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An Innovation in the Wine Closure Industry: Screw Caps Threaten the Dominance of Cork

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Abstract

Cork stoppers became the industry standard for wine bottle seals probably going as far back as the 1600s. Manufacturers of alternative wine bottle seals have made several attempts to wrest market away from cork manufacturers, particularly over the last thirty years. In spite of these efforts, cork remains the dominant wine bottle seal, with a market share of around 90 per cent.

This paper examines the threat to cork manufacturers of one innovative product, the screw or twist top wine seal. Developed in the late 1950s and thoroughly piloted and tested in the market in Australia in the 1970s, the screw top seal was largely a failure, despite the commitment of a group of Australian winemakers to what they believed was a technically superior product. While Australian wine makers abandoned the screw top experiment in the early 1980s, a second attempt by a small number of wine makers from the mid 1990s has captured the attention of the wine industry internationally due to its initial success.

What unfolds in this paper is a fascinating story of a product that on many performance attributes outperforms the cork seal, but has so far failed to gain mainstream market acceptance from retailers and end consumers. Although there have been scores of articles in wine and food magazines that have discussed the merits of cork versus alternative seals, we are not aware of any literature that has evaluated the contest through the lenses of innovation theory. In so doing this paper analyses why the initial product launch of the screw top was unsuccessful and why the recent second attempt may indeed be a turning point for the screw top wine bottle seal.

The paper is divided into five sections. Section one provides a brief overview of the nature and history of cork as a wine seal. The growing dissatisfaction with cork as a wine seal is outlined in section two. Section three provides the background to the development of the screw top wine seal and its launch in Australia. In section four we explore with the aid of technology adoption innovation theory why the launch was a failure. We then outline in section five the second recent attempt by Australian wine makers to gain market acceptance for the screw top. We will see in this section there are a number of factors that have changed between the first launch and the second launch. Section six focuses on the question as to whether the second attack on the industry standard will be successful.

We conclude that innovation theory can both explain why the first launch failed and why the second launch may indeed be successful in the long run. In particular, Moore's (2001) adaptation of the technology adoption life cycle model, although originally developed from experience in hi-tech industries, aided in understanding the key reasons for the initial failure of the screw cap and also in predicting the early success of the screw cap's second attack.

Introduction

The cork manufacturing industry is a significant industry. It is estimated that the annual production of cork wine stoppers is nearly 13 billion per year and generates approximately $1Billion (Eurodollars) for cork manufacturers each year. Portugal and Spain control over 80 per cent of the world's production of cork. Wine corks are the most profitable of the numerous products derived from the cork oak tree (Natural Cork Quality Council, 2002)

Section 1: The history and nature of cork as a wine bottle seal

Cork is a spongy, lightweight product obtained from the bark of the cork oak tree. The ancient Egyptians, Greeks and Romans used cork for a variety of purposes including as stoppers for wine casks. However, the use of cork as a wine stopper took off in the 1600s:

> It really started seriously in the 1600s, growing in tandem with the increasing demand for mass-produced glass bottles. The monk Dom Perignon in Champagne, replacing an old hit-or-miss tradition of an olive oil soaked piece of hemp wrapped around a wooden plug, instigated this benchmark turning point. The world's first cork factory opened around the mid -1750s in Spain, and once glass bottle producers mastered the art of a uniform neck and opening, the rest, as they say, is history. (Knight, S. 2001)

While cork is a marvellous natural product, it does have some inherent deficiencies that have been hotly debated by wine makers. The following section examines the key weaknesses of cork as a wine seal.

Section 2: Growing dissatisfaction with the industry standard product.

While cork has been the dominant wine stopper for around 300 years it is well known in the wine industry to be a less than perfect product. It is a major concern of the wine industry that consumers may be offered a "corked" wine where the quality of wine is compromised due to the cork. There are two main ways a wine can become corked: oxidation and cork taint.

Oxidation occurs through the ingress of oxygen into the wine bottle, either past or through the cork itself, allowing the wine to spoil. This produces a very distinctive flavour easily identified by most consumers. Tainting of wine occurs through a separate process. The variability in flavour that results from "corking" makes for a more insidious industry problem. The main cause of corked wine is a substance known as TCA (2,4,6 trichloro-anisole) that can be found in natural cork.

> TCA is mould that infects the cork. It can be introduced into cork in a number of ways. The cork producers admit that they do not fully understand how it occurs, or how to overcome it. It affects cork at all levels of quality, whether it be top-of-range for aging; lesser quality for medium term cellaring, or agglomerate (cork pieces glued together) for ready-to-drink wines (Knight, S. 2001).

Cork taint diminishes the 'fruit quality' in wine rendering it at best unappealing and at worst undrinkable. This type of mould is invisible and is not to be confused with the mould that one sees on top of the cork that occurs sometimes through minor leakage. Because it is invisible consumers naturally blame the wine and not the cork. This is a real concern for wine producers who are trying to protect their wine's reputation.

In fact, a wine that is moderately tainted is of most concern to wine producers. In this case, the wine tastes flat or uninteresting and the consumer understandably will often not consider the cork as the culprit. The consumer believes what they are drinking is representative of this particular wine and will base further purchasing decisions on this perception. A badly tainted cork emits a distinctly 'off' smell and in this case the consumer is more likely to blame the cork than the wine.

There is a great deal of sensitivity in the wine industry about cork taint, with cork producers blaming poor wine bottling processes or poor handling. So how common is the problem of cork tainting? It seems that it depends who you ask:

> According to the cork manufacturers, the figure is 1.5-1.7%; Stephanie Toole of the Mount Horrocks winery in Clare Valley believes 5% of her Riesling is severely tainted and a further 10% slightly spoiled. Professor Christian Butzke of the Department of Enology and Viticulture at U.C.Davis in California estimates that five percent of US wine is tainted with TCA from natural cork. Steve Pannell of the big Australian wine company BRL Hardy (the firm behind such brands as Nottage Hill, Chateau Reynella, Houghton and Leasingham) puts the figure at 8%. The organisers of the San Diego National Wine Competition recorded an incidence of 2.5% in 1997 and 1998 and 3% in 1999. (Corkwatch, 2002)

Professor Butzke (above), who is heading a comparative study of wine closures at the University of California, Davis, contends that too little testing has been done to say with any certainty what percentage of wines have and will continue to be tainted by TCA-laden corks. (Skeen, 2002)

Section 3: A new technology emerges - the screw cap

The most significant threat to the cork wine stopper has been the Stelvin screw cap wine seal. Following the acceptance of a screw cap closure in use over spirits, liqueurs and aperitifs, a French manufacturer, Le Bouchage Mecanique (L.B.M.) decided in 1959 to develop a quality table wine closure that would replace the cork stopper. By the late 1960s L.B.M. had developed the "Stelvin" that was claimed to be at least comparable and in many respects superior to the traditional cork product. The Stelvin was made of aluminium, was corrosion resistant, and had a treated and chemically inert wad facing that was completely compatible with wine.

The Stelvin appeared to be a major breakthrough. It delivered two major benefits - it eliminated the problem of oxidation and the risk of cork tainting. And, importantly, it still allowed the wine to develop over time.

The first attack on the industry standard

One Australian winery, Yalumba, was instrumental in the introduction of this new style of screw cap closure, the "Stelvin", into the Australian wine making industry:

> Production Director, Peter Wall, originally approached Le Bouchage Mecanique in 1964 about an alternative sealing system for wine bottles. Peter Wall almost single-handedly drove the development of the Stelvin closure (Courtney, 2001).

ACI obtained the Australian rights to manufacture "Stelvin" in 1970 and began a testing and evaluation program in 1973 with the co-operation of the Australian Wine Research Institute in the areas of bottling, storing, testing and tasting of wines. Seven wine companies provided nearly 3,000 bottles of red and white table wines, closed with "Stelvin" variants. Control batches were sealed with corks. A highly respected tasting panel met every six months to evaluate the wines. From the beginning significant differences were apparent between sealing systems. The panel consistently scored the wines stored under “Stelvin” higher. The "Stelvin" was introduced to the Australian Wine Industry in1976. Between 1976 and the early 1980s approximately 20 million wine bottles were sealed with the Stelvin closure. (ACI, 1980)

By 1980 ACI was very positive about the progress of the Stelvin seal within Australia. After four years of commercialisation, ACI's belief that the Stelvin was a success can be gauged from the following quote:

> During this time we have seen an escalation of its use over the whole gambit of red and white, as well as many fortified wines. Market resistance to the concept of "Stelvin" has been minimal. Ease of opening of the premium image aluminium closure has been very favourably accepted by consumers. Pulling a cork certainly holds no mystique for the increasingly important female consumer in Australia.
>
> This has resulted in "Stelvin" being regarded as THE closure of the present and of the future (ACI, 1980).

Supporting ACI's corporate view were the testimonials in the late 1970s from leading winemakers. The following extracts reveal strong support for the Stelvin seal, and an expectation that it would become a much more widely accepted and used alternative to the cork seal:

> Customer convenience of Stelvin is obvious and Renmano will soon be releasing a new range of table wines using Stelvin. *I anticipate that most Australian dry whites will be using this form of closure within 5 years. (italics added)* G. Kraehe General Manager, Renmano Wines
>
> The whole process of winemaking is an act of "quality control" based on the primary quality of the grape itself. The weakest link of the process often proves to be the closure of the container in which the product finally reaches the consumer. The natural variation in quality of the traditional cork closure remains the winemakers "Achilles' heel" in the sequence of the acts of quality control, which constitute the winemaking process….[the Stelvin seal] has proven to be a predictable, convenient and attractive closure. … Brian Croser, Riverina College of Advanced Education.
>
> After being involved in Stelvin testing over a period of three and a half years, I had no hesitation in recommending to Hardys its use in white wines where it is desired to retain the freshness and grapey flavour of the wine. An added advantage is that there is no risk of 'off' flavours from cork which are appearing more frequently in recent times. Peter Weste Chief Winemaker, Thomas Hardy & Sons Pty. Ltd. (ACI, 1980, p.3).

However, these positive evaluations and bold claims were proven to be unfounded with most wine makers caving in to consumer resistance by reverting to cork seals by the early 1980s. The upbeat expectations of ACI, with a strong commercial interest in the Stelvin seal, were clearly well off the mark. Fundamentally, mainstream consumers rejected the value proposition offered by the screw cap seal.

What happened? Why didn't the screw cap take off?

Unfortunately for all those who could see the benefits of the Stelvin closure - it eliminated the problem of oxidation and the risk of cork tainting - the consumers overwhelmingly rejected it and by the late1970s many winemakers were sworn off the Stelvin closure. As one wine industry expert put it:

> The industry loved Stelvin: retailers could stand bottles upright on display shelves, as there was no cork to keep moist. Restaurateurs and events organisers loved Stelvin: a quick flick of the wrist and a bottle was open. Winemakers loved Stelvin because their wines aged slowly and gracefully without the risk of premature oxidisation, which can occur when poor storage conditions allow the cork to dry out. And of course winemakers loved Stelvin as it

> eliminated the danger of cork taint. But consumers hated Stelvin. They thought it looked cheap and, more importantly, there was no magical “pop” as the cork was drawn (Bourne, P. 2000, p.31).

The poor response of consumers to the Stelvin seal was a big blow for wine makers. The effect on Pewsey Vale, one of Australia's premium Riesling producers, was severe:

> Pewsey Vale Riesling sales took a hiding and the move to Stelvin almost killed the brand as a prestige product. Bowing to consumer pressure, the 1984 Pewsey Vale Riesling was returned to cork and remains so packaged today (Bourne, P. 2000, p.31).

What do innovation theories have to offer to allow us to understand the forces at work and why Stelvin failed in the 1970s? To what extent does such analysis help us to understand the recent second attempt to promote the Stelvin seal?

Section 4: Application of innovation theory - The technology adoption life cycle

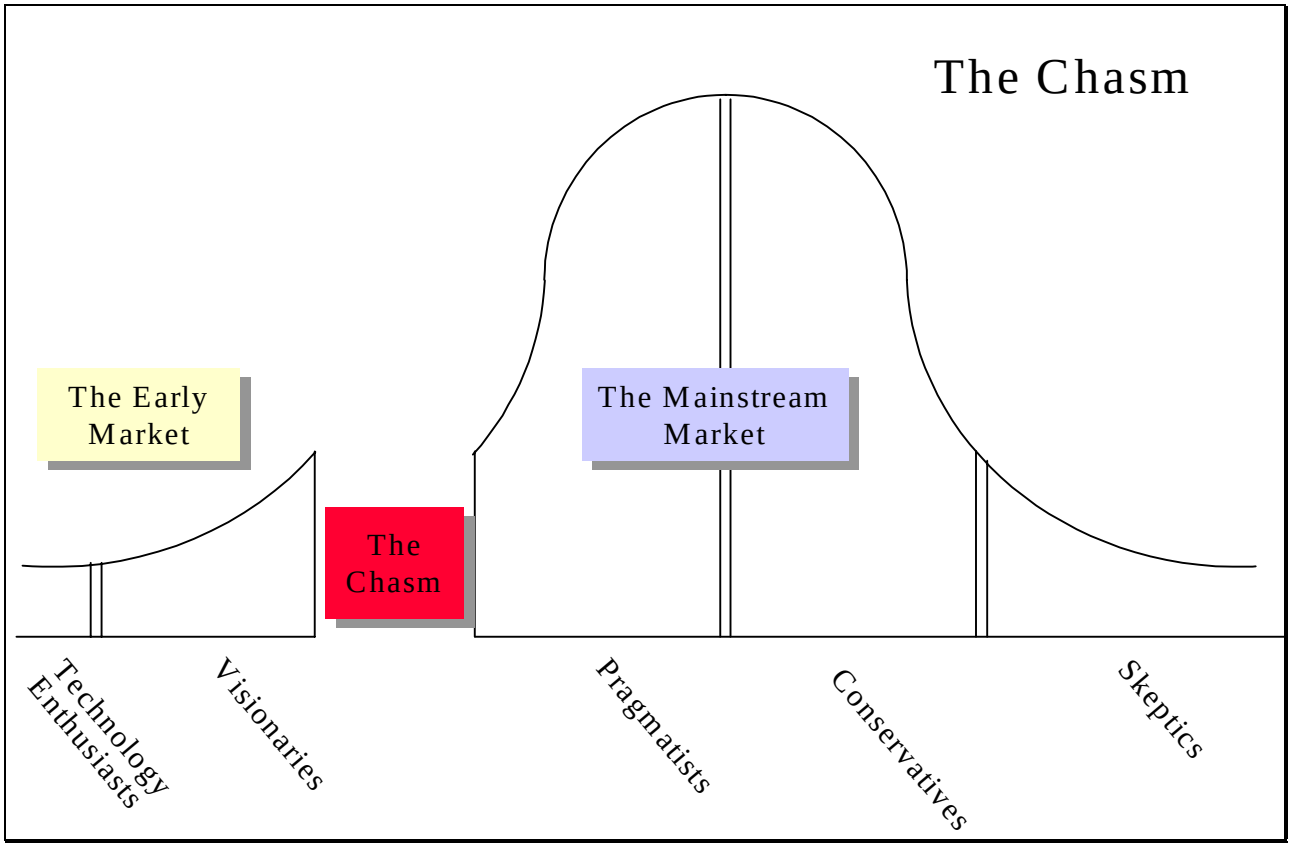
The technology adoption life cycle is a model introduced by Rogers (1962) to describe the process of adoption of a discontinuous change by a community. Rogers' work provides the basis of innovation diffusion theory.

One important adaptation of Rogers’ theory resulted from Moore's experience and work in the hi-tech sector of Silicon Valley, United States. According to Moore (2001), "virtually all contemporary thinking about high-tech marketing strategy has its roots in the technology adoption life cycle" (p.265). The technology adoption life cycle model was developed from research in the 1950s of how communities respond to 'discontinuous innovations' (Rogers, 1962, 1976). A discontinuous innovation, such as the Stelvin seal, requires the marketplace to change their past behaviour in some significant respect with the promise of gaining some new benefits.

The model, which is depicted graphically in Exhibit 1 below, suggests that when customers are offered an opportunity to switch to:

> a new infrastructure paradigm - from typewriters, say, to word processors - customers self - segregate along an axis of risk aversion, with the risk-immune *innovators* moving to the forefront, asking - even demanding - to be first to try out the new opportunity, while the risk-allergic *laggards* retreat to the rear of the line … In between, the model identifies three additional communities - the *early adopters*, *early majority*, and *late majority*. (Moore, 2001, p. 266).

Exhibit 1: Technology Adoption Life Cycle



(Source: Moore, G.A. 2001, 'Crossing the Chasm – and Beyond', in *Strategic Management of Technology and Innovation*, eds Burgelman, R.A., Maidique, M.O., and Wheelwright, S.C., 3rd edition, McGraw-Hill, Boston, p.269).

According to the technology adoption life cycle, the first two groups are the innovators and early adopters, and together they form the 'early market'. By nature, the early market consists of individuals who tend to be contrarian, break away from the pack, take risks and seek what is possible. The life cycle theory suggests that once the early market has accepted the discontinuous innovation, the early majority will follow in sequence. In contrast to those consumers that make up the early market, consumers in the early majority category tend to be conformist and stay with the herd (Moore 2001, p.268).

In summary, Moore's (1994, 1995) theory separates customers into five categories, along which the cycle of new technology adoption proceeds. Moore renames the five categories, and adapts the model based on his experience in hi-tech industries. Following is a description of the five categories with Moore's nomenclature shown in italics:

1. Innovators - *technology enthusiasts* who are by nature committed to new technology on the grounds that sooner or later it will improve their lives.
2. Early Adopters - *visionaries* and entrepreneurs who want to use the innovation to make a break with the past. (Groups 1 and 2 form the 'early market')
3. Early Majority - *pragmatists* who buy only when there is a proven track record of useful productivity improvement.
4. Late Majority - *conservatives* who are very price sensitive and pessimistic about the added value of the product; they buy only when technology has been commoditized.

5. Laggards - *skeptics* who are very difficult to capture; goal is not to sell to them, but work around their criticisms.

Unfortunately, in practice the transition from the early adopters to the early majority is a difficult one and may not occur. It is the problems and dynamics of this transition from the visionaries to the pragmatists that represents a new fundamental insight attributable to Moore. The more conservative and cautious nature of the mainstream market (consisting of the early majority and the late majority) is such that the technology may be rejected. Indeed, a key contribution to innovation diffusion theory by Moore was that he highlighted that the visionaries do not necessarily influence the early mainstream pragmatists. Moore (2001) refers to this failure to make the transition from the early market to the early majority as falling into the 'chasm', in which sales begin to fall rather than take off:

> The Chasm, [is] a time of great despair, when the early-market's interest wanes but the mainstream market is still not comfortable with the solutions available (p.272).

Moore emphasises the importance to individual firms of crossing the chasm:

> Whenever truly innovative high-tech products are first brought to market, they will initially enjoy a warm welcome in an *early market* made up of technology enthusiasts and visionaries but then will fall into a *chasm*, during which sales will falter and often plummet. If the products can successfully cross this chasm, they will gain acceptance within a *mainstream market* dominated by pragmatists and conservatives. Since for product-oriented enterprises virtually all high-tech wealth comes from this third phase of market development, crossing the chasm becomes an organizational imperative (Moore, 1995, p.19).

The way to cross the chasm according to Moore is to establish a beachhead or niche foothold in the mainstream market where there are ‘compelling’ customer needs (Foster, 1986, similarly emphasises the importance of gaining a beachhead). Once this group has accepted the new technology it is much easier to persuade other segments within the mainstream market to follow. Thus Moore’s adaptation of the life cycle model differs from standard diffusion-of-innovation theory (Rogers, 1962, 1976) by postulating different dynamics in the progression between phases or segments.

The thesis inherent in Moore's interpretation of the technology adoption life cycle is that the strategy of the developers of the new technology needs to change at each stage in the cycle, particularly to make the transition from early adopters to early majority.

To what extent does this model help understand the failure of the Stelvin in the 1970s? The early adopters, in this case being the winemakers and consumers who purchased wine sealed with the Stelvin, greeted the launch of the Stelvin in Australia in the 1970s warmly. They could see the benefits of the technology - end wine consumers would benefit from increased product reliability and convenience and this would create greater customer satisfaction and loyalty. To the early adopters this was the compelling reason to make the switch from cork. However, the conservative nature of the early majority (cautious wine makers and wine consumers) meant that it would always be difficult to convince them of the merits of the change to Stelvin. There were considerable risks for all parties – wine makers, retailers, and wine consumers. The risk for wine makers and retailers were financial in nature resulting from consumer rejection of the Stelvin seal. The risks for consumers were of a social nature – how would friends, peers and family perceive them by being associated with the Stelvin alternative?

The attempt to capture the mainstream market - to leap from early adopters to early majority- without a beachhead or a niche is a key reason why Stelvin faltered in Australia. The Stelvin enthusiasts, ACI, the Australian Wine Research Institute, and the lead group of winemakers who supported the Stelvin trial in the 1970s, believed their work was done once it was scientifically demonstrated that the Stelvin was a technically superior product. While the technical superiority of

the Stelvin was enough to convince the risk taking ‘early market’ to make the switch away from cork, the more conservative ‘early majority’ rejected the new technology. Wine consumers rejected the Stelvin because it lacked the ‘romance’ and tradition of the cork, and wine makers and wine retailers because of fear of turning away consumers.

Lack of a launch strategy proved even more damaging when the Stelvin by chance became established in two niches – low priced table white wines and wines served on airline flights in economy class. The experience of the 1970s stamped the image of the Stelvin as a 'cheap' product in the minds of most consumers.

The following section provides an overview of a second attempt by Australian wine makers to convince the early majority to make the switch from cork to Stelvin.

Section 5: A second attack gathers momentum

One of the most enthusiastic proponents of the Stelvin in the 1970s was the Yalumba (Pewsey Vale) winery (as outlined in section 3 above). Although the winery reverted to cork seals in 1984 they began experimenting with the Stelvin again in 1995:

> The Pewsey Vale winemakers remained convinced of the suitability of *Stelvin* as a closure - particularly for premium wines with good ageing potential. Each year, since 1995, the small quantity of Pewsey Vale Riesling destined for museum release is bottled in *Stelvin* and set aside for later release as a Pewsey Vale aged Riesling called `The Contours’.
>
> *Stelvin* eliminates the possibility of wine taint from cork and is a wonderful seal for ensuring great bottle ageing of suitable white wines - especially Riesling. As the seal does not allow any air into the bottle at all, the wine undergoes a slow but perfect bottle ageing process. The end result is a superb aged Riesling and the guaranteed satisfaction of the drinker (Pewsey Vale, 2002).

Notable in this quote is the emphasis on the suitability of the Stelvin for Riesling wines, particularly for its ageing. This is significant as Riesling is a very delicate wine with fruity notes. It is also an unwooded wine. These characteristics mean that extremely low levels of cork taint easily compromise the variety's flavour. That is, Riesling winemaker’s are acutely aware of the extra problems of cork taint in their operations.

Other Australian wineries persisted with the Stelvin seal, but mainly for their own ‘museum’ stock for ‘ageability trials’ and for sending to wine shows for judging. The following appear to be the most well known examples of Australian wineries that continued their faith in the Stelvin seal:

> **Henschke** experiments with market reaction with the capping of a portion of the 1996 Riesling
>
> **Richmond Grove** seals a portion of the Richmond Grove Watervale Riesling 1998 and the Richmond Grove Barossa Riesling 1998 in screwcap and markets the wines in a 'special cellaring pack'. Such was the demand that the 1999 production of the Richmond Grove Rieslings in screwcap was increased.
>
> A portion of the 1998 **Dorrien Estate** Individual Vineyard Storton Riesling was bottled with a Stelvin seal.
>
> The 1999 vintage saw several producers turn to screwcap
> - **Leasingham** capped a portion of their 1999 Bin 7 Riesling
> - **Majella** caps their first vintage of the 1999 Coonawarra Riesling

- **Logan Wines** cap their 1999 Clare Valley Riesling
- **Orlando** introduce their 1999 Steingarten Stelvin Riesling

(Courtney, 2001)

However, the most well publicised endorsement of the Stelvin seal occurred in 2000 when a group of prestigious winemakers made a pact, one that we will argue below was instrumental in crossing the chasm.

The Clare Valley Initiative: "Riesling with a Twist"

A group of 16 well-known Clare Valley winemakers made a joint commitment to bottle at least part of their year 2000 release of Riesling using the Stelvin closure. The group included Knappstein, Richmond Grove's Watervale Riesling, Mount Horrocks, Taylors and Jeffrey Grosset's Polish Hill.

The Clare Valley group attracted widespread and international attention. Of particular note was the involvement of several well-known premium wine makers such as Jeffrey Grosset.

In addition, ten of the Clare Valley group put together a 12-bottle collection of Rieslings, all sealed with a screw cap. This special offer was marketed through one of Australia's largest wine retailers and attracted considerable attention (Clare Valley Wine Makers Go Stelvin, 2000).

The extract below indicates that the experimentation with the Stelvin or similar screw cap seal then spread from Australia to the United States and New Zealand. The New Zealand initiative (see 'New Zealand joins the revolution' below) has also attracted significant press attention internationally.

> ***Not just the Aussies***
> In September 2000, the Napa Valley winery Plumpjack had internationally released some of their top red wine, 1997 Reserve Cabernet Sauvignon, in screwcap. They sold it at a US$10 increase over the same wine sealed with cork.
>
> ***New Zealand joins the revolution***
> In 2001, 28 producers have formed the **Screwcap Wine Seal Initiative**. The first wine from the group is launched on 13th August 2001. …Frustration with cork taint and the search for quality wine has been the driving force.
>
> ***Belief in Screw Cap technology spreads***
> ***March 2002:*** Other US wineries are joining the trend:
> **Sonoma-Cutrer** of Windsor, California announced in November 2001 that it will close 800 cases of its US$65 Founder's Reserve Chardonnay from the 1999 vintage with screw caps - to be released in the US autumn.
> **Downing Family Vineyards** of Napa announced at the 2002 Annual ZAP Tasting that it would put screw caps on 210 cases of its US$35 Fly By Night Zinfandel, to be released in May 2002.
>
> ***April 2002***
> Montana, New Zealand's largest wine company is backing screwcap technology by placing Stelvin brand screwcap wine seals on their restaurant brand 'Copperfields'.
>
> ***May 2002***
> The NZ Screwcap Wine Seal Initiative represented 31 wineries at the recent London International Wine and Spirit Fair.
>
> (Courtney, 2001)

Southcorp, one of the largest winemakers in the world, has recently committed to bottle all its Rieslings from the 2002 vintage onwards in the Stelvin seal (about 220 thousand dozen bottles). ('The screw cap's time has come', 2002).

Winemakers receive support from retailers, wine media researchers

Arguably the most significant recent influence on the wine industry's attitude to the screw cap seal after the Clare Valley group was the decision in May 2002 of Tesco, the United Kingdom's largest wine retailer, to commence a six-month trial of the screw cap seal:

> 'Persuading such major producers to change to screwcap was an uphill task', Helen McGinn, product development manager for Tesco, told decanter.com.
>
> 'There was a job of convincing to be done,' she said. 'One of the biggest challenges was to persuade ACI, Australia's main glass manufacturer, to work with producers on the design and manufacture of new bottles.'
>
> Tesco has made the move 'to break the association of screw caps and cheap wine,' because it believes levels of cork taint are unacceptable …McGinn said, 'if as many faulty cans of baked beans were found as bottles of wine, it would be on the TV news. We have to break the mould.'
>
> The supermarket is convinced that people are coming round to the idea of plastic closures and screw caps in more expensive wines, but still reckon the public needs educating. 'When we launch these wines we are going to put out a lot of customer information at the same time,' McGinn said. 'We are really going to make a very big noise about it.' (Lechmere, 2002a).

According to a spokesperson for Tesco, the primary driver for the trial was concern with quality:

> If there were no issue with cork taint, then we wouldn't be having this conversation. We try to guarantee quality for our customers. (Lechmere, 2002b)

Peter Goddard, who is directing an ongoing Australian Wine Research Institute (AWRI) test of 14 different closures: a screw-cap, two grades of conventional natural cork, two natural cork with synthetic components and nine closures manufactured from synthetic polymer material, concluded in a recent e-mail:

> Today's bottle sealed with a screw cap was by far the best in terms of freshness, colour and positive fruit characters (Skeen, 2002).

The AWRI study is regarded as one of the most respected and comprehensive assessments of the various closures. So far results have been compiled from 36 months of testing of Semillon, a white wine. (Godden et al, 2001).

According to James Halliday, one of Australia's most respected wine commentators who has been involved in an annual blind tasting of wines bottled in the early 1980s with Stelvins and with corks:

> Over the years the trials continued, I never failed to correctly identify the wines [those sealed Stelvin versus those in cork]. Those with Stelvin were fresher and brighter, and as each year went by, the difference became even more obvious. I have several dozen Rieslings from that period and … everyone I have opened recently has been perfect. … the Stelvin now has a taint-free track record of more than 20 years behind it (Halliday, 2000).

There are several on-line wine magazine and expert commentator sites most with favourable reviews of the Clare Valley initiative and with information on why the Stelvin or similar screw caps are superior to cork seals (www.jancisrobinson.com; www.food-fun-wine.com.au; www.winespectator.com; www.corkwatch.com).

Section 6: Will the disruptive screw cap technology prevail this time?

The advantages of the Stelvin seal over the cork seal that were emphasized in the testimonials in the 1970s are identical to those cited in the media and literature today: the consistency in technical performance, the preservation of the freshness and unique qualities of the white wine, the protection of delicate wine from cork, and the reduced risk of oxidation.

It is also notable that in the first evaluation of the Stelvin in the 1970s some winemakers cited an inability of cork suppliers to be able to meet world demand for cork and the increasing incidence of cork taint ("off flavours from cork") as key reasons for a switch to Stelvin seals. These arguments are also prevalent today in the literature.

So are we simply seeing a repeat effort of the 1970s where disgruntled winemakers seek to make the change to the Stelvin seal, only to be thwarted in their efforts by "recalcitrant" consumers and wine retailers? Will we see a repeat of the 1970s whereby the attempt to persuade the 'early majority' is blocked by the 'chasm'?
As the theory suggests the early adopters are by nature significantly different to the early majority:

> Notably, it has been the well-informed, confident wine collectors and cellarers who have been first to accept premium screw cap sealed wines. (The screw cap's time has come, 2002).

A key question is whether the chasm has been crossed and a beachhead established in the early majority part of the mainstream market.

The way to cross the chasm, according to Moore (2001) is to establish a beachhead or niche foothold in the mainstream market where there is a compelling customer need. Applying the theory to the 1990s developments we would argue that a beachhead has been established amongst premium Riesling wine makers. While a beachhead in the niche of airline and cheap wine was established, strategically this niche need not provide a platform to win over the pragmatists in the early majority market.

Riesling wine is most susceptible to cork taint and therefore there is a more compelling reason for the Stelvin seal for this wine. It was the use of the screw cap on premium wines by a well-respected group of wine makers that has made the screw cap more acceptable to a broader section of the mainstream market.

However, there are several other important differences between the first and second attack to suggest that an influential and solid base has been established in the mainstream market. These are:

1. Large retailer pull: The wine retail industry in Australia has consolidated in recent years and the power of retailers increased considerably. The largest UK wine retailer, Tesco, a significant customer of Australian wine companies, is committed to the screw cap seal, primarily for reasons of quality control and to reduce customer complaints and returns. Once this large early market customer has accepted the new technology it is much easier for other retailers within the mainstream market to follow. In this case other wine retailers now face less of a risk in following Tesco's lead.

2. Retailer specialisation: in order to compete with the large wine retailers in Australia the boutique wine retailer has sought to differentiate itself by developing relationships with loyal customers based on personalised service and wine knowledge and education. These retailers are committed to educating their customers about the superiority of the screw cap closures.

3. Wine media: There is a much larger, sophisticated and easily accessible wine media and magazine industry today compared with the 1970s. This is significant because most of the wine

writers have been critical of cork's inconsistent qualities and appear eager to support those wine makers who are taking a risk in attempting to entice wine consumers to switch from cork sealed bottles (Robinson, 2002).

Conclusion

Although the technology adoption life cycle model as interpreted by Moore (1994,1995,2001) was developed from his work in hi-tech markets, we have found that it was relevant and insightful in understanding why consumers rejected the screw cap seal in the 1970s in Australia. Moore asserts that a strategy is required to make the transition from the early adopters to the mainstream market. Our analysis clearly demonstrates that the promoters of the screw cap in the 1970s lacked an appropriate strategy. No collective strategy was evident as the key stakeholders (screw cap manufacturers, wine makers, and wine retailers) allowed the screw cap to become associated with cheap wine and economy airline travel. The demonstrable superiority of the technology was clearly insufficient to cross the chasm and become successfully adopted by the mainstream market. While the screw cap established a beachhead, it was the wrong beachhead from which to penetrate the mainstream market.

This analysis highlights the importance of examining in detail the strategic marketing requirements to make the transition from the early to the mainstream market. While Moore appropriately distinguishes between the early adopters and the early majority, specific strategic options require greater elaboration in the literature. Our analysis suggests that consideration be given to forming a collective strategy of multiple industry players in order to overcome adoption hurdles and make the transition from early adopters to the mainstream market. In the second attack on the cork a collective strategy emerged. A key stimulus for this collective strategy was the Clare Valley initiative, which was supported strongly by the wine media and by wine retailers. The new beachhead was premium Riesling wines. This allowed the wine retailers and the wine media to associate the screw cap with premium wine and to weaken the consumers' association of the screw cap with cheap wine.

The reason why the interests of key stakeholders coalesced can be partly explained by the changed wine retail industry structure and the growth and sophistication of the wine media industry. It is arguable that without these accompanying factors, the technically superior screw cap may have failed a second time.

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