1990; Goldsmith, 1990; Goldsmith & Hofacker, 1991; Mahajan 1995; Mahajan et al., 2000; Goldsmith, et al., 1998; Steenkamp et al., 1999; Steffens, 2001; Im et al., 2003; Roehrich, 2004; Meade & Islam, 2006, Peres et al., 2010). Authors have distinguished between “innate innovativeness” (Midgley & Dowling, 1978), “vicarious innovativeness” (Hirschman, 1980) and “domain specific innovativeness” (Goldsmith & Hofacker, 1991). Tellis et al., (2009) classify prior consumer innovation research into three groups, namely (a) measurement of innovativeness; (b) relationship between innovativeness and new product adoption; and (c) the individual and social antecedents of innovativeness.

In the current paper we are primarily concerned with explaining the customer’s adoption decision. Prior authors have approached this by using one or more measures of innovativeness as the mediating variable to explain adoption (see, e.g. Venkatraman (1991), Midgley & Dowling (1993), Steenkamp et al., (1999), Im et al., (2003), Tellis et al. (2009) and Chao et al., 2012). Yet, as noted above, researchers have generally found that innovativeness offers relatively poor prediction of new product adoption (e.g. Tellis et al., 2009; Peres et al., 2010; Chao et al., 2012). Peres et al. (2010:100) state “To effectively investigate individual adoption decisions, researchers should elaborate on the individual-level models by separating the adoption process into a hierarchy of effects (awareness, consideration, liking, choice, purchase, and repeat purchase), integrating into each stage findings

from behavioral studies.” In this paper we follow the advice of these authors and examine a hierarchy of impediments to the adoption decision.

3. An Alternative Model of New Product Adoption

First we propose that the new-product-adoption decision occurs at the completion of a decision-making *process* conducted by the prospective purchaser of the new product. This is not, for most consumers, a “snap decision” but is instead the culmination of a reasoning process that is characterized by (potentially multiple) information searches and periods of reflection on the relative value of the new product in the context of the customer’s current consumption patterns, prior commitment to other products that serve the same need(s) or want(s), and income or wealth constraints. Nonetheless, the adoption decision could be a snap decision for a consumer who suddenly becomes aware of the availability of a new product and for whom none of the other five impediments are binding. Such customers are “primed for purchase” like the two million people who signed up for Apple’s *iPhone 5* prior to its launch in September 2012. These customers nonetheless go through a decision process that is partly premeditated (due to recognition of a felt need) and partly precipitated by the appearance or availability of a new product that offers a value proposition they cannot resist.

Second, we recognize the heterogeneity of consumer preferences (Meade & Islam, 2006) and that only some consumers will *ever* see the new product as a desirable value proposition. We confine our attention to the target market, which we define as those customers who will *sooner or later* adopt the new product, even though they may have little or no interest in the product initially (e.g. the laggards and hermits).

Third, our approach is to identify reasons why target customers are prevented or inhibited from buying the product, rather than taking the positive view that they will or should buy it because they are “innovative”. Many factors intervene to prevent innovative consumers from actually purchasing a new product (Alexander et al., 2008), and by focusing on these we will be better able to predict which of the target consumers are likely to go forward to actually adopt the new product in a timely manner.

Fourth, rather than dismissing the unobservable innovativeness concept we are attempting to explain adoptive behavior by more-readily observable factors that underlie innovativeness, *and* by other factors that the innovativeness approach typically neglects, although the six inhibitors to adoption have been previously recognized to a greater or lesser extent by some recent authors (e.g. Gourville, 2006; Alexander et al., (2008); Tellis et al., 2009; Peres et al., 2010) as component elements of innovativeness or as barriers to adoption. We will locate particular elements of innovativeness within the six barriers to the adoption-decision process, and make explicit those inhibitors that are not explicitly accounted for by the innovativeness construct.

Research in the various management fields suggest six factors that are likely to delay the decision to commit to purchase of the new product or service. Here we argue that there is a logical temporal sequence involving six stages in the adoption-decision process, and that the potential consumer must proceed through these six stages in sequence or conjointly as they overcome the inhibitors one by one. To facilitate exposition of the model, the barriers to adoption are expediently named awareness, attraction, aversion, alternatives, affordability and accessibility, and we shall address these in turn.

3.1 Awareness

‘Awareness’ is defined here as the extent of knowledge that consumers have about the product, starting with its existence and continuing with its purpose and manner of use, its quality attributes and differentiation, its price, place of sale, and so on. It is the converse of consumer ignorance as defined by Shepherd, Douglas & Shanley (2000). Awareness can range from zero to almost total knowledge of the product’s origins, capabilities, complexity, availability, purchase conditions, and so on. We expect there to be a distribution of awareness among the heterogeneous target customers, with awareness ranging from zero to very high, with the majority of potential consumers falling somewhere in between, such that there is a uni-modal distribution of target customer awareness with central tendency, not necessarily normally distributed.¹ The extent of a potential customer’s

¹ It is hypothesized that the six factors will each have a uni-modal distribution over time such that when these six distributions are added vertically the *aggregate* distribution of time to adoption by customers will be approximately normal. Note also that non-target customers may also be aware of the new product but are not ever going to buy it (by our definition of target customers, above).

awareness when a product is first launched will depend on that customer's utilization of the media, internet browsing activity, and access to and utilization of social and business networks, not to mention their curiosity or penchant for new information (see, e.g. Tellis et al, 2009).

3.2 Attraction

'Attraction' refers to the potential customer's innate appreciation for the consumer benefits associated with the new product or service. From the economics literature we borrow the concept of 'utility' which describes the psychic satisfaction expected to be derived from consumption of the new product or service (see, e.g. Thomas & Maurice, 2011: ch.5). Expected utility due to the satisfaction (by the new product) of one or more particular needs or wants will differ across heterogeneous potential customers from relatively high to relatively low, most likely with central tendency such that again there is likely to be a uni-modal and perhaps (but not necessarily) bell-shaped or normal distribution of initial customer attraction. The potential consumer will be attracted to the new product to a greater or lesser degree, both absolutely and relatively to other products that he/she might purchase instead. If the new product seems to offer a competitive value proposition relative to available alternative sources of satisfaction of the consumer's needs or wants, the potential consumer will be attracted to the new product and will move to the next step in the adoption-decision process. If the new product is not seen as a potentially competitive value proposition, the potential customer stalls at this stage of the adoption process and remains there until there is a sufficient increase in his/her expected utility, and/or a sufficient reduction in the price level, such that the value proposition (perceived quality over price) offered does attract enough interest to induce the prospective customer to proceed to the next stage.²

3.3 Aversion

'Aversion' refers to the target customer's quality-risk aversion, or their fear that the quality of the new product may fall short of their quality expectations based on the quality claims made by the firm.

² We say 'potentially competitive value proposition' because the customer's evaluation of the new product (as a means of satisfying their need or want) is not yet complete. This stage in the adoption-decision process has been called 'interest' (Rogers, 1962) or 'consideration' (Peres et al., 2010). At this stage the new product is yet to be critically evaluated for its quality risk (aversion stage) or against other products that purport to satisfy the same needs or wants (alternatives stage).

The prospective customer will fear that if the quality found is not as expected he/she will have wasted funds on a product that does not deliver the utility that was expected prior to purchase (Sweeney, Soutar & Johnson, 1999; Tellis et al., 2009; Peres et al., 2010). The actual quality experienced might also include unexpected negative outcomes such as ill-health or inflicted pain, and potential customers may perceive these risks and thus not proceed to purchase. Quality-risk aversion should be expected to vary across potential customers from very low to very high, such that again there is likely to be centrally-tending distribution of levels of this inhibiting factor. Perceived quality risk will be reduced as new information about product quality flows to the consumer, as they observe others consuming without incurring adverse effects, and as the new product gains trust and legitimacy in the market. Quality-risk aversion is never likely to be zero, but this impediment to adoption is overcome when the ratio of perceived risk to the expected utility of adoption falls to a level commensurate with the consumer's other risk-taking activities.

3.4 Alternatives

'Alternatives' refers to the availability of other means to satisfy the customer's needs or wants. The risk-reward trade-off introduced immediately above occurs for virtually all consumption activities and the risk-averse consumer can be imagined to compare the new product to other products and to purchase the product that provides the best expected-utility-to-price ratio in conjunction with the best expected-utility-to-risk ratio. A new product that replaces an existing product utilizing an older technology (such as an electric toaster replacing the toasting of bread on a fork in front of a fire) will face delayed purchase by individuals who prefer to continue to use the older technology out of habit (Zeelenberg & Peeters, 2008) or nostalgia (Steenkamp et al., 1999) or because they already own all the resources necessary to do it that way. *Switching costs* associated with adoption of the new product also relate to the use of alternative to satisfy a need. Switching costs include the extent of personal inventories of an alternative product currently held by the potential customer, and the investment of time, effort and costs required to convert to the new product, including learning costs (Klemperer, 1987; Burnham, Frels & Mahajan, 2003). We expect that the switching costs of potential customers, when switching to the new product from an alternative source of satisfying a specific need, will vary

from relatively low to relatively high, and also be characterized by a roughly bell-shaped frequency distribution.

3.5 Affordability

If the potential adopter concludes that the new product is the best alternative in terms of its expected utility, its price, and its quality risk, the next step in the adoption-decision process will be to consider its affordability (Golder & Tellis, 1998). That is, can the potential customer afford to purchase the new product or service, given their income or wealth situation? Affordability might be measured by the ratio of the price of the new product to the consumer's income or purchasing power. From economics we learn that consumers, with incomes that are limited relative to their wants and needs, must make allocation decisions based on the ratio of marginal utility to the price of the last unit purchased, which equates to expected utility per dollar of expenditure (Thomas & Maurice, 2011: chapter 5). If the new product's price is the same (or nearly so) for all potential customers, the operative variable becomes the potential customer's income or purchasing power. We expect that potential consumer incomes will vary from very low to very high – accordingly, some will be able to buy immediately while others will have to save up over a longer period in order to afford purchase of the new product, thus delaying their decision to purchase (Golder & Tellis, 1998).

3.6 Accessibility

The final step in the adoption decision process is to gain access to the seller of the new product such that it can indeed be purchased. Accessibility might be very easy for some potential consumers and very hard for others. Accessibility might be measured by the customer's degree of inconvenience associated with purchasing the new product – inconvenience might be due to a more-distant location relative to the new venture's sales outlet (Kelley, 1968). Inconvenience might be best operationalized in terms of the time involvement and inconvenience required to consummate purchase of the new product. Again, we might expect this to vary across individuals from relatively low to relatively high with probable preponderance of observations around a mean which is somewhere in between these extreme observations.

Thus the six steps in the adoption-decision process provide a series of checkpoints through which the target customer either passes on the way to actually buying the new product, or at which that potential customer stalls and does not yet buy the new product, awaiting the decay of that obstacle to adoption. Each of these impediments to purchase is likely to be uni-modally distributed across the target market. When these six frequency distributions are summed vertically over time the aggregate distribution is hypothesized to be approximately normally distributed around a mean time to adoption, as evidenced by the plethora of studies affirming that new product adoption is normally distributed around a mean time to adoption. Thus we contend that the frequency distribution of the time to adoption is alternatively explained by the sum of the frequency distributions of the six inhibitors to adoption.

4. Decay of the Barriers to Adoption

As time passes each of the six barriers to adoption will tend to decay. Customer *awareness* will tend to grow as information spreads across the market due to promotional efforts by the vendor, by inter-customer transmission of information, and by potential customers' observation of the choices of others. *Attraction* of potential customers to the new product is likely to grow over time as they observe earlier purchasers enjoying the new product and/or learn more about the benefits of the new product via word-of-mouth or internet browsing. Quality-risk *aversion* in most cases should also decline as increased information flows to quell uncertainty about product quality in the mind of the potential customer.³ The *alternatives* to purchase, in view of other methods of satisfying the same consumer need and/or the switching costs faced by the potential customer, are likely to decline over time as older assets physically deteriorate and consumer-owned inventories of the services of those assets are depleted. The *affordability* of the new product is likely to increase over time as potential customers save to accumulate the necessary funds and/or plan to allocate funds towards that purchase in a subsequent time period. The price of the new product is also likely to decline over time as the new firm benefits from economies of scale and scope, and as rivals emerge and practice price competition (Peres et al., 2010). Finally the *accessibility* of the new product will tend to increase as

³ In some cases the new product might be revealed to cause ill health or other adverse effects, in which case the perceived quality risk associated with consumption will increase, thereby setting back the process of adoption.

new distribution channels and retail outlets are established, and as more buyers and sellers engage in internet shopping thereby reducing the inconvenience of purchasing for the potential customer.

Now, since the passage of time causes the decay of the inhibiting factors, in each discrete time period some number of potential customers will decide to purchase, since they are now more aware; more attracted; less quality-risk averse; alternatives are less satisfying; the product is more-affordable; and the new product is more accessible. Note that any one of these inhibiting factors being above a threshold value could continue to delay purchase for an individual consumer – the consumer makes the decision to purchase when the new product becomes the best value proposition taking into account these six factors.

We can imagine potential consumers cascading through the six stages until they reach the point of adoption. Due to the assumed uni-modal frequency distributions in each stage, more and more prospective consumers will cascade per day from one stage to the next stage as time passes, until the median consumer in each stage has moved into the next stage, and thereafter fewer and fewer will cascade per day as the late majority, the laggards and finally the hermits cascade at an increasingly slower rate into the next stage.

As ignorance about the existence of the new product decays, the individual's awareness reaches a critical level of knowledge about the new product after which point the individual enters the appreciation stage. Since awareness spreads (i.e. ignorance decays) at an increasing rate (up to the median consumer), progressively more and more potential consumers become aware each day and enter the appreciation stage of the adoption-decision process. Similarly, in the appreciation stage, knowledge about the product benefits increases at an increasing rate (up to the median consumer), as social networks and other means of information transmission support the spread of information regarding the benefits of the product. At some point, almost certainly different for each (heterogeneous) consumer, the individual consumer appreciates the new product enough to transition from the appreciation stage to the aversion, alternatives, and affordability stages (perhaps simultaneously or in one sequence or another).

At some point in the adoption-decision process the consumer evaluates the positive and negative attributes of the new product including its price and affordability, and in effect arrives at a net benefit score, and is able to evaluate the value proposition (i.e. net benefits over price) offered by the new product. If this value proposition is superior to other products, the consumer will move to the accessibility stage and seek to gain access to the firm to consummate the adoption (purchase) of the new product.

Given the hypothesized normal distribution of the vertically-summed six impediment distributions over time, the incidence of adoption will increase at an increasing rate at first and later increase at a decreasing rate, consistent with the observation of marketing researchers. The inhibiting factors decline below threshold levels for relatively few people at first – these are the potential customers who are found in the tails of the distributions – i.e. high awareness, high appreciation, low aversion, low alternatives, high affordability, and high accessibility. The first to navigate the cascade will be the innovators; then will follow the larger group of early adopters, then the even larger group of the early majority; then the similarly-sized group called the late majority; then the smaller group of laggards; and finally the very small group of hermits (in the opposite tail of the ‘time to adoption’ distribution).

In Figure 1 we show an indicative dynamic process by which target customers convert to adopters as time passes and the barriers to adoption decay for each consumer category. In this Figure we depict a normal distribution of time to adoption around the mean time to adoption, with the adopter categories as indicated earlier. We show stylized curvilinear progressions of seven particular potential customers as they move through the adoption-process stages. The six solid curves depict the last (slowest to adopt) customer in each of the six adopter categories. The hatched line in the innovator category depicts an innovative customer who adopts about 2.5 SDs before the MTA. One can imagine a similar curve to represent every target customer as they progress through the adoption-decision process. Note that these paths are indicative and do not preclude alternative decision paths – for example, a target customer may remain unaware for several periods then accelerate quickly through the remaining stages to become a late adopter for example. Similarly, the smooth decision path is not likely to be

typical – for example, a target customer may proceed irregularly through the stages and be stalled (horizontal movement in terms of the Figure) in one or more of the later stages before overcoming that or those impediments.

[Figure 1 near here]

5. Hypothesized Characteristics of the Adopter Categories

Accordingly, we contend that innovators are likely to have relatively high initial scores on awareness, attraction, affordability and accessibility and relatively low scores on aversion and alternatives. According to the marketing literature they serve as opinion leaders who try the new product and begin talking about it to other potential consumers in their social and other networks. Note that our approach does not rely on their innovativeness, except to the extent that our six stages may provide a new definition of innovativeness. In terms of the 6A factors in this model, social interaction helps build consumer *awareness* and *appreciation* and reduces quality risk *aversion*, and these enhanced and reduced levels (respectively) may characterize the innovative customer. Next in line, in terms of their initially somewhat lower awareness, appreciation, affordability and accessibility, and/or their initially somewhat higher aversion and alternatives, are the early adopters. The initial height of the barriers to adoption are expected to be progressively higher as we proceed through the adopter categories until we arrive at the other extreme, i.e. the hermits, who initially will have very low awareness, appreciation, affordability and/or accessibility, and relatively high quality-risk aversion and alternatives (or switching costs).

As implied earlier, it is critical that the firm introducing a new product adequately estimates the numbers of adopters in the first months following the new product launch, both to capitalize on latent demand (if it exists), to deter market entry of rival firms, and to avoid the financial stress associated with estimates that are overly optimistic. Accordingly, the firm must identify which target customers are most likely to purchase in the initial weeks and months following launch of the new product, by identifying those with the least impediment to adoption, and then focusing marketing communications on those target customers identified as the innovators and early adopters.

The following research propositions are therefore suggested by the foregoing analysis:

- P1: The initial awareness of the new product will be negatively associated with the time to adoption;*
- P2: The initial attraction of the new product will be negatively associated with the time to adoption;*
- P3: The initial quality-risk aversion to the new product will be positively associated with the time to adoption;*
- P4: The initial alternatives owned and/or switching costs related to the new product will be positively associated with the time to adoption;*
- P5: The initial affordability of the new product will be negatively associated with the time to adoption; and*
- P6: The initial accessibility to the new product will be negatively associated with the time to adoption.*

These research propositions might be tested at the time of new product launch by sampling visitors to the firm's trade show exhibit, website, or physical shopfront and administering an appropriate survey to ascertain factor scores for initial awareness, attraction, aversion, alternatives, affordability and accessibility, and regressing these scores against data subsequently obtained from the same respondents on time lag before adoption. Alternatively, for a new product that is arguably well into the early majority phase of the diffusion process, such as Apple's iPad, owners of iPads might be surveyed to reveal their recollections of their date of purchase and the height of their 6A barriers at the time when the product was first launched (taking care to avoid recall bias).

Where the new venture has introduced a new product and wishes to accelerate adoption to reduce new venture mortality risk, the entrepreneur might attempt to capture contact information from those who reveal themselves as being at least somewhat aware of the new product (by initiating contact with the new firm) and offer an inducement to complete a survey to identify the height of their 6A factors. Armed with this data the new venture might then focus its promotional efforts on those who fit the 6A profile of the innovative and early adopters, to maximize the yield on their promotional expenditures. Conversely, the entrepreneur might assess a particular target group as most likely to be attracted to the new product, and/or have limited aversion or alternatives, and undertake marketing communications

designed to make them aware of the new product's existence and user benefits, using traditional marketing communication methods.

6. Discussion

6.1 Reconciliation with the unobserved 'innovativeness' construct

Tellis et al., (2009) identified ten dimensions of consumer innovativeness, shown in Table 1, where each dimension is represented by a single item to define their construct of innovativeness. This is not the only innovativeness scale used by prior researchers, merely one of the most recent, but it might be taken to represent the frontier of thinking about the innovativeness construct. The question arises, are the 6A factors measuring the same thing as consumer innovativeness? In Table 2 we show the 6A factors aligned with these ten dimensions of consumer innovativeness.

[Tables 1 and 2 near here]

Interestingly all ten of the innovativeness dimensions can be viewed as sources of attraction (utility) or repulsion (disutility) and thus part of the attractiveness issue. Thus we contend that the innovativeness construct is largely concerned with the person's desire to achieve satisfaction through the medium of the new product, balancing positive aspects of the new product with negative aspects. Note also that several of the ten dimensions also align with one or more of the other stages of the adoption process. For example, awareness, although taken for granted in the Tellis et al. measure, is likely to be increased by the novelty seeking, variety seeking, and stimulus variation dimensions included in their measure. The quality-risk aversion stage seems to include both the risk taking and suspicion dimensions of innovativeness. The alternatives stage can be argued to involve the habituation, nostalgia, and effort dimensions. Finally, the affordability stage seems to involve the frugality dimension, and the accessibility stage seems to include the effort dimension. This is necessarily a simplistic comparison, since the innovativeness dimensions are generally quite complex constructs. Nonetheless it seems feasible that the innovativeness construct may be attempting to measure the same thing as attractiveness of (i.e. expected utility from) the new product, but that the

construct also includes opposing items that assert their influence against adoption rather than recognizing these as impediments to completion of a different stage of the adoption decision process.

6.2 The Consumer's Regulatory Focus

Regulatory focus theory (Higgins, 1987; Shah & Higgins, 1997; Higgins, 1998) has been applied in the entrepreneurship literature to explain the entrepreneur's initial promotional focus on the entrepreneurial opportunity where the focus is on the positive aspects of the opportunity, followed by a preventative focus where the entrepreneur dwells on the negative aspects of the opportunity (Brockner, Higgins & Low, 2004; Baron, 2004; Fitzsimmons & Douglas, 2011). In many ways the risk-averse prospective customer with limited financial resources who is contemplating the purchase of a new product is in a similar situation of decision making under uncertainty. In the context of the customer's adoption decision process it seems quite likely that the prospective customer will similarly adopt a promotional focus in the awareness and attraction stages and revert to a preventative focus in the aversion, alternative, and affordability stages of the decision process. Alexander et al., (2008: 209) hint at this in the context of temporal construal theory, when they argue that "when consumers evaluate products well before they buy them, they tend to focus on the abstract benefits, or pros, of the products and underweight the product's more concrete constraints, or cons." Conversely, "when the purchase opportunity is at hand, people tend to increase the weight given to a product's low-level considerations of feasibility and to reduce the weight given to high-level benefits" Thus it seems that the 6A model could be strengthened by the incorporation of a regulatory-focus explanation for the prospective customer's initial interest in the new product followed by a more cautious evaluation of the new product' quality risk and its value proposition relative to those of competing means to satisfy the same customer wants or needs.

5.3 Radical innovation vs. Incremental innovation

In this paper the six-stage model has been couched largely in the context of radical innovation, also known as disruptive innovations (Bower & Christensen, 1995). Disruptive new products effectively create a new product category, notwithstanding that they might replace in consumption a sale from an existing product category, such as hybrid-electric cars replacing petrol-engine cars. Incrementally-

innovative new products, such as an infinitely-variable-ratio transmission that replaces a multiple-gear transmission, are nonetheless subject to a similar adoption-decision process. The potential adopter (of a vehicle with the new transmission) first needs to become aware of the new product version and its value innovations; be attracted to the new product (i.e. find the value innovations utility enhancing); not be put off by perceptions of high quality risk attached to the new product; not find alternative products that currently serve the same need to be better value propositions; be able to afford the price of the new product; and be able to access the market for the new product to consummate the purchase.

Incremental innovations might be expected, in general, to have shorter adoption-decision processes than for radical innovations, since the consumer may already be familiar with the basic product category and the generic quality attributes of products in that product category. The unknown elements of the incrementally-new product are largely confined to the value innovations in that new product. Thus the potential consumer needs only to gain awareness of and become attracted to the enhanced combination of product attributes in the incrementally-new product to proceed to the next stage in the adoption-decision process.

5.4 Felt Needs and Pent-up Demand

In perhaps most cases a product innovation (either radical or incremental) offers a value innovation that satisfies a 'felt need' – i.e. the customer is aware of the probable user benefits associated with consumption of the new product as soon as they become aware of its existence, such as a cure for the common cold. Similarly, pent-up demand that remains unsatisfied due to shortage of supply, means that the customers' attraction to the new product is already established, assuming a reasonable value proposition relative to alternative ways to satisfy that particular need. In both cases we would expect the adoption-decision process to be shortened by the pre-existing awareness and attraction when the new product enters the market for the first time (such as the case of the iPhone 5 mentioned earlier).

5.5 The Impact of the Internet

Internet retailing has almost certainly operated to reduce most of the obstacles to new product adoption and served to facilitate the adoption-decision process (Keeney, 1999). It has reduced the

awareness problem by facilitating on-line browsing; it has reduced the *accessibility* barrier by on-line shopping; it has reduced the quality-risk *aversion* barrier by providing quality ratings by previous consumers, which also serves to raise the *attractiveness* associated with purchase (Keeney, 1999). While Internet search engines facilitate the finding of *alternative* means of satisfying the particular need which the new product addresses, they also facilitate comparison of product alternatives. Finally, the internet reduces the *affordability* barrier by allowing the target customer to find lower prices and also to sell other items (e.g. via eBay) to raise the funds necessary. Thus, all six stages of the process can be shortened by utilizing Internet search engines, referring to the reported experiences and opinions of others, comparing alternative products, finding the least-cost source of supply for a new product, and so on. Thus Internet marketing by firms and internet shopping by consumers has also served to increase the speed of the adoption-decision process and thus reduced the mean time to adoption in perhaps most markets.

5.6 Management intervention to accelerate adoption

As time passes, the volume of information available to potential adopters increases due to ‘natural’ forces, such as passive information capture, word-of-mouth marketing, observation of celebrity endorsements or social-network members’ involvement with the product, and/or chance encounters with the new product or information about the new product, such that potential-customer awareness of and attraction to the new product will rise over time without any intervention by the firm’s management. This is similar to the ‘natural’ reduction of new venture mortality risk advocated by Shepherd et al (2000). Those authors also suggest that strategic management interventions can be applied to accelerate the decline in new venture mortality risk. Similarly, management interventions in the adoption-decision process take the form of strategic marketing communication activities, such as informative advertising to raise awareness; persuasive advertising to raise attractiveness; public relations and celebrity endorsements to quell aversion; initial promotional pricing to present a superior value proposition to alternatives; lay-by schemes and provision of credit to increase affordability; and adding additional places of sale (including internet sales) to increase accessibility. The greater the investment in such marketing interventions the faster one expects the adoption-decision process to be

for all consumer categories, and thus the sooner will the new venture gain revenue from its new product introductions, with beneficial effect on the mortality risk for the new venture.

7. Summary and Conclusion

In this paper we have proposed an alternative argument for the shape of the diffusion curve of new product adoption. In place of the customer innovativeness (trait) approach long favoured by marketing academics, we argue a six-stage adoption-decision process. Our model purports to explain time to adoption by observable constructs that are also related to time rather than by an unobservable construct that is not (Midgley & Dowling, 1978). The adoption decision process is argued to comprise six stages characterized by awareness, attractiveness, aversion, alternatives, affordability, and accessibility. To gain accelerated access to revenues from target customers the new venture must first identify the target market in terms of who would benefit from the value innovations (Kim & Mauborgne, 1997) embodied in the new product. Within this set, the firm must then focus on those who are most aware, most attracted, least quality-risk averse, least attracted to alternatives, most able to afford, and can most easily access the market to consummate purchase of the new product. These will be the innovative (and early adopter) consumers who reveal themselves by adopting the product more than two (one) standard deviations before the mean time to adoption. As time passes and information flows naturally (via social networks and other media) and is provided strategically by the firm, the other categories of potential consumers move in stages through the adoption-decision process and eventually make the decision to purchase. Because each of the stages in the decision process represent a barrier to adoption and because the height of each barrier varies from low to high across potential consumers, it is proposed that the aggregation of these barriers provides an approximately normal distribution of time to adoption, and will thus explain adoption by individuals better than will measures of their innovativeness.

7.1 Contributions to the Literature

This paper proposes an alternative explanation for the S-curve shape of the diffusion curve based on a logical temporal sequence of six-stages in the consumer's adoption-decision process, rather than explaining this shape in terms of a presumed normal distribution of the unobservable innovativeness

trait in consumers, which has proven difficult to measure and which has shown relatively low predictability of the time to adoption in empirical studies. It proposes a means of better predicting new product adoption by starting from the premise of what constrains innovative customers from adopting rather than the converse approach of expecting “innovative” customers to adopt without giving sufficient attention to the awareness, aversion, alternatives, affordability and accessibility dimensions of the adoption decision process.

This paper makes three main contributions to the entrepreneurship literature. First, it brings the diffusion curve phenomenon to the attention of entrepreneurship researchers and educators –this phenomenon is not typically taught in entrepreneurship classes and the pattern of sales projections and sales growth for new ventures is usually treated simplistically in entrepreneurship research. Second, this paper contributes to the literature on new venture mortality risk by suggesting a means by which entrepreneurs might identify the innovative and early adopter consumers and focus their marketing communications efforts on those most likely to purchase in a timely manner. Third, this paper throws new light on the demand side of the demand-technology nexus that characterizes entrepreneurial new ventures, but which is generally given little attention by entrepreneurial educators and new firms and who often adopt an “if you build it, they will come” mentality.

This paper also makes two important contributions to the marketing literature. First, it responds to the call by prominent marketing scholars that the theory and antecedents of the individual customer’s decision to adopt new products should be the focus of attempts to explain the adoption of new products by particular consumers rather than by the market in aggregate. Second, it provides a framework of six readily observable barriers to adoption to theorize that individual consumers cascade down through the six stages and reach the point of adoption in an approximately normal distribution of adoption over time, and thus provides an alternative explanation for the observed logistic curve of new product diffusion that does not rely on the measurement of the unobservable innovativeness trait.

7.2 Directions for Further Research

This paper proposes a series of empirical research propositions that may be tested by researchers with access to data on the adoption decisions of consumers in new product markets and on items representing each of the 6A factors. Such research might utilize time-series data, starting from the date at which the new product is launched (or first announced), or cross-section data relying on accuracy of recall for the completion of earlier stages of the adoption-decision process.

Table 1: Ten Key Dimensions of the Tellis et al., (2009) Consumer Innovativeness Construct

Item	Dimension	Comment
1	Novelty seeking	The desire to seek out the new and different (e.g. Hirschman, 1980)
2	Risk taking	A preference for taking risks or being adventurous (e.g. Raju, 1980)
3	Variety seeking	A preference for a change of pace (e.g. Steenkamp & Baumgartner, 1992)
4	Opinion leadership	Independence from other people's opinions and external communications (e.g. Midgley & Dowling, 1993)
5	Stimulus variation	A preference for unfamiliar stimulation over the familiar; curiosity (e.g. Raju, 1980)
6	Habituation	Resistance to change, absence of goal-directed behavior (e.g. Zeelenberg & Peeters, 2004)
7	Nostalgia	A longing for the things of the past (e.g. Steenkamp, Hofstede & Wedel, 1999)
8	Suspicion	Suspicion that the seller of the new product (e.g. Google) will exploit them (Parasuraman, 2000)
9	Effort	Reluctance to expend effort and time to adopt new products (e.g. Berry, Seiders & Grewal, 2002)
10	Frugality	Reluctance to pay high prices for new products, or to waste resources on uncertain new products (Tellis et al. 2009)

*Source Tellis et al., (2009)

Table 2: Reconciliation of the Six-Stage Model with Tellis et al., (2009) Consumer Innovativeness Construct

Steps in the Adoption process	Innovativeness dimensions	Comments
1. Awareness	<ul style="list-style-type: none"> Novelty seeking Nostalgia (-) 	<ul style="list-style-type: none"> Desire to seek novelty leads to greater awareness Focus on the past reduces awareness of the new
2. Attraction	<ul style="list-style-type: none"> Novelty seeking Risk taking Variety seeking Opinion leadership Stimulus variation Habituation (-) Nostalgia (-) Suspicion (-) Effort (-) Frugality (-) 	<ul style="list-style-type: none"> Newness of new product is attractive <i>per se</i> Risk associated with new product is attractive <i>per se</i> New product represents variety, change of pace Early adoption shows leadership, which is valued Unfamiliarity of new product is attractive <i>per se</i> Resistance to change reduces attraction of the new Nostalgia for the old reduces attraction of the new Quality-risk aversion reduces attractiveness of the new Reluctance to expend effort reduces attraction of new High initial price reduces the value proposition offered
3. Aversion	<ul style="list-style-type: none"> Suspicion Frugality 	<ul style="list-style-type: none"> Seems to equate with quality-risk aversion Consumers don't want to risk wasting money on new products that don't deliver on their promises
4. Alternatives	<ul style="list-style-type: none"> Nostalgia 	<ul style="list-style-type: none"> The 'old' way serves customer needs adequately
5. Affordability	<ul style="list-style-type: none"> Frugality (-) 	<ul style="list-style-type: none"> Reluctance to spend money on high-priced new products that may turn out to be not as expected.
6. Accessibility	<ul style="list-style-type: none"> Effort (-) 	<ul style="list-style-type: none"> Effort & time required to buy the new product limits willingness to gain access to it

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Figure 1: The dynamic process of new product adoption

