The nuts and bolts of the UK kit car movement, 1949-2009: an ecological analysis

FLETCHER, MARK,ANDREW

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Mark Andrew Fletcher

A thesis submitted for the degree of Doctor of Philosophy at the University of Durham

December 14, 2011

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Statement of copyright

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I wish to thank my supervisors: László Pólos and Mike Hannan, who were a source of encouragement throughout. I also wish to thank David Barron and Anand Swaminathan for taking the time to consider my thesis, carry out my viva, and their assistance in pointing out errors. This was despite their busy schedules: I thank them both. Peter Hamilton and Mike Nicholson deserve mention and thanks for finding funds for me to travel to either event history courses or presenting papers at conferences. I wish to recognize the financial support that came from Durham Business School, and thank the School and my family for bankrolling me over this period. I thank my family, friends, and Jonathan Bah for their support and putting up with me over this time. Finally, I thank Peter and everyone at `www.wordzworth.com` for helping me format the manuscript.

All errors remain my own.

Chapter 1

Introduction

The British automotive industry was once considered to be the world leader, with a stable of marques and engineering prowess that at one stage seemed unrivaled. Marques such as Triumph, AC, Aston Martin, Austin, Bentley, Hillman, Jaguar, Jensen, Lotus, MG, Mini, Morris, Rolls–Royce, Rover, and TVR being at the vanguard of the automotive industry, and across all classes and price ranges. However, with the emergence of Japanese cars being more reliable and cheaper, the increased reputation of German marques for sturdy build quality, and the disastrous conglomerate of British Leyland, by the end of the 1970's, British mass car manufacturing seemed to be perilously close to death. Although, such companies such as Ford, Vauxhall (GM's UK brand), Nissan, and Honda provided mass production jobs in the UK, it was becoming increasingly more difficult to find an "all British" company in this arena. The last of these large mass production [1] firms - MG Rover - ceased production in 2005, having the MG brand sold to China's Nanjing group, and BMW retaining the Mini brand. Some household names in British car manufacturing were also bought over by non–British firms. Bentley and Rolls–Royce were sold to Volkswagon and BMW, Aston Martin, Jaguar, and Land Rover to Ford (Jaguar Land Rover having recently been re-sold to India's Tata), Lotus having had a significant equity stake bought by Malaysia's Proton, TVR being sold to a Russian businessman and subsequently ceasing

[1] "large" in terms of mass production in the UK, but being widely considered to be a small mass producer when compared to the volume of sales of other companies such as Toyota, Ford and such like.

production, and the Jensen and Austin–Healey brands and trade marks being sold to foreign car manufacturers. Such activity led many to believe that the British car industry was dead (Church, 1995; Rupert, 2008; Simms and Boyle, 2010; Wood, 2010).

Although the mainstream UK automotive industry might be considered a shadow of its former self, the same cannot be said for the UK kit car movement - a part of the industry that few outside the movement know exists. This movement has flourished since its inception in 1949, and as of 2009 had nearly 200 organizations producing cars in component form, creating hundreds of jobs directly, and indirectly supporting thousands of jobs from materials and component manufacturers [2]. Not only this, but the next chapter will illustrate how innovative some of these organizations and their product offerings have been. Moreover, the movement and its organizations and product offerings is characterized by two different types of authenticity (Lindholm, 2007): craft and type (Carroll and Wheaton, 2008). Although Carroll and Wheaton (2008) highlighted the different manifestations of authenticity, the real power of authenticity in organizational populations was evidenced starkly in Carroll and Swaminathan's (2000) analysis of the microbrewery movement. The kit car movement also has a number of product categories present, where product offerings of organizations are scrutinized by audience members and categorized accordingly. [3] Of the longest surviving organizations, some have produced product offerings across many product categories, whilst others have produced offerings in only one or a few product categories.

1.1 Motivation

Over the past decade or so, organizational ecology has benefited from the introduction of logical formalizations of theory fragments (Péli, Bruggemann, Mausch, and Ó Nualláin, 1994; Péli, 1997; Pólos and Hannan, 2002; 2004; Pólos, Hannan, and Carroll, 2002; Hannan et al., 2007). By applying first

[2]interviews with various kit car manufacturers and enthusiasts, May 2009
[3]interview with kit car enthusiasts, May 2009.

order logic, theories can be built and developed, and possible inconsistencies exposed. Such theoretical development has led to advances in age dependence (Pólos and Hannan, 2002), and how codes are constructed (Pólos et al., 2002), for example. As noted by Hannan (2010), in recent times theoretical progress has advanced at such a rate that empirical support for the theories developed has been slow in coming into fruition. For example, there exists no empirical support explicitly dealing with codes applied by audience members. Given one of the major contributions of Hannan et al.'s (2007) seminal work was to focus on the role audience members and codes play in organizational dynamics, it seems prudent to find a scenario where this theory can be tested. Therefore, this thesis scrutinizes the theoretical concept of a code as articulated by Pólos, et al., (2002) and Hannan et al., (2007) with qualitative evidence garnered from a content analysis of critical reviews of kit cars. The conception of a code is readdressed with respect to how it is constructed by a specific sub - set of the audience: critics. Hitherto, it has tacitly been assumed the code applied by general audience members (consumers) is similar to that of critics. Yet, if the purpose of critics is to reduce uncertainty (Zuckerman, 1999; Hsu and Podolny, 2005), then their codes should be more detailed than those of general audience members. Second, there has been a significant theoretical advancement of multiple category membership (see Hannan et al., 2007; Hsu, Hannan, and Pólos, 2011, for example). Empirical evidence has tended to be over a short observation period, and assessing audience appeal (Hsu, 2006; Hsu, Hannan, and Kocak, 2009, for example). Moreover, such empirical studies have considered appeal, but not entry and exit rates - a central tenet of organizational ecology (see Hannan and Freeman, 1989). Much of the empirical evidence for multiple category membership stems from genres of films in America, where a film genre is considered to be a category. In this respect, multiple category membership entails a film to be attached to more than one genre by audience members. This does not address multiple category membership from a producer perspective, where the categories concerned are actual organizational categories - those of type authentic producers and craft authentic producers. Research on multiple category membership is thus advanced to apply to organizational categories, not just those of film genres (or product categories).

The unit of analysis is the organization *not* the marque, consistent with prior ecological research on the automotive industry (Bigelow, Carroll, Siedel, and Tsai, 1997; Dobrev, Kim, and Carroll, 2003; Dobrev, Kim, and Hannan, 2001). The marque might persist over a period of time and appear to be stable, whereas the organization which owns the marque might have exited the population and been replaced by another organization. A prime example is the history of the Marcos marque: having been present in the population for decades, but suffering from having several changes of ownership. Looking at the marque conceals these organizational dynamics. In this way, the vital rates of entry and exit of organizations from the population can be accurately estimated. At this juncture it seems prudent to differentiate the work of Dobrev et al., (2001; 2003), and that of Torres (1995) in particular. These pieces of work assessed UK mass producing organizations, *not* kit cars. Inspection of their data sources - Baldwin, Georgano, Sedgwick, and Laban (1987); Culshaw and Horrobin, (1997), for example - includes the most prominent kit car manufacturers in their works. However, this totals less than 5% of the overall kit car population. Indeed, these studies did not consider the kit car movement a separate population from the mainstream car manufacturing population.

1.2 Major theoretical issues

The one qualitative and two empirical chapters of this thesis addresses the following theory fragments of organizational ecology: (1) the theoretical construction and empirical [4] evidence in support of a frequency code, (2) organizational vital rates with respect to multiple category membership (3) measuring population dynamics: diversity and the engagement niche.

(1) *the theoretical construction and empirical evidence in support of a frequency code.* The theory of the code (Pólos et al, 2002; Hannan et al., 2007) is a relatively novel theoretical construction in ecology, with little -

[4] "empirical" in the meaning of qualitative researchers

if any - explicit empirical/qualitative research conducted in this area. This chapter highlights how the present construction of a code is unsuited in its application to a specific sub - set of the audience: critics. General audience members are unable to dedicate time and effort in understanding all aspects of an offering or organization; they look at only a small set of feature values. Should an object satisfy this schema, the object takes on a taken for granted character. The fewer the feature values assessed by an audience member, the higher the taken for grantedness of the object. By devising a frequency code, the role of the critic - reducing uncertainty to audience members by assessing all aspects of an object - can be fully appreciated. Although all aspects of the objects are scrutinized, some feature values might come under more scrutiny than others. It is this aspect of the frequency code that determines an object's taken for granted character. Should all of the features be subjected to low scrutiny, the taken for granted character of the object is high; should the feature values be subjected to higher scrutiny, the taken for granted character of the object is lower. Restating aspects of the theory leads to insights that can be qualitatively assessed with respect to critical reviews of kit cars. By using content analysis to support the theory development, it is hoped the issue of defining and measuring codes is progressed further by researchers, and the insight garnered from qualitative data analysis can be applied more often to studies assessing codes.

(2) *organizational vital rates with respect to multiple category membership.* Category generalism (those which claim membership of more than one labeled category) and category specialism (those which claim membership of a single labeled category) have focussed on audience appeal, whether it be via critical attention of securities (Zuckerman, 1999; 2000), film reviews (Zuckerman and Kim, 2003; Zuckerman, Kim, Ukanwa, and von Rittman, 2003; Hsu, 2006) or wine reviews (Negro et al, 2010). Category specialists have higher audience appeal and fitness at a given position than category generalists. Such appeal might manifest itself in the form of greater coverage by critics (Hsu, 2006) and more favorable reviews (Hsu, 2006; Negro et al., 2010), to a higher probability of selling a product at online auction (Hsu et

al., 2009). One of the limitations of these studies is that they do not have sufficient temporal length to investigate core ecological and evolutionary dynamics of entry and exit rates. By having the complete history of the UK kit car movement from its inception in 1949 to 2009, attempts can be made at applying multiple category membership to a long term evolutionary perspective. Empirical evidence supports the hypotheses that the interaction of density of category generalists (those organizations which produce both type authentic and craft authentic product offerings) inhibits the legitimation of the category specialist identities (type authentic category specialists and craft authentic category specialists). This interaction between density of category generalists and category specialists lowers the founding rate and increases the failure rate of category specialists. Although the lower appeal of category generalists has been documented, the deleterious effect of increasing category generalist density on the vital rates (and legitimation) of category specialist identities has not been assessed.

(3) *measuring population dynamics: diversity and the engagement niche.* Measuring the engagement niche (Hannan et al., 2007) of an organization is a complex task, with different ways in which a variable can be constructed (Hannan et al., 2007; Hsu et al., 2009). This chapter examines the effect of constructing variables that capture the engagement niche of an organization in a competitive environment. It starts with a relatively basic construction, then builds up to one that considers competition within a product category, and then one within the population. The merits or otherwise of each variable and their implications to researchers are discussed in detail. It concludes with comparing the Simpson Index of diversity against the Shannon entropy measure with the intention of analyzing the particular strengths of each diversity measure. The differing variables capturing the engagement niche illustrate the attention required by the analyst when deciding on how to conceptualize the engagement niche.

1.3 A reader's guide

The thesis proceeds as follows.

Chapter 2 gives readers a historical grounding in the world of kit cars: its foundation and pattern of growth over the intervening years are outlined. Then, the individual product categories applied in the coding process are described in detail to justify why such categories were used. It also adds to the general historical overview. This chapter might not appear to be essential reading, but it puts the following chapters in context: without an understanding of the movement and the differences between the product categories, it is difficult to follow the theoretical arguments and empirical evidence.

Chapter 3 provides details of the quantitative methodology which is used in Chapter 6 and Chapter 7. A detailed explanation of how the data sources, and how it was used to construct the data set are provided. Model selection is assessed also, justifying the use of the log - normal model, and the benefits of using maximum likelihood estimation in studies of this nature. Readers not interested in these methodological issues could skip this chapter and go straight to Chapter 6 and Chapter 7.

Chapter 4 provides details of the qualitative methodology which is deployed later in Chapter 5. A detailed explanation of the pilot study, coding processes involved, and why content analysis was used are all contained here. For readers not interested in these methodological issues, skipping this chapter and delving straight into Chapter 5 is possible, but not desirable. Although it should be noted Chapter 5 is relatively self–contained.

Chapter 5 is the sole qualitative chapter, which re-addresses and builds on the theoretical construction of a code. Its novelty lies in applying a content analysis of critical reviews of kit cars from Complete Kit Car magazine from 2007–2009 as a way of ascertaining the code length of a product offering/organization. On a theoretical level, the construction of a frequency code, and the issue of label fuzziness on the length of the code and number of code violations perceived by audience members is advanced. The results of the content analysis generally find support for this advancement of the theory proposed.

Chapter 6 is the first quantitative chapter, investigating the impact increased density of category generalist organizations has on the legitimation (via assessing entry and exit rates) of category specialist organizations. The empirical evidence provides broad support for the hypotheses developed, and is applied to the two category specialist identities: type authentic category specialists and craft authentic category specialists.

Chapter 7 is the second quantitative chapter, and focuses on how to measure the engagement niche of an organization; several variables are applied and tested. Diversity measures are also examined to determine whether an optimal measure of diversity is available to researchers.

Chapter 8 is the concluding chapter of the thesis and summarizes the findings from the qualitative and empirical chapters, noting their generalizability to other organizational populations and limitations. Possible further lines of research derived from the thesis are mentioned.

Chapter 2

Historical background

Given the UK kit car movement is a somewhat specialist area, the aim of this chapter is to bring the reader up to speed on the history of the movement from its inception in 1949, and charts its history. Then, the individual product categories are detailed, in order for the reader to better understand how and why the authenticity and niche width variables are constructed later on in Chapter 6 and Chapter 7.

2.1 The history and dynamics of the kit car population

Normally, a car is built in a factory before being sold to the customer. This is not necessarily the case for kit cars. A kit car is sold to the owner in 'kit' form; although being sold many of the necessary components, it is up to the owner to assemble the car themselves. Indeed, for many it is this 'do – it – yourself' nature of the kit car that attracts them in the first place to own such cars. As one enthusiast put it, "you know, half the fun – maybe all the fun – is in spending an hour here, an hour there... tinkering and trying to build the [car]. It's nice to see the finished product, but it's the making of it that really gives me pleasure – I can say to people 'I built that"' [1]. Kit car manufacturers normally produce a chassis, frame, and shell of the kit car, requiring parts from other cars to be used – this is known as there having to be 'donor cars'.

[1]interview with AC Cobra Replica owner, May 2009

For example, the suspension, brakes, engine, gearbox, steering column, and wiring might come from a single donor, or many donor cars. Typically, donor cars tend to be aesthetically past their prime, with rust and wear and tear visible. However, the mechanical and working parts of the car are still in working order. In this sense, kit car enthusiasts claim kit cars to be the most environmentally friendly cars available: they recycle major components from older cars that would otherwise be scrapped (Complete Kit Car, various years). This eliminates the need to produce new engines, gearboxes and the like. Not only does this recycle perfectly usable mechanical components from cars that would otherwise be destined for the scrap heap, it keeps the overall cost of a project relatively low. For example the MEV Exocet has a reputed build cost of only £2,500 (for a budget build), as it uses as its single donor vehicle the Mazda MX-5 (Complete Kit Car, October 2010). However, this figure is reliant on parts of the MX-5 that are surplus to the Exocet being re-sold, "the final build cost is arrived at by deducting the money you can claim back by selling off body panels and other Mazda parts you won't be using" (Complete Kit Car, October 2010:18). In addition to the use of donor cars, kit cars are usually characterized by fibreglass, carbon fibre or aluminium shells, making the cars light. In some instances, fibreglass or aluminum shells are simply bolted onto the chassis of a donor, such as the NCF Sahara. With a brief outline of what a kit car is, the UK kit car population needs some historical context.

When asked to name a few UK car manufacturers (regrettably more difficult to do now than in previous decades), names such as Aston Martin, Bentley, Rolls Royce, Lotus, TVR, and Noble usually spring to mind. However, when asked to name a few UK kit car manufacturers, a certain degree of head scratching occurs and many people would not be able to name a single kit car manufacturer . This is despite the fact Lotus, TVR, and Noble started life as kit car manufacturers. The UK kit car industry appears to have started in 1949 (Lawrence, 1991), where pre – World War II cars had their shells constructed from steel, which was prone to corrosion. Although the chassis and working parts of such cars were in working order, the shells were decidedly unattractive with the rust and holes forming. Since the mechanics of the car had many years of life left in them, these could be taken out of the car and placed into a new construction. It was at this stage enthusiasts began to toy with the idea of using the running gear of existing mass–produced cars, and insert them in newly designed tubular space framed chassis. Not only was it light, safe, and relatively inexpensive, but it would not rust. With a space frame chassis, a newly designed shell made from either aluminium or fibreglass was attached, leading to a completely different car emerging from the parts of the original rust prone one. Cars of this period were termed 'specials', due to the fact they were not produced in vast numbers, presumably due to the novelty of both the fibreglass and the idea of converting a rusting family car into a sports car. The first known organization to venture down this path was Buckler Cars of Berkshire, who produced the Mk V in 1949 (Lawrence, 1991). However, it has been pointed out, the term 'kit car' only came into parlance in the 1960s, therefore Buckler Cars (and other manufacturers before 1960) were not strictly a kit car manufacturer. More importantly, it would not have been described at the time as a kit car manufacturer! Indeed, the founder of Buckler Cars (C.D.F. Buckler) did not term his cars 'kits'. The cars were offered in component form to the public, so in this sense Buckler Cars (and other manufacturers) were 'component car' manufacturers [2]. Nowadays, it appears the term 'kit car' and 'component car' are synonymous with one another (browsing websites of manufacturers shows the use of both terms: some sites sell cars in 'kit' form, others in 'component' form, but the meaning of both remains the same). Buckler named its first product offering (and indeed, the very first 'kit' car) the 'Mk V', allegedly for the reason customers might be put off if it was called the 'Mk I': the Mk V name implied previous designs had been tested and gone before it (Lawrence, 1991). The Mk V was the production car of Derek Bucklers own 1947 creation that competed at race events across England. Indeed, such was the success of the tubular space frame design, Derek Buckler won over two hundred racing events. This space frame was a revolution in car design, and it is widely regarded that Buckler was the first company to use the design in a commercial setting (Culshaw and Horrobin,

[2] I thank Malcolm Buckler for raising this crucial point, by personal communication.

1997). The Mk V came as a space frame chassis and used Ford running gear, with a shell constructed out of either aluminum or fibreglass (as a car in component form would be exempt from Purchase Tax). Following the success of Buckler, the 1950s led to a steady increase in the number of organizations producing such 'Specials' as the Buckler Mk V. Although the aesthetics of the cars were very different - illustrating the creative freedom of the designer - they shared the idea of a space frame, re-using the chassis and running gear of existing cars (usually Ford's), and having a light shell constructed from either fibreglass or aluminum. In some instances, these took the form of a fibreglass shell bolted onto an existing car chassis. For some specials, over the space of a weekend it would be possible for enthusiasts to strip the rusting shell off their existing car, and bolt on the rust proof fibreglass one instead. Dull sedans could be transformed into sleek sports cars with relative ease requiring limited engineering know how.

Having given a brief description of the history and starting point of the population, the population dynamics – density, entry, and exit of organizations – can be discussed in further detail. Figure 2.1 shows the total number of organizations present in the population over its entire history. Of note is the way in which the projection of the population does not appear to follow the normal pattern found in most populations. Under the model of density dependent legitimation (Hannan and Carroll, 1992; Carroll and Hannan, 2000), populations should witness a relatively rapid and uninterrupted increase in density, followed by a decline from a peak level. Instead, the kit car population is characterized by a series of cascades of relatively rapid growth, followed by a slight decline and pronounced stagnation. The early years of the population show a relatively slow and stable growth phase - with most of the organizations entering at this time producing 1950's specials. The population reaches a peak in 1960, with a density of 24, only to decline in numbers to a low of 18 in 1964. Most of the decline is attributable to the waning of the 1950's special as a product category; noteworthy is the exit from the population of Buckler Cars – the progenitor of the kit car population in 1962. After this point, the population witnesses a dramatic increase in density from a low of 18 in 1964, to a peak of 69 in 1971. In the space of

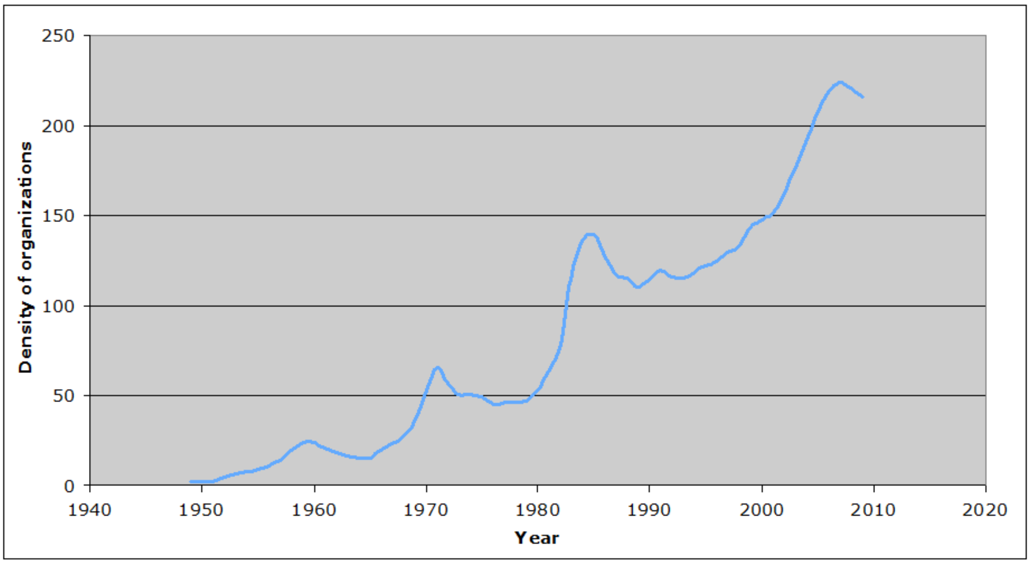

Figure 2.1: Kit car population density, 1949-2009

seven years, the population experienced a more than three fold increase in size. Following this peak, another decline in density occurred over the period 1971–1979, bottoming out at 50 organizations present in 1979. From this low point however, another rapid increase in density was to be experienced from 1979–1985, with 144 organizations present in the population at its peak in 1985. Once again, in a short space of time (6 years) there was a near tripling of the population. To many enthusiasts old enough to remember this period, this was the kit car scene's zenith, where manufacturers such as Dutton introduced cheap kit cars that brought in new customers to the kit car scene. After the peak in 1985, there was another decline in density until the mid 1990's, when the population experienced another fast paced rise in density, reaching a peak of 244 organizations in 2007. From 2007 -2009 there appears to be another decline in density, although it is too early to tell whether this is a continuing trend, or just a brief blip on the rise in density. In terms of densities of producers according to whether they are a type authentic category specialist, craft authentic category specialist, or category generalist, Figure 2.2 plots the respective densities. Moreover, the entry and exit of organizations from the population shows a similar pattern, exhibited in Figure

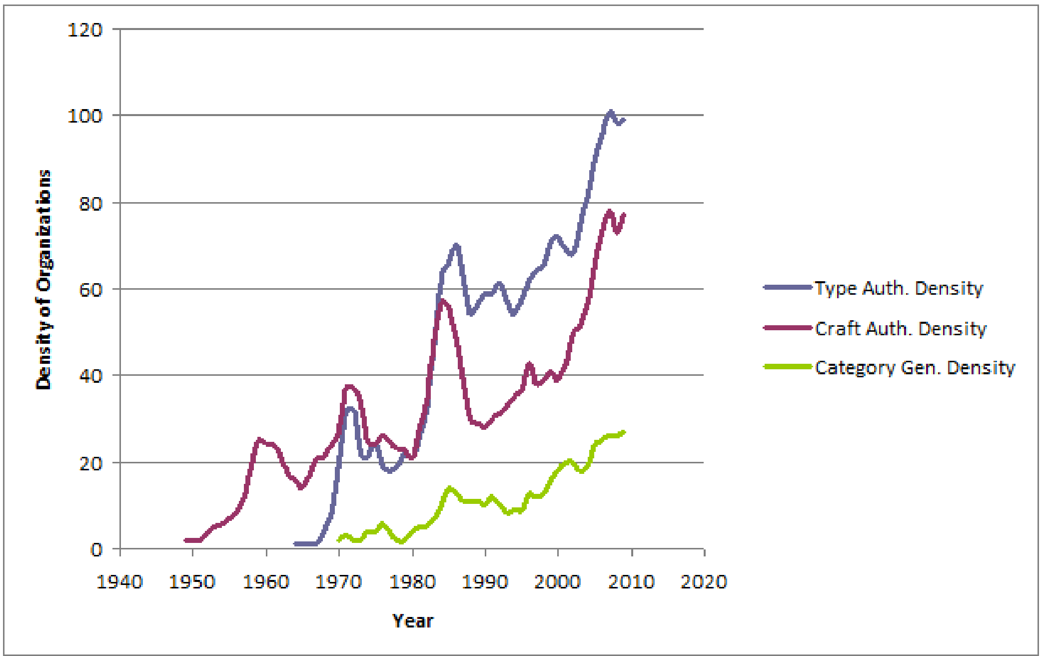

Figure 2.2: Kit car population density, by authenticity class, 1949-2009

2.3. Entries of organizations into the kit car population has a peak in 1959, with 8 organizations entering in that year; the next peak of entries reaches its climax in 1971 when 22 organizations enter in a single year. The most pronounced peak entry of organizations is in 1981, where 41 organizations entered the population in that year. From 2000–2007 there was an increase in entries only to plateau before a significant decline in entries from 2007–2009. What is noticeable, though, is the rapid increase in entries over a short period of time that leads to a peak and then sharp decline in entries. The most significant of these occurred during 1980–1988, where entries increased from 7 a year to reach their peak of 41 in 1981, only to decline to 4 entries a year in 1988. Organizational exits follow a similar pattern of peaks and troughs as organizational entries, albeit with a slight lag compared to the entry peaks. Organizational exits grow steadily over the late 1950's and early 1960's to peak at 6 exits per year in 1962, with the number of organizations exiting declining again until the 1970's. By 1970 there is a sharp increase in exits from 2 per year in 1970, to a peak of 19 in 1972, declining once more to

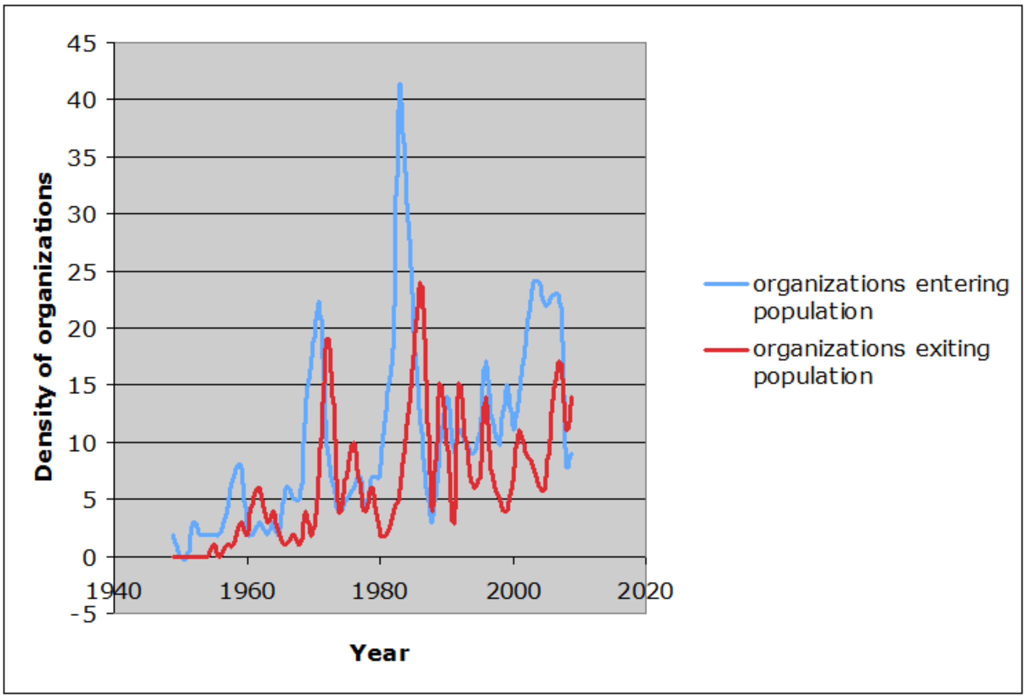

Figure 2.3: Organizational entry and exit from kit car population, 1949-2009

a low of 4 exits per year in 1974. Then, the number of organizations exiting increases from a low of 2 per year in 1981 to a peak of 24 exits per year in 1986. With peaks of entry closely followed by peaks of exit, an examination of how long an organization remains in the population seems appropriate. As Figure 2.4 illustrates, organizations present in the population have a half life of just over seven years: half of the population dies after seven years. Some organizations have a fleeting visit in the population, such as speedboat manufacturer Fletcher. With the Fletcher GT, Fletcher speedboats sold just four of these models in 1967 before leaving the kit car population to focus on building speedboats once again (Rees and Philby, 1997). Others, such as Caterham Cars have been in the population for nearly forty years, having joined the kit car scene as a manufacturer in 1973.

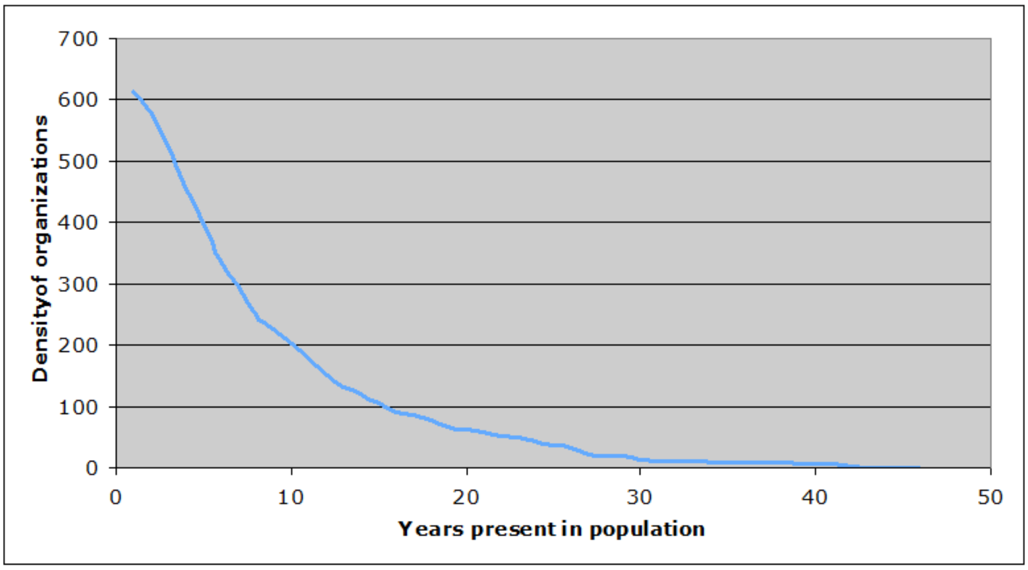

Figure 2.4: Cumulative duration of organizations in kit car population, 1949-2009

2.2 The social movement aspect of the kit car population

The UK kit car scene is unusual in that it seems to possess certain characteristics reminiscent of a social movement. Bearing in mind the classical hallmarks of a social movement in a population of organizations comprises a body of enthusiasts who regularly meet, compare notes on products and organizations, hold shows and festivals, and publish their own salient journals or magazines (Carroll and Swaminathan, 2000). The same sort of process is evidenced in the UK kit car scene. Enthusiasts and manufacturers organize festivals and shows throughout the year, where kit car enthusiasts meet and come together to discuss their own cars and those of others. Indeed, the biggest of these (held at Stoneleigh every May Bank Holiday weekend) attracts thousands of visitors, hundreds of enthusiast's cars, and dozens of kit car manufacturers. This is not the only motor show held: currently there are four kit car shows held on an annual basis, with many more track day events held in between (Complete Kit Car, November 2010). There are product category specific (UK Cobra Replica Club), marque specific (Marlin Owners Club), region specific (North East Kit Car Club), and even designer specific (Jeremy Phillips Sportscars Club) Owners Clubs who meet on a regular basis to compare their cars with one another, seek help and guidance in building the cars, have road trips and perhaps even holidays/pilgrimages to the Le Mans race track circuit, or just a general get together of like minded people every so often. Many of the clubs have an annual meeting at the main kit car show in Stoneleigh, and have a dedicated space for club cars to be exhibited. Since the mainstream automotive journalists do not appear to cover the kit car scene, kit car specific publications have emerged, with highly detailed car reviews, news and comments on the kit car scene in general. Features in the magazine might be a detailed test drive of a new product offering that has recently come on the market, a test drive of an enthusiast's own kit car that has been built and specced out to an unusually high standard, and notes from club get togethers and track days. Not only this, parts detail enthusiast's own build projects and regularly update readers on how the build process is going, to dedicated sections providing advice to enthusiasts on technical points - whether it be gel coating, engine maintenance, suspension or brake calibration, or issues relating to electrics and circuitry.

However, for it to take on a social movement character, the kit car scene needs to have an *oppositional* character (Koopmans, 2007; Olzak and West, 1991; Carroll and Swaminathan, 2000; Pólos et al., 2010). The oppositional character of the kit car movement to the mainstream mass – produced product offerings (and the organizations themselves) is noticeable through the comments of the kit car enthusiasts. Commenting on the type of person in the kit car movement, one enthusiast noted, "they're not happy with everyday vehicles"[3] . Echoing this sentiment, another enthusiast stated, "I just wanted something a bit different" as the main reason for purchasing their kit car [4]. Informal semi – structured interviews carried out at the main kit car show in 2009 revealed countless enthusiasts mentioning a dis-satisfaction or frustration with mainstream cars – often for being too complex. To them,

[3]interview with LSIR owner, May, 2009
[4]interview with Marcos Owners Club member, May 2009

kit cars are basic [5], and allow the enthusiast to diagnose the problem with the car and fix it themselves. As a member of the Marlin Owners club put it, “I don’t want a computer telling me whats wrong with *my* car, and then the garage hooking up a lap–top to fix it. *I* want to be able to tell whats wrong with *my* car, and *I* want to fix it in *my* garage”. The very fact kit cars are so different to mainstream mass produced vehicles is a great appeal to these enthusiasts. Although, their contempt for mass produced vehicles does not necessarily mean they do not own or use a mass produced car that they despise so much. A member of the Quantum Owners Club noted, “I have a Quantum, and I have a [Ford] Focus– it’s my everyday run around”. Another interesting theme to emerge is enthusiasts believing the mass producer organizations to be more profit orientated and less concerned about what audience members want in a vehicle: such cars do not cater for the individual taste of the audience member. One enthusiast from the Dutton Owners Club was quite scornful on the fact mass producers create a car that does not appeal to individual tastes, “if I buy a Ford or BMW, or whatever, the only thing I get to choose is the colour. With a Dutton I get to choose what engine I want to put in, what interior trim I want, what type of seat I want ... I can do anything with it.... Thats why ... no two Duttons are exactly the same”. The profit oriented aspect of the mass producers was not lost on kit car producers either, with Geoff Beston of the Gentry Motor Car Company commenting, “I build these [kit cars] because I want to build these, not because I have to, but I want to”, and a Lotus Seven replica producer saying making cars, “is in m[y] blood”.

The opposition to the mass produced vehicles was summed up perfectly by Geoff Beston, “you get the mass – produced Euro – box... because they all look the same... they’ve got a certain squareness about them and it’s inevitable they’re going to be the same if you test it until you get the most fuel economy you can out of it, it’s going to become as aerodynamic as it possibly can be. Wind’s not going to act differently in Peugeot’s wind tunnel than it does in BMW’s wind tunnel, so ultimately they’re all going to end

[5] they are ‘basic’ in the sense that they do not have built in computers and the like. Many are aerodynamically and mechanically superior to mass produced cars

up looking very similar". From this anecdotal evidence the kit car movement appears to possess all of the traits evidenced in a social movement: it has highly engaged enthusiasts who organize shows and events throughout the year, enthusiast clubs and publications, as well as an overarching idea of the movement being in opposition to the mainstream mass produced car market. Enthusiasts noted they wanted something different, something that was not like a mass produced car at all (although they readily accept modern family living dictates they need a practical run around that the mass producers are generally superior at making versus a family friendly kit car). Indeed, mass produced cars (to enthusiasts at least) are similar to one another, and do not cater for the individual tastes of the audience members. Whereas, kit cars enable the enthusiast to have a car that is very different to mass produced cars, and enables the owners to customize the vehicles to their own personal specifications.

2.3 Kit car product categories

In the following chapters, the product offerings of kit car manufacturers have been clustered according to whether they fit a certain category or style. In all, eleven product categories have been applied, and a brief outline of them and their criteria for entry are discussed.

Category 1: Lotus Seven Inspired Replicas (LSIR)

This is perhaps the most prominent kit car category of all: ask someone to name a kit car, and they will usually come up with a Caterham 7 or Westfield replica. The Lotus car company was the brainchild of Colin Chapman, an engineering graduate and ex–RAF pilot, who had a penchant for designing fast cars, and applied the motto "simplificate, then add lightness" to his car design. Indeed, Lotus became synonymous with motorsport – Formula 1 in particular – having notched up 72 Grand Prix wins, 7 Constructor's Championships, and 6 Driver's Championships by the end of 1984 (Baldwin et al. 1987). Lotus Cars was founded in 1951, but producing racing cars meant the common motorist could not purchase a Lotus until 1957 and the eponymous Lotus Seven came into production in component form (Culshaw and Horrobin, 1997). The car itself was sold primarily in kit form, to take advantage of the British tax system that had a lower tax rate on cars sold in component form (Baldwin et al., 1987), and comprised a space frame chassis and suspension, hydraulic drum brakes and the choice between a BMC 'A' Series engine or a Ford 100E engine being the preferred choice of the 242 cars sold between 1957-60 (Lawrence, 1991). Over time, a series of modifications were made to the car, and in 1973 Lotus sold the moulds and rights of the Seven to one of their dealerships, Caterham Cars, who have been refining the Seven ever since. The LSIR category is just that: inspired replica's of the original Lotus Seven. Products look similar to, but should not be identical to, the original Lotus Seven. Westfield produced a Seven, "which was such a blatant copy of the Lotus/Caterham Seven that Caterham Cars took legal action – and, in 1987, won. Westfield agreed to modify its design and afterwards concentrated on the SE, which looked like a close relative of the Caterham Seven but was sufficiently different to avoid further action" (Lawrence, 1991:324). Product offerings in this category have a definite resemblance to the original Lotus Seven. The category began in 1970 and continues to the present day; the category makes a substantial contribution to the overall density of organizations and product offerings in the kit car population.

Category 2: beach buggy replicas

The beach buggy category owes its existence to enthusiasts from California, who wanted to test their skills at off– road driving on otherwise impassable terrain. Using the independent suspension from a Volkswagon meant handling would be improved over the rough terrain; the VW gearbox was robust enough to endure the numerous gearshifts required in passing over the differing terrain types. Not only this, but taking a VW Beetle chassis and shortening it improved general ground clearance, as did the placement of bigger tyres. (Hale, 2006). Such cars were intended purely as trials cars for competitions, and not for every day road use. It was not until Bruce Meyer saw these cars that the concept of everyday use and beach utility were capitalized on. Using fibreglass moulding that was more at home in the world of boat hull design (showing Meyer's profession as a boat designer and builder), the first Meyer's Manx buggy was produced in May 1964. It comprised a shortened VW Beetle chassis (to improve ground clearance and manoeuvrability), with its running gear in tact, and sporting a new and lightweight – not to mention stunning– fibreglass shell. As noted by Hale, "[w]ho was first to produce a buggy kit in Britain is open to debate, though the entirely home–grown Volksrod Mk I, produced by Warren Monks at Doncaster based firm Volksrod, may have just pipped the more publicised GP buggy to the post." The category started in the UK in 1964, and has prevailed ever since, with products like the Hoppa Street Buggy creating a modern twist to the 1960's buggy. However, the buggy phenomenon has not been one of constant growth, as Hale recalls,

> 1971 was *the* year of the buggy in Britain. Manufacturers, encouraged by buggies appearing in *The Thomas Crown Affair* and the Walt Disney feature film *The Computer Wore Tennis Shoes*, which starred Kurt Russell, built them in large numbers. an American buggy, the Scorpion, was imported specially for the *Daily Telegraph* stand at the 1971 London Motor Show, and Brands Hatch hosted a unique buggy race just after Christmas of that year. In 1972, however, interest in glassfiber–bodied buggies began to wane, on both sides of the Atlantic

Category 3: AC Cars replicas

AC Cars produced their first car in 1908, although the kit car population (and this category) focus on only three AC cars: the Ace (produced between 1953 and 1963), the Cobra 289 (1962-8), and the famous Cobra 427 (1965-8). The Ace was crucial for the survival of AC, and was the genesis of the classic 427 Cobra (Robson, 2006). Purchasing the design rights of a John Tojiero model, the Ace created a stir with its elegant looks and Le Mans racing performance. The Cobra 289 is the start of the Cobra legend in motoring. With famous American racing driver Carroll Shelby convincing AC to provide him with the cars, Ford would provide engines and more sturdy transmission to accommodate the 289 cubic inch (from where the 289 derives its name), 4.7 litre Ford engine that would go on sale – mostly in the USA (Robson, 2006). Shelby created a tweeked AC which had, "raw, red–blooded, unashamed performance, with a harsh ride and deafening exhaust note. Wheelspin was part of the deal, but no-one complained" (Robson, 2006:10). Shelby then produced an AC with a 427 cubic inch, 7 litre engine, with visible differences from the 289 being it required larger wheel arches, a larger air intake at the nose, and generally looked more aggressive (Culshaw and Horrobin. 1997). The 427 Cobra was – and still is in many respects – seen as the ultimate car: "[e]ven customer cars had 390bhp and 475lb/ft of torque, which meant 0-60mph in 4.2. seconds and a top speed of 165mph/265kph" (Lawrence, 1991:11). Such was the power and sheer exhiliration of the car that, "[a]nyone who drove one, and did not admit to a raised heartbeat, clammy palms, and unstoppable smiles or even outright laughs, was not normal" (Robson, 2006:11). Although only 413 were produced – nearly all being sold in the USA – there are thousands of AC Cobra 427's on the roads in the UK, leading one magazine to observe 99.9% of AC 427's seen on UK roads are kit car replicas. The category started in 1977, and has been providing product offerings ever since.

Category 4: super car replicas

The super car category endeavors to produce replicas of high performance road going (perhaps even racing) cars that are of considerable expense. Perhaps the most iconic of these super cars is the Ford GT40, so called because it stands a mere 40 inches high. Produced in 1964 (Culshaw and Horrobin, 1997), it was intended to be raced at Le Mans in the annual 24 hour race. Having been designed as an 'out and out' racing car to compete with the best at Le Mans, few were produced for road use to the general public. So successful was the GT40 that it won Le Mans four years in a row: 1966, 1967, 1968, and 1969, giving it a certain cult or celebrity status amongst car enthusiasts. Due to this, it is perhaps unsurprising that kit car enthusiasts took to producing replicas of the car at more affordable prices (with a limited number of GT40's produced, they command extremely high prices). Due to the desire to create as close a copy to the original, many of the replicas take as their mould GT40's that have been damaged during track racing. However, the GT40 is not the only constituent of this category, Italian super cars feature as well. Replicas of Ferrari – modern cars such as the 430 and classics such as the Dino – abound, and there has recently been a steady growth in the number of Lamborghini replica product offerings available. Given a Ferrari or Lamborghini costs over £100,000 for the real thing, a replica Ferrari can be bought (in kit form, naturally) for a mere fraction of the price – around £15,000 (Complete Kit Car, September, 2010). Indeed, as one of the columnists of the magazine noted, "this is what motoring is all about, enjoying whatever your car is and enjoying it even more by getting together with people who share the same dream - *and if you can't afford the real car of your dreams, why not build one yourself?*" (Complete Kit Car, September 2010, p.15 [emphasis added]) The category first appeared in 1968, and has had product offerings available to enthusiasts ever since.

Category 5: classic car replicas

This category title is fraught with disagreement on what comprises a 'classic' car; indeed, the next category 'vintage' suffers the same problem. To some, only cars made before the 1980's qualify as a classic, to others it is cars that are over 15 years old. Some even believe the classic car definition can only be met on a car of a certain age, and of a certain minimum value. For instance, the Mini Cooper would not be deemed a classic under this last definition, due to its ubiquity and relatively low value; nor would an MG Midget be deemed a classic. For insurance purposes, the definition of a classic entails, "[c]lassic cars generally have to be at least 15 years old...The classic car does not have to be a glamorous super car...They do not even need to be especially valuable" (`http://www.cheapmotorinsurance.info/main/classic-car-insurance.html`). Due to differing start and end dates of the 'classic' car category, the start date was taken for simplicity as the end of World War II (1945), and the end date of January 1, 1973. The end date was chosen as this is the legal definition of a classic car; cars older than this are exempt from paying road tax, and defined as a classic (`http:`

//www.oldclassiccar.co.uk/classic_car_article12.htm). Cars such as the XK 120 and 140 produced by Nostalgia Cars qualify as classic cars under this definition, given the cars they are replicas of were produced between 1945 and 1973. The classic car category made its first appearance on the kit car scene in 1972 (a year before the actual category was classified as ending); the product offering was of a Jaguar XK120 replica, the original being produced between 1948-54 (Robson, 2006).

Category 6: vintage cars

Like the classic cars category, the vintage category suffers from disagreement from enthusiasts about the start and end dates of a vintage car. The dictionary definition of the term is as follows: “a car built between 1919 and 1930” (Collins, 2001:1094), with the 1930-1939 period known as the “pre–World War II era” . However, note the Classic Car Club of America’s definition of a classic car would appear to encroach upon the vintage period, since it is defined as starting in 1925, and ending in 1948. Since this is a study of the British kit car movement, the former (British) definition is adopted. For example, replicas of the Bugatti type 35 would be classified as vintage cars; given its motorsport pedigree it is not surprising to find this car has been made into a kit form replica by many organizations. As Baldwin et al. (1987:79) note, “[t]he Type 35 was the most successful racing car of the inter–war period and the only car capable of winning Grands Prix which could also be bought by the amateur. In 1926 the Type 35 won 12 major Grands Prix, and in 1927 Bugatti claimed to have won 2000 sporting events”. The category had its first product offering in 1969, and has had a continuous following of product offerings in the category ever since.

Category 7: 1950’s specials

The kit car population owes its very existence to this category of car, and specifically the very first company, Buckler Cars (although, Buckler Cars might not have considered themselves a kit car manufacturer). For this reason, the category has been given more detailed attention earlier in this chapter. With the Bucker Mk V demarcating the start of this category (and the kit car population) in 1949, the 1950's specials were widely accepted to have flourished in the 1950's, with hundreds of specials being produced in this decade. Although their title is of "1950 special", this does not mean they were present solely in this decade, as they persisted through until the 1970's. However, the 1960's saw the category decline, with product offerings dwindling and organizations stopping producing such cars. Only a few organizations continued to produce specials in the late 1960's and did so doggedly until their ultimate demise in 1976.

Category 8: cycle cars

The cycle car was itself a product category in the mainstream car industry from 1910 to the 1920's, where the engine (and perhaps the running gear) of a motorcycle was placed into a light frame and four wheeled vehicle, although many adopted three wheels – one on the rear and two at the front of the vehicle. By virtue of being a three wheeler, the product offering is almost always a two seater, very low to the ground, and looks distinctive from normal four wheeled cars. Indeed, having a motorcycle drivetrain to the single rear wheel leads to both weight reduction and excellent handling. Being quite conspicuous having only three wheels, the real artistic flair of the designer can come to light, as was the case with the Rayvolution three wheeler, "[d]elicacy and aggression have never been so successfully unified than they are in the stunning new Rayvolution"(Complete Kit Car, October 2008:14). Note that the product category excludes trikes: motorcycles that have a rear axle, and still have the motorcycle riding position (not to mention handlebars). The trike is a product category of the motorcycle population, a three wheeler is intended to have car like features (such as car seats, steering wheels, a monocoque shell, for example), but uses a motorcycle drivetrain.

Category 9: racing cars

For a car to be deemed a racing car, it must meet certain criteria. The car should be intended primarily for track/racing use, but also has capacity for legal road use (this distinguishes it from Caterham Seven's and AC Cobra replicas, which although can be raced at track events, were primarily intended for everyday road use). Some cars in this genre are open top Le Mans style racing cars, such as the Spire GTR, or Reynard Inverter - so called because the level of downforce generated at high speed could (theoretically) allow it to stick to a ceiling. Others take the form of closed cockpit racers such as the TA Spirit, or various Noble incarnations. One racing car deserves a specific mention, and is considered by many enthusiasts as a motorsport legend: the Ultima GTR. Designed by Lee Noble, and continued by racing driver Richard Marlow, the Ultima currently holds the 0-100-0mph world record and the Nurburgring lap record - to name but two achievements (see `http://www.ultimasportscars.co.uk`), making it faster than the Bugatti Veyron, and at a fraction of the price. However, perhaps the Ultima's greatest achievement has been to break the lap record of BBC's "Top Gear" test track. In the words of the company (`http://www.ultimasports.co.uk/Content.aspx?f=records`):

> "The Ultima GTR720 recorded a blistering 1min 9.9secs lap time, which demolishes the previous record of 1min10.7secs set by seven-time world Formula 1 champion Michael Schumacher in his £1 million Ferrari FXX track car. To put things into perspective the Ultima is almost 10 seconds per lap faster than the fastest road car that Ferrari produces which is the renowned £450,000 Enzo which has been timed around the track in 1min19.0secs."

The category first appeared in 1958 and has been providing product offerings for enthusiasts constantly over this period.

Category 10: craft cars

This title might appear to be vague and nondescript, but this appears to be the only way to categorize the product offerings that have graced the kit car stage over the years. Nor is this intended as a rubbish bin category that encompasses cars not classified in the other categories. Kit car journalists readily acknowledge the kit car population has been home to some novel, weird, quirky, and plain bizarre manifestations (Kit Car Magazine various years, Total Kit Car, various years, Complete Kit Car, various years). A few of these cars deserve mention, due to their quirkiness. Take the Futura, produced in 1971 which had "an incredible wedge–shaped body, whose windscreen hinged up sideways to allow the passengers to enter by climbing over the nose" (Rees and Philby, 1997:42). Perhaps the most innovative product to come from this category – and arguably from the whole of automotive design – was the Dennis Adams designed Probe 15 (Heseltine, 2001:106):

> "[i]ntended as an 'investigation into the extremes of styling', it was the lowest car in the world, the top of its domed roof sitting just 29 inches above the ground. The Probe 15...was so low that doors were neither necessary nor possible. To gain entry to the avant–garde cockpit you simply slid back the roof over the rear deck and stepped aboard".

The importance of this category should not be understated, it has led to product offerings and organizations producing them that moved into the mainstream car industry. Cars made by Lotus, TVR, and Noble all came from this category, and are stalwarts of British engineering and motor manufacturing history. A discussion of the kit car movement would not be complete without mention of Jem Marsh and Frank Costin's Marcos Cars. Marcos cars also hailed from this category, and brought the aerodynamically advanced Marcos 1800 to market with its futuristic and aerodynamic styling that was to characterize Marcos for decades to come (Rees and Philby, 1997) – and their advanced aerodynamics were to influence car design not just from the realm of kit cars. The category is the longest serving of all the product categories, having started in 1957 and still producing cars to this day.

Category 11: off–roader's (4x4)

Product offerings of this category are characterized by large tyres, high ground clearance, and their ruggedness. Many of these product offerings are intended for 4x4 competitions, and are designed to withstand the most extreme driving conditions. For example, the IBEX range produced by Foers Engineering have low front and rear overhangs to improve ground clearance and departure angles, whilst focusing the weight between axles provides increased stability not normally found on mass produced off–road vehicles. Not only this, but the IBEX range also have their own unique winch system that allows them to ascend or descend the toughest inclines. Consequently, performance is better than many mass produced vehicles, due to the design centering around utility and off road performance in the toughest of conditions (see `http://www.ibexvehicles.com`). Indeed, a review of an off–roader gives the general mood of this product category, "[i]t's not only the size of it that gives the new Dakar Mutant impact, it's also down to the unashamedly rough and tumble appearance. It looks as though scaffolding has been bent like plastic straws around the right–angled body panels. Indestructible is one word for its rugged demeanour" (Complete Kit Car, August 2009, p44).

Chapter 3

Methodology I: Quantitative

This chapter details the sources of data used to construct the data set, and statistical research methods used in Chapter 6 and Chapter 7. A distinction is made between the two methods deployed in this thesis: event count models and event history (or survival) models. A discussion of Maximum Likelihood concludes this chapter.

3.1 Data sources

Depending on the population being studied, sources of data and information can either be found with relative ease, and by and large complete; others are more difficult to find, and somewhat less complete in their information. In populations which are regulated in some form, organizations present need to be registered before they can operate in this population. Due to this, populations that are regulated by governments or other public bodies tend to have an exhaustive database of organizations. For example, in the State of Nevada, USA, any organization wishing to enter the casino population is required to obtain a license before they can operate a casino. The Nevada Gaming Commission and State Gaming Control Board have annually updated data pertaining to which organizations in the State possess such a license (`http://gaming.nv.gov/`); at any one point in time it is possible to ascertain the exact number of casinos in the population by consulting this data source [1] Contrast this situation to the kit car scene in the UK: there is no governmental regulation for registration present, and so there is no central, definitive source of data in ascertaining the population. Instead, several sources had to be consulted, and shall be discussed in further detail below. Indeed, it is encouraging that whenever kit car experts are shown the data, they concede they did not realize so many organizations were present in the population[2]; some of whom they were not aware existed.

3.1.1 Organizational and product level entry and exit dates

In order to ascertain how many organizations and product offerings were present in the industry from its inception in 1949 to October 2009, data was obtained from the major kit car insurance brokers. This data only provides the name of marques and their product offerings, entry and exit dates are therefore lacking. Moreover, a list of marques is not equivalent to a list of organizations (Dobrev et al., 2001; Dobrev et al., 2003); marques might remain constant over time, but their ownership is likely to differ over that period. The history of one of Britain's most famous kit car manufacturers - Marcos Cars - attests to this, with numerous organizations taking on production of the marque, only to go into administration (see Marsh, Marsh, and Zini, 2010). Building a more detailed picture of organizations entering the population over time, every issue of the three kit car magazines were consulted: Kit Car Magazine (1980-October 2009), Total Kit Car (2004-October 2009), and Complete Kit Car (2007-October 2009). These sources detailed new entrants into the population, changes of ownership in existing organizations, and exits of organizations as well. Unfortunately, these sources only stretch back to 1980, which leaves a substantial period of the industry unaccounted for. Although not an ideal situation, it was mitigated by two general types of

[1] this deals with a positively valued category, i.e. legalized casinos. It does not consider the operation of illegal casinos

[2] perhaps tongue in cheek, manufacturers, gatekeepers, and enthusiasts were asked a final question when interviewed as to how many kit car manufacturers they thought were present in the industry. On the whole, consensus was that less than 100 manufacturers were present (with many estimates being far lower than this)

sources being utilized to find such information. The first comprised reference manuals and encyclopedias of British cars: Culshaw and Horrobin (1997), Lawrence (1991), and Robson, (2006). Unfortunately, these sources were rather sparse and inconsistent in their treatment of documenting kit cars; as the foreword in Robson (2006:5) attests, "we decided not to include several build–it–yourself kit cars whose manufacturers relied on the customers to do the assembly". Of some consolation (and perhaps due to the fact no other catalogue of kit cars appears to exist) was a catalogue of kit cars from 1953 - 1985 (Rees and Philby, 1997). Although, the statement "they're [kit cars] all in this book" (Rees and Philby, 1997:5) is perhaps slighly misleading; many kit cars are documented, but this turned out to be only a partial representation of the industry and kit cars over that time period. Given the social movement nature of the population, a more fruitful strategy was to consult the various owners clubs and manufacturers directly. Either the owners club websites contained a detailed history of the company and car models (e.g. the Scamp Owner's Club website:`http://www.scampownersclub.co.uk`), or individual members (club executive committee members) were contacted directly. Likewise, for organizations still present in the industry, they were contacted also. Direct contact was made through a combination of email enquiries, telephone conversations, and face - to - face conversations at their owners club stands at the 2009 National Kit Car Show held at Stoneleigh, UK. Most of the manufacturers, and all of the owners clubs contacted agreed to provide very detailed information concerning their marques. In order to ascertain whether such information was reliable and accurate, enquiries were made to marques whose entry and exit dates were already known and verified in the encyclopedias. Manufacturers were able to give very precise and accurate information regarding their marque's history. Surprisingly though, owners clubs provided detailed information that was (almost) identical to those of the manufacturers (if the manufacturers were still present in the population). Owners clubs and manufacturers seem to have an extremely close relationship with one another, with information flowing between the two parties quite regularly. As one manufacturer put it, "they [the owners clubs] *are* our marketing”[3]

Product offerings required entry and exit dates as well. The entry dates of products were relatively straightforward, as these were well documented either in the kit car magazines or by the Owners Clubs. More difficult was ascertaining when a product offering ceased production. In some instances, moulds were sold by one organization to another; such instances were well documented in the kit car magazines. Indeed, two organizations deserve special mention in this regard. Sylva Cars and MK Engineering are prolific designers of racing kit cars, and regularly sell their current moulds in order to move on to another project. However, in some cases the ceasing of production was not documented. This raised an important methodological question: should the production years of the vehicle be documented, or the years for which an organization possessed a mould for a particular model? It is suggested the latter is of more relevance: once a mould is created, it requires physical space to store it. And even if an organization ceases production of a particular model it usually retains the mould, meaning the organization can bring a model back into production with relative ease. The exception to this is when a mould is sold, but this has been well documented in the kit car magazines and Owners Clubs. In this sense, product offerings remain ‘dormant’ when not in production, but can be utilized again when demand requires. Product level exits were coded according to the following rationale: if product exit year was known (i.e. the moulds were sold), the year of exit was taken as this year. If product exit year was unknown, the year of exit was taken as the year an organization exited the population. These stages led to a data set comprising 635 organizations (of which 23 organizations were excluded from analysis due to a lack of entry or exit date, or both being obtained), which produced 1753 product offerings from between 1949 and October 2009. Despite the coding efforts outlined above, it was possible only to obtain product level entry and exit data for 1514 the 1753 product offerings.

[3]Interview with Mr. Geoff Beston, BA(Hons), Proprietor of The Gentry Motor Car Company, 2009.

3.1.2 Product level category allocation

After interviewing a range of enthusiasts, manufacturers, and gatekeepers, and reading the kit car magazines, it became apparent product offerings are clustered into distinct categories. The interviews and magazines led to eleven distinct product categories being coded, comprising: Lotus Seven inspired replica (LSIR), buggy replica, AC replica, super car replica, classic replica, vintage replica, 1950's Special, cycle car, racing car, craft, and 4x4.[4] Whilst this might suggest the data is inherently biased and artificial, it is countered by the fact that the use of such categories is how audience members *actually* classify such product offerings. In this sense, the classification of product categories is not solely an analytical tool entirely dreamt up by the researcher; rather it is trying to capture the categorization processes audience members in the kit car population use on a repeated basis. Evidence of this can be found in some enthusiasts' clubs being created not according to the marque (such as the Gentry Owners Club: `http://www.gentry-owners.co.uk`), but according to the category of the products - transcending marque (such as the Buggy Club UK:`http://www.buggyclubuk.org.uk`, which caters for the category 'buggy'; or the Cobra Replica Club: `http://www.cobraclub.com`, for owners of products under the 'AC replica' category).

In order to classify product offerings into their respective categories, photographs of product offerings from `http://www.madabout-iktcars.com` were consulted. This website has an extensive library of kit car images, and facilitated category allocation for the majority of cases. A few product offerings were not present in the image library of madabout-kitcars, and so the three kit car magazines were pored over to identify these product offerings. Unfortunately, some product offerings were unable to be identified and allocated into their categories; 1690 of the 1753 identified product offerings were able to have their categories ascertained with these sources. At first glance it might appear some bias or error might creep in by the analyst having to decide which categories a product was a member of. On the whole

[4]a more detailed description of the categories is provided in the historical background chapter

though, the categories are relatively crisp; there is therefore a binary outcome - either a product is a member, or it is not. For the type authentic categories (1 through 6), this was always the case; either a product offering is a replica of the original, or it is not. Craft authentic categories were slightly less straightforward. For categories 7 and 8, either a product was a 1950's special or cycle car -there was little ambiguity since the category was crisp. 1950's specials had a temporal element: they could only be created during a certain period of time, and there was already consensus about which products comprised this category. Cycle cars were three - wheeled product offerings, and so were identified with relative ease. Similarly, identifying a product offering as being either a member of the racing category (9), or off - road 4x4 category (11) was relatively straightforward: these categories were crisp also. Racing category cars looked very much like Le - Mans style open top racers, or had give away signs such as being adorned with racing roll cages and aerofoil packages. Category 11 product offerings were similarly straightforward to identify; these product offerings had large tyres and high ground clearance. Category 10 ('craft') was a relatively problematic category for which to identify and classify product offerings in some cases. This category is characterized by product offerings that very much emphasize craft authenticity, and so do not necessarily look similar to one another. Rather, it is the use of different components, and designer freedom to innovate that determines this category. Product offerings of this category are characterized by designer freedom and avante - garde styling. For example, the Nova did not have any doors, but a one piece cockpit canopy; the Hustler was designed with glass sliding doors and had canteen chairs used as the seats. In this sense, the quirkiness and atypicality of these product offerings led them to stand out from other categories and be classified as members of category 10.

3.2 Analysis of entry rates

Chapter 6 assesses the rate of organizations entering the kit car population. In modeling entry rates, data of organizations entering the population are temporally aggregated, in order for a hazard of entry rate to be calculated. Event counts "are variables that have for observation *i (i = 1,..., N)* the number of occurrences of an event in a fixed domain" (King, 1988:838). An organizational entry event has been described by Hannan (1991:19) as an "*arrival process*", where the rate of those cumulative entries at a given time can be defined as:

$$\lambda_y(t) = lim_{\Delta t \to 0} \frac{Pr\{Y(t + \Delta t) - Y(t) = 1 | Y(t) = y\}}{\Delta t} \tag{3.1}$$

where Y(t) represents the cumulative number of entries at time t , with a stochastic entry process $\{Y(t)|t \geq 0\}$. In the case of the kit car population, the entry rate relates to the cumulative number of organizations counted as entering the population in a given year.

In ecological research, the Poisson model has been utilized for modeling entry rates of organizations into populations ranging from film production (Mezias and Mezias, 2000), banks (Lomi, 1993; 2000; Kuilman and Li, 2006), beer (Carroll and Swaminathan, 1992; 2000), and microprocessors (Wade, 1996). As observed by Lomi (1993:142) "the basic assumption is that the dependent variable, i.e., the cumulative number of new organizations appearing on a market or geographical area, follows a Poisson process with constant arrival rate". The Poisson probability for the number of y foundings (or arrivals)being:

$$Pr\{Y_t = y_t\} = \frac{e^{-\lambda_t \tau} \lambda_t \tau^{y_t}}{y_t!} \tag{3.2}$$

and with entry events aggregated by the year (in the kit car population, it was only possible to ascertain the date of entry of an organization by calendar year), τ is set to 1. The model assumes the rate of entry at state y +1 at time t is constant (Hannan, 1991), with the mean and variance (λ) specified as:

$$\lambda_t = exp(\beta' \mathbf{x_t}) \tag{3.3}$$

where β' is a vector of coefficients, and $\mathbf{x}$ a set of covariates to be estimated. However, the standard Poisson model assumes the conditional mean and variance to be equal to one another: there is a constant and equal probability of an organization experiencing an event (Hannan, 1991). This seems to be a very strong assumption, and so it is possible the Poisson model might be too restrictive in certain situations. A Poisson model fails to account for over - dispersion: when variance exceeds that of the mean (see Barron, 1992). In empirical scenarios, it seems possible for the data to have greater variance than the variance in mathematical models. Such over - dispersion might arise from unobserved heterogeneity, and so it is possible for over - dispersion to be present to some degree in many data sets. As Cameron and Trivedi (1986:31) note "[i]nappropriate imposition of this restriction may produce spuriously small estimated standard errors". One possible way to overcome this is to use a negative binomial model, which does not assume the conditional mean and variance to be equal, as implied by a Poisson model. The rate of entry of organizations into a population may indeed vary quite widely on an annual basis, or it might vary within a time period that is not measured. For example, if entry data is only accurate to the nearest year of organizational entry, many entries at the start of the calendar year are likely to encourage new entries for the rest of the calendar year. Similarly, few entries at the start of a calendar year are likely to discourage new entries for the rest of the calendar year (see Hannan, 1991). Hence, the variance is allowed to be greater than the mean:

$$Var(y_t) = \lambda_t(1 + \alpha\lambda_{\mathrm{t}}) \tag{3.4}$$

if α (the dispersion parameter) equals zero, there is no over-dispersion present: variance does not exceed the mean. In this case, the negative binomial model is reduced to a Poisson model; when α is greater than zero, over-dispersion is present, in which case α accounts for the over - dispersion. Analysis of the data applied the negative - binomial model, with the results indicating the dispersion parameter α to be non - zero: over-dispersion was present, and the negative binomial model was therefore retained instead of the Poisson model [5]

[5]the over - dispersion parameter, α, is included in the results tables of founding rate models in chapter six.

3.3 Analysis of exit rates.

In a given population, some organizations are joining the population, others are exiting the population. This constant state of flux requires a dynamic process that can account for and accommodate these changes in state over a prolonged period in time. Event history analysis (Tuma and Hannan, 1984), or sometimes called survival analysis (Allison, 1984) has been defined as comprising "various statistical methods for examining shifts between successive states (or categories) within some continuous interval of time on the basis of a complete temporal record of some sample" (Mayer and Tuma, 1990: 3). The 'event' in question is the exit of an organization from the population. Given the nature of event history analysis, it is more suited to population studies, where potentially the whole life histories of organizations are recorded and measured over a continuous period of time. This has led to some studies of populations spanning centuries: beer brewing (Carroll and Swaminathan, 1992; Carroll, Preisendoerfer, Swaminathan, and Wiedenmayer, 1993), newspapers (Carroll and Delacroix, 1982) and Labor Unions (Hannan and Freeman, 1987), to name but a few. Of course, event history studies need not necessarily cover such a long period of time; the key is gaining information on most – if not all– organizations over a prolonged period (preferably from the beginning of the population). Comparatively shorter studies have investigated the semi - conductor industry (Freeman, Carroll, and Hannan, 1983), bio-technology (Sorensen and Stuart, 2000), auditors (Bogaert, Boone, and Carroll, 2006; Boone, Bröcheler, and Carroll, 2000), and the hard disk drive industry (McKendrick and Carroll, 2001; McKendrick, Jaffee, Carroll, and Khessina, 2003). In these studies the dependent variable "is the instantaneous rate of an organization's disappearance from the population" (Carroll. Feng, Le Mens, and McKendrick, 2011:21), which is defined as :

$$r(t) = lim_{\Delta t \to 0} \frac{Pr[t < T < t + \Delta t | T > t]}{\Delta t} \tag{3.5}$$

with T being a random variable for the time of the mortality occurring, t the tenure - or length of time - at risk in the population, with $Pr[t < T < t + \Delta t | T > t]$ the conditional probability of an organization's exit from the population over the interval $[t, t+\Delta t]$ assuming the organization was present in the population at t . With parametric models possessing differing features, it seemed prudent not to set out using only one arbitrarily chosen model. In assessing the degree of temporal variation in transition rates, the piecewise exponential model is stated as

$$r_i(t) = exp(\alpha_p + \beta \mathbf{x}_{\text{it}}), \quad \text{p} = 1, ..., \text{P} \tag{3.6}$$

with α_p a constant which is associated with the tenure specific effects, $\beta \mathbf{x}_{\text{it}}$ contains a vector of coefficients (β) and time varying covariates ($\mathbf{x}$) (see Blossfeld and Rohwer, 2009). The overall time is split into discrete time periods: the transition rates within these time periods are constant, but are allowed to vary between time periods (Blossfeld, Golsch, and Rohwer, 2007). In this way, the length of each piece is manipulated by the analyst, but the rates of every piece are determined through the data itself (Carroll and Hannan, 2000). These pieces, or the breakpoint between each piece is denoted as

$$0 \leq \tau_1 \leq \tau_2 \leq \tau_3 ... \leq \tau_p$$

The piecewise exponential model was estimated using maximum likelihood implementing Sorensen's (1999) user defined routine "stpiece" for the the statistical software program Stata. Using this technique, time pieces of differing lengths were tested until four time pieces were eventually settled on: $\langle 0, 2], \langle 2, 5], \langle 5, 10]$, and periods longer than ten years. These time pieces were arrived at by having time pieces for each consecutive year (up to 15), and then collapsing these into time pieces with similar values to their neighboring time pieces. The result of this constant collapsing of time pieces led to the four time pieces noted above being used. The results of this estimation can be found in Table 3.1, Table 3.2, and Table 3.3. Although extremely flexible, the piecewise exponential model is one of several models that could potentially be utilized. The Gompertz (1825) law states the transition rate decreases monotonically with the onset of time, with the model specified as:

$$r_i(t) = \beta exp(\gamma_t), \quad \beta, t > 0 \tag{3.7}$$

and so when γ is negative, the rate decreases from β to zero. When γ is positive, the rate increases (Carroll and Hannan, 2000). Next, the Weibull model follows a Weibull (1951) distribution,

$$r_i(t) = \lambda\rho(\lambda t)^{\rho-1}, \quad \lambda, \rho, t > 0 \tag{3.8}$$

when $\rho < 1$, the rate is monotonically decreasing with the onset of time, whilst when $\rho > 1$, the rate is monotonically increasing with the onset of time (Carroll and Hannan, 2000; Blossfeld and Rohwer, 2009). The Gompertz and Weibull models imply either a monotonically increasing rate, or a monotonically decreasing rate. But what if the rate rises to a peak, and then declines? Such non-monotonicity can be captured using a log - normal or log - logistic model. The log - normal model being:

$$r_i(t) = \frac{\frac{1}{t} exp[-\frac{(\log\ t)^2}{2\sigma^2}]}{\sigma\sqrt{2\pi} - \int_0^t \frac{1}{u} exp[-\frac{(\log\ u)^2}{2\sigma^2}]du} \tag{3.9}$$

Relatively few ecological studies have used accelerated failure time models that facilitate non - monotonic rates: a noticeable departure has been Brüderl and Schüssler (1990), for which a log - logistic model was applied. In justifying the use of the log -logistic model over a log - normal model, Hannan and Freeman (1989) note both log - normal and log - logistic models usually have good fits to data, that the log -logistic is to be preferred for one apparent reason. The log - logistic model "can imply either monotonic or non - monotonic duration dependence or age dependence" (Hannan and Freeman, 1989:191), whereas the log - normal implies only a non - monotonic relationship. The log - logistic model is specified as

$$r_i(t) = \frac{\lambda\gamma(\lambda t)^{\gamma-1}}{1 + (\lambda t)^{\gamma}}, \quad \lambda, \gamma, t > 0 \tag{3.10}$$

Which model fits the kit car data best, and how is that decided? Perhaps the most widely utilized criterion for model selection is to use the Akaike Information Criterion (hereafter, AIC) to compare models against one another (Akaike, 1974). Whereas a Wald χ^2 criterion requires models to be nested, the AIC does not require this: models can be non- nested (Stata, 2010). The

AIC is defined as:

$$AIC = -2lnL + 2k \tag{3.11}$$

where $ln\ L$ is the maximized log - likelihood of the model, [6] and k is the number of parameters estimated. In addition to the AIC value, the Bayesian Information Criterion (BIC) (Schwartz, 1978) was used in addition to the AIC, the BIC defined as:

$$BIC = -2lnL + k\ lnN \tag{3.12}$$

with the addition of N , being the number of observations. Although this might perhaps seem a relatively simple addition to the AIC formula, Raftery (1995) points out it is often difficult to define N , which is not to be found in the AIC. This added complication arguably makes the BIC less attractive than the AIC, although both the AIC and BIC suffer from the likelihood functions required to be conformable - they must measure the same event [7]. Generally, the lower the AIC value and BIC value, the better the fit of the model.

From Table 3.1, the piecewise - exponential model is statistically significant at the one percent level for all time pieces. The exit rate has a coefficient of -2.634 at 0-2 years, only for the rate to increase for the period 2-5 years, having a coefficient of -2.321. The exit rate then declines once again for the period 5-10 years (having a coefficient of -2.813), and continuing to decline for the period over 10 years, with a coefficient of -2.925. The piecewise exponential model has a log - likelihood of -321.454, an AIC value of 650.907, and a BIC value of 674.363. For the Gompertz model, γ has a value of -0.027 (statistically significant at the 5 percent level), indicating a monotonically decreasing exit rate to be present. The log - likelihood score is -321.761, and the Gompertz model has an AIC value of 647.522, and BIC value of 658.919. The Weibull model has a ρ value of 0.980, although this is not statistically significant; ρ being less than 1 indicating a monotonically decreasing exit rate. The Weibull model has a log - likelihood score of -324.775, an AIC

[6] the AIC therefore requires there to be log - likelihood values to be present in models

[7] for a more detailed discussion of the AIC, see Sakamoto, Ishiguro, and Kitagawa (1986)

value of 653.551, and a BIC value of 664.947. For the log - normal model, σ has a value of 1.276, statistically significant at the 1 percent level, indicating a non - monotonic rate to be present. The model has a log -likelihood score of -314.853, an AIC value of 633.705, and a BIC value of 645.101. For the log - logistic model, γ has a value of 0.744 (statistically significant at the 1 percent level), indicating a non - monotonic rate to be present. The log - logistic model has a log - likelihood score of - 317.054, an AIC value of 638.109, and a BIC value of 649.505.

The log - normal model has the lowest log - likelihood score, having a value of -314.853. In terms of AIC values, the log - normal model has the lowest value (633.705); turning to the BIC values, and again the log -normal model has the lowest value (645.101). Due to the log - normal model having the lowest log - likelihood value (-314.853), the lowest AIC value (633.705), and the lowest BIC value (645.101), it is applied to assess the exit rate of type authentic organizations in the kit car population in Chapter 6.

From Table 3.2, the piecewise - exponential model is statistically significant at the one percent level for all time pieces. The exit rate has a coefficient of -2.457 at 0-2 years, only for the rate to increase for the period 2-5 years, having a coefficient of -2.191. The exit rate then declines once again for the period 5-10 years (having a coefficient of -2.443), and increasing for the period over 10 years, with a coefficient of -2.388. The piecewise exponential model has a log - likelihood of -364.075, an AIC value of 736.150, and a BIC value of 759.172. For the Gompertz model, γ has a value of -0.002 (although not statistically significant), indicating a monotonically decreasing exit rate to be present. The log - likelihood score is -364.957, and the Gompertz model has an AIC value of 733.913, and BIC value of 745.039. The Weibull model has a ρ value of 1.079, although this is not statistically significant; ρ being greater than 1 indicating a monotonically increasing exit rate. The Weibull model has a log - likelihood score of -364.113, an AIC value of 732.226, and a BIC value of 743.352. For the log - normal model, σ has a value of 1.188 statistically significant at the 1 percent level; indicating a non - monotonic rate to be present. The model has a log -likelihood score of -360.887, an AIC value of 725.775, and a BIC value of 736.900. For the log - logistic model, γ

has a value of 0.680 (statistically significant at the 1 percent level), indicating a non - monotonic rate to be present. The log - logistic model has a log - likelihood score of - 361.228, an AIC value of 726.456, and a BIC value of 737.582.

The log - normal model has the lowest log - likelihood score, having a value of -360.887. In terms of AIC values, the log - normal model has the lowest value (725.775); turning to the BIC values, and again the log -normal model has the lowest value (736.900). Due to the log - normal model having the lowest log - likelihood value (-360.887), the lowest AIC value (725.775), and the lowest BIC value (736.900), it is applied to assess the exit rate of craft authentic organizations in the kit car population in Chapter 6.

From Table 3.3, the piecewise - exponential model is statistically significant at the one percent level for all time pieces. The exit rate has a coefficient of -2.767 at 0-2 years, only for the rate to increase for the period 2-5 years, having a coefficient of -2.297. The exit rate then decreases for the period 5-10 years (having a coefficient of -2.546), and decreasing for the period over 10 years, with a coefficient of -2.633 The piecewise exponential model has a log - likelihood of -789.776, an AIC value of 1587.552, and a BIC value of 1614.552. For the Gompertz model, γ has a value of -0.012 (statistically significant at the 10 percent level), indicating a monotonically decreasing exit rate to be present. The log - likelihood score is -794.238, and the Gompertz model has an AIC value of 1592.476, and BIC value of 1605.656. The Weibull model has a ρ value of 1.048, although this is not statistically significant; ρ being greater than 1 indicating a monotonically increasing exit rate. This is in contrast to the result of the Gompertz model, which suggested a monotonically decreasing exit rate to be present. Such conflicting findings perhaps indicate a non - monotonic rate to be present, as neither the Gompertz model nor Weibull model are suited to accounting for non - monotonicity (Blossfeld and Rohwer, 2009; Stata, 2010). The Weibull model has a log - likelihood score of -794.951, an AIC value of 1593.902, and a BIC value of 1607.082. Given there is the possibility of a non - monotonic rate being present (as evidenced in the time pieces of the piecewise - exponential model, and conflicting results from the Gompertz and Weibull models), the log - normal and log - logistic models are to be preferred when a non - monotonic rate is present (Blossfeld and Rohwer, 2009). For the log - normal model, σ has a value of 1.198, statistically significant at the 1 percent level, indicating a non - monotonic rate to be present. The model has a log -likelihood score of -780.697, an AIC value of 1565.394, and a BIC value of 1578.574. For the log - logistic model, γ has a value of 0.689 (statistically significant at the 1 percent level), indicating a non - monotonic rate to be present. The log - logistic model has a log - likelihood score of - 781.979, an AIC value of 1567.959, and a BIC value of 1581.139. The log - normal model has the lowest log - likelihood score, having a value of -780.697. In terms of AIC values, the log - normal model has the lowest value (1565.394), and is therefore the preferred model to apply to the data. Turning to the BIC values, and again the log -normal model has the lowest value (1578.574). Due to the log - normal model having the lowest log - likelihood value (-780.697), the lowest AIC value (1565.394), and the lowest BIC value (1578.574), it is applied to assess the exit rate of organizations in the kit car population in Chapter 7.

3.4 Model estimation

Although the parametric model of time dependence has been selected (log-normal), a continuous time stochastic model is required as a baseline for event history analysis. For this, Maximum Likelihood (hereafter, ML) techniques have become the dominant model in ecological studies (see Carroll and Hannan, 2000, for a review). Allison (2001:13) notes the "basic principle of ML estimation is to choose as estimates those values that, if true, would maximize the probability of observing what has, in fact, been observed". ML techniques work well in large sample sizes, and less well in smaller sample sizes (Tuma and Hannan, 1984; Allison, 2001). Indeed, ML (in large sample sizes) possesses the properties of being consistent, asymptotically efficient, and asymptotically normal (Agresti and Finlay, 1997). Being consistent entails the estimates being comparatively unbiased in samples. Efficiency entails standard errors being at least as small as standard errors for consistent estimators; "[t]he asymptotic part means that this statement is only approximately true, and the approximation gets better as the sample size get larger" (Allison, 2001:14). Asymptotic normality entails estimates have a "normal distribution around the true parameter value as mean and with variance that is easily calculated" (Cox and Hinkley, 1974: 294). Moreover, ML estimation uses censored observations in estimating parameters, eliminating biases resulting from *ad - hoc* research design intended to deal with this (Tuma and Hannan, 1984). The likelihood being:

$$L = \prod_{\mathrm{i=1}}^{\mathrm{I}} L_i^{w_i} \tag{3.13}$$

with sample member i raised to the power of w^i, its sampling weight. In assessing the relative degree of fit between nested models for hazard rates, Stata uses the log - likelihood ratio test and Haberman's (1977) χ^2 , with the log - likelihood considered to be more reliable in finite samples (Cox and Hinkley, 1974). The Haberman tests a restricted model specification (S_2) against a less restricted specification (S_1) (Kuilman, 2005).

$$-2[lnL(S_2) - lnL(S_1)] \sim \chi^2 \tag{3.14}$$

with an asymptotic χ^2 distribution and degrees of freedom equal to the difference between the number of variables between S_1 and S_2 (Agresti, 1990).

Table 3.1: *Estimates of specifications of age dependence in the exit rate of category specialist (type authentic) members, 1964-2009*

	Piecewise exp.	Gompertz	Weibull	Log - normal	Log - logistic
$0 < u \leq 2$	-2.634 ***				
	(0.143)				
$2 < u \leq 5$	-2.321 ***				
	(0.177)				
$5 < u \leq 10$	-2.813 ***				
	(0.183)				
$u > 10$	-2.925 ***				
	(0.162)				
γ		-0.027 **			0.744 ***
		(0.012)			(0.049)
ρ			0.980		
			(0.062)		
σ				1.276 ***	
				(0.041)	
Constant		-2.489 ***	-2.649 ***	2.206 ***	2.192 ***
		(0.115)	(0.178)	(0.093)	(0.091)
Log - likelihood	-321.454	-321.761	-324.775	-314.853	-317.054
No. parameters	4	2	2	2	2
AIC value	650.907	647.522	653.551	633.705	638.109
BIC value	674.363	658.919	664.947	645.101	649.505

Significance levels:
* :10% ** : 5% *** : 1 %
Standard errors are in parentheses

Table 3.2: *Estimates of specifications of age dependence in the exit rate of category specialist (craft authentic) producers, 1949-2009*

	Piecewise exp.	**Gompertz**	**Weibull**	**Log - normal**	**Log - logistic**
$0 < u \leq 2$	-2.457 ***				
	(0.125)				
$2 < u \leq 5$	-2.191 ***				
	(0.164)				
$5 < u \leq 10$	-2.443 ***				
	(0.151)				
$u > 10$	-2.388 ***				
	(0.156)				
γ		-0.002			0.680 ***
		(0.012)			(0.060)
ρ			1.079		
			(0.061)		
σ				1.188 ***	
				(0.063)	
Constant		-2.377 ***	-2.575 ***	1.927 ***	1.941 ***
		(0.107)	(0.162)	(0.078)	(0.076)
Log - likelihood	-364.075	-364.957	-364.113	-360.887	-361.228
No. parameters	4	2	2	2	2
AIC value	736.150	733.913	732.226	725.775	726.456
BIC value	759.172	745.039	743.352	736.900	737.582

Significance levels:
* :10% ** : 5% *** : 1 %
Standard errors are in parentheses

Table 3.3: *Estimates of specifications of age dependence in the exit rate of members of the kit car population, 1949-2009*

	Piecewise exp.	**Gompertz**	**Weibull**	**Log - normal**	**Log - logistic**
$0 < u \leq 2$	-2.767 ***				
	(0.118)				
$2 < u \leq 5$	-2.297 ***				
	(0.088)				
$5 < u \leq 10$	-2.546 ***				
	(0.102)				
$u > 10$	-2.633 ***				
	(0.100)				
γ		-0.012 *			0.689 ***
		(0.007)			(0.028)
ρ			1.048		
			(0.041)		
σ				1.198 ***	
				(0.044)	
Constant		-2.453 ***	-2.663 ***	2.071 ***	2.074 ***
		(0.068)	(0.095)	(0.054)	(0.052)
Log - likelihood	-789.776	-794.238	-794.951	-780.697	-781.979
No. parameters	4	2	2	2	2
AIC value	1587.552	1592.476	1593.902	1565.394	1567.959
BIC value	1614.552	1605.656	1607.082	1578.574	1581.139

Significance levels:
* :10% ** : 5% *** : 1 %
Standard errors are in parentheses

Chapter 4

Methodology II: Qualitative

This chapter outlines the research methods that are applied in Chapter 5. Generally speaking, there are two methodologies researchers apply to data: quantitative or qualitative analysis. Quantitative analysis entails deploying statistical models to numerical data; qualitative analysis concerns investigating what has been said or done by certain actors - the data is usually textual rather than numeric. These are what might be called *global* definitions of the terms. The first methodology chapter concerns quantitative methods, whereas the present chapter is qualitative. However, within qualitative analysis there exists what might be called *local* definitions of the terms "qualitative" and "quantitative". In the latter case, dealing with textual data entails "objectivity and more 'mechanical' techniques. They use the principle of replication, adhere to standardized methodological procedures, measure with numbers"' (Neuman, 2003:141). Here the emphasis is on counting the number of times a phrase or theme is present in the text, and then using elementary statistical tools to frame the data. Whereas in the former case, textual data enables "discovering significant classes of things, persons, and events and the properties which characterize them" (Schatzman and Strauss, 1973:108). Qualitative research (in the *global* sense of the word) has in recent times been split between those who apply a deductive approach to their data – in the spirit of Popper (1959) – and those who espouse the process of abduction (Strauss and Corbin, 1998). Silverman (2005) observes those researchers who deploy a deductive approach are aligned to a quantitative (in the *local* sense of the word) analysis of data, whilst abduction is carried out by researchers who use qualitative (in the *local* sense of the word) analysis to data.

4.1 The deductive approach

This research follows in the footsteps of the Popperian notion of deduction, requiring an initial hypothesis to be made before it is tested in some form - whether by using first order logic to assess the consistency of an argument (see Gamut, 1991a), or some sort of experiment or empirical setting. As noted by Popper (1959:9), the purpose of this "is to find out how far the new consequences of the theory - whatever may be new in what it asserts - stand up to the demands of practice, whether raised by purely scientific experiments, or by practical technological applications". So, an initial hypothesis (or hypotheses) is constructed before the researcher has access to data or embarks upon analysis of the data in question. The researcher finds a research question, and starts to answer it by using a process of theory building, in the absence of data to corroborate or steer the theory in a certain direction. Once the theory has been developed it is subjected to empirical testing: the initial hypothesis can either be verified or falsified. In the words of Popper (1959:10), "if the singular conclusions turn out to be acceptable, or *verified* , then the theory has, for the time being, passed its test: we have found no reason to discard it". Should the conclusions from empirical analysis not verify the initial hypothesis "conclusions have been *falsified* ...their falsification also falsifies the theory from which they were logically deduced" (Popper, 1959:10). This process is succinctly put by Nueman (2003:170), "begin with a concept then create empirical measures that precisely and accurately capture it in a form that can be expressed in numbers".

4.2 Content analysis

Since this research is pursuing a quantitative analysis of data, the question must be asked: how can data comprising words be analyzed quantitatively?

Silverman (2005:160) notes the quantitative researcher's "favoured method is content analysis in which the researchers establish a set of categories and then count the number of instances that fall into each category". This highlights the growing preference of researchers to use content analysis in recent years, and confirms Woodrum's (1984:1) expectation of content analysis to become more 'mainstream' in quantitative research. Content analysis requires the researcher to apply a systematic coding process to the data, and count the number of times the particular codes are present in the data (Markoff, Shapiro, and Weitman, 1974). Holsti (1969:14) notes it is a "technique for making inferences by objectively and systematically identifying specified characteristics of messages". The benefit of this method is data from various sources can be readily compared with one another, in order for certain trends or themes to emerge (Neuman, 2003). Morevoer, the likes of Berelson (1952), Neuman (2003) and Silverman (2005) affirm since the researcher is merely counting the number of times a code occurs in a text, it is an objective process. Being objective, validity and reliability issues are supposedly addressed better than in qualitative research. However, this does not account for the fact the researcher has to generate the codes; in doing so, the researcher introduces their own bias into the coding process which is then carried on through the counting of these codes (Bryman, 2007). Mason (1996:93-4) acknowledges this, and stresses it is a by- product of the deductive approach; it requires the researcher to select a data set relevant to the theoretical underpinnings of the research project "it builds in certain characteristics or criteria which help to develop and test your theory". The process of counting the number of times a code occurs in a piece of data ensures the researcher is not tempted to "use merely supportive gobbets of information to support the researcher's interpretation" (Silverman, 1985:17).

Criticism of quantitative analysis

The quantitative method of data analysis has its limitations, as any research method surely has. Perhaps the strongest criticism is the way in which the researcher devises their own codes to be applied to the data. In constructing codes to try and capture the essence of a proposed theory or hypotheses, the project is inherently biased *ab–initio* (see Strauss, 1987, for example). Indeed, by devising pre–determined codes, there is the possibility the researcher will inevitably find what they initially set out to find. By searching data for the pre–determined codes, much of the data is disregarded; such data might reveal a new or countervailing theme to be present that was hitherto not considered (Cicourel, 1964). For this reason, Strauss and Corbin (1998) propose a “grounded theory”, whereby codes are generated during the process of data analysis. Without any pre-conceived ideas of codes, the analyst searches for themes present in the data, as and when they arise. Indeed, quantitative researchers acknowledge these issues, but assert it is part of the deductive approach to social science (see Bryman, 2007, for a review). Hence the abductive approach is at odds with the deductive method. What was a criticism of content analysis and quantitative analysis, upon closer inspection turns out to be more of a criticism of the deductive approach itself. As Silverman (2005:99) observes “no research method is intrinsically better than the other” with this in mind, the deductive method is deployed, which relies on quantitative analysis of the data. The rest of this chapter outlines the research methods deployed, and discusses possible limitations or different interpretations of the same data. By detailing the processes undertaken - albeit revealing their limitations as well - the applicability and preference of the quantitative method of data analysis to qualitative analysis of the present data is evidenced.

4.3 Coding data

In quantitative data analysis, the process of coding involves the researcher spotting patterns in the data, then using a word, phrase, or theme to act as a reference point for examining the data. With these emerging categories “the researcher searches for those that have internal convergence and external divergence” (Guba, 1978: 23). Words and phrases similar to one another – or conveying the same meaning – are clustered together; phrases that are dis-similar are placed into different categories. Therefore, the coding process enables similar phrases or themes to be categorized, whilst noting phrases or themes that are different so as to be separated into another code. Once a code – or series of codes – is developed, the researcher applies these codes to the whole data, by marking passages or words as satisfying the code or codes (Marshall and Rossman, 2006). However, multiple types of coding processes exist, ranging from process coding (Bogdan and Biklen, 2007; Charmaz, 2002) on the micro- scale, where gerunds (words that end with - 'ing') are coded, to holistic coding (Dey, 1993) on the macro level, where general themes in a text are coded.

In the pilot study (discussed below), there was an initial round of hypothesis coding (Bernard, 2006; Weber, 1990), whereby pre-determined codes were drawn up in order to test the theory. However, as this phase illustrated, much of the information contained in the data was disregarded by having such narrowly constructed codes. Instead, a provisional coding process (Dey, 1993; Miles and Huberman, 1994) was carried out, which took account of the product offering features (such as 'bodywork', 'suspension', and so on). Such a list was devised from extensive reading of the kit car magazines, where it appeared the reviewers focussed on certain aspects of the car on a repeated and systematic basis. However, an advantage of provisional coding is that certain codes can be refined or modified as the researcher gains a finer grained understanding of the data itself. In this sense, provisional coding has the ability for an updating process to be carried out. Once a provisional coding process is carried out, it can facilitate structural coding (MacQueen, McLellan–Lemal, Bartholow, and Milstein, 2008) to take place, whereby the coder searches the data for key phrases (those codes identified by provisional coding). Normally, these key phrases relate to a hypothesis already developed, or an earlier round of coding (Saldana, 2009). According to Namey, Guest, Thairu, and Johnson (2008:141) structural coding "acts as a labeling and indexing device, allowing researchers to quickly access data likely to be relevant to a particular analysis from a larger data set". From the pilot, various coding processes were carried out. Hypothesis coding was performed to test an initial intuition/hypothesis, but once this revealed limitations, a provisional coding process was carried out. Then, a round of structural coding took place – building on the provisional coding. The result of first round coding processes usually results in a vast array of codes being used and traced, given it is better to start with a wide array of codes, and then create more generalizable categories they can be collapsed into (Saldana, 2009). In the spirit of Guba (1978), the second round of coding created categories where codes that were similar to one another could enter, yet dis-similar codes would be separated from one another. This reduced the overall number of codes by applying a more thematic approach to the data and codes identified.

4.4 Pilot study

In keeping with other quantitative studies – specifically content analysis based – a pilot study was enacted (Krippendorff, 1980; Nuendorf, 2002) before a comprehensive study of the kit car reviews was undertaken. A pilot study is perhaps one of the best ways a researcher can improve the reliability of a study (see Nueman, 2003 and Nuendorf, 2002, for example); it enables the researcher to focus on a (random) subset of the overall data, and deploy, develop and refine coding systems to the sample. For the pilot, two issues of Complete Kit Car magazine were chosen at random, so their respective car reviews could be examined. Two issues were selected because coding rules were required for review articles of both type and craft authentic product offerings. An issue containing a review of a type authentic product offering was to be randomly selected first, another issue containing a type authentic product offering review was to be selected second. However, although the first random selection resulted in a type authentic review being selected, the second random selection resulted in this also. Consequently, the first review was retained, and the second magazine was placed back in the pool of magazines to be randomly selected. When a second magazine was chosen randomly once more, the review was of another type authentic product offering. This magazine was placed into the pool of magazines, and another random selection took place; on this occasion a craft authentic product offering review was contained in the magazine, resulting in one type authentic and one craft authentic review being selected.

The deductive nature of this research led to pre-determined themes to be

Table 4.1: Initial pilot study - differences between type and craft reviews

	type	craft
company	3	6
designer/boss	1	4

noted and tested for. For type authentic product offerings, issues of looking similar to the original car being copied were of importance; the product offering rather than the organization and its designer were of importance to reviewers. By comparison, for craft authentic product offerings, the novelty and quirkiness of the product offering was stressed, alongside the reputation or background of the designer. Therefore, the key differences between the two types of reviews were hypothesized to be type authentic product offerings having a focus on the product offering and little discussion of the company/owner, and craft authentic product offerings having reviews that not only focussed on the product offering, but also the organization/designer. In order to ascertain whether this was present in the reviews, the two reviews were examined, and the number of times the words 'designer', 'owner', 'boss', 'company', and other words synonymous with these were used in the reviews. Such a coding procedure made use of both the in–vivo coding technique (Glaser, 1978; Glaser and Strauss, 1967) and hypothesis testing (Bernard, 2006). The result of this is outlined in Table 4.1 below: Although the craft authentic review has twice as many references to the company, and four times as many references to the designer/boss than the type authentic review, this is rather simplistic and disregards the richness of the text. From reading these two reviews (and brief readings of all the other available reviews), it appeared this initial hypothesis was quite restrictive: the reviews focussed in differing proportions on certain aspects of the product offering. Therefore, a focus on product vs organizational features did not seem pertinent. Instead, the pilot relied on provisional coding (Dey, 1993). Here, phrases or themes were pre-determined from examination of the data, but were allowed to be updated with new codes or perhaps a refinement of the existing code. Take an extract from one of the reviews of the DNA 3Sixty(Complete Kit Car, February 2010, p.17):

Not only are the surface finish and return edges good, but the

> back of the panels are flow coated in black by the company DNA uses to make them. For starters, it means that any panel inners that remain visible in the finished car are already black, rather than bare fibreglass. And the flow coating also helps to seal the fibreglass and add an additional protection from stone chips hitting the panels from the underside.

The first sentence makes reference to the body panels of the kit: "not only are the surface finish and return edges good". The sentence asserts whether the panels are good or bad; not only is a code needed to note the reference to a certain aspect of the car ('panels' in this case), but it is a positive statement also (the word "good"). So, the code 'panels' receives two mentions ("surface finish" and "return edges"), but it also receives two positive citations (both surface finish and return edges are noted as being "good"). For the second part of the sentence, "back of the panels" is a direct reference to the code 'panels', and therefore receives a mention. Not only this, the fact the panels are "flow coated in black" is a positive aspect (being flow coated is to be preferred to exposed fibreglass), and so the code "panels" receives a positive citation. In the second sentence, "panel inners" entails the code 'panels' receives a mention. Moreover, the fact they are "already black, rather than bare fibreglass" is deemed a positive aspect of the offering, and so the code 'panels' receives another positive citation. For the final sentence, "flow coating" is a reference to the panels, and so the code 'panels' receives yet another mention. The benefit of having the flow coating is explained by being able to, "seal the fibreglass and add an additional protection from stone chips". Sealing the fibreglass is a positive aspect, as it prevents osmosis from occurring: the code 'panels' receives a positive citation. Finally, the fact the flow coating provides "additional protection from stone chips" is another positive aspect, and so the code 'panels' receives one more positive citation. Overall then, Table 4.2 reveals the following coding results: Not only are the aesthetic issues looked at in detail, so too is the ride and handling of the car

Table 4.2: Initial pilot study - how critics assess feature values

	mentions	positive	total
panels	5	6	11

(Complete Kit Car, February 2010, p.20):

> But the DNA does ride reasonably well and is easy to drive. The body conversion adds weight to the car and you can feel this in the way it reacts, but the structure itself remains pretty good and, thanks to the lower ride, body roll is kept well in check and the large tyres obviously offer prodigious dry weather grip

Take the first sentence, "[B]ut the DNA does ride reasonably well and is easy to drive". Mention of "ride" is a reference to how a car handles; the code 'handling' receives a mention. With respect to the handling, the car riding "reasonably well" is a positive citation, whilst "easy to drive" notes the handling is positive also. From this sentence, the code 'handling' receives a citation, and two positive mentions. Sentence two needs to be broken down into component parts. The first part reads, "[T]he body conversion adds weight to the car and you feel this in the way it reacts". Mentioning the body conversion is making reference to the body panels of the car, and so the code 'panels' receives a mention. However, the negative aspect of the body panels is in relation to the handling of the car, not the quality of the panels themselves. The addition of weight to a car has a detrimental effect on its overall handling and performance. The code 'handling' receives a negative citation. Noting "you can feel this in the way it reacts" is a direct mention of the handling of the car, the code 'handling' receives a citation. Next, the part of the sentence "but the structure itself remains pretty good and" is a reference to the body panels, so 'panels' receives a citation. Not only this, but the panels are complimented, entailing the code 'panels' receives a positive mention. For the part of the sentence, '"thanks to the lower ride, body roll is kept well in check" the handling of the car is the center of discussion. The term "ride" is a component of the code 'handling', and so the code is mentioned here. Moreover, "body roll" is also an aspect of handling, and so the code 'handling' receives another mention. However, since body roll is apparently "kept in check", this is a desirable effect on handling, and so the code 'handling' receives a positive citation. Also, as a consequence of a "lower ride", the body roll was kept in check; having a lower ride therefore is also another positive aspect of the code 'handling'. The final part of the

Table 4.3: Initial pilot study - other coding possibilities

	mentions	positive	negative	total
handling	5	5	1	11
panels	2	1	0	3
tyres/wheels	1	1	0	2
total	8	7	1	16

sentence "and the large tyres obviously offer prodigious dry weather grip" gives a direct reference to the code 'tyres/wheels'. With a preponderance for automotive journalists to claim the larger the tyre, the better this must be (issues of Complete Kit Car, or Top Gear Magazine evidence this), the fact the tyres are indeed "large" entails the code 'tyres/wheels' receives a positive citation. Finally, the mention of "grip" is a direct reference to the overall handling of a car – for this reason the code 'handling' receives a mention. Because the grip is "prodigious", the code 'handling' receives a positive citation. Cumulatively, this extract was coded accordingly in Table 4.3:

Another way to code?

A problem with coding data is the knowledge and inherent bias an analyst brings to the process. For example, the kit car reviews go into quite technical details of cars, how they handle, the build process, and so on. To a casual observer, this might be daunting and result in technical references being misunderstood (and incorrectly coded), or excluded from the coding process altogether. Knowledge of technical phrases and how they are applied (e.g. "grip" refers to the overall handling of the car) limits the possibility of phrases being coded incorrctly or not at all. However, despite this industry specific knowledge, differences in coding passages might exist between one coder and the next. The first review extract highlights this problem:

> Not only are the surface finish and return edges good, but the back of the panels are flow coated in black by the company DNA uses to make them. For starters, it means that any panel inners that remain visible in the finished car are already black, rather

> than bare fibreglass. And the flow coating also helps to seal the fibreglass and add an additional protection from stone chips hitting the panels from the underside. It's a nice touch.

Firstly, can it be agreed the coding be split into 'mentions', 'positive', and 'negative' citations, or should only overt mentions of a code (such as 'panels') be counted? If the latter option is applied, there are only five mentions of the code 'panels'. However, the richness of the original text is lost; the reviewer mentioned many positive aspects of the panels, and detailed them. These positive aspects appear to have been intended to help the reader assess the car, an exclusion of them reduces the analytical assessment of the car the reviewer gave. Assuming a coder agrees that both mentions of the code 'panel' and positive citations be noted, next comes the question of deciding what comprises a positive citation? Words such as 'good' are an obvious indicator of a positive assessment, but what about the phrase, "flow coating also helps to seal the fibreglass and add an additional protection from stone chips hitting the panels from the underside"? Although not an explicitly positive statement, it could nevertheless be construed as an implicitly positive statement - the fact it seals the fibreglass, and also protects it from chips are positive aspects of the panels. But assuming it is agreed this is a positive statement, does it deserve one positive citation or two? At first instance, the relation between sealing fibreglass and protection from stone chippings seem to be one and the same - sealed fibreglass gives it protection from stonechippings: only one positive citation need be applied. However, this does not account for the fact sealed fibreglass stops - or reduces the effects of - osmosis occurring (which makes fibreglass weaker and more flexible). In this regard, the sealing of the fibreglass limits osmosis and offering protection from chips, resulting in two positive citations. From the brief counterexamples above, it becomes clear different coders with different degrees of knowledge, or just different beliefs in sentence structures can come to quite diverging coding results. Table 4.4 highlights the possible coding results to the code 'panels'. Note however, this coding stems from using the sentence, "and the flow coating also helps to seal the fibreglass and add an additional protection from stone chips hitting the panels from the underside": therefore the differences in coding relate to

Table 4.4: Initial pilot study - other coding possibilities

	mentions	positive	total
original	5	6	11
possible 1	5	5	10
possible 2	5	4	9

the differing interpretations derived from this sentence only. As Table 4.4 illustrates, a brief extract from a 4–5 page car review has shown the number of positive citations can be as low as 4, and increase 50% to 6, depending on how the phrases are coded.

First and second round coding processes

The two reviews were between 5–6 A4 pages (with around 50 % of the review taken up with photographs of the cars), the above excerpts are intended as a proxy for how the overall coding process was carried out for the two reviews in both the pilot study, and the empirical analysis in chapter 5. Indeed, the same coding processes outlined above were adhered to for the rest of the pilot, with Table 4.5 summarizing the results of the first round coding process for the type authentic review. After this initial round of coding, a second round of coding took place to construct more coherent categories. The codes 'original and closeness', 'panels', and 'looks' were amalgamated into the category 'body'; while the codes 'gears', 'suspension', and 'exhaust' were amalgamated into the category 'mechanics'. The code 'donor' was changed to 'chassis', without altering the meaning of the term. The other codes from the first round of coding were retained as distinct categories, leading to the second round coding process for the type authentic review to resemble the results of Table 4.6: The above tables represent the review of a type authentic product offering; bearing in mind the kit car population contains product offerings that are either type authentic or craft authentic, the second review in the pilot study concerned a craft authentic product offering. The first round coding process for the craft authentic product offering led to the following results, shown in Table 4.7:

Table 4.5: Results from first round coding, type authentic review

	mentions	positive	negative	total
original & closeness	7	11	0	18
panels	10	13	1	24
donor	7	6	5	18
engine	4	1	2	7
gears	4	0	0	4
suspension	3	2	0	5
cost	7	0	2	9
exhaust	2	1	0	3
handling	5	6	1	12
interior	6	1	0	7
looks	2	1	0	3
organization	3	0	0	3
“boss”	1	0	0	1
total	61	42	11	114

Like in the case of the type authentic review, after this first round of coding, a second round took place in order to categorize these thematically into more coherent categories. The codes ‘overall car’, ‘front’, ‘rear’, and ‘bodywork/finish’ were collapsed into the single category ‘body’; with the codes ‘suspension’, ‘gears’, ‘exhaust, and ‘steering’ subsumed into the category ‘mechanics’. All of the other initial codes remained the same, with the code ‘designer’ being altered somewhat to ‘boss/designer’ to allow the heads of organizations of both type and craft authentic producing organizations to be placed in a single category. The code ‘price’ was changed to ‘cost’, without losing any meaning but making a direct comparison with the type authentic code ‘cost’. Such processes led to the following results to be found in Table 4.8:

4.5 Reliability and validity

Addressing reliability and validity issues remain vitally important in qualitative (in the *global* sense of the term) research. Reliability entails “depend-

Table 4.6: Results from second round coding, type authentic review

	mentions	positive	negative	total
body	19	25	1	45
chassis	7	6	5	18
mechanics	9	3	0	12
engine	4	1	2	7
handling	5	6	1	12
company	3	0	0	3
boss/designer	1	0	0	1
cost	7	0	2	9
interior	6	1	0	7
total	61	42	11	114

ability or consistency" (Nueman, 2003:179), where the same result should be found in similar conditions. Validity relates to how a researcher conceptualizes an idea, and how that is measured (Nueman, 2003). The discrete subsets of reliability and validity are addressed below.

Stability reliability

This relates to how (or if) measures and data vary across time. If a researcher has constructed measures that vary significantly over time, there will be underlying problems with stability reliability. Content analysis aids in keeping stability reliability high over time (Neuendorf, 2002; Riffe and Freitag, 1997), as the mechanical process of counting key words or phrases makes the process more objective – they do not vary over time. Moreover, with the period under study from 2007–2009, there is a low probability the writing style of the magazine to have altered significantly over that period; indeed, the reviews were written by the same two authors over this period, helping keep stability reliability high. Issues of stability reliability will no doubt be present, but they are mitigated by virtue of the research being content analysis based, the period of study being relatively short, and the authors of the reviews remaining constant over this time.

Table 4.7: Results from first round coding, craft authentic review

	mentions	positive	negative	total
overall car	15	11	4	30
front	7	6	1	14
rear	3	2	1	6
bodywork/finish	10	10	0	20
interior	14	12	2	28
suspension	9	4	1	14
gears	11	10	1	22
engine	17	2	1	20
exhaust	3	3	0	6
chassis	7	7	0	14
ride/handlng	7	7	0	14
steering	7	7	0	14
company	6	0	0	6
designer	4	0	0	4
price	7	2	2	11
total	127	83	13	223

Representative reliability

Addressing the reliability across sub-populations is the aim of representative reliability (Neuman, 2003; Bryman, 2007). Because the kit car population comprises both craft and type authenticity, two sub-populations exist. The essence of representative reliability is in assessing whether the codes generated by the analyst were applicable to both craft and type authentic reviews, or whether it favored one over another. For example, the pilot study discovered in reviews of craft products, the term 'designer' was used, whereas in type authentic reviews, 'boss' or 'owner' were used. Had the code comprised 'designer', it would have been biased and favored the craft reviews over type authentic reviews. In order to minimize this, references to the words 'boss', 'owner', 'designer' were clustered into one category. Improving representative reliability was aided by the deductive approach, having clearly conceptualized constructs and categories. The implementation of a pilot study revealed

Table 4.8: Results from second round coding, craft authentic review

	mentions	positive	negative	total
body	35	29	6	70
chassis	7	7	0	14
mechanics	30	24	2	56
engine	17	2	1	20
handling	7	7	0	14
company	6	0	0	6
boss/designer	4	0	0	4
cost	7	2	2	11
interior	14	12	2	28
total	127	83	13	223

certain discrepancies in key words or phrases used in certain instances between craft and type authentic product reviews. By conducting the pilot study, these issues were raised, and dealt with in the appropriate manner by making the code applicable to both sub–populations (as the example above eludes to). Moreover, by having a pilot study with one craft authentic product review and one type authentic product review, the codes garnered from both reviews can be compared and contrasted accordingly. As in the case of the owner/designer codes, such discrepancies can be detected and treated accordingly.

Construct and discriminant validity

These relate to measures designed with multiple indicators (Nueman, 2003, Bryman, 2007), and whether those indicators operate in a consistent way. Although at first glance it might appear construct validity is not an issue, this belies the fact the coding process collapsed measures into broader categories. For example, the final code 'bodywork' was a composite of several earlier codes relating to the front and rear of the product offering. Discriminant validity assesses whether codes dis-similar to one another really are so, and if they are found in separate categories. For example, mention of words or phrases connected to the code 'chassis' should not include words or phrases connected to 'bodywork' or 'engine' codes: these codes are distinct from one another. As noted by Guba (1978), the process of collapsing codes into discrete categories with internal convergence but external divergence necessarily entails construct validity to be high. By collapsing codes which are similar to one another into a more general code (which is distinct from other general codes), both construct validity and discriminant validity remain high.

4.6 Statistical analysis

Given content analysis lends itself well to quantitative analysis (Krippendorff, 1980), a brief description of the quantitative techniques being deployed is necessary. The techniques below are used to ascertain how the data is distributed, using varying degrees of complexity. The standard deviation and z–scores are perhaps the most useful tools in understanding the underlying dispersion of the data (Brooks, 2007; Heij, de Boer, Franses, Kloek, and van Dijk, 2004).

Standard deviation

In statistics, the standard deviation is used to determine the spread about the mean, or dispersion (Brooks, 2007). The standard deviation of a value is calculated as:

$$\sigma = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$$

with x a given value, $\bar{x}$ the mean value, and n the number of observations. More complex than the median, the standard deviation gives a description of how the data is dispersed around the mean. A low standard deviation entails data are closely dispersed around the mean, a high standard deviation entails data are dispersed widely around the mean. Once the standard deviation has been calculated, this facilitates the z–score to be ascertained also.

z-score

The z–score enables the researcher to determine how many standard deviations a value is above or below the mean:

$$z = \frac{x - \mu}{\sigma}$$

with x the score to be standardized, μ the mean value of the population, and σ the standard deviation of the population.

student's t - test

The t - test permits the analyst to determine whether the mean values of two groups are statistically different from one another, as a post-test design (Brooks, 2007) The t - test is defined as:

$$t = \frac{\bar{X}_T - \bar{X}_C}{SE(\bar{X}_T - \bar{X}_C)} \tag{4.1}$$

With $\bar{X}_T$ the mean value of the treatment group, and $\bar{X}_C$ the mean value of the control group mean. The Standard Error values on the denominator are derived as follows:

$$SE(\bar{X}_T - \bar{X}_c) = \sqrt{\frac{\mathrm{var_T}}{\mathrm{n_T}} + \frac{\mathrm{var_C}}{\mathrm{n_C}}} \tag{4.2}$$

with var_T the variance of the treatment group, n_T the number of observations in the treatment group, var_C the variance of the control group, and n_C the number of observations in the control group. Once the t -value has been determined, it is necessary to test the significance by determining the probability level (α), and the degrees of freedom (ν) and consulting a table of critical values of the Student's t - distribution (see Gujarati, 2003 for example). The degrees of freedom(ν) is defined as the sum of the number of observations in both groups, minus two. Therefore, in the present context, ν =23.

Chapter 5

Critical reviews and the frequency code

This chapter assesses the recent theoretical construction of a code (Pólos et al., 2002; Hannan et al., 2007; Pólos et al., 2010; Hsu et al., 2010), and reveals aspects that have hitherto not been considered. First, the term "audience" is decomposed to illustrate how sub-sets of the audience have differing ways of assessing objects. General audience members, such as consumers - might use what Hannan et al., (2007) termed a minimal test code, where only a fraction of an object's feature values are assessed. This clashes with the fundamental principle of a critic to be an expert who decreases uncertainty in an object by providing audience members with detailed analysis (Hsu and Podolny, 2005). In this way, a new type of code is applied - and restricted to- critics; a *frequency code* enables critics to consider all of an object's feature values, whilst detailing also the degree of scrutiny a critic subjects the object to. Levels of scrutiny are likely to differ when fuzzy categories (Hannan et al., 2007) are considered, something which has not been directly addressed by Pólos et al., (2002). Critical reviews of kit cars belonging to the type authenticity or craft authenticity label (Carroll and Wheaton, 2008) are assessed using content analysis to empirically test the theory proposed.

5.1 Authenticity and organizations

As noted by Brunner (1994:399), the term ‘authenticity’ cannot be defined in isolation, “the meaning of any expression is not a property inherent in the wording of a dictionary, but rather is dependent on the perceptions and practices of those who use the expression”. Ascertaining whether something is authentic or not has proved problematic for anthropologists as to what constitutes being ‘authentic’ Italian cuisine (Lindholm, 2007), to whether the reproduction of a town from a period in history can be termed authentic (Brunner, 1994). The very connotation of authenticity has been observed as a Western phenomenon (Cheng, 2004; Boyle, 2004). Indeed, Boyle (2004:4) notes issues of authenticity are beginning to - and will continue to- affect organizations as “people’s demands for the authentic are increasingly felt”. In this regard, mass–produced offerings are considered inauthentic, and low volume hand made products are deemed authentic by consumers. Accepting there is no single definition for authenticity, Carroll and Wheaton (2008) have made significant headway in classifying different manifestations of authenticity to organizations and product offerings. The first definition assesses whether a product or organization is true to a style, genre or category ‘type authenticity’ (Carroll and Wheaton, 2008:11). If an offering does not conform to pre-defined standards or specifications, it cannot be described as type authentic. Providing an organization meets criteria set out for membership of the genre, the type authentic label is applied. Negro, Hannan, and Rao, (2010) found evidence of type authenticity in Italian wine making, where to be a ‘traditional’ winemaker a winery should conform to a certain style, or genre. Next, there is “moral authenticity [where]...the focus is on first whether the morals invoked are deemed appropriate and second on whether the object actually embraces them” (Carroll and Wheaton, 2008:12). Not only should the morals claimed be deemed valid, but both product offering and organization must satisfy the moral code. In the UK, celebrity chef Hugh Fernley Whittingstall has successfully teamed up with the group Compassion in world farming to form the ‘Chicken out! Campaign For A Free Range Future’ (`http://chickenout.tv`), to alter the general publics food habits to buy only free-range chickens instead of those bred in a less humane environment. Whilst one of the major UK supermarkets claimed it was in the process of changing its ways, some of its actions appear to have fallen short (see Khan, 2008). Such an organization might meet the first part of these criteria, but not the second; it is unlikely audience members would apply the moral authentic label to it. Over time, these definitions of authenticity for the restaurant market have evolved somewhat to create idiosyncratic authenticity and craft authenticity, the former being defined as the "symbolic or expressive interpretation of aspects of an entitys idiosyncrasies" (Carroll and Wheaton, 2008:24). Such idiosyncrasies or quirks of the organization or product offering can be traced to a historic event, codified and continued to the present day. Even though these quirky practices might be somewhat obsolete, out dated, or plain bizarre, they are nonetheless justified under the banner of idiosyncratic authenticity. Carroll and Wheaton (2008) use the example of Norway's Linie Aquavit, where the product travels by ship to cross the equator and back, as it is thought this improves the taste of the product. Finally, craft authenticity is "centered on whether...[the offering]...is true to craft, rather than true to some particular institutionalized type or genre" (Carroll and Wheaton, 2008:19). Focus is not necessarily on whether a product conforms to strict membership rules, but on the skill and craftsmanship of the persons within the organization in creating a product offering.

Do claims of authenticity have implications for organization theory, and industries in general? Consider the phenomenal growth of the microbreweries and brewpubs in America since the 1980s, and why audience members have preferred these over mass-produced alternatives (Carroll and Swaminathan, 2000). Microbrewers are aligned to craft authenticity using natural products with no artificial sweeteners or flavors, and fermentation processes following traditional techniques and routines. This is in contrast to the larger Macrobrewers, who brew a lighter, more watery beer, appealing to a broad spectrum of audience tastes (Carroll, Dobrev, and Swaminathan, 2002). Evidence of this emphasis on craft authenticity is captured by the quality mark program of the Oregon Brewers Guild, which tries to "identify beer brewed by authentic craft brewers in Oregon and to further the awareness of Oregon craft beers" (Carroll and Swaminathan, 2000:732). Audience members are enthusiasts who might brew their own beer at home, and want a flavor that is more European in style than what the larger American macrobrewers produce.

5.2 Schematization

Categorization processes require two main steps to be taken by audience members. First, the audience need to agree upon the application of a label: this is extensional semantic consensus, and is reached when audience members agree upon a label to be used, and the organizations to which the label applies. The second stage, termed intensional semantic consensus (Hannan et al., 2007:67), requires audience members reach "consensus on the meaning of the label". Applying fuzzy set theory (Zadeh, 1965), intensional consensus is partial - a matter of degree - and is not binary; audience members might have differing levels of intensional semantic consensus to the meaning of a label. High intensional consensus is reached when audience members reach agreement on the meaning of a label; low intensional consensus is arrived at when audience members do not agree on the meaning of a label. A prime example of audience members possessing low intensional semantic consensus is evidenced in the optical disk drive industry - there is agreement concerning neither definitions of terms nor standards to be set. Indeed, many audience members are confused by the different types of storage devices and platforms, not to mention a lack of universal standards and measurements consistently applied throughout the industry. As noted by McKendrick and Carroll (2001), one of the organizations operating in this population resorted to providing a glossary of terms it used to allow clients to decipher what the products actually did. How is this agreement (or lack thereof) arrived at? In determining whether an organization or product offering has a specific label applied to it, audience members use what Hannan et al., (2007:60) termed a schema, which "articulates a view about what pattern of feature values determines the applicability of the label". To satisfy a schema, organizations or their product offerings must possess or satisfy certain feature values, as noted by Murphy (2002:47):

> A schema is a structured representation that divides up the properties of an item into dimensions (usually called *slots*) and values

> on those dimensions (*fillers* of the slots)...The slots have restrictions on them that say what kinds of fillers they can have."

Audience members do not necessarily have identical schemata to one another, their level of agreement is likely to differ. For example, should an audience member have a *restrictive* schema, they might consider a small set of feature values satisfying the schema fully; an audience member with a *loose* schema might consider a larger set of feature values to satisfy the schema fully. The agreement between audience members therefore depends on the number of feature values they agree on as fitting the schema for the label. Hannan et al. (2007:67-8) provide a theoretical example of the notion of restrictive and loose schemata. Noting the schemata of the American Labor Union form comprising (as an example) four distinct triplets of feature values:

1. ⟨ working conditions, craft/occupation, strike⟩,
2. ⟨ working conditions, racial–ethnic group, strike ⟩,
3. ⟨ working conditions, craft/occupation, boycott ⟩,
4. ⟨ working conditions, racial–ethnic group, boycott ⟩.

For an audience member to apply a restrictive schema, perhaps only one of the triplets is applied to the label 'Labor Union'. However, if an audience member uses a loose schema, perhaps all of the options are applied to the label. Hence, restrictive and loose schemata relate to the number of feature values audience members apply that satisfies the application of the label. Individual audience members might possess either restrictive or loose schema, ascertaining the level of agreement between the schemata of two audience members is defined as "the similarity of the patterns of feature values that they admit as fitting the schemata" (Hannan et al., 2007:68). Consider two audience members who have loose and restrictive schemata, resulting in low agreement as to the schema. Whereas if those audience members both had either loose or restrictive schemata, the degree of agreement would be high. Within an audience segment, this leads to the grade of membership in an intensional semantic consensus, defined by Hannan et al., (2007:69) as "the degree to which his or her meaning of the label agrees with those of other members of the audience segment who employ the label". On the cumulative level, if all audience members in the category have similar schemata, the grade of membership in an intensional semantic consensus is high. Similarly, should audience members in the category have differing schemata, the grade of membership in an intensional semantic consensus is low.

5.3 Critics as a sub–set of the audience

The seminal research of Ezra Zuckerman (1999; 2000) brought back in to focus the role critics play as intermediaries between organizations and their offerings on one side, and audience members on the other. Prior to this, much organization theory treated the audience as a given, and instead addressed the organizations, without acknowledging the impact the audience - and certain subsets of the audience - had on organizations and their offerings. Influenced by the new institutional sociology (DiMaggio and Powell, 1991), Zuckerman constructed a complex imagery of how organizations competed against one another to gain the attention and favor of audience members. The audience plays a key role in organizational processes, but some play more of a role than others: echoing the sentiment of Napoleon in Animal Farm, "all animals are equal, but some animals are more equal than others" (Orwell,1946). Intermediaries or critics are the primary audience segment that scrutinize organizations. The role of critics cannot be underestimated; they are a powerful subset of the audience, who wield great influence in shaping audience perceptions about an organization or product offering. Research into the motion picture industry places great importance on the role of critics as mediators between the film studios and general audience members (Zuckerman and Kim, 2003; Zuckerman, Kim, Ukanwa, and von Rittman 2003; Hsu, 2006). Indeed, a film that receives a poor critical review might suffer at the box office if audience members heed the assessment of the critic. Individual actors might suffer from being typecast if they unsuccessfully expand the genres of film they are present in. The woeful reviews of Sylvester Stallone in anything other than an action film led to his being typecast as an actor limited in his ability to span genres and acting roles (Zuckerman et al., 2003). But why do critics take on an important role in some domains, such as the motion picture industry, whilst have a minimal - or even non -

existent - role in others? Levels of uncertainty are key to understanding this. When there is little uncertainty present as to the quality of an offering or organization, audience members know the traits of most or all offerings and organizations in the domain. They can make an assessment on an offering or organization using their own comprehensive information which indicates the quality of the offering. Increasing uncertainty arises when there are organizations and offerings that audience members have limited or no information regarding the level of quality of the offering. Without complete information, audience members are unable to make fully informed decisions concerning the quality of the offerings and organizations in the domain. Such a scenario is likely to be present in the market for social goods (Nelson, 1974), where there exists a wide choice of offerings for consumers to choose from, but audience members are unable to know the underlying quality of all of the offerings. Take the example of purchasing a bottle of wine. Customers are not (legally) allowed to open the bottles and taste them in the store, and then select the one they prefer based on that sampling. Instead, they might have to rely on the reputation of the producer (Shapiro, 1982), or perhaps even its status (Benjamin and Podolny, 1999) as a signal of the underlying quality of the product offering, in the absence of information regarding its present quality. Alternatively, an audience member might mitigate the uncertainty present by relying on the reviews of critics as to their assessments regarding the quality of wines. Indeed, in the wine industry, critics exert great influence on the success or otherwise of certain wines and *terroir* . Perhaps the best and most recent example of this has been the proclamation by renowned wine critic Robert Parker, that French 2008 vintages being of excellent quality. Indeed, scores were unusually high - in the 95/100 and above range - with some chateau's even scoring the much coveted 100/100 score. This is in contrast to many critics (and wineries) asserting 2008 was at best only an average year for French wines, expecting them to be of good, but not excellent quality. However, because Parker is a well respected wine critic, his recommendations for certain grape varieties and vineyards led to a marked increase in value of those selected bottles, as investors and consumers relied on his assessment of their quality (Wiggins and Burgess, 2009).

The divergence of opinion between the quality of certain French 2008 vintages, leads to the question of how critics assess offerings. In order to assess organizations and their offerings, critics devise their own schema with which they compare organizations against. So, in investment banking, an analyst might use P/E ratios and other such analytical tools to derive an assessment of a particular organization or set of organizations. Wine critics might use elements such as smell, color, and complex taste criteria to rate a wine. Little research has explicitly examined how critics create schema, Hsu and Podolny (2005) being a notable exception. What is apparent though, is the important role critics play in the potential success or failure of an offering or organization with regard to the broader audience. Even the decision of a critic to review an offering can lead to an increased awareness by audience members of the offering in the domain. For example, the decision of a securities analyst to cover a particular stock can lead to an increase in the number of analysts covering the stock – cascades of coverage occur (Rao, Greve, and Davis, 2001). With an increase in the number of analysts covering a stock, an organization can benefit by being more widely known by those in the financial markets. If it is more widely known, investment houses, hedge funds, pension funds and the like are able to use the analyst coverage and earnings estimates as a basis for determining whether to invest in the stock. Should an organization beat analysts' quarterly earnings expectations for example, it is more likely the stock price will rise. Of course, this entails that when bad news relating to the stock is revealed, such as earnings forecasts not meeting analyst expectations, it is more likely the stock price will fall by a greater amount than for a stock that is not covered by analysts. In the capital markets, stocks that are easy to compare against one another receive more attention from securities analysts than more complex or difficult to assess stocks. A stock that carries out all of its activity in a single SIC code gets an accurate earnings forecast from the analysts covering that industry. Should an organization generate revenues in different industries, it is unlikely analysts are able to account for these extra revenues in their earnings forecasts - a coverage mismatch occurs (Zuckerman, 1999). A possible exception to this might be the conglomerate form, such as GE, which generates revenues from activities such as aircraft engine supply, chemicals and plastics, LED lighting, and credit cards to name but a few. It is because analysts specialize in only one or a few related SIC codes (industries) that they do not cover stocks and their revenues that accrue from diversified interests (Zuckerman, 1999; 2000). Such a lack of coverage led many diversified organizations to either sell or spin off parts of the business that were unrelated to their core activities, in order that analysts might be able to assess the organization more easily (Zuckerman, 2000). Indeed, McKendrick and Carroll (2001) provide the example of analysts struggling to come up with accurate earnings forecasts for Reuters as a vivid example of such a problem.

5.4 Theory

It is important to note that the theory below extends only to critics, and that the categorization process has been carried out by audience members already. Categorization by audience members (usually highly engaged enthusiasts, but also comprising general audience members) comprises clustering organizations according to their relative similarity to one another, using schematization processes outlined above. The categories for examination by critics are therefore normally existing and mature or stable in nature and composition. Consider the pre-existing structure of industry - or SIC - codes to classify and categorize stocks; such a system was created not by critics, but by highly engaged enthusiasts such as state regulators and statisticians (see NAICS Association: `http://www.naics.com/faq.htm`, accessed 2011/02/27). Securities analysts who provide critical analysis of stocks use these existing categories as a way of structuring their processes and expertise (see Zuckerman, 1999, for example). The critical review process involves determining the extent to which an organization is considered a member of the category (Phillips and Zuckerman, 2001). Critics therefore review organizations or products which are attached to a pre-existing label that has been created by the audience.

In assessing a product offering or organization, a critic applies the same schema or rating system to those offerings or organizations in the population, requiring them to assess the same feature values of those organizations. Such a process results in the critics being able to add a high degree of consistency and easy comparison to other reviews for audience members who depend upon those reviews in arriving at decisions - such as purchasing a stock, a motor car, wine, or even a degree course and University. Indeed, the way in which the critic applies the same schema to organizations in the population is the basis of the critical review process, stressed by Hsu and Podolny, (2005:191) “a critic’s review is simply a judgment about qualities of an individual act or work...the partitioned schema is a sorting mechanism”. For example, wine reviews might universally apply the (basic) schema comprising: bouquet, colour, taste on palate, after taste, and so on (see Adams, 1990). The schema a critic applies to organizations in a population is the same (in order to conserve the direct comparability between products), but categories within a population might have certain aspects of the schema having more attention paid to them than others. A prime example of this is in real ale guides, where the product offerings can generally be classified as being either microbrewed or coming from a brewpub (see *Good Beer Guide,* various years). For the brewpub, more of the critics time is taken in describing the business itself than it is for reviews of microbreweries. In Scotch Whisky guides, there is a distinction between the “single malt” category and “blend” category, with a corresponding difference of emphasis on certain parts of the schema for one category over the other (see *Jim Murray’s Whisky Bible,* various years). Whilst critics create schema to assess an offering or organization, different categories within a population might be assessed in a slightly different manner, or have different emphasis of the schema applied to them - as the two examples above allude to. Although the schema an individual critic applies is the same, this does not mean the schemata applied by all critics is identical - indeed, if it were, the role of the critics and their lack of disagreement would make their role redundant. Like the treatment given by Hannan et al. (2007) to categories, there is not a single schema used by critics. To paraphrase Hannan et al. (2007:69) this means there is no reference to *the* schema for a critic to apply to a category. Such a position is adopted from the work of Barth (1987; 1993), D’andrade (2003), and

Wenger (2006). So, the schema applied by an individual critic is the same for assessing different categories within a population, with the feature values assessed across those categories being the same also.

Although the code applied by a critic is the same, the intensity of critical attention paid to certain feature values of an organization or product offering differs. In the example of critical reviews of ales, although the code applied to microbrewed beer and brewpub beer is the same, the critic spends more time considering the organization of the brewpub than for the microbrewery. The definition of a code as constructed by Pólos and collaborators (Pólos et al., 2002; Hannan et al., 2007) remains silent on this aspect, and therefore deserves further investigation. If a code were conceptualized in terms of being a *frequency code* , then the intensity to which a critic assesses the individual feature values are explicitly considered. Although the number of feature values comprising the code remain the same (as is the case of the Pólos code), the frequency code notes the level of attention those feature values come under by a critic. A frequency code differs somewhat from a weighted code as envisioned by Pólos, Hannan, and Hsu, 2010, and Hsu, Hannan, and Pólos, (2010:11), as " weights [are] assigned to features such that mismatches reduce fit more when they occur on certain features". Under the frequency code, feature values of the code are given equal weight, and mismatches to those features or parts of the code do not carry disproportionate bias. Although both frequency code and weighted code stress the way in which critical attention to certain feature values might differ, the former is constructed in a way such that any mismatch is given an equal weighting or punishment by critics. If feature values garner differing degrees of attention or scrutiny from an individual critic or a grump of critics [1], why might this be so? It is suggested differing degrees of label fuzziness play a crucial role in this process, as the purpose of a code is to assess the suitability of an object being attached to a certain label (Hsu and Podolny, 2005; Zuckerman, 1999).

Label fuzziness is determined by the level of intensional semantic consensus audience members have towards a label. It should be borne in mind that

[1] "grump" being a light heartedly suggested collective noun for a group of critics, `http://all-sorts.org/nouns/critics`, accessed 2011/02/27

this part of the categorization process is carried out mainly by general audience members, not critics. Intensional semantic consensus between audience members as to the suitability of a label being applied to a category comprises three main stages. First, individual audience members have to reach an agreement with one another upon the schema to be applied. Hannan et al., (2007:68) define agreement of schemata as "the similarity of the patterns of feature values that they admit as fitting the schemas". Therefore, the similarity measurement as defined by Tversky (1977) is applied to ascertain the extent of such agreement between audience members. Consider the possible schemata audience members could apply to define the "trade union" label, as noted earlier. If audience members agree upon the same triplet(s) of feature values, then agreement of schema is high. Conversely, should audience members not agree on the same triplet(s) of feature values, agreement of schema is low. Second, the grade of membership in an intensional semantic consensus is to be considered. This has been defined by Hannan et al., (2007:69) as "the degree to which... [an audience member's] meaning of the label agrees with those of other members of the audience segment who employ the label". Thirdly, the strength of intensional consensus relates to the extent to which all of the audience members agree to the meaning or application of the schema. This strength is "the average (among the members of the audience segment) of the grades of membership in the intensional consensus for that label" (Hannan et al., 2007:69). Should many audience members agree with one another as to the meaning of the schema, the strength of intensional consensus is likely to be high; if relatively few audience members agree about the meaning of the schema, the strength of intensional consensus is low.

A fuzzy label indicates audience members have a low degree of agreement as to the meaning of the label; this is caused by audience members having low agreement as to the schema to be applied, and low similarity of schemata. With low agreement of the schemata by audience members, a correspondingly low grade of membership in an intensional semantic consensus follows. Consequently, the ensuing strength of intensional consensus amongst audience members who are users of the label is low. For example, consider the fuzzy label "hedge fund", and its relatively low strength of intensional consensus.

An IMF report on the hedge fund industry found it difficult for the authors and audience members in general to define the “hedge fund” label: “[A]ny attempt to generalize further about the features of hedge funds immediately confronts two problems: first, their investment and funding techniques vary enormously, and second, other individual and institutional investors engage in many of the same activities as hedge funds” (Eichengreen and Mathieson, 1999). The authors highlight the label shares certain characteristics with organizations attached to labels such as: private equity, vulture funds, asset management and mutual funds, private wealth funds, and investment banking (in their proprietary trading departments). Even within the hedge fund industry there is a lack of agreement as to whether certain hedge funds which do not “hedge” (cover themselves by holding short and long positions on asset classes) are really hedge funds and just speculators (see Soros, 2003; Rogers, 2004). A crisp label results in audience members having a high degree of agreement as to the meaning of the label; audience members have high agreement as to the schema to be applied, and a high degree of similarity of the schemata being applied. The audience having high agreement as to the schemata, there is a high grade of membership in an intensional semantic consensus.; the strength of intensional consensus amongst audience members who use the label is high. So, the label “bank” appears to have a relatively high degree of intensional consensus amongst audience members as to the meaning of the label.

As the above example of determining the meaning of the label “hedge fund” illustrates, when there is disagreement amongst audience members concerning the meaning of a label, low intensional semantic consensus arises, and results in that label becoming fuzzy. Due to the label fuzziness that arises as a consequence of general audience disagreement, critics cannot determine in a relatively straightforward manner whether an object satisfies the label. By not being able to determine in a straightforward manner whether an object satisfies the label results in critics subjecting the object to increased levels of scrutiny to aid in their analysis of whether the object satisfies the label. In terms of the label ‘craft authenticity’, this requires an object to be true to some sort of craft: something that is difficult to determine. For example, in their examination of French cuisine, Rao, Monin, and Durand., (2003:806) observe the comments of Weiss (2001:233) in his treatment of explaining the meaning of the 'nouvelle cuisine' label: "If there were to be a theorization of nouvelle cuisine, it would be a theory of exceptions, nuances, refinements... The operative terms for the use of condiments, for instance, are often referred to as un rien, un souppon, une touche, une idle (a nothing, a suspicion, a touch, an idea)". Such a difficulty in determining whether an object is craft authentic increases the likelihood for disagreement amongst general audience members on what is craft authentic, and so the 'craft authentic' label becomes fuzzy. With respect to the kit car movement, to be a craft authentic offering, the product should be deemed to be a novel piece of work that is quirky in its design. Perhaps one of the best examples of the artisanal skill and quirkiness required of a craft authentic car was illustrated with the launch of the Adams Design Probe 15 at the 1969 Racing Car Show (Heseltine, 2001: 106):

> ...the motoring press lurching into hyperbole overload over the outlandish newcomer. And it isn't difficult to see why. Intended as an ''investigation into the extremes of styling", it was the lowest car in the world, the top of the domed roof sitting just 29 inches above the ground. The Probe 15 ... was so low that doors were neither necessary nor possible. To gain entry to the avant - garde cockpit you simply slid back the roof over the rear deck and stepped aboard

In this way, objects attached to the craft authenticity label of the kit car movement are subjected to increased scrutiny by critics to quantify that the offering really is quirky and novel, resulting in the critics having to examine in more detail an offering's internal and external feature values, and the design team's background. In this regard, a review of a craft authentic offering went into great detail of the designer's background at Jaguar/Land Rover, where it was noted he was "pretty accomplished at what he does too, having been the team leader for exterior design on both the Freelander 1 and 2 projects and most recently being the designer of, amongst many other things, the Jaguar XK's rear lights and wheels" (Complete Kit Car, May 2010, p.17).

When there is agreement amongst audience members concerning the meaning of a label, high intensional semantic consensus arises, and results in a label becoming less fuzzy. As a result of the lower label fuzziness, critics can determine in a relatively straightforward manner whether an object satisfies the label. Determining in a straightforward manner whether an object satisfies the label results in critics subjecting the object to decreased levels of scrutiny in assessing whether the object satisfies the label. For the label 'type authenticity', this requires the object to be true to a type or genre style, which is less difficult to determine. An example of type authenticity lies in country music of the USA, where fans of the genre place great stress on the, "legitimating twang of the pedal steel guitar... only the whining, poignant sound of the pedal steel can express the deep pain that is the emotional signature of their music" (Lindholm, 2007:30). Peterson (1997:218) notes "signifiers are also vital. The boots, the hat, the outfit, a soft rural Southern accent, as well as the sound and objects of the songs, all help". A lack of difficulty in determining whether an object is type authentic decreases the likelihood for disagreement amongst general audience members on what is type authentic, and the "type authentic" label becomes less fuzzy. With respect to the kit car movement, an offering is classified as type authentic if it is true to a specific style or genre of offering (see Chapter 2 for a more in depth assessment of the type authentic product categories): something that is relatively straightforward in determining. The closeness of a type authentic offering was noted in the classic car product category with the review of a Jaguar replica, where the product offering was deemed to be such a close likeness to the original Jaguar that the reviewer noted, "this car is so authentic it has the seal of approval from Jaguar clubs" (Complete Kit Car, December 2009, p.43). Hence, objects attached to the type authenticity label of the kit car movement are subjected to decreased scrutiny by critics, resulting in them examining in less detail an offering's internal and external feature values, and the credentials of the design team or company. For example, in assessing a Ferrari replica it was noted the car "is exactly the same width and height as the real thing" leading to the conclusion, "I've no doubt that to the casual (and even more car focussed) observer, the...[car]... would be mighty convincing if you saw it driving through town" (Complete Kit Car, February 2010, p.18).

Hypothesis 5.1: Interior and exterior looks of craft authentic product offerings come under greater scrutiny from reviewers than type authentic product offerings.

Hypothesis 5.2: Reviewers scrutinize designers and the organization belonging to craft authentic product offerings more than type authentic product offerings.

For the craft authentic label, critics are unable to determine in a relatively straightforward manner whether an offering satisfies the label as a consequence of the increased label fuzziness. By not determining in a straightforward manner whether an offering satisfies the label, critics subject the offering to increased levels of scrutiny. It is normally the case that critics subjecting an offering to higher levels of scrutiny results in an increase in the likelihood of code violations being perceived (Pólos et al., 2002). As critics expose the organization to their increased scrutiny, more aspects of the offering are delved into, and in greater detail than normal. Due to the increased levels of scrutiny, critics are more likely to uncover aspects of the offering that would not normally have been considered or examined, had the level of scrutiny been lower. In this way, more aspects of the offering are examined, leading to an increased likelihood of a code violation being perceived by a critic. Moreover, should a code violation be perceived, it is likely this code violation leads to a cascade of further code violations being perceived by the critics (Pólos et al., 2002). However, in the case of a fuzzy label, critics are unable to determine in a straightforward manner whether an offering satisfies the label - despite the increased levels of scrutiny applied. So although critics subject an object attached to a fuzzy label higher levels of scrutiny, because they are unable to determine whether the offering satisfies the label, the likelihood of a code violation being perceived by critics decreases. In assessing a craft authentic kit car offering, the reviewer could not determine for certain whether the car was a code violation of the craft authentic label: "while it unquestionably has a retro - style that will appeal to older customers, there's also something about the styling and the level of finish that has a modern twist to it" (Complete Kit Car, April 2010, p.23).

With the type authentic label, critics can determine in a relatively straightforward manner whether an offering satisfies the label, due to the decreased fuzziness of that label. Being able to determine in a relatively straightforward manner whether an offering satisfies the label, critics subject the offering to lower levels of scrutiny. Normally, when a critic subjects an offering to lower levels of scrutiny there should be a decrease in the likelihood of code violations being perceived (Pólos et al., 2002). With critics not needing to subject the offering to increased detail, fewer aspects of the offering are assessed or scrutinized. As a result of lower scrutiny, critics are less likely to uncover aspects of the offering; there is a decreased likelihood of a code violation being perceived by a critic. However, for a less fuzzy label, critics are able to determine in a relatively straightforward manner whether an offering satisfies the label - despite the decreased levels of scrutiny. Although critics subject an object attached to a fuzzy label to lower levels of scrutiny, because they are able to determine whether the offering satisfies the label, the likelihood of a code violation being perceived by critics increases. For example, a review of an AC 427 replica observed the product offering had larger and wider tyres fitted than the original. Whilst accepting this offered great grip on larger roads and race tracks, this aspect of the car was noted as being "a compromise too far" (Complete Kit Car, September 2007, p.62). Indeed, this is similar to Rao et al.'s (2001) research into analyst ratings and coverage of NASDAQ stocks. Those stocks that were covered by securities analysts received harsher penalties (in terms of a decrease in their share price) when they released poor quarterly earnings reports, than the share price of stocks which were not followed by analysts.

Hypothesis 5.3: Craft authentic product offerings receive fewer criticisms than do type authentic product offerings from reviewers.

The fuzzy label of craft authenticity results in critics not being able to determine in a straightforward manner whether an offering satisfies the label, leading to increased scrutiny of its internal and external feature values, as well as organizational or designer features also. Whereas the less fuzzy label of type authenticity results in critics being able to determine in a relatively straightforward manner whether an offering satisfies the label. This leads to lower scrutiny of internal and external feature values, as well as organizational or designer features also. Overall then, the expectation is for critics to examine in greater detail the reviews of craft authentic offerings than of type authentic offerings:

Hypothesis 5.4: The craft authenticity code is longer than the type authenticity code

Extension of the theory

For organizations attached to a fuzzy label, it is difficult for an individual critic to determine whether a code violation has been perceived, and so the probability of a code violation being perceived is low. Now consider the implications this has at the collective critic level. With individual critics finding it difficult to determine whether a code violation is perceived, normally all critics assessing organizations attached to the fuzzy label face such a problem. Cumulatively, critics are unable to determine in a straightforward manner what feature values constitute a perceived code violation, and so the probability of critics as a collective sub–set of the audience perceiving a code violation is low. For organizations attached to a crisp label, it is relatively straightforward for an individual critic to determine whether a code violation has been perceived, increasing the probability of a code violation being perceived. Given an individual critic has relative ease in ascertaining whether a code violation is perceived, normally critics who assess organizations attached to such a crisp label are in a similar position. At a cumulative level, critics have clarity as to what feature values are considered a perceived code violation, with the probability of critics as a sub–set of the audience perceiving a code violation being high.

Bearing in mind the power which some critics can exert upon audience members and producers (see Hsu, 2006 for a discussion of Roger Ebert's film reviewing; or consider the extraordinary power Robert Parker has in influencing the style of wines produced by vinters), the frequency code and label fuzziness has an impact upon the taken for grantedness of a category, and hence on legitimation (Hannan and Carroll, 1992) and the probability of an organizational category reaching what Hannan and Freeman (1977; 1989) termed a form. At this stage note the distinction that although taken for grantedness applies to the audience in general, levels of taken for grantedness are not necessarily equal across different sub–sets of the audience - such as between general consumers and critics. Pólos and collaborators (Hannan et al., 2007; Pólos et al., 2010:39) define taken for grantedness as "the degree to which an agent takes for granted that the untested feature values of a labeled producer conform to a schema for the label at a time point is the ratio of the untested code to the whole code". In using a minimal test code (Hannan et al., 2007), whereby audience members may create a schema or code that comprises a few feature values of an organization, the length of the minimal test code is critical in determining the level of taken for grantedness present. For example, should an organization be deemed to possess ten feature values and only one of those feature values comprises the test code, taken for grantedness is high. More accurately, since taken for grantedness is the ratio of untested code to the whole code, taken for grantedness of the organization is $9/10 = 0.9$. Now consider an organization deemed to possess ten feature values, but this time six of those feature values comprise the test code, taken for grantedness is lower. In this scenario, the taken for grantedness of the organization is $4/10 = 0.4$. Note however that the above definition remains silent on who comprises the "agent". It may well be the case that ordinary audience members - such as consumers - do not have time to delve deep into all of the feature values of an organization, and so use a minimal test code as a way of establishing an organization's level of taken for grantedness. To be sure, this is one of the reasons why critics arise (Hsu and Podolny, 2005). However, with critics being a specific sub–set of the audience, the use of a minimal test code might not be appropriate. Recall the role of a critic is to be an expert in the field, and reduce the degree of uncertainty present to general audience members concerning product offerings or organizations (see Becker, 1990; Greenfeld, 1989; Hsu and Podolny , 2005; White and White, 1992). By only considering and examining a proportion of a product offering or organization's feature values, uncertainty for audience members would likely still remain high. Rather, it is due to the critic applying a detailed schema that considers in detail all aspects or feature values of the object under scrutiny that uncertainty is reduced and audience members are better able to make a more informed decision. For example, the UK consumer online advice magazine Which? details its critical review process conducted by its researchers on a host of product offerings:

> You can be sure that *Which?* provides you with advice based on the highest standards of testing because no other organisation investigates as thoroughly as we do. Every month, we conduct independent and extensive tests on hundreds of products and services. *Every aspect of product performance and specification price, running costs, efficiency, and reliability is compared against exacting criteria* (emphasis added). [2]

For critics to define taken for grantedness with respect to the minimal test code and the ratio of the untested code to the whole code seems unsatisfactory. This is where the utility of the frequency code plays an important role, and why it is restricted to use by this specific sub–set of the audience (critics). Recall that the frequency code tests all feature values of an offering or organization, and accounts for the relative scrutiny of those individual feature values by the critics. Under the frequency code construction, taken for grantedness is redefined as being inversely proportional to the length of the frequency code. Therefore, an organization that has many of its feature values scrutinized in detail has a lower level of taken for grantedness than an organization which has few of its feature values scrutinized in detail. The longer the frequency code, the lower the level of taken for grantedness present in an organization. Levels of taken for grantedness for an individual organization are constructed in this way, leading to the overall taken for grantedness of a category to be defined as well. Pólos et al., (2010:39) define, "[t]he degree to which an agent takes for granted the label at the time point...is the average of taken for grantedness over the producers to which the agent assigns the label". For the frequency code and its application to critics, this definition need not be altered: only the way in which taken for grantedness is calculated has been changed. The taken for grantedness of a label is still dependent upon the average taken for grantedness of organizations claiming membership to the label. Should a label contain organizations with long frequency codes, the taken for grantedness of the category label is

[2] `http://www.which.co.uk/about-which/what-we-do/reviews-and-advice/`, accessed 2011/02/27

lower than that of a label where the organizations attached to the label have shorter frequency codes.

5.5 Variables

Since Hypothesis 5.1 concerns the internal and external features of type authentic and craft authentic product offerings, what these feature values comprise needs to be noted. References to the codes [3] "body", "chassis", "mechanics", and "interior" were counted, and then summed to give a total number of references for both type authentic and craft authentic product offerings. These references included the number of times the feature value was mentioned, including positive citations of the feature values, but excluded negative mentions. [4] For Hypothesis 5.2, references to the codes "company" and "designer/boss" were counted, and then summed to give a total number of references to the organizational processes. References comprised the number of times a feature value was mentioned, including any positive mentions. Negative references to the feature values were excluded from this part of the analysis. Whereas with Hypothesis 5.3 concerning the amount of negative comments critics gave product offerings, these negative references had to be explicitly considered. Negative references to the codes "body", "chassis", "mechanics", "engine", "handling", "company", "designer/boss", "cost", and "interior" were counted and summed to give a total for negative comments towards type authentic and craft authentic product offerings. Given Hypothesis 5.4 relates to the overall length of the code, all of the feature values of a product offering were summed. The feature values comprise the codes "body", "chassis", "mechanics", "engine", "handling", "company", "designer/boss", "cost", and "interior". Once again, references comprise the

[3]the term "code" in this sense relates to the coding process detailed in the qualitative methodology chapter. It should not be confused with the theoretical conception of a code, as per Pólos et al. (2002).

[4]Appendix I provides analysis of the data where positive and negative citations are excluded from the results, as well as data on z–scores and standard deviations based on authenticity type. Unfortunately the identity of the author in many of the reviews was unobtainable, being credited as "CKC" (Complete Kit Car); z–scores and standard deviations based on reviewer are therefore unavailable.

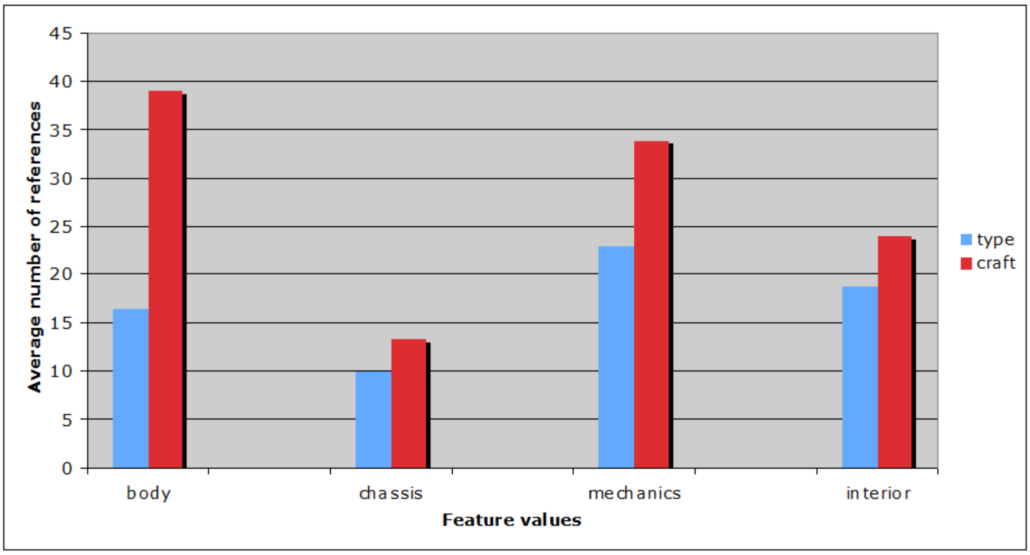

Figure 5.1: Average number of references by critic of individual internal and external features

number of times a specific feature value was mentioned, which includes positive comments but excludes negative ones.

5.6 Findings

Figure 5.1 illustrates the average number of references to the exterior and interior feature codes made by critics. The number of times the code "body" was mentioned in type authentic product offerings was 16.385, and 38.917 for craft authentic product offerings. References of the code "chassis" was 9.846 for type authentic product offerings and 13.333 for craft authentic offerings. Mentions of the code "mechanics" was 22.692 for type authentic offerings compared to 33.833 for craft authentic offerings; the number of interior references was 18.692 for type authentic product offerings, and 23.917 for craft authentic offerings. As Figure 5.2 illustrates, the total number of exterior and interior references was 67.846 for type authentic product offerings, whilst being 110 for craft authentic product offerings. Critics mentioned interior and exterior feature values of craft authentic product offerings 62%

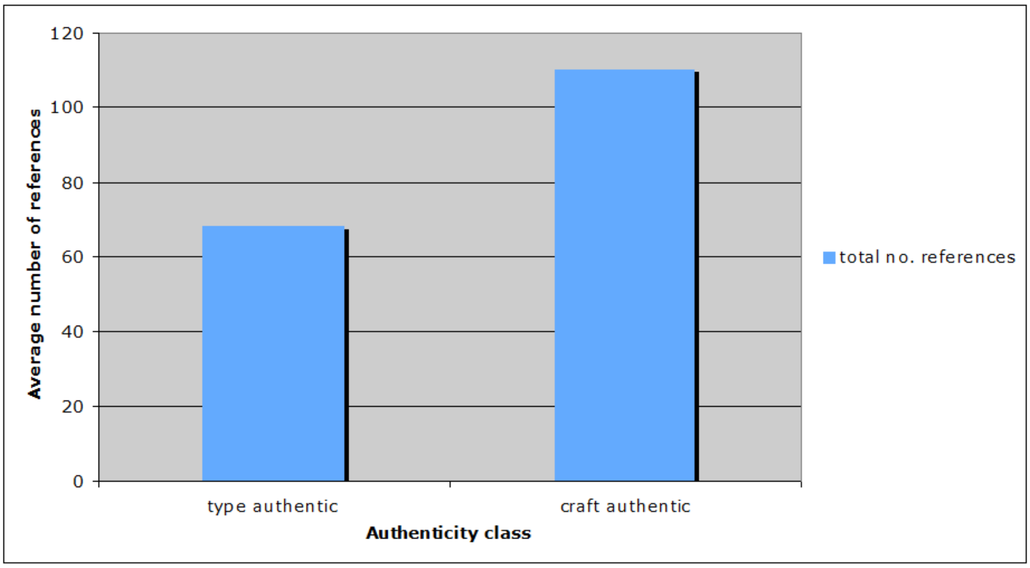

Figure 5.2: Average total number of references by critic of internal and external features, by authenticity class

more than their type authentic counterparts. Indeed, since craft authentic product offerings had more mentions of these features in the reviews than type authentic product offerings, critics appear to have gone into greater assessment or scrutiny of the interior and exterior features of craft authentic offerings than type authentic offerings. Using a t- test, the null hypotheses that the means are not different from one another is rejected at the 0.0005 level, lending support to Hypothesis 5.1: critical attention of the internal and external feature values is more intense for reviews of craft authentic product offerings than it is for type authentic product offerings. Hypothesis 5.2 builds upon the label fuzziness of craft and type authenticity, and how that affects the critical review process. In the kit car movement, type authenticity concerns the product being a replica of the original car that has been copied, which can be ascertained from the internal and external features of the offering. Whereas craft authenticity relates being true to a craft, and how "quirky" or "novel" an offering is, necessitating critics to assess the design team as a way of understanding what is quirky and what is not. Therefore, reviews of craft authentic product offerings go into more detail

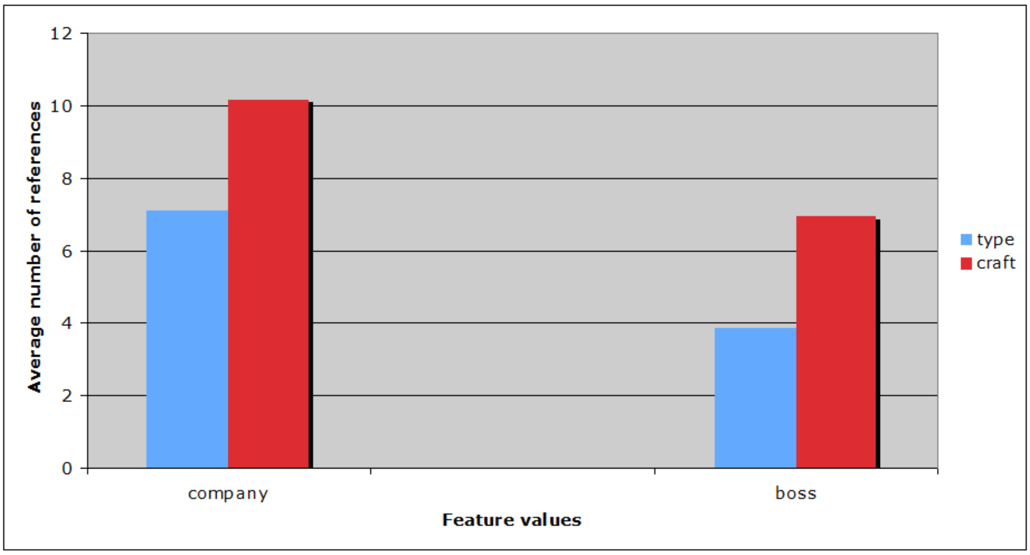

Figure 5.3: Average number of references by critic of individual organizational features

of the designers and organization than a review of a type authentic product offering. Critics assess the credentials of the design team in creating a truly novel and quirky piece of work. Figure 5.3 represents the average number of references to the codes "company" and "owner/designer". The number of times the code "company" received a mention was 7.077 for type authentic reviews, whilst 10.167 for craft authentic reviews. Not only this, but the number of times the code "boss/designer" was mentioned was 3.846 for type authentic product offerings, compared to 6.917 for craft authentic product offerings. Overall, the total number of organizational and boss/designer references made in the reviews was 10.923 for type authentic product offerings, and 17.083 for craft authentic product offerings, as depicted in Figure 5.4. Critics mentioned organizational and designer aspects over 56% more for craft reviews than for type. Consider again the roles of the designer and organizations and the scrutiny they come under from audience members. The label for type authenticity is crisp, with critics having a clear conception of what feature values satisfy the code; they do not need to assess the organizational or designer aspects to gain more insight as to whether the product

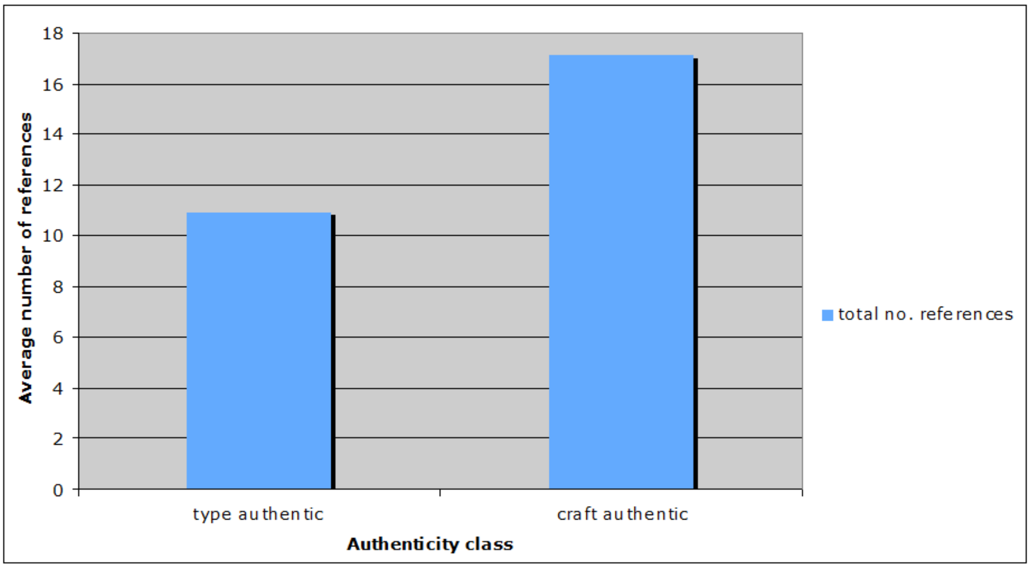

Figure 5.4: Average total number of references by critic of organizational features, by authenticity class

offering is a close replica of the original offering - it is more visual. However, the label for craft authenticity is fuzzy, resulting in critics not having a clear conception of what feature values satisfy the code and are true to a craft. Since craft authenticity enshrines the artisanal skill of the person generating a truly novel and quirky product offering, examining the design team in detail aids the process of determining the quirkiness of a product offering for audience members. Once more, there is a large difference between the number of references made by critics to designers in type authentic and craft authentic reviews. Using a t- test, the null hypotheses that the means are not different from one another is rejected at the 0.05 level, which lends support to Hypothesis 5.2: critics spend more time assessing the design team behind a product offering if it is craft authentic than time spent scrutinizing the design team behind a type authentic product offering.

Figure 5.5 details the average number of negative comments made in reviews of type authentic and craft authentic product offerings. Of interest is the relatively low number of negative comments only ever getting above the 2.5 mark for the interior of both type authentic and craft authentic product offerings. Indeed, the critics appear to have stayed away from openly criticising the boss or designer; the only time a company faced negative comments was in discussion of how previous owners of a firm did not do as well as they could have, either in marketing or customer care. Other negative comments concerned the overall pricing of the offering being expensive. Type authentic product offerings receive on average 7.692 criticisms per review, whilst craft authentic product offerings receive 7.667 criticisms per review. Hypothesis 5.3 stated type authentic product offerings should incur more criticisms from critics than craft authentic product offerings, as critics are better equipped to determine in a straightforward manner perceived code violations in a type authentic product offering than a craft authentic one. Whilst there may be a *prima facie* case to suggest Hypothesis 5.3 has been satisfied, this may not hold up upon closer inspection. A greater difference in the two values would be expected as a consequence of the label fuzziness; this is not the case, and the difference between negative criticism (perceived code violations) of type and craft authentic offerings is less than 1%. Using a t- test, the null hypotheses that the means are not different from one another cannot be rejected at any level level of statistical significance: Hypothesis 5.3 does not gain support. One possible reason for the lack of difference in perceived code violations is the social movement aspect of the population. The critics (journalists from Complete Kit Car), are themselves enthusiasts who have built many cars for themselves; they know how difficult it can be to build a car. It may very well be the case that the critics in the magazine have a high level of empathy - or even sympathy - for the organizations, and this is why criticism is not prevalent. Contrast this to the critics of mass produced cars, where there is no empathy for how the car is produced. Reviews list criticisms, and can at times be scathing on manufacturers and the product offering (as perusal of reviews made by motoring journalist Jeremy Clarkson would attest to). Indeed, an informal examination of reviews in main stream (mass produced) car magazines reveals the journalists are more forthcoming as to negative aspects of a product offering. The preceding hypotheses lead to the central hypothesis of the theory: the frequency code for craft authentic product offerings being longer than that of type authentic product offerings.

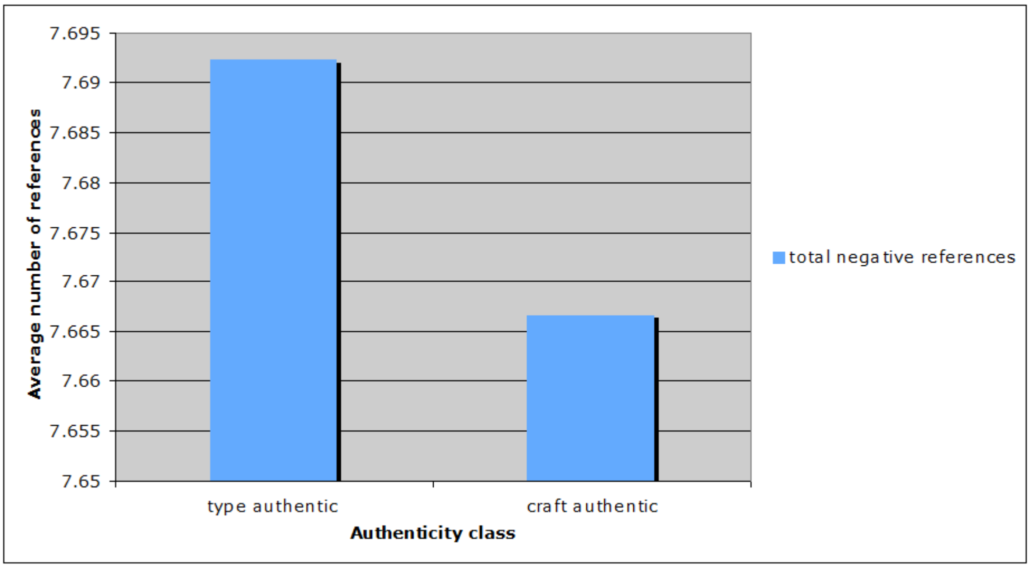

Figure 5.5: Average total number of negative references by critic for all feature values, by authenticity class

In the present context of critical reviews, the number of times feature values are mentioned in a type authentic product review should be greater than the number of times feature values are mentioned in a craft authentic review. A greater number of mentions entails the overall code for type authentic product offerings is longer than the code for craft authentic product offerings. Across all feature values then, craft authentic product offerings should generally receive more mentions than type authentic product offerings. Figure 5.6 illustrates this, with the average number of references made to each feature value. The number of references made to the code "body" is 16.385 for type authentic product offerings, and 38.917 for craft authentic offerings. The code "chassis" receives 9.846 mentions in type authentic offerings and 13.333 for craft authentic product offerings, "mechanics" has 22.923 for type authentic reviews and 33.833 for craft authentic reviews, "engine" receives 8.615 mentions for type authentic product offerings and 11.750 for craft authentic offerings, "handling" gains 10.539 mentions for type authentic reviews and 19.417 for craft authentic reviews. The number of references made to the code "company" was 7.077 for type authentic product offerings, and 10.167

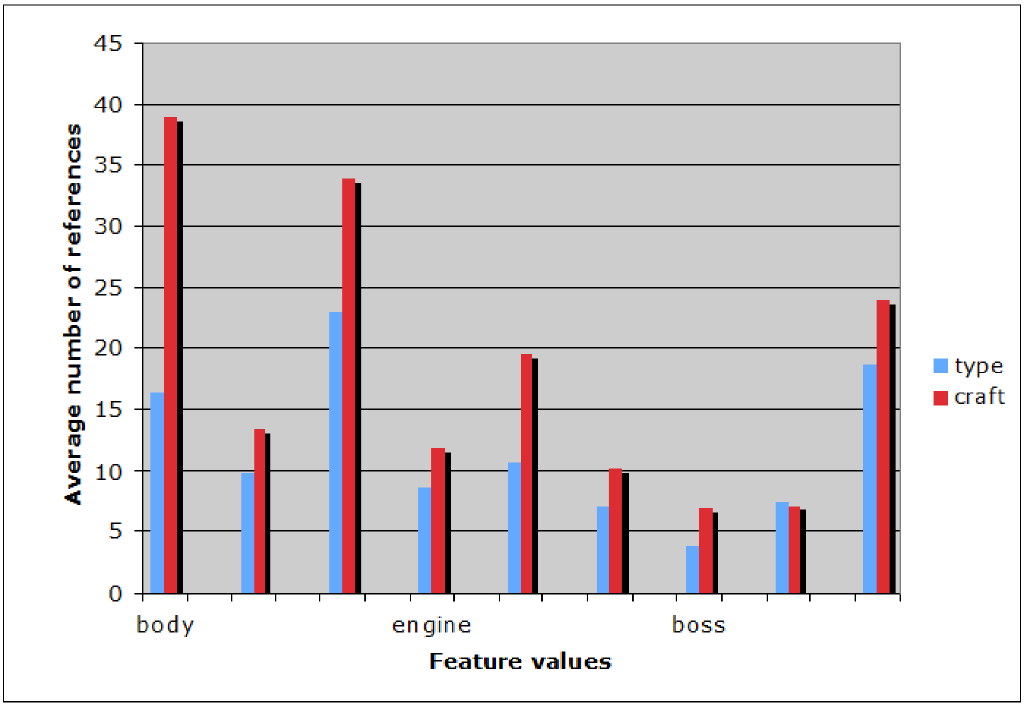

Figure 5.6: Average number of references by critic of all feature values

for craft authentic offerings, "boss/designer" has 3.846 mentions for type authentic offerings and 6.917 for craft authentic offerings, "cost" had 7.385 mentions for type authentic product offerings and 7.083 for craft authentic product offerings. Finally, the number of references to the code "interior" was 18.692 for type authentic product offerings and 23.917 for craft authentic product offerings. Figure 5.7 illustrates the sum of these feature values being mentioned was 105.308 for type authentic reviews, and 165.333 for craft authentic reviews. Critics made reference to a craft authentic product offerings feature values almost 57% more than a review of a type authentic product offering. Again, the difference between the total number of references made to type authentic product offerings with respect to craft authentic product offerings is substantial. If the number of times feature values are mentioned is greater for craft authentic product offerings than type authentic product offerings, audience scrutiny of craft authentic product offerings is more in-

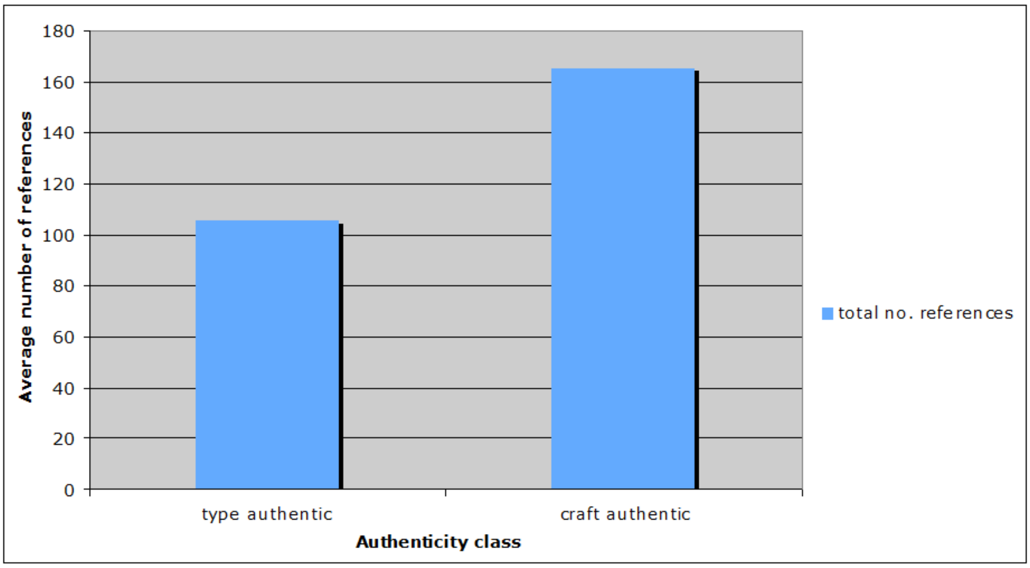

Figure 5.7: Average total number of references by critic of all feature values, by authenticity class

tense than that of type authentic product offerings. Overall, the code for craft authentic product offerings is longer than the code for type authentic product offerings. Using a t- test, the null hypotheses that the means are not different from one another is rejected at the 0.0005 level: Hypothesis 5.4 gains support.

5.7 Discussion

The idea of a code is a relatively novel conception in organizational sociology, and can be elusive to define. Pólos, Carroll, and Hannan (2000) note codes comprise rules or certain criteria that need to be satisfied, and a violation or failure to satisfy such rules lead to consequences perceived by audience members (see Meyer and Rowan, 1977). Indeed, a code might relate to either an internal identity code or an external identity code (Pólos et al., 2002), with an internal identity code being more difficult to identify - perhaps only perceived by insiders of an organization. Notwithstanding this, a code could also be understood as“a set of interpretative signals, as in the ‘genetic code’ [or]...

a set of rules of conduct, as in the 'penal code' "(Hannan et al., 2007:21). The actual length of the organizational code can have repercussions for an organization. If an organization has a short code, then much of its feature values possess what Meyer and Rowan (1977) termed as having a taken for granted status. The more feature values - or parts of the code - that are directly perceived and assessed by audience members, the lower the overall taken for grantedness of an organization. Conversely, the fewer feature values directly perceived by audience members, the higher the taken for grantedness. As the theoretical understanding of codes has progressed rapidly over the past decade, empirical application dealing explicitly with codes has been slower in advancement. This chapter sought to assess codes exclusively. By focussing on how critics assess product offerings in a domain with different labels of authenticity, new insights into codes have been gained. Although current theory details the importance of the length of the code, it does not precisely detail how those codes become short or long. Conceptualizing labels in terms of fuzziness (Hannan et al., 2007) has clarified issues. Indeed, by ascertaining how fuzzy a label is (see Hannan et al., 2007), predictions for the length of the code can be made. A fuzzy label is a result of audience members having low agreement as to the meaning of the label. The critic is unable to determine in a relatively straightforward manner what feature values satisfy the code (and by extension, label). It becomes increasingly difficult to perceive code violations, the probability of a code violation being perceived decreases. On the other hand, a crisp label is a consequence of audience members having high agreement as to the meaning of the label; a critic is able to establish in a relatively straightforward manner what feature values satisfy the code. Perceiving code violations becomes more straightforward, and the probability of a code violation being perceived increases. A fuzzy label results in a critic having to subject an object to increased levels of scrutiny, whereas a crisp label leads to a critic subjecting an object to decreased levels of scrutiny. Empirical support for this theory was gained from the critical reviews of kit cars. Type authentic product offerings had a crisp label, whereas craft authentic product offerings had a fuzzier label. This led to type authentic product offerings having a shorter code than craft authentic offerings. However, as a result of this empirical setting, some issues need to be clarified.

Firstly, how do the differing degrees of label fuzziness relate to issues of authenticity? Recall that two types of authenticity exist in the the kit car movement: type and craft. Type authenticity realtes to a product fitting into a specific genre or style; in the kit car scene this relates to being replicas of other (usually more expensive and out of production) cars. To be type authenitc, product offerings need to be as close a match as possible to the original car. If type authenticty requires being a near carbon copy of an original, then audeince members have a clear reference of how the product offering should look. A crisp label results from this, since audience members have high intensional semantic consensus as to what feature values product offerings should possess, and how they they should look. Whereas craft authenticity concerns the artisanal skill of the creator; audience members place a premium on novelty and quirkiness, leading to low intensional semantic consensus surrounds the craft authentic label. Due to this, the craft authenticity label is fuzzy, as audience members have low intensional semantic consensus as to what feature values product offerings should possess.

Second, there is a legitimate concern of using product offerings as a proxy for quantifying differing incarnations of authenticity: should product offerings be used as a signal of authenticity, and if so, why? Since type authenticity concerns satisfying a certain style or genre, it seems appropriate to assess an organization's product offering to ascertain whether it satisfies the style. With type authenticity in the kit car movement relating to whether the product offering is as close a copy as possible to the original, issues of authenticity center on the product offering itself. Should a product offering bear close resemblance to the original, audience members deem it to be type authentic. Whereas craft authenticity relates to being true to a craft - the creative flair of the designer in creating a novel and quirky offering is important. Is it appropriate for the product offering to be assessed in determining craft authenticity - should the focus of attention not be on the designer instead? Product offerings are the end result of a design process, where the designer has used their creative ability to generate a novel and quirky product offering. They are inseparable from their designers: the offering is the physical manifestation of the designer's skill and flair. In the kit car movement, a craft authentic product offering is usually characterized as being innovative, or novel and quirky by its looks and design features. It is in this resepct that the artist (or designer, in this case) expresses their creative ability and skill in creating such a product offering. Craft authenticity by its very nature places more emphasis on the designer than does type authenticity. Whilst noting craft authenticity can be evidenced in the product offering, Hypothesis 2 acknowledges the above point, and measures how often critics discussed the organization and the designer/owner behind the product offerings. It would be expected reviews of offerings claiming craft authenticity to have more references to the design team than for reviews of type authentic product offerings. As the results indicate, Hypothesis 2 gained support - critics did indeed spend considerably longer noting the designers behind craft authentic product offerings than the team behind type authentic product offerings. However, the use of product offerings seems a rather moot point, as the critical reviews themselves detail aspects of the organization. Moreover, it should be remembered that this chapter and the theory of a frequency code relates to critical reviews. The critical reviews from a kit car magazine (Complete Kit Car) have been used to empirically test the theory of the critical review process and the application of the frequency code.

A third issue concerns the definition of the code itself, an aspect of which has been addressed to an extent. As the theory section outlined, the code proposed in this chapter is that of a frequency code: audience scrutiny of feature values comprising the code is calculated. However, could the frequency code not be a manifestation of a *weighted* code, where the overall length of the code remains the same, but feature values make up differing proportions of the code? Hsu et al., (2010) broach this idea when discussing flat schemata. Instead of thinking about the frequency with which feature values arise in a code, this frequency should be used to calculate the various weightings given to each feature value. For example, if the average frequency code length is for one hundred mentions, and the feature value "body" takes up thirty of these, the weight of that feature value to the overall code is

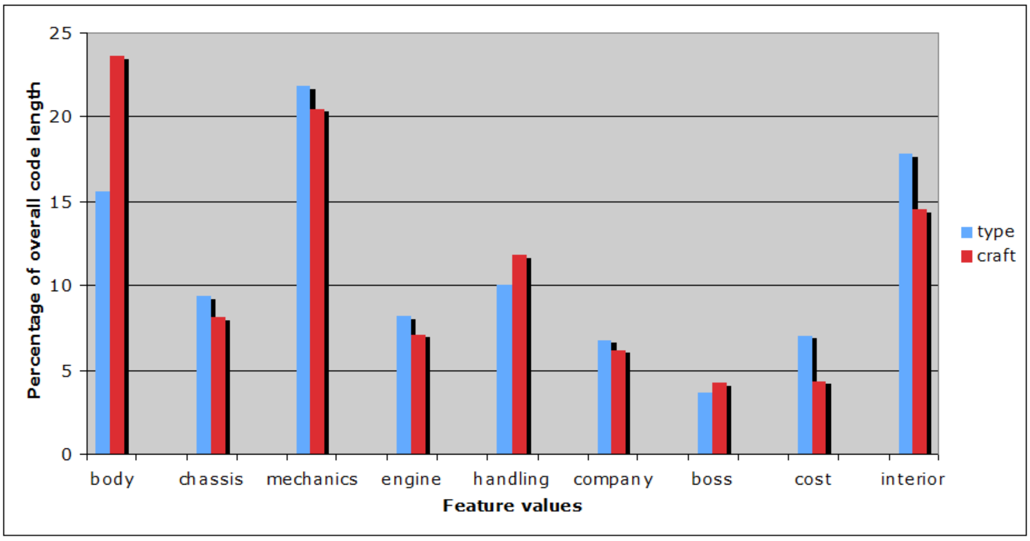

Figure 5.8: Average number of references by critic of all feature values, expressed as a percentage of overall code length

thirty percent. Figure 5.8 illustrates the average weighted code of both type and craft authentic product offerings, using the total number of times the feature values were mentioned (excluding negative citations), and applying that as a percentage of the overall length of the code. Feature values such as "body", "mechanics", and "interior" take up a large proportion of the code. What is also noticeable though is the relatively similar proportional size of the feature values in the type authentic and craft authentic code. Moreover, the expectation would have been for craft authentic product offerings to have a substantially larger portion of the code allocated to the designer, compared to type authenticity - as outlined in Hypothesis 5.2. This was not the case, with the weight given to the designer/boss being just over 10 % greater for the craft authentic code than for the type authentic code. However, the weighted code system has one large drawback: it does not fully document the degree of audience scrutiny of feature values and detail how they differ across objects and categories. The weighted code's limitations are exposed by not capturing absolute differences in audience scrutiny, only proportional differences. Focussing on absolute values captures the intensity of audience scrutiny on a feature value: the higher the frequency of a feature vale being mentioned, the more intense the scrutiny placed on it by audience members. The frequency codes of type and craft authenticity have revealed audience scrutiny of product offerings is significantly more intense for craft authentic product offerings than it is for type authentic offerings. If a weighted code were used, such intricacies would not have been observed; indeed, the frequency code better captures the process of critics scrutinizing to different degrees objects and their membership of differing categories.

5.8 Appendix: Calculations of t - test values

5.8.1 Calculating the variance

$$SE(\bar{X}_T - \bar{X}_c) = \sqrt{\frac{\mathrm{var_T}}{\mathrm{n_T}} + \frac{\mathrm{var_C}}{\mathrm{n_C}}} \tag{5.1}$$

Hypothesis 1:

$SE(\bar{X}_T - \bar{X}_c) = \sqrt{\frac{513.641}{13} + \frac{825.296}{12}} = 10.406$

Hypothesis 2:

$SE(\bar{X}_T - \bar{X}_c) = \sqrt{\frac{24.744}{13} + \frac{62.022}{12}} = 2.659$

Hypothesis 3:

$SE(\bar{X}_T - \bar{X}_c) = \sqrt{\frac{26.397}{13} + \frac{17.697}{12}} = 1.872$

Hypothesis 4:

$SE(\bar{X}_T - \bar{X}_c) = \sqrt{\frac{514.731}{13} + \frac{2086.629}{12}} = 14.611$

5.8.2 Calculating t - test values

$$t = \frac{\bar{X}_T - \bar{X}_C}{SE(\bar{X}_T - \bar{X}_C)} \tag{5.2}$$

Hypothesis 1:

$t = \frac{107.750 - 67.846}{10.406} = 3.835$

Hypothesis 2:

$t = \frac{15.750 - 10.923}{2.659} = 1.815$

Hypothesis 3:

$t = \frac{7.692 - 7.667}{1.872} = 0.013$

Hypothesis 4:

$t = \frac{160.917 - 105.308}{14.611} = 3.806$

Chapter 6

Multiple category membership

In this chapter, multiple category membership is addressed with respect to the vital - entry and exit - rates of organizations claiming membership of category specialist identities. The category specialist identity entails organizations having a perceptual focus (McKendrick and Carroll, 2001; McKendrick et al., 2003) in a single category, whilst category generalism implies a lack of such focus. When there is a lack of distinctiveness between the category specialist and category generalist identities, increasing density of category generalist producers lowers the perceptual focus of the category specialist identity. Less focus leads to the taken for granted character of the category specialist identity diminishing, and with it a reduction in levels of legitimation. This lack of distinctiveness between the two identities is a critical factor in the role that increasing category generalism density has to play in reducing the legitimation of the category specialist identity.

6.1 Partiality

Until recently, most sociological and organization theory research treated categories as a given; in this respect they were constructed by the analyst for ease of comparison (Ragin, 2000; see also Hannan, 2010). Often times, categories were constructed by analysts as a result of how secondary data sources presented themselves. For example, In Hannan and Freeman's studies into the survival rates of unions in the US Trades Union movement (Hannan and Freeman, 1987;1988), they separated organizations into two categories:

"craft" unions and "industrial" unions, due to the fact they were the two most commonly identified categories to be found in the Labor Union population. Hannan and Freeman (1987:927) explain their schema for categorizing unions into the craft category, "[w]e classify unions as using the craft form when they define their target membership in terms of occupations (rather than industrial locations). The craft form, defined in this way, has not been restricted to the highest skill levels". In this way, the researchers had to analyze the unions in detail to understand who their intended audience members were, and the categorization was dependent upon this, rather than any link to a specific set of industries. Whereas, note the slight difference in schema for the industrial union (Hannan and Freeman, 1987:928), "the industrial union form ignores differences among occupations and skill levels. Unions with this form seek to organize all production workers at work sites". Using these widely accepted definitions of the different types of labor union in a binary manner - either a union is a trade union, or it is not - led Hannan et al., (2007:88) to note a particular problem with this process:

> each union was treated as one or the other, but not both. Unfortunately, some cases were genuinely ambiguous. Consider the United Brotherhood of Carpenters and Joiners (UBC). This historically important union began as a classic craft union, as the name suggests. After twenty years of operation and some considerable turmoil, it broadened its claimed jurisdiction to "all that's made of wood", and later added "or that was ever made of wood". In the course of expanding its jurisdiction, it began to organize entire industries such as furniture making. The union became a hybrid. It operated partly as a craft union (in the building trades) and partly as an industrial union (in manufacturing). forcing this case into either category at the midpoint in its history strains credulity. But there was no alternative, other than to create a "not-otherwise-classified" category for such cases.

In this scenario Hannan and Freeman (and the Unions, not to mention most - if not all - sociologists and organization theorists) had been using a categorization system based upon classical set theory, which adhered to Frege's (1893/1903, Vol. 2:139) maxim, "[a]ny object that you choose either falls under the concept or does not fall under it". Either an object was to be categorized as being a member of a set, or it was not; the law of the excluded middle (see Barwise and Etchemendy, 2003; Hodges, 2001). To use the example of the unions in a classical set theory form, membership of the craft union category ($\mathbf{C}$) from the population of unions (U) entails:

$$\mathbf{C} : \mathrm{U} \longrightarrow \{0, 1\},$$

where either a union was a member of the craft category, 1, or it was not, 0. However, fuzzy set theory (Zadeh, 1965) offered a more realistic view of how the world was constructed; objects could be classified not by the simple "yes/no" classification available by classical set theory, but objects could be considered members of a category as a matter of degree. Partiality (Hannan et al., 2007; Hannan, 2010) enables more nuanced classification of objects into categories, by using a grade of membership function (μ), whereby an object is graded by the extent to which it is considered a member of the category - this ranges anywhere from 0 - 1. Applying the trade union example into set theory once more, but this time using a fuzzy set construction yields:

$$\mu\mathbf{C} : \mathrm{U} \longrightarrow [0, 1].$$

An organization might not be considered a member of the craft union category at all, in which case its grade of membership is zero; it might be considered a full member, with grade of membership one. Or it could reside anywhere in between and "sort of" be a member of a category (see Smithson and Verkuilen, 2006; Zimmerman, 2001). A grade of membership permits audience members to express the extent to which they believe an object belongs to a category. The work of Rosche and collaborators (Rosche, 1973; 1975; Rosche and Mervis, 1975) addressed the typicality of semantic and real life objects, as perceived by audience members. The purpose of one such experiment was, "to observe the relation between degree of relatedness between members of the category and the rated typicality of those members" (Rosche and Mervis, 1975:577). For example, for the category "vehicle" subjects were given a list of twenty objects and asked to grade their typicality to the category label. Objects such as "car" and "bus" were graded highly typical of the category, whilst objects such as "tank" and "elevator" were graded less typical of the category. In this way, the relationship between a category label and the grading of objects belonging to it was established [1]. Such a major line in cognitive psychology research was readily applied to organizational sociology by Hannan et al. (2007) to help understand the processes audience members went through in determining the extent to which an organization was a member of a labeled category. However, it is worth noting that in the trade union example noted above, the issue might not immediately have been one of the *extent* to which it belonged to a category, but *how many* categories the organization was a member of [2]. In this way, the theory of typecasting and multiple category membership shed new insight into such scenarios.

6.2 Typecasting and multiple category membership

The sociological phenomenon of typecasting (Faulkner, 1983) has recently been the focus of attention of organization theorists (Zuckerman et al., 2003; Hsu et al., 2010). At its core, the typecasting dynamic concerns an actor's position in the market, which might be determined by social status (Podolny, 1993; 1994; 2005), social network ties, (Grannovetter, 1985; Uzzi, 1997; Phillips, 2001), or some other mechanism. These cues are then used as a signal (Spence, 1974) of an actor's present ability or quality levels. In the study of film composers by Faulkner (1983), it was found that composers were assessed on the relative success of their previous film scores, which was used as a signal of their potential and likelihood of subsequent success. Composers were thus typecast on their ability, but this acted as a constraint in some ways, as it did not express what work a composer was *capable* of. Hence, successful composers in one style of music or film genre were not considered for scores in genres or skill sets outside their previous ones. Zuckerman et

[1] However, the experiments of Rosche and Mervis were designed to grade the *typicality* of an object to an category, whereas another strand of research by Nosofsky (1984; 1988; 1991), more recently by and Nosofsky and Johansen (2000) stresses how subjects grade objects to a category by using exemplars. The differences between prototype and exemplar theory is beyond the scope of this research, but it is worth noting.

[2] admittedly, an organization which is considered a member of a single category by default has a higher grade of membership than an organization in the category which is also considered a member of other categories.

al., (2003) acknowledged the typecasting phenomenon was strongest in mediated markets, specifically in labor markets such as acting, thereby limiting the generalizability of their study somewhat. With respect to typecasting and actors, it was shown typecast actors in a film genre [3] were more likely to obtain future work or roles in a film in the genre they were currently in than those actors who were currently not considered to be typecast in that genre, and were currently trying to seek work in that particular genre. For example, John Wayne was regarded as the prototypical Western star and had little trouble in gaining roles in such films during the heyday of the western genre, having starred in over 90 films belonging to the "western" genre (`http://www.imdb.com/name/nm0000078/filmogenre`, accessed 2011/03/02). This is the positive aspect of typecasting, as acknowledged by composers in Faulkner (1983), and echoed by a talent agent in Zuckerman et al., 2003:1039), "[t]ypecasting can be just like a foot-in-the-door. It's great to be known and consistently hired". Indeed, in the somewhat different world of Investment Banking, Michael Milken and the bank Drexel, Burnham were renowned (and arguably typecast) as being the "junk bond king" on Wall Street, where the majority of the firm's revenue came from issuing such bonds, despite their presence in other activities such as equity raising, and merger and acquisition advice (see Bruck, 1989). Zuckerman et al., (2003) found this effect to be especially strong in determining the success of novice actors or those just starting out in the business, confirming their qualitative evidence. There also exists a negative aspect of typecasting, where typecast actors in a category are less likely to obtain future employment or film roles in other genres than those actors who are typecast. Take the example of Sylvestor Stallone, who was typecast in the action genre and was unable to successfully broaden his portfolio of roles and genres outside of the action genre. From interviews with several industry insiders (Zuckerman et al.,, 2003 pp.1039-40), it was noted:

> many of Hollywood's most successful actors were typecast (Lucille Ball, Jerry Lewis, and Harrison Ford were common examples), and they also cited many examples of actors who were failures at broadening the range of characters they played. Sylvester Stallone, who had acted against his action image in several comedies

[3] Again, note how Zuckerman et al., 2003 restricted the number of genres to: western, comedy, drama, and action, as it was in these genres that the typecasting dynamic was strongest

> and dramas, was often mentioned as an example of the latter.

However, the effect of being typecast and consistently receiving roles in this genre outweighs the negative impact of not receiving roles in genres outside that of the typecast genre. Indeed, with the majority of actors in Hollywood struggling to find roles in films, the consistency of film roles to be had as a typecast actor is most beneficial to fledgling actors (Zuckerman et al., 2003).

Hsu et al., (2010) conceive of typecasting in a more theoretical manner, relating typecasting of an actor to earlier work on the application of schemata and codes (Pólos et al., 2002; Hannan et al., 2007). Under this construction, an audience member constructs a schema and applies it to the actor (the term "actor" relating to the psychological term, not the labor role) in order to better understand the actor by a sufficient degree of abstraction (Murphy, 2002). In this way, the audience member has a schema applied to the actor that does not "clash" (Pólos et al., 2002), Hannan et al., 2007; Pólos et al., 2010). The audience member discovers at a later period in time the object it had applied a schema to, now has a schema applied to it that clashes with the first schema constructed by the audience member. A definition of typecasting can be framed as thus (Hsu et al., 2010:15):

> [i]n the case of two concepts with schemas that clash only outside audience members' minimal tests for them, membership in one concept at an earlier point in time presumably (1) yields a higher fit to that schema at subsequent times but (2) reduces the fit to the other schema at a later point in time

The typecasting results in an increase in appeal in the first concept, and a reduction of appeal in the second concept (Hsu et al., 2010). A prime example of the typecasting dynamic can be found in industry with the conglomerate form. Consider the US behemoth GE, which to many would be considered an electronics firm (or to some, a firm that just produces light bulbs); audience members are usually surprised to discover that their banking and loans part of the business - GE Finance - generates a substantial proportion of their profits. Not only this, these audience members had not necessarily considered GE to be a bank/loans company in the first place (see Zuckerman, 2000, for the empirical implications of the conglomerate form).

The seminal work of Zuckerman (1999, 2000) has been widely thought to have initiated a renewed interest in categorization processes, and the complexities and implications surrounding membership of more than one category by an actor (see Negro, Koçak, and Hsu, 2010). Proposing a "candidate - audience interface", the first stage comprises organizations vying for the attention of audience members to purchase their offerings (Zuckerman, 1999; Phillips and Zuckerman, 2001). Offerings which do not fit the audience members' requirements are excluded from the consideration set. For the second stage, this set of organizations which have offerings that fit audience specifications are regarded as "legitimate" by audience members. Gaining acceptance by the audience "requires conformity with the audience's minimal criteria for what offers should look like and differentiation from all other legitimate offers" (Zuckerman, 1999:1402). Empirical evidence revealed stocks that spanned multiple SIC codes were significantly undervalued (in terms of market capitalization of the stock) by the securities analysts that followed an individual SIC code or sector, and the stocks contained within that sector. Indeed, in the case of Pepsi, it was undervalued by hundreds of millions of dollars due to its spanning the beverage and food retail categories. With analysts in the beverage sector unaware of its presence in the food retail sector - and vice–versa - the earnings forecasts of securities analysts in the individual sectors did not reflect the overall value of the company. These issues were not just specific to the financial services industry, as Zuckerman and Kim (2003), found the performance of films produced by major film labels and those by independents were in many respects determined by the degree of category purity (or "crispness" in the fuzzy set terminology of Hannan et al., 2007). When audience members consider categories as contrasting or oppositional to one another, there is a pressure placed upon the members of those categories to remain pure, or crisp in construction. In the case of the film industry this was evidenced in the relative success of independent film companies against their larger major film company rivals (Mezias and Mezias, 2000). Another example of the oppositional nature of categories and a need for category crispness can be evidenced in the success of the microbrewery movement in the US, where the microbrewers focus on and highlight the differences between themselves and their larger macro-brewer peers (Carroll and Swaminathan, 2000). Pólos, Hannan, and Carroll (2010) argue the use of a sub–label "micro" to the more general "brewer" label acts as a mechanism for creating the segregation process of the microbrewers against the macrobrewers; this identity permits the microbrewers to persist and thrive, and restricts the success of the macrobrewers from entering this category (Carroll and Swaminathan, 2000; Carroll et al., 2002). However, such mechanisms and perils for organizations only arise when the categories concerned are crisp: the identity divide declines when the contrast of categories is low (Zuckerman and Kim, 2003).

By aligning multiple category membership with the existing framework and mechanisms available under organizational ecology, the effect of category spanning was conceptualized in terms of a principle of allocation (Hannan and Freeman, 1977; 1989; Péli, 1997). In an examination of the relative success of films receiving audience attention, and specifically that of film critics, Hsu (2006) found those films attached to multiple genre labels received disproportionately lower attention by critics (in the form of reviews) than did films attached to a single genre. Critics had experience or expertise in certain genres, so spanning a genre made it more difficult for a critic to attach their schema, which was generally in the form of a single genre. How audience members - specifically critics and gatekeepers - generate schemata and review offerings has received relatively little attention by organization theorists, although Hsu and Podolny (2005) offer a refreshing exception. From an audience perspective, organizations which span categories are harder to evaluate, as audience members have expectations (or schemata) of product offerings in a category. By spanning genres, films had lower appeal with audience members. In terms of general audience appeal, this translated into lower box office sales; in terms of critics as a sub-set of the audience, critical reviews were either less eager to review the films (such as the film critic Roger Ebert passing such opportunities to review the films and instead other members of the team doing so), or the films they did review received lower ratings (Hsu, 2006). By applying an allocation principle to multiple category membership, niche theory (Freeman and Hannan, 1983; Hannan and Freeman, 1989; Carroll and Hannan, 2000; Hannan et al., 2007) could be used as a tool for further understanding the processes involved. In this sense, multiple category membership could be compared to classical [4] niche theory (Freeman and Hannan, 1983), where generalist organizations were those who were able to survive in fluctuating environments, whilst specialists were those who survived in a single environment. When the environment was stable, a specialist organization outperformed a generalist, as it was calibrated for optimal performance in this environment. When the environment was unstable, a generalist organization was calibrated to operate and survive in multiple environments, whilst the specialist was not; in this scenario, the "jack of all trades" phenomenon of the generalist organization being able to "hedge its bets" (Freeman and Hannan, 1983). Hsu et al., (2009) conceive of multiple category membership in terms of there being category generalists and category specialists; and their relative degrees of fit to the category label (or the schema applied to the label). Category spanners (or category generalists) have poor fit to such expectations or schemata, and have reduced actual appeal with audience members in the category, compared to category specialists who are solely present in the category (see Hsu et al., 2009, for example). Such a representation treats multiple category membership from the audience perspective, and do not consider the consequences of multiple category membership for producers themselves, which has only recently been the subject of analysis (Hsu et al., 2009). On the producer side, category generalists engage audience members across multiple categories. In terms of the grade of membership function, a category generalist has a lower engagement grade of membership in a given category than category specialist organizations. Hence, the fitness of a category generalist organization is lower than the fitness of a category specialist organization at a given category. By defining an organization's engagement niche as the number of genres or categories it engages at, an audience perspective on multiple category membership of

[4] "classical" is applied, as there is a distinction between this form of niche theory as originally constructed by Freeman and Hannan, and that subsequently compiled by Carroll (1985), McPherson, (1983), and McPherson and Ranger- Moore, (1991), which treat specialism/generalism in terms of niche width and the number of social positions an organization is present in

Hsu et al., (2009) found films with a broad engagement niche - or category generalists - had lower appeal with audience members. From a producer perspective, sellers on the online auction site ebay were more likely to successfully complete an auction if they were category specialists than category generalists. Hsu et al., (2009) document the findings of Kǫcak (2008) where sellers on ebay with specialized category names had higher levels of fitness than sellers with non–category specialized names. Again, being a category specialist producer improves fitness over a category generalist. The adverse effects of category spanning have been evidenced in the production of Italian wine, and the conflict over traditionalism and modernism in the wine making process (Negro et al., 2010, 2011). All of the aforementioned studies have assessed the impact of multiple category membership in terms of organizational appeal, the logical extension of this is to apply the theories developed of multiple category membership in assessing the vital rates of organizations in a population.

6.3 Theory

The legitimation of a category depends upon its taken for granted character with audience members (Meyer and Rowan, 1977), where there is "little question in the minds of actors that it serves as the natural way to effect some kind of collective action" (Hannan and Carroll, 1992:34). In this way, social norms are established by audience members as to how organizations should conduct themselves, and what expectations audience members have of them as well. These norms "specify in a rulelike way the appropriate means to pursue these technical purposes rationally" (Meyer and Rowan, 1977:344). For example, Ruef (2000) documents how the organizational form 'birthing center' in America gained a taken for granted character after World War II. Prior to this, the majority of child births were carried out in the patient's home, and the thought of a dedicated place where patients came for their child to be delivered was an alien concept. Moreover, Hannan et al., (2007) note how the medical profession became highly taken for granted in the mid twentieth century, as a recognized medical degree and membership of a regulated society was all patients required in order to ascertain whether they were being treated by a doctor. Consider the recent development in organizational ecology in the role claims of identity have to play in legitimation (see Hsu and Hannan, 2005), where an identity "constrains what an entity would/could be and what is expected and not expected of it" (Pólos et al., 2002:90). In this sense, a code details what activities or properties an organization should possess (Pólos et al., 2002; Hannan et al., 2007). The identity of an organization is based on the extent of its activities in a population (Hsu and Hannan, 2005; Hannan et al., 2007). Therefore, if an identity can be constructed based on the activities of organizations in a population, their focus - or lack of focus - in a category can be used as the basis for an identity to be constructed. In this sense, an identity is based on category generalism and category specialism. An identity based on category specialism entails the code requires a producer to have its stock of engagement focussed in a single category, and for its product offerings or activities to be limited to a single category. Whereas an identity based on category generalism entails the code requires a producer to have its engagement diluted across several categories, and its product offerings or activities to be present in more than one category. Perhaps one of the best examples of the category generalist identity concerns securities analysts having categories of organizations to assess not according by industry (SIC code), but by whether they are classed as 'conglomerate' (see Eccles and Crane, 1988; Zuckerman, 1999; 2000). Being a category specialist producer entails having what McKendrick and Carroll (2001; see also Hsu et al., 2010) termed 'perceptual focus', where audience members can readily identify and recognize such organizations. Not only this, but the perceptual focus entails organizations tend to be homogeneous to one another; the rules or codes audience members apply and enforce are therefore more easily applied and visualized. This perceptual focus manifests itself in being present in a single category; the engagement of an organization is concentrated in the single category. Whereas, category generalist organizations do not have perceptual focus. The very nature of category generalism is for an organization's stock of engagement to be spread across many categories. Organizations engage audience members by having product offerings present at given social positions. Therefore, should a category specialist organization engage at the same social position as a category generalist organization, their product offerings are likely to be similar to one another. Note that this implies the product offering of category specialist producers and category generalist producers are intended to be similar to one another in a given category or social position It is only the fact that the category generalist organization operates in many categories that result in it being considered a category generalist. Its range of product offerings in each category are similar to those of category specialists in those categories. For example, the conglomerate GE has a presence in aeroplane engine production, whose engines are similar in nature to those of competitors such as category specialist Rolls - Royce.

What happens to the taken for grantedness of the category specialist identity - which is perceptually focussed - when there becomes an increasing lack of visible distinctiveness between it and the category generalist identity? At a given social position, the product offering of a category specialist organization and the product offering of a category generalist organization are similar to one another. It is difficult for audience members to visibly distinguish between the offerings of a category specialist and those of a category generalist at a given social position. Due to this, the ability of audience members to easily recognize and identify the perceptually focussed identity of a category specialist declines. The boundary and exclusion rules or codes between category specialists and category generalists becomes less crisp. Category specialists lose their focussed identity, as the product offerings of category generalists are not visually distinct from those of category specialists at a given social position where the two identities interact or compete against each other. Hence, the boundary between the category specialist and category generalist identity becomes less crisp, and the taken for granted character of the category specialist identity declines as audience members cannot distinguish clearly the identity between a category specialist organization and a category generalist organization. Taken for grantedness has an impact upon the degree of legitimation present of those identities, as the degree of legitimation is proportional to taken for grantedness (Carroll and Hannan, 2000; Hannan et al., 2007). Legitimation has ramifications for the vital rates of those producers attached to the identity. The entry rate is directly proportional to the legitimation of the category (or identity) at a given time (Hannan and Carroll, 1992); higher legitimation entails a higher entry rate of producers. A highly taken for granted category that has higher levels of legitimation present can be "more readily visualized by potential organizers than one with dubious or unknown standing" (Hannan and Carroll, 1992: 36). High taken for grantedness of a category entails those producers find it easier to gain access to financial and human capital than those of a less taken for granted category. Being able to access financial and human capital resources easier ultimately leads to barriers to entry being lowered for a category that is highly taken for granted versus one that is not so. The exit rate is inversely proportional to legitimation of a category (or identity) at a given time (Hannan and Carroll, 1992); higher legitimation entails a lower exit rate. High levels of legitimation "enhances the ability of organizations to fend off challenges" (Hannan and Carroll, 1992:37). Because the category specialist identity is not clearly distinguishable from that of the category generalist identity (in terms of having product offerings at a given social position that are not visibly distinguishable from one another), the interaction of category generalist producers reduces the perceptual focus of category specialist producers. Note that the lack of visible distinctiveness between category generalists and category specialists derives from their product offerings. This should not be mistaken for the density of their product offerings lowering the taken for granted character of the identities. Product offerings establish that there is a lack of distinguishability between the identities at a social position, but taken for grantedness and legitimation are still organizational based processes related to the identity of the organizations. A decrease in perceptual focus results in the taken for granted character of the category specialist identity to decline; lower taken for grantedness manifests itself as lower legitimation. Lower levels of legitimation have ramifications on the entry and exit rate of category specialists:

Hypothesis 6.1: Organizational entry rate of category specialist producers *will fall with initial increases (when density is low) in the density of category generalist producers*

Hypothesis 6.2: Organizational exit rate of category specialist producers will rise with initial increases (when density is low) in the density of category generalist producers

As the density of category generalist producers increases, it decreases the perceptual focus of the category specialist identity. Increasing numbers of category generalist organizations and their offerings are mistaken by audience members as category specialists at a given social position where they compete against category specialists. The distinctiveness of the perceptually focussed identity of category specialism decreases as the boundary between category specialists and category generalists becomes less clear cut. As the taken for grantedness of the category specialist identity declines, so does its legitimation. Hypotheses 6.1 and 6.2 relate to the impact lower legitimation has on the rates of entry and exit of category specialists, but this can be extended to encompass the overall legitimation of the category specialist identity. If increases in category generalist density decreases the entry rate and increases the exit rate of category specialist organizations, then category generalism is an inhibiting factor on the legitimation of category specialism:

Hypothesis 6.3: Interaction of density of category generalist producers inhibits the legitimation of category specialism

How does category generalism and category specialism manifest itself in the case of kit cars? In the case of the kit car population, both authenticity classes (type and craft) are distinct from one another. Type authenticity requires an offering to be true to type, and be as close a replica as possible to the original car that is being copied. Therefore, the artistic flair of the designer is limited, and the precision and attention to detail of creating a replica is highly regarded by audience members. A review of an AC 427 replica produced by Hawk Cars went into great detail concerning the car and its closeness to the original 427 by listing the features of the car that were true to the original "...a lack of side vents and higher wheelarches, the lips of which are described as 'straight out'. It will also have a race style bucket seat, revised dashboard layout and a forward - strut–roll - over hoop. As ever, it's the detail that's key with Hawk Cars!" (Compete Kit Car, June 2009, p.9). Indeed, similarity to the original product offering being recreated has led one producer of a replica modern day super car to have the same body paint and alloy wheels as used by the factory where the original was produced, (Complete Kit Car, February 2009). Whereas the skills required for craft authenticity are somewhat different. The skill of the designer(s) in creating something that is quirky and novel that stands out from the crowd is desired; as a review of one such craft authentic product offering noted "[d]elicacy and aggression have never been so successfully unified than they are in the stunning new Rayvolution...There are so many visual details to drink in." (Complete Kit Car, October 2008, pp.15-16). Perhaps one of the best examples of the artisanal skill and quirkiness required of a craft car was illustrated with the launch of the Adams Design Probe 15 at the 1969 Racing Car Show (Heseltine, 2001:106):

> ...the motoring press lurching into hyperbole overload over the outlandish newcomer. And it isn't difficult to see why. Intended as an "investigation into the extremes of styling", it was the lowest car in the world, the top of its domed roof sitting just 29 inches above the ground. The Probe 15... was so low that doors were neither necessary nor possible. To gain entry to the avant–garde cockpit you simply slid back the roof over the rear deck and stepped aboard.

A category specialist identity requires an organization to produce either only type authentic product offerings, or only craft authentic product offerings; a category generalist identity requires an organization produce both type authentic product offerings and craft authentic product offerings.

6.4 Variables

Population age (T)

The kit car movement began in 1949 with Buckler Cars selling the Mk. V. Since these offerings were craft authentic, the craft authentic population begins from this time point also. The craft authentic population age ranges between 0 and 61, since the data extends to the end of 2009. In the tables below, the craft authentic population age is denoted by T_c , whilst the type authentic population age is denoted by T_t . For the type authentic population, the first entrant was in 1964, and so the type authentic population ranges between 0 and 46, given the data extends to the end of 2009.

Macro economy controls

Seeing as kit cars are relatively expensive items (ranging from around £2,000 for a Lotus Seven replica, to over £80,000 for a Ford GT40 replica), macro economic conditions presumably will have an influence on the evolution of the movement. Two proxies capture the more global macro economic trends. the first is UK levels of percentage annual change in GDP (Office for National Statistics, `www.statistics.gov.uk`), as a proxy for determining periods of positive economic growth versus periods of negative economic growth. The second is inflation adjusted oil prices (obtained from `www.inflationdata.com`) to gauge general economic prosperity [5].

Population specific controls

Two events are salient for the kit car population. The first of these occurred in 1973, when tax exemption on component cars was phased out. Prior to that, purchasers could save considerable money by purchasing their car in component form, thus avoiding the sales tax. However, when this loophole was closed in 1973, it is possible this had an effect on some companies stopping producing cars in kit form - or even leaving the movement - given that the tax advantage of this disappeared. This appears to be the case of Lotus, who stopped selling cars like the Elan in component form after 1973. A dummy variable coded “1” for the year 1973 and all subsequent years, and “0” otherwise. The phasing out of the tax was widely known in the kit car movement, and manufacturers would still enjoy a tax break for selling cars

[5]note that oil prices are for the price of crude oil, not petroleum. The intention of this variable is to try and capture global macro–economic trends - periods of positive or negative growth. It should not be interpreted as a control for the price of petroleum at fuel stations, which could arguably be a determining factor to some audience members in their choice of kit car

in component form until 1973; it made little sense for organizations to stop producing cars in kit form when the loop hole and tax advantage were still present.

The second population specific event occurred with the introduction of the SVA car safety test in 1998. This was legislation put in place that required any self-build car to have to undergo a relatively rigorous test before it could be deemed road legal. Should a car fail this test, it would not be allowed to be driven (legally) on British roads until it was altered in some form to make it satisfy a re-test. At the time of the introduction of the legislation, the kit car magazines were hailing this as the British government trying to destroy the kit car scene. They worried many kit car manufacturers would go to the wall with the application of extra safety features and having to conform to this strict test (Kit Car Magazine, various years). Undoubtedly, many kit car manufacturers did exit under this additional strain, but the magazines have observed the introduction of the SVA has seen the standard of kit cars improve over this time, and now consider its introduction a good thing for the long-term competitiveness of the industry (Complete Kit Car, various years). A dummy variable coded "1" for the year 1998 and all subsequent years, "0" otherwise. From the early 1990's the kit car movement had anticipated legislation emphasizing safety features would have to be phased in, so it was not a sudden shock when the SVA was introduced. Manufacturers had years to prepare for the relatively straightforward but necessary safety upgrades required in their product offerings. Organizations wishing to sell road legal kit cars knew they would have to alter their offerings to comply with this law and be able to sell their offerings from 1998 onwards.

Type of entry

A *de–novo* dummy variable coded "1" for an organization being a *de–novo* entrant and "0" for *de–alio* entrant was included to control for the type of entry made by the organization (see McKendrick and Carroll, 2001 for implications of entry type).

Category densities

The density of type authentic category specialist organizations which produce *only* type authentic product offerings (labeled "N_t " in tables) in year t is calculated as its value in *t-1* plus the difference between the number of organizations entering and the number of organizations exiting the category. Density of craft authentic category specialist organizations which produce *only* craft authentic product offerings (labeled "N_c " in tables) in year t is calculated as its value in *t-1* plus the difference between the number of organizations entering and the number of organizations exiting the category. Organizations which are category generalists and spanned categories - having type authentic product offerings and craft authentic product offerings - had their density (labeled "N_g " in tables) in year t calculated as its value in *t-1* plus the difference between the number of organizations entering and the number of organizations exiting the category. Density upon entry of type authentic category specialist producers (labeled "$N_{e,t}$ " in tables) refers to the number of type authentic category specialist organizations founded in a given year, and is calculated as the number of type authentic category specialist organizations in the population founded at time t . Density upon entry of craft authentic category specialist producers (labeled "$N_{e,c}$ " in tables) refers to the number of craft authentic category specialist organizations founded in a given year, and is calculated as the number of craft authentic category specialist organizations in the population founded at time t .

Product offering density (N_{prod})

The density of type authentic product offerings ($N_{prod,t}$)in year t is calculated as its value in *t-1* plus the difference between the number of type authentic product offerings entering and the number of type authentic product offerings exiting. Density of craft authentic product offerings ($N_{prod,c}$)in year t is calculated as its value in *t-1* plus the difference between the number of craft authentic product offerings entering and the number of craft authentic product offerings exiting.

Density interaction

There are three variables that are constructed to assess the interaction between type authentic category specialist density with category generalist density - $(N_t \text{ x } N_g)/100$, the interaction between type authentic category specialist density with craft authentic category specialist density - $(N_t \text{ x } N_c)$ /100 , and the interaction between craft authentic category density with category generalist denisty - $(N_c \text{ x } N_g)/100$. These were calculated by multiplying their respective density values at time t , and dividing this by 100.

6.5 Results

Tables providing descriptive statistics and correlations are provided in an appendix, found at the end of this chapter. This section is split into three parts: the first analyzes results for type authentic category specialists, the second analyzes results for craft authentic category specialists, the third combines the results from these sections to derive implications on the hypotheses.

6.5.1 Type authentic category specialists

Table 6.1 presents the entry rate models of type authentic category specialist producers. Model 1 is the baseline, the entry rate increasing as the population ages, with a coefficient of 0.057 which is statistically significant at the 5 percent level. Improved economic activity - in the form of increased GDP - increases the entry rate, having a coefficient of 0.106, but this is not statistically significant. Higher oil prices increase the entry rate, having a coefficient of 0.016 which is statistically significant at the 5 percent level. The application of the sales tax to kit cars led to a substantial decrease in the entry rate, having a coefficient of -1.046, statistically significant at the 10 percent level. Presumably, potential entrants and entrepreneurs were deterred from entering the scene once the incentive of zero sales tax had been eradicated. Introducing the SVA legislation also led to a decrease in the entry rate, having a coefficient of -0.699, although this is not statistically significant. Model 1 has a log - likelihood value of -116.978, and an LR χ^2 value of 11.65 (5 d.f.).

In Model 2 the density values of the three categories are introduced. Density of type authentic category specialist producers increases the entry rate, having a coefficient of 0.036, statistically significant at the 5 percent level. Increasing density of craft authentic category specialist producers increases the rate of entry also, with a coefficient of 0.048, statistically significant at the 5 percent level. Density of category generalist producers decreases the rate of entry, having a coefficient of -0.186, statistically significant at the 1 percent level. Model 2 has a log - likelihood value of -105.189, and an LR χ^2 value of 32.23 (8 d.f.) - both of which are an improvement over Model 1. Model 2 sees a significant improvement in fit over Model 1, having a Haberman's χ^2 value of 23.58 (Δ d.f. $= 3$; $p = < 0.01$). Model 3 has variables for not only for organizational density, but product offering density; in this case it is the number of type authentic product offerings present in the population at time t . Once again, density of type authentic producers increases the entry rate, with a coefficient of 0.051 which is statistically significant at the 5 percent level. Increasing density of craft authentic producers increases the entry rate, having a coefficient of 0.060 which is statistically significant at the 1 percent level. Density of category generalist producers decreases the entry rate, with a coefficient of -0.094 which is statistically significant at the 5 percent level. Increasing density of type authentic product offerings decreases the entry rate, having a coefficient of -0.020, although this is not statistically significant. Model 3 has a log - likelihood value of -104.406, and a LR χ^2 value of 36.80 (9 d.f.), both of which are an improvement over Model 1. Model 3 sees a significant improvement in fit over Model 1 (Haberman's $\chi^2 = 25.14$; Δ d.f. $= 4$; $p = < 0.01$). In Model 4, increasing density of type authentic producers increases the entry rate, having a coefficient of 0.026, although this is not statistically significant. Density of craft authentic producers increases the entry rate as well, having a coefficient of 0.056 which is statistically significant at the 1 percent level. Once again, increasing density of category generalist producers leads to a decrease in the entry rate, having a coefficient of -0.050, statistically significant at the 5 percent level. Model 4 introduces the interaction variable between type authentic category specialist density and category generalist density, which decreases the entry rate, having a coefficient of -0.230 which is statistically significant at the 1 percent level. Model 4 has a log - likelihood value of -100.055, and a LR χ^2 score of 45.50 (9 d.f.), both of which are an improvement over Model 1. Indeed, Model 4 sees a significant improvement in fit over Model 1 (Haberman's χ^2 = 33.85; Δ d.f. = 4; $p = < 0.01$). Model 5 introduces the final interaction variable. Increasing density of type authentic producers increases the rate of entry, having a coefficient of 0.033, but this is not statistically significant. Density of craft authentic producers increases the entry rate also, with a coefficient of 0.081 which is statistically significant at the 10 percent level. Increasing density of category generalist producers decreases the rate of entry, with a coefficient of -0.006, although this is not statistically signifiant. The interaction of densities between type authentic category specialists and category generalist producers decreases the entry rate, having a coefficient of -0.123, but this is not statistically significant. Interacting the densities of both category specialists leads to an increase in the entry rate, with a coefficient of 0.044, although this is not statistically significant. Model 5 has a log - likelihood value of -99.885 and an LR χ^2 value of 45.84 (10 d.f.), both of which are an improvement over Model 1. Indeed, Model 5 sees a significant improvement in fit over Model 1 (Haberman's χ^2 = 34.19; Δ d.f. = 5; $p = < 0.01$).

Models 2 - 5 provide strong support for Hypothesis 6.1, that the entry rate of category specialist producers falls with initial increases in density of category generalist producers, as the density of category generalist producers leads to a substantial decrease in the rate of entry of type authentic category specialist producers into the population. Across all Models (except for Model 5) this is large and statistically significant. Model 4 provides support for Hypothesis 6.3, that the interaction of category generalist density counteracts the legitimation of category specialism. In this case, the interaction of type authentic category specialist density with that of category generalist density significantly decreases the rate of entry of type authentic category specialist producers. In Model 5 this is also the case, but the coefficient is not statistically significant. However, only partial support for Hypothesis 6.3 is found, as the theory relates to legitimation: the founding rate models need to be compared against the exit rate models before more general support for Hypothesis 6.3 can be found. Moreover, the hypothesis concerns category specialist producers - type authentic category specialists are only a sub - set of this. Throughout all Models of Table 6.1, the dispersion parameter, α has been positive, and statistically significant in three out of the five models - indicating over-dispersion to be present.

Table 6.1: *Maximum Likelihood estimates of negative binomial models for entry rate of category specialist (type authentic) members, 1964-2009*

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
T_t	0.057 **	0.005	0.044	0.019	0.017
	(0.022)	(0.030)	(0.043)	(0.027)	(0.027)
GDP	0.106	-0.065	-0.054	-0.027	-0.034
	(0.072)	(0.069)	(0.069)	(0.065)	(0.066)
Oil	0.016 **	-0.001	-0.001	0.008	0.008
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
Tax 1973	-1.046 *	-0.129	-0.462	-1.032 *	-0.910
	(0.533)	(0.464)	(0.544)	(0.527)	(0.563)
SVA	-0.699	0.303	0.548	0.268	0.184
	(0.450)	(0.447)	(0.482)	(0.387)	(0.417)
N_t		0.036 **	0.051 **	0.026	0.033
		(0.019)	(0.022)	(0.016)	(0.021)
N_c		0.048 **	0.060 ***	0.056 ***	0.081 *
		(0.019)	(0.021)	(0.017)	(0.046)
N_g		-0.186 ***	-0.094 **	-0.050 **	-0.006
		(0.057)	(0.091)	(0.081)	(0.128)
$N_{prod,t}$			-0.020		
			(0.016)		
(N_t x N_g) /100				-0.230 ***	-0.123
				(0.068)	(0.197)
(N_t x N_c) /100					0.044
					(0.076)
Constant	-0.365	-0.088	-1.089	-0.983	-1.435
	(0.634)	(0.738)	(1.091)	(0.719)	(1.073)
α	0.309	0.107	0.095	0.038	0.040

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Table 6.1 – Continued

Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	(0.109)	(0.064)	(0.062)	(0.048)	(0.049)
LR $\alpha = 0$	30.96 ***	5.19 **	4.45 **	0.86	0.92
log - likelihood	-116.978	-105.189	-104.406	-100.055	-99.885
LR χ^2 (d.f.)	11.65 (5)	32.23 (8)	36.80 (9)	45.50 (9)	45.84 (10)
Haberman's χ^2(d.f.)		23.58 (3) ***	25.14 (4) ***	33.85 (4) ***	34.19 (5) ***
No. obs. (years)	46	46	46	46	46

Significance levels:

* :10% ** : 5% *** : 1 %

Standard errors are in parentheses

Table 6.2 presents the exit rate models of type authentic category specialist producers. Model 1 is the baseline, with the time to failure decreasing as the population ages, having a coefficient of -0.002, although this is not statistically significant. Increased prosperity - in the form of higher levels of GDP - leads to a decrease in the time to failure, having a coefficient of -0.027, but this is not statistically significant. Higher oil prices decrease the time to failure, having a coefficient of -0.010 which is statistically significant at the 10 percent level. The introduction of the sales tax in 1973 led to an increase in the time to failure, having a coefficient of 0.751 which is statistically significant at the 10 percent level. Government legislation in the form of the SVA increases the time to failure, with a coefficient of 0.439, although this is not statistically significant. The de - novo dummy variable has a coefficient of -0.679, statistically signifiant at the 1 percent level, indicating being a de - novo producer significantly decreases the time to failure. Such a finding is consistent with Carroll, Bigelow, and Siedel (1996) who found that de - alio producers were able to cross - subsidize their activity in one domain with revenue from another domain. Density delay increases the time to failure, having a coefficient of 0.036, statistically significant at the 10 percent level. However, this is contra to that of Carroll and Hannan (1989), where density delay increases the failure rate of organizations. Model 1 has a log - likelihood value of -267.449 and a LR χ^2 score of 35.17 (7 d.f.). In Model 2 the density values of the three categories is introduced. Once again, being a de - novo producer decreases the time to failure, having a coefficient of -0.613 which is statistically significant at the 1 percent level. Increased density at founding increases the time to failure, having a coefficient of 0.065, statistically significant at the 5 percent level. Increased density of type authentic producers decreases the time to failure, with a coefficient of -0.034 which is statistically significant at the 5 percent level. Density of craft authentic producers decreases the time to failure, having a coefficient of -0.003, statistically significant at the 10 percent level. Increased density of category generalist producers decreases the time to failure, having a coefficient of -0.060 which is statistically significant at the 5 percent level. Model 2 has a log - likelihood value of -257.950 and LR χ^2 score of 54.17 (10 d.f.), both of which are an improvement over Model 1. Model 2 has a significant improvement in fit over that of Model 1 (Haberman's χ^2 = 19.00; Δ d.f. = 3; $p = < 0.01$). In Model 3, being a de - novo producer substantially reduces the time to failure, having a coefficient of -0.598 which is statistically significant at the 1 percent level. Once again, density delay increases the time to failure, having a coefficient of 0.075, statistically significant at the 1 percent level. Increased density of type authentic category specialist producers decreases the time to failure, having a coefficient of -0.056 which is statistically significant at the 5 percent level. Density of craft authentic category specialist producers decreases the time to failure, with a coefficient of -0.013, statistically significant at the 10 percent level. Increased density of category generalist producers decreases the time to failure, having a coefficient of - 0.134 which is statistically significant at the 5 percent level. Density of type authentic product offerings increases the time to failure, having a coefficient of 0.022, although this is not statistically significant. Model 3 has a log - likelihood of -257.212 and LR χ^2 score of 55.64 (11 d.f.), an improvement over the baseline in Model 1. Model 3 shows a significant improvement in fit over Model 1 (Haberman's χ^2 = 20.47; Δ d.f. = 4; $p = < 0.01$). In Model 4, being a de - novo producer significantly decreases the time to failure with a coefficient of -0.588 (statistically significant at the 1 percent level), and increased density of founding once more increases the time to failure, having a coefficient of 0.093 which is statistically significant at the 1 percent level. Increased density of type authentic category specialist producers decreases the time to failure, having a coefficient of -0.040 which is statistically signifiant at the 5 percent level. Density of craft authentic category specialist producers decreases the time to failure, with a coefficient of -0.014 which is statistically significant at the 10 percent level. Increased density of category generalists decreases the time to failure, having a coefficient of -0.182 which is statistically significant at the 5 percent level. Model 4 introduces the interaction variable between type authentic category specialist density and category generalist density, which decreases the time to failure, having a coefficient of -0.176 which is statistically significant at the 5 percent level. Model 4 has a log - likelihood of -256.371 and a LR χ^2 score of 57.33 (11 d.f.), a significant improvement over that of Model 1; there is also a significant improvement in fit over the baseline (Haberman's $\chi^2 = 22.16$; Δ d.f. $= 4$; $p = < 0.01$). In Model 5, being a de - novo producer significantly decreases the time to failure, having a coefficient of -0.590, statistically significant at the 1 percent level. Density delay of type authentic producers increases the time to failure, with a coefficient of 0.092 which is statistically significant at the 1 percent level. Increased density of type authentic category specialist producers decreases the time to failure, having a coefficient of -0.051 which is statistically significant at the 5 percent level. Density of craft authentic category specialist producers decreases the time to failure, with a coefficient of -0.057, statistically significant at the 10 percent level. Increased density of category generalist producers decreases the time to failure, having a coefficient of -0.092 which is statistically significant at the 10 percent level. In terms of the interaction between type authentic category specialist producer density and category generalist producer density, the time to failure decreases substantially, with a coefficient of -0.110, statistically significant at the 5 percent level. The interaction between the two category specialist producer densities (type authentic and craft authentic) increases the time to failure, with a coefficient of 0.071, although this is not statistically significant. Model 5 has a log - likelihood of -256.147 and LR χ^2 score of 57.78 (12 d.f.), and is an improvement over Model 1. There is a substantial improvement in fit over the baseline, Model 1 (Haberman's $\chi^2 = 22.60$; Δ d.f. $= 5$; $p = < 0.01$).

Models 2 - 5 provide strong support for Hypothesis 6.2: exit rate of category specialist producers rises with initial increases in the density of category generalist producers, as the density of category generalist producers results in a substantial decrease in the time to failure (and therefore a correspondingly higher exit rate) of type authentic category specialist producers. Across all Models this is large and statistically significant. However, it is also to be noted that density of the two category specialists - type authentic and craft authentic - also leads to a decrease in the time to failure, but it is of a different order of magnitude to that exerted by category generalists. It appears that competition effects may be present between type authentic producers and craft authentic producers. Model 4 lends support for Hypothesis 6.3: the interaction of category generalist density inhibits the legitimation of category specialism. The interaction of category generalist density with that of type authentic category specialist density substantially decreases the time to failure of type authentic category specialist producers. Model 5 lends support to Hypothesis 6.3 also, and the interaction between the two category specialist densities - although increasing the time to failure - is not statistically significant. In terms of type authentic category specialist producers, Hypothesis 6.1 and 6.2 have gained support: the entry rate of (type authentic) category specialist producers decreases with initial increases in the density of category generalist producers. Similarly, exit rate of (type authentic) category specialist producers rises with initial increases in the density of category generalist producers. In terms of type authentic category specialist producers, the interaction of category generalist producers hampers the legitimation of the type authentic category specialist identity: decreasing the entry rate of type authentic category specialist producers, and increasing the failure rate of type authentic category specialist producers. Not only this, but the interaction between these two densities increases the failure rate as well. To this extent, Hypothesis 6.3 gains support.

Table 6.2: *Maximum Likelihood estimates of log - normal models for exit rate of category specialist (type authentic) members, 1964-2009*

Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
T_t	-0.002	0.104 ***	0.066	0.098 ***	0.100 ***
	(0.018)	(0.032)	(0.045)	(0.032)	(0.032)
GDP	-0.027	0.070	0.072	0.078	0.090
	(0.061)	(0.069)	(0.069)	(0.069)	(0.071)
Oil	-0.010 *	-0.003	-0.004	-0.010	-0.009
	(0.006)	(0.008)	(0.008)	(0.009)	(0.009)
Tax 1973	0.751 *	0.337	0.572	0.802	0.537
	(0.424)	(0.495)	(0.537)	(0.570)	(0.683)
SVA	0.439	0.204	-0.144	0.044	0.190
	(0.381)	(0.518)	(0.591)	(0.524)	(0.570)
Novo = 1	-0.679 ***	-0.613 ***	-0.598 ***	-0.588 ***	-0.590 ***
	(0.205)	(0.198)	(0.199)	(0.199)	(0.198)
$N_{e,t}$	0.036 *	0.065 **	0.075 ***	0.093 ***	0.092 ***
	(0.021)	(0.025)	(0.027)	(0.031)	(0.031)
N_t		-0.034 **	-0.056 **	-0.040 **	-0.051 **
		(0.020)	(0.027)	(0.020)	(0.026)
N_c		- 0.003 *	-0.013 *	-0.014 *	-0.057 *
		(0.021)	(0.025)	(0.023)	(0.068)
N_g		-0.060 **	-0.134 **	-0.182 **	-0.092 *
		(0.063)	(0.088)	(0.094)	(0.161)
$N_{prod,t}$			0.022		
			(0.018)		
(N_t x N_g) /100				-0.176 **	-0.110 **
				(0.101)	(0.265)
(N_t x N_c) /100					0.071
					(0.106)
Constant	2.116 ***	0.059	1.177	0.976	1.890
	(0.568)	(0.808)	(1.245)	(0.975)	(1.687)
Σ	1.189 ***	1.131 *	1.133 *	1.128 *	1.126 *
	(0.080)	(0.077)	(0.077)	(0.077)	(0.077)
log - likelihood	-267.449	-257.950	-257.212	-256.371	-256.147
LR χ^2 (d.f.)	35.17 (7)	54.17 (10)	55.64 (11)	57.33 (11)	57.78 (12)
Haberman's χ^2(d.f.)		19.00 (3) ***	20.47 (4) ***	22.16 (4) ***	22.60 (5) ***
No. obs.	2087	2087	2087	2087	2087

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Table 6.2 – Continued

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Significance levels:					
* :10% ** : 5% *** : 1 %					
Standard errors are in parentheses					

6.5.2 Craft authentic category specialists

Table 6.3 presents the entry rate models of craft authentic category specialist producers. Model 1 is the baseline, with the entry rate increasing as the population ages, having a coefficient of 0.042 which is statistically significant at the 1 percent level. Economic prosperity - in the form of higher levels of GDP - increases the entry rate, with a coefficient of 0.031, although this is not statistically significant. Higher oil prices increase the rate of entry, having a coefficient of 0.016 which is statistically significant at the 1 percent level. The introduction of the sales tax in 1973 decreases the entry rate, with a coefficient of -0.955, statistically significant at the 5 percent level. Legislation in the form of the SVA leads to a decrease in the entry rate also, having a coefficient of -0.599 which is statistically significant at the 10 percent level. Model 1 has a log - likelihood of -139.819 and a LR χ^2 score of 21.18 (5 d.f.). In Model 2, the density variables are introduced. Increasing density of type authenticity category specialist producers decreases the entry rate, having a coefficient of -0.007, although this is not statistically significant. Density of craft authentic category specialist producers increases the rate of entry, with a coefficient of 0.067 which is statistically significant at the 1 percent level. Increasing density of category generalist producers lowers the entry rate, having a coefficient of -0.106 which is statistically significant at the 1 percent level. Model 2 has a log - likelihood of -123.139 and LR χ^2 score of 54.54 (8 d.f.). There is an improvement in fit over Model 1 (Haberman's χ^2 = 33.36; Δ d.f. = 3; $p = < 0.01$). In Model 3, increased density of type authentic category specialist producers decreases the entry rate, with a coefficient of -0.007, however this is not statistically significant. Density of craft authentic category specialist producers increases the entry rate, having a coefficient of 0.076 which is statistically significant at the 1 percent level. Increasing density of category generalist producers decreases the entry rate, with a coefficient of -0.031 that is statistically significant at the 5 percent level. As the density of craft authentic product offerings increases, the entry rate decreases, having a coefficient of -0.013 which is statistically significant at the 5 percent level. Model 3 has a log - likelihood of -120.866 and LR χ^2 score of 59.05 (9 d.f.). There is an improvement in fit over Model 1 (Haberman's $\chi^2 = 37.87$; Δ d.f. $= 4$; $p = < 0.01$). For Model 4, increasing density of type authentic category specialist producers decreases the entry rate, with a coefficient of -0.015, although this is not statistically significant. Density of craft authentic category specialist producers increases the entry rate, having a coefficient of 0.081 which is statistically significant at the 1 percent level. Increasing density of category generalist producers increases the entry rate, with a coefficient of 0.027, although this is no longer statistically significant. Model 4 introduces the interaction between density of craft authentic category specialist producers and category generalist producers, which decreases the rate of entry, having a coefficient of -0.166 which is statistically significant at the 5 percent level. Model 4 has a log - likelihood of -120.324 and LR χ^2 score of 60.17 (9 d.f.). There is also a significant improvement in fit over Model 1 (Haberman's $\chi^2 = 38.99$; Δ d.f. $= 4$; $p = < 0.01$). In Model 5, increasing density of type authentic category specialist producers decreases the entry rate, having a coefficient of -0.023, but this is not statistically significant. Density of craft authentic category specialist producers increases the entry rate, with a coefficient of 0.079 which is statistically significant at the 1 percent level. Increasing density of category generalist producers increases the entry rate, having a coefficient of 0.051, although this is not statistically significant. The interaction between increasing density of craft authentic category specialist producers and category generalist producers leads to a decline in the entry rate, having a coefficient of -0.229, but this is not statistically significant. Finally, the interaction between the two category specialist densities increases the entry rate, with a coefficient of 0.019, although this is not statistically significant. Model 5 has a log - likelihood of -120.285 and a LR χ^2 value of 60.25 (10 d.f.) - an improvement over Model 1. Indeed, there is a significant improvement in fit over Model 1 (Haberman's $\chi^2 = 39.07$; Δ d.f. $= 5$; $p = < 0.01$).

Models 2 and 3 provide support for Hypothesis 6.1: the rate of entry of category specialist producers falls with initial increases in density of category generalist producers, as the results show density of category generalist producers decreases the entry rate of craft authentic category specialist producers. However, Models 4 and 5 - although without levels of statistical significance attached to them - run contra to the findings of Models 2 and 3 (and therefore Hypothesis 6.1). Therefore, Hypothesis 6.1 finds limited support. Model 4 provides support for Hypothesis 6.3: the interaction of category generalist density counteracts the legitimation of category specialists. In the present findings, the interaction of craft authentic category specialist density with category generalist density significantly decreases the rate of entry of craft authentic category specialist producers. In Model 5 the coefficient is also negative, but is no longer statistically significant. Once again, since these results reflect only the founding rate of craft authentic category specialist producers, only partial support for Hypothesis 6.3 is found (as this refers to both craft authentic *and* type authentic category specialist producers. The effects of legitimation are reflected in not only entry rate models, but exit rate models also). With the exception of Model 1 of Table 6.3, the dispersion parameter (α) has been zero, and so the negative binomial model reduces to a Poisson model (since the dispersion parameter α equals zero).

Table 6.3: *Maximum Likelihood estimates of negative binomial models for entry rate of category specialist (craft authenticity) members, 1949-2009*

Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
T_c	0.042 ***	0.012	0.032 *	0.007	0.010
	(0.014)	(0.017)	(0.019)	(0.017)	(0.021)
GDP	0.031	-0.111 **	-0.104 **	-0.096 **	-0.098 **

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Table 6.3 – Continued

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
	(0.053)	(0.045)	(0.045)	(0.046)	(0.046)
Oil	0.016 ***	-0.005	-0.005	0.002	0.002
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Tax 1973	-0.955 **	0.182	-0.350	-0.241	-0.261
	(0.410)	(0.308)	(0.408)	(0.367)	(0.377)
SVA	-0.599 *	0.103	-0.076	0.096	0.081
	(0.324)	(0.368)	(0.380)	(0.363)	(0.366)
N_t		-0.007	-0.007	-0.015	-0.023
		(0.012)	(0.012)	(0.012)	(0.031)
N_c		0.067 ***	0.076 ***	0.081 ***	0.079 ***
		(0.011)	(0.012)	(0.013)	(0.015)
N_g		-0.106 ***	-0.031 **	0.027	0.051
		(0.040)	(0.054)	(0.068)	(0.109)
$N_{prod,c}$			-0.013 **		
			(0.006)		
(N_c x N_g) /100				-0.166 **	-0.229
				(0.070)	(0.239)
(N_c x N_t) /100					0.019
					(0.067)
Constant	0.241	0.252	0.322	-0.121	-0.110
	(0.344)	(0.346)	(0.343)	(0.395)	(0.398)
α	0.165	.	.	.	.
	(0.065)	.	.	.	.
LR $\alpha = 0$	16.18 ***	.	.	.	.
log - likelihood	-139.819	-123.139	-120.866	-120.324	-120.285
LR χ^2 (d.f.)	21.18 (5)	54.54 (8)	59.05 (9)	60.17 (9)	60.25 (10)
Haberman's χ^2(d.f.)		33.36 (3) ***	37.87 (4) ***	38.99 (4) ***	39.07 (5) ***
No. obs. (years)	61	61	61	61	61

Significance levels:

* :10% ** : 5% *** : 1 %

Standard errors are in parentheses

Table 6.4 presents the exit rate models of craft authentic category specialist producers. Model 1 is the baseline, with the time to failure increasing as the population ages, having a coefficient of 0.027, statistically significant at the 1 percent level. Increasing prosperity (in the form of increasing levels of GDP) decrease the time to failure, with a coefficient of -0.069, although this is not statistically significant. Rising oil prices increase the time to failure, having a coefficient of 0.001, although this is not statistically significant. Of the two population specific controls, neither is substantial nor statistically significant. The de - novo dummy decreases the time to failure, with a coefficient of -0.458 which is statistically significant at the 1 percent level. Once again, such a finding is consistent with that of Carroll et al., (1996) that de - alio producers are able to cross - subsidize their activities. Density delay of craft authentic category specialists decreases the time to failure, having a coefficient of -0.001, although this is not statistically significant. Model 1 has a log - likelihood of -295.455 and a LR χ^2 score of 80.67 (7 d.f.). In Model 2, increasing density type authentic category specialist producers decreases the time to failure, having a coefficient of -0.003, although this is not statistically significant. Density of craft authentic category specialist producers decreases the time to failure, with a coefficient of -0.019, although this is not statistically significant. Increasing density of category generalist producers decreases the time to failure, having a coefficient of -0.060, statistically significant at the 5 percent level. Model 2 has a log - likelihood of -293.595 and a LR χ^2 score of 84.39 (10 d.f.). There is an improvement in fit over Model 1 (Haberman's χ^2 = 3.72; Δ d.f. = 3), but this is not statistically significant. Model 3 introduces the density of craft authentic product offerings variable. Increasing density of type authentic category specialist producers decreases the time to failure, having a coefficient of -0.001, but this is not statistically significant. Density of craft authentic category specialist producers decreases the time to failure, with a coefficient of -0.013 which is statistically significant at the 10 percent level. Increasing density of category generalist producers decreases the time to failure, having a coefficient of -0.032, statistically significant at the 5 percent level. Density of craft authentic product offerings increases the time to failure, with a coefficient of 0.008, but this is not statistically significant. Model 3 has a log - likelihood of -292.562 and a LR χ^2 score of 86.46 (11 d.f.), and is an improvement in fit over Model 1 (Haberman's χ^2 = 5.79;

Δ d.f. $= 4$), but this is not statistically significant. For Model 4, increasing density of type authentic category specialist producers increases the time to failure, having a coefficient of 0.009, although this is not statistically significant. Density of craft authentic category specialist producers decreases the time to failure, with a coefficient of -0.014 which is statistically significant at the 10 percent level. Increasing density of category generalist producers decreases the time to failure, having a coefficient of -0.042, statistically significant at the 5 percent level. Introducing the density interaction variable between density of craft authentic category specialist producers and category generalist producers decreases the time to failure, having a coefficient of -0.128, which is statistically significant at the 5 percent level. Model 4 has a log - likelihood of -292.174 and a LR χ^2 score of 87.23 (11 d.f.). There is an improvement in fit over Model 1, although this is not statistically significant (Haberman's $\chi^2 = 6.56$; Δ d.f. $= 4$). In Model 5, increasing density of type authentic category specialist producers once again increases the time to failure, having a coefficient of 0.003, although this is not statistically significant. Density of craft authentic category specialist producers decreases the time to failure, having a coefficient of -0.057 which is statistically significant at the 10 percent level. Increasing density of category generalist producers decreases the time to failure, with a coefficient of -0.025, statistically significant at the 10 percent level. Of the density interaction variables, the interaction between density of craft authentic category specialist producers and density of category generalist producers decreases the time to failure, having a coefficient of -0.151, which is statistically significant at the 5 percent level. The interaction between density of craft authentic category specialist producers and density of type authentic category specialist producers increases the time to failure, with a coefficient of 0.215, although this is not statistically significant. Model 5 has a log - likelihood of -291.080 and a LR χ^2 score of 89.42 (12 d.f.), and exhibits an improvement in fit over Model 1, although this is not statistically significant (Haberman's $\chi^2 = 8.75$; Δ d.f. $= 5$).

Models 2 - 4 of Table 6.4 lend strong support to Hypothesis 6.2: the exit rate of category specialist producers rises with initial increases in the density of category generalist producers. In the present context, density of category generalist organizations decreases the time to failure (resulting in a higher exit rate) of craft authentic category specialist producers. Across all of these models the coefficient was large and statistically significant. However, in Model 5, although category generalist density decreased the time to failure of craft authentic category specialist producers, increasing density of craft authentic category specialist producers decreased to the time to failure to a greater extent than that of increasing category generalist density of producers. Density of craft authentic category specialist producers decreased the time to failure across all models as well, although the coefficient of this was substantially smaller than that of the category generalist producer density coefficient (with the exception of Model 5). Again, increased density of craft authentic producers decreasing the time to failure is perhaps an indication of competitive pressures amongst craft authentic producers. In Models 2 and 3, increasing type authentic category density decreased the time to failure as well, although the coefficient turned positive in Models 4 and 5. Model 4 finds support for Hypothesis 6.3: the interaction of category generalist density counteracts the legitimation of category specialism. The interaction of category generalist density with craft authentic category specialist producer density substantially decreases the time to failure of craft authentic category specialist producers. Model 5 finds support for Hypothesis 6.3 also, with the interaction between the two category specialist producer densities increasing the time to failure, although this is not statistically significant. For craft authentic category specialist producers, Hypothesis 6.1 found more limited support: the entry rate of (craft authentic) category specialist producers falls with initial increases in the density of category generalist producers. Whereas Hypothesis 6.2 found more universal support: the exit rate of (craft authentic) category specialist producers rises with initial increases in density of category generalist producers. For craft authentic category specialist producers, the interaction of category generalist producers hampers the legitimation of the craft authentic category specialist identity- decreasing the entry rate of craft authentic category specialist producers, and increasing the exit rate of craft authentic category specialist producers. Therefore, Hypothesis 6.3 gains support also.

Table 6.4: *Maximum Likelihood estimates of log - normal models for exit rate of category specialist (craft authentic) members, 1949-2009*

Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
T_c	0.027 ***	0.031 *	0.026	0.035 **	0.031 *
	(0.005)	(0.017)	(0.017)	(0.017)	(0.018)
GDP	-0.069	-0.031	-0.016	-0.019	-0.019
	(0.048)	(0.051)	(0.052)	(0.052)	(0.051)
Oil	0.001	0.004	0.008	0.003	0.007
	(0.004)	(0.005)	(0.005)	(0.005)	(0.006)
Tax 1973	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SVA	0.001	0.001	0.001	0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Novo = 1	-0.458 ***	-0.437 ***	-0.408 ***	-0.411 ***	-0.386 ***
	(0.156)	(0.159)	(0.159)	(0.160)	(0.160)
$N_{e,c}$	-0.001	0.018	0.026	0.032	0.034
	(0.017)	(0.021)	(0.022)	(0.022)	(0.023)
N_t		-0.003	-0.001	0.009	0.003
		(0.010)	(0.010)	(0.012)	(0.013)
N_c		- 0.019	-0.013 *	-0.014 *	-0.057 *
		(0.021)	(0.025)	(0.023)	(0.068)
N_g		-0.060 **	-0.032 **	-0.042 **	-0.025 *
		(0.014)	(0.016)	(0.019)	(0.022)
$N_{prod,c}$			0.008		
			(0.018)		
(N_c x N_g) /100				-0.128 **	-0.151 **
				(0.076)	(0.202)
(N_c x N_t) /100					0.215
					(0.145)
Constant	1.451 ***	1.516 ***	1.346 ***	1.849 ***	1.511 ***
	(0.258)	(0.425)	(0.438)	(0.482)	(0.522)
Σ	0.998	0.986	0.983	0.987	0.983
	(0.056)	(0.056)	(0.055)	(0.056)	(0.055)
log - likelihood	-295.455	-293.595	-292.562	-292.174	-291.080
LR χ^2 (d.f.)	80.67 (7)	84.39 (10)	86.46 (11)	87.23 (11)	89.42 (12)
Haberman's χ^2(d.f.)		3.72 (3)	5.79 (4)	6.56 (4)	8.75 (5)
No. obs.	1910	1910	1910	1910	1910

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Table 6.4 – Continued

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Significance levels:					
* :10% ** : 5% *** : 1 %					
Standard errors are in parentheses					

6.5.3 Overall results

Given the results have been split into two respective categories, it seems prudent to review the findings and relative support or otherwise to the hypotheses. Hypothesis 6.1 stated the rate of entry of category specialist producers will fall with increases in density of category generalist producers. The results from Models 2, 3 and 4 of Table 6.1 found broad support for this: the entry rate of type authentic category specialist producers decreases with the density of category generalist producers. Note however, this considers only one sub - set of category specialist producers. Results from Table 6.3 found more limited support for Hypothesis 6.1. In Models 2 and 3 the entry rate of craft authentic category specialist producers decreases with the density of category generalist producers. However, in Models 4 and 5, it appears the entry rate of craft authentic category specialist producers actually increases with density of category generalist producers - but this is not statistically significant. Therefore, the founding rate results of category specialist producers (type authentic and craft authentic) found general support for Hypothesis 6.1. Hypothesis 6.2 stated the rate of exit of category specialist producers will rise with increases in density of category generalist producers. The results across all Models in Table 6.2 found strong support for this: the exit rate of type authentic category specialist producers increases with density of category generalist producers. There was strong support for Hypothesis 6.2 across all Models in Table 6.4, as the exit rate of craft authentic category specialist producers increases with density of category generalist producers. Hence, the exit rate results of category specialist producers (type authentic and craft authentic) found strong support for Hypothesis 6.2.

Hypothesis 6.3 is a corollary of Hypothesis 6.1 and Hypothesis 6.2: if density of category generalist producers lowers the entry rate of category specialist producers, and increases the exit rate of category specialist producers, then legitimation of the category specialist identity decreases. Therefore, the findings supporting Hypotheses 6.1 and 6.2 implicitly lend support to Hypothesis 6.3. However, the inhibiting effect on legitimation can be readily evidenced when the density of category generalist producers interacts with category specialist producers. The results of Table 6.1 and Table 6.3 found support for Hypothesis 6.3, as the interaction of density between category generalist producers and type authentic category specialist producers significantly decreases the entry rate of type authentic category specialist producers, and the interaction of density between category generalist producers and craft authentic category specialist producers significantly decreases the rate of entry of craft authentic category specialist producers. However, the findings were statistically significant in only half of the models. With respect to exit rate models, Tables 6.2 and 6.4 found strong support for Hypothesis 6.3: interaction between category generalist density and category specialist density increases the exit rate of category specialist producers. The interaction of category generalist producer density with type authentic category specialist density increases the exit rate of type authentic category specialist producers, whilst interaction of category generalist density with craft authentic category specialist density increases the exit rate of craft authentic category specialist producers. Interaction of category generalist producer density with category specialist producer density inhibits the legitimation of category specialists; Hypothesis 6.3 found general support.

6.6 Discussion

The recent resurgence of interest in multiple category membership by organization theorists assesses the impact spanning categories has on audience appeal (Zuckerman, 1999; Hsu, 2006; Hsu et al., 2009). Organizations which span categories have lower appeal with audience members in those categories than organizations which are category specialists. Not only this, but spanning categories also lowers the overall contrast of the categories (Negro et al., 2010; Kovacs and Hannan, 2010). Hsu et al. (2009) have documented the detrimental consequences of category generalism in terms of appeal, but the natural progression of this is to assess how multiple category membership is detrimental to the vital rates of organizations present in the population.

This chapter sought to test three hypotheses relating to multiple category membership and legitimation. The first stated that the entry rate of category specialist producers decreases with increasing density of category generalist producers. Second, the exit rate of category specialist producers rises with increasing density of category generalist producers. Third, increasing density of category generalist producers inhibits the legitimation of the category specialist identity. Since the category specialist identity becomes less clearly distinguishable from that of the category generalist identity - their product offerings at a given social position are not visibly distinguishable from one another - the interaction between category specialists and category generalists lowers the perceptual focus (McKendrick and Carroll, 2001) of the category specialist identity. Hence, the taken for granted character of the category specialist identity declines with density of category generalist producers, and with that decline ensues lower legitimation. Increasing density of category generalist producers lowers the legitimation of the category specialist identity, resulting in the entry rate of category specialists to decline, and the exit rate of category specialists to increase accordingly (see Hannan and Carroll, 1992). The kit car population is split into two styles of product offering: either an offering is type authentic, or it is craft authentic. Both rely on differing skills of the designer. In the case of type authenticity, there is an emphasis on creating a product that is as close a copy as possible to the original. A premium is placed on the accuracy of the offering being similar to the original; the artistic flair of the designer is severely curtailed as a result of this. Whereas for craft authenticity, the emphasis is on the designer creating a product offering that is quirky and novel in conception. It is here where the real artistic and artisanal flair of the designer can be expressed fully in the product offering. Therefore, a category specialist producer is an organization which produces either only type authentic product offerings, or only craft authentic product offerings. A category generalist producer is an organization which produces both type authentic product offerings and craft authentic product offerings.

The results found broad support for the hypotheses. In the case of type authentic category specialists, density of category generalist producers decreases the rate of entry of type authentic category specialists. In terms of exit rate models, density of category generalist producers increases the exit rate of type authentic category specialists. It appears that as type authentic category specialist producers and category generalist producers interact with one another, the category generalist identity inhibits the legitimation of the type authentic category specialist identity, resulting in lower entry rates and higher exit rates. For craft authentic category specialists, density of category generalist producers decreases the entry rate of craft authentic category specialists. Density of category generalist producers increases the exit rate of craft authentic category specialists. The interaction between category generalists and craft authentic category specialists also inhibits the legitimation of the craft authentic category specialist identity. A lack of distinctiveness between the offerings of category specialists and category generalists at a given social position makes the codes for category specialism less crisp in nature, and the boundary between category specialism and generalism becomes less crisp as a consequence of this. Increasing density of category generalist producers reduces the perceptual focus of category specialists, and with that reduction in focus comes a corresponding decrease in the taken for granted character of the category specialist identity. Falling taken for grantedness leads to lower legitimation of the category specialist identity, and so it becomes harder to attract financial and human capital: the rate of entry of category specialists declines. With lower taken for grantedness and legitimation, the exit rate of category specialist producers increases. Category spanning in the kit car movement is extremely rare - just under 10% of organizations were classified as category generalists. Of the 58 organizations which were category generalists in the population, 38 entered as category generalists, the other 20 started as category specialists and eventually became a category generalist at a later stage in their lives. Despite their small sample size and relatively rare occurrence in the population, increasing density of category generalist producers significantly inhibits the legitimation of category specialists.

This chapter sought to advance the current literature in two ways. First, it progresses research in multiple category membership by addressing how category generalism and category specialism interact on the vital rates - entry and exit - of those identities. By having a data set spanning the entire history of the kit car population, empirical findings of this nature could be sought. Prior to this, much research on multiple category membership concerned investigating appeal and fitness. For example, Hsu (2006) found evidence that films which spanned multiple genres received lower ratings from film critics than those films which were genre/ category specialists. Indeed, the films with multiple genres received lower coverage than those focussed in a single genre, as the schemata critics had for assessing films in a single genre were not well equipped to assessing such hybrid films. In terms of general audience members and appeal, Hsu et al., (2009) found films that straddled more than one genre received less favorable reviews than films which were focussed in a single genre. With respect to fitness, Hsu et al., (2009) found that sellers at an online auction site who sold goods in many categories had a lower success rate than those sellers who were specialized in a single category. The present chapter places multiple category membership on a footing more at home in assessing ecological processes of entry and exit. Second, category generalism lowers the perceptual focus of the category specialist identity; the product offerings of category generalists and category specialists at a given social position are not visibly distinguishable from one another. This lack of distinctiveness between the category specialist identity and the category generalist identity causes the perceptual focus of the category specialist identity to decrease. With increasing density of category generalist producers, the distinctiveness between category generalism and category specialism decreases, as does the perceptual focus of the category specialist identity. A decrease in the perceptual focus of the category specialist identity lowers the taken for granted character of the identity, and hence the legitimation . It appears the lack of distinguishability between the offerings of category generalists and category specialists at a given social position is a critical factor - and catalyst - in lowering the perceptual focus of the category specialist identity.

6.7 Appendix

Table 6.5: Descriptive statistics of type authentic category specialists, entry rate

Variable	mean	std. dev.	min.	max.
(1) T_t	23	13.423	0	46
(2) GDP	2.491	1.840	-2.1	7.2
(3) oil price	39.360	21.340	15.770	98.070
(4) Tax 1973	0.804	0.401	0	1
(5) SVA	0.261	0.444	0	1
(6) N_t	47.913	29.342	1	101
(7) N_c	37.957	16.557	14	78
(8) N_g	9.935	8.048	0	27
(9) $N_{prod,t}$	118.044	90.358	1	304
(10) (N_t x N_g)/100	6.961	7.732	0	26.730
(11) (N_t x N_c)/100	22.364	21.072	0.140	78.780

Table 6.6: Descriptive statistics of craft authentic category specialists, entry rate

Variable	mean	std. dev.	min.	max.
(1) T_c	31	17.753	0	61
(2) GDP	2.550	1.772	-2.1	7.2
(3) oil price	35.207	19.819	15.770	98.070
(4) Tax 1973	0.607	0.493	0	1
(5) SVA	0.197	0.401	0	1
(8) N_t	36.131	32.840	0	101
(9) N_c	31.557	18.760	2	78
(10) N_g	7.492	8.197	0	27
(11) $N_{prod,c}$	90.344	67.581	2	266
(12) (N_c x N_g)/100	3.713	5.397	0	20.790
(13) (N_c x N_t)/100	16.865	20.672	0	78.780

Table 6.7: Descriptive statistics of type authentic category specialists, exit rate

Variable	**mean**	**std. dev.**	**min.**	**max.**
(1) T_t	28.351	10.813	0	46
(2) GDP	2.553	1.575	-2.1	7.2
(3) oil price	41.757	20.503	15.770	98.070
(4) Tax 1973	0.447	0.497	0	1
(5) SVA	0.447	0.497	0	1
(6) Novo = 1	0.685	0.465	0	1
(7) $N_{e,c}$	6.868	4.122	0	19
(8) N_t	65.491	22.781	1	101
(9) N_c	46.677	16.897	14	78
(10) N_g	14.529	7.450	0	27
(11) $N_{prod,t}$	170.726	82.582	1	304
(12) (N_t x N_g)/100	11.148	8.292	0	26.730
(13) (N_t x N_c)/100	33.905	22.300	0.140	78.780

Table 6.8: Descriptive statistics of craft authentic category specialists, exit rate

Variable	**mean**	**std. dev.**	**min.**	**max.**
(1) T_c	39.997	15.645	0	61
(2) GDP	2.613	1.637	-2.1	7.2
(3) oil price	40.308	21.184	15.770	98.070
(4) Tax 1973	0.018	0.132	0	1
(5) SVA	0.357	0.479	0	1
(6) Novo = 1	0.711	0.453	0	1
(7) $N_{e,c}$	5.814	4.104	0	19
(8) N_t	53.442	32.038	0	101
(9) N_c	42.527	18.986	2	78
(10) N_g	11.766	8.950	0	27
(11) $N_{prod,c}$	126.917	71.378	2	266
(12) (N_c x N_g)/100	6.543	6.741	0	20.790
(13) (N_c x N_t)/100	28.212	24.504	0	78.780

Table 6.9: Correlations of type authentic category specialists, entry rate

Variable	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
(2)	- 0.05									
(3)	0.39	-0.40								
(4)	0.85	-0.12	0.56							
(5)	0.67	0.04	0.20	0.39						
(6)	0.95	0.00	0.37	0.79	0.68					
(7)	0.86	0.06	0.45	0.66	0.66	0.90				
(8)	0.92	-0.02	0.38	0.72	0.81	0.96	0.88			
(9)	0.92	0.03	0.30	0.65	0.76	0.95	0.92	0.96		
(10)	0.84	0.03	0.44	0.62	0.75	0.92	0.93	0.95	0.94	
(11)	0.79	-0.01	0.44	0.55	0.81	0.87	0.89	0.94	0.92	0.98

Table 6.10: Correlations of craft authentic category specialists, entry rate

Variable	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(2)	- 0.01									
(3)	0.21	-0.45								
(4)	0.69	0.12	0.46							
(5)	0.75	0.07	0.11	0.28						
(6)	0.95	0.06	0.19	0.63	0.68					
(7)	0.77	0.13	0.33	0.43	0.68	0.87				
(8)	0.94	0.01	0.24	0.58	0.82	0.95	0.87			
(9)	0.96	0.05	0.20	0.56	0.81	0.97	0.89	0.98		
(10)	0.88	0.03	0.27	0.44	0.83	0.90	0.90	0.97	0.97	
(11)	0.84	0.07	0.33	0.45	0.74	0.91	0.97	0.93	0.95	0.96

Table 6.11: Correlations of type authentic category specialists, exit rate

Variable	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**
(2)	- 0.00											
(3)	0.19	-0.39										
(4)	0.48	-0.03	0.24									
(5)	0.81	0.04	0.20	0.19								
(6)	-0.01	0.04	0.03	0.04	-0.03							
(7)	0.09	0.18	0.25	-0.03	0.12	0.08						
(8)	0.91	0.07	0.28	0.40	0.72	0.04	0.29					
(9)	0.69	0.09	0.54	0.18	0.66	0.03	0.51	0.85				
(10)	0.92	-0.01	0.36	0.37	0.84	0.01	0.20	0.95	0.85			
(11)	0.94	0.03	0.33	0.35	0.84	0.01	0.24	0.97	0.87	0.98		
(12)	0.87	-0.03	0.46	0.28	0.82	0.00	0.22	0.93	0.90	0.98	0.98	
(13)	0.79	0.02	0.53	0.25	0.71	0.02	0.38	0.92	0.97	0.92	0.93	0.97

Table 6.12: Correlations of craft authentic category specialists, exit rate

Variable	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**
(2)	- 0.06											
(3)	0.38	-0.39										
(4)	-0.13	0.38	-0.11									
(5)	0.76	-0.02	0.27	-0.10								
(6)	0.12	-0.01	0.09	0.04	-0.03							
(7)	0.23	-0.02	0.38	-0.04	0.16	0.10						
(8)	0.95	-0.01	0.41	-0.13	0.72	0.12	0.32					
(9)	0.80	0.04	0.55	-0.05	0.70	0.09	0.53	0.89				
(10)	0.93	-0.06	0.45	-0.15	0.84	0.06	0.30	0.96	0.89			
(11)	0.91	-0.03	0.40	-0.12	0.82	0.05	0.28	0.95	0.91	0.97		
(12)	0.82	-0.07	0.55	-0.12	0.81	0.02	0.34	0.88	0.94	0.95	0.95	
(13)	0.84	-0.03	0.55	-0.11	0.76	0.05	0.40	0.92	0.97	0.95	0.95	0.99

Chapter 7

Measuring population dynamics

This chapter evaluates the differing ways in which population diversity and the engagement niche can be measured. In measuring the diversity of a population, the Simpson Index and Shannon Index are applied to ascertain levels of diversity present. Contra to current theory and empirical evidence, it appears that a lack of diversity in the kit car movement lowers the exit rate; this is explained using anecdotal evidence pertinent to the kit car movement. Next, four different variables are constructed that capture in differing ways how the fuzzy engagement niche might be conceptualized, as well as the Hirschman–Herfindahl Index; one variable appears to be favored over the other variables.

7.1 The organizational niche and the principle of allocation

A central tenet of organizational ecology is the organizational niche - a concept taken from bio-ecology to describe how species of animals have differing environmental requirements for survival (Grinnell, 1904)[1]. Given ambiguity surrounding early definitions of the niche, it was not until Hutchinson's (1965) N-dimensional space encapsulated the relative fitness of a species, that the ambiguous definition of the niche receded. Levins (1968:39) noted that a niche should be able to answer certain questions the ecologist had

[1]this section draws heavily from Fletcher (2009).

concerning the species, namely: “what determines the species diversity of a community in relation to an area, climate region, size of organism, trophic level, etc?...How similar can species be and yet coexist?...How do species in the same community affect each others’ evolution?” In applying the bio-ecological theory of the niche to the world of organizations, Hannan and Freeman (1977:947) stated a niche comprises “all those combinations of resource levels at which the population can survive and reproduce itself”. If the niche is used to assess under what conditions and environments an organization can survive, the size - or width - of the niche has to be taken into consideration.

Niche width

Niche width is “a population’s tolerance for changing levels of resources, its ability to resist competitors, and its response to other factors that inhibit growth” (Freeman and Hannan, 1983: 1118); the width of an organization’s niche can have a substantial impact upon not only the relative fitness of the focal organization, but for others in the population as well. In this sense, organizations have to decide whether they want to allocate their resources to one particular environment, or whether they, “hedge their bets” (Freeman and Hannan, 1983: 1119) and allocate resources for different environments. Both scenarios have implications for fitness and survival chances of an organization in a population. Organizations might align themselves to a single environment, where all resources are allocated to improve the quality in the offering or service - resulting in a narrow niche. Another strategy enables the organization to allocate resources so it is suited to multiple environments; such organizations possess a broad niche. In terms of fitness functions, when the environment remains constant, an organization with a narrow niche is fitter than an organization with a broader niche at that point in time. A narrow niche organization has all of its resources dedicated to the specific environment, whilst the broader niche organization has only a certain proportion of its resources dedicated to such an environment: slack resources are present, in anticipation of a changing environment. Due to the narrow niche organization being better suited to a single environment, it outperforms its broader niche counterpart when the environment remains constant over time. However, when environments change, broader niche organizations are fitter than narrow niche organizations. With a broad niche organization having allocated resources to cope with differing environmental conditions, once the environment does change, it is able to make a transition into the new environment with relative ease. Since a narrow niche organization allocated resources to a particular environment that has now passed, it is no longer suited to the new environment. Under these circumstances, having a broader niche is favored over a narrower niche (Freeman and Hannan, 1983; Hannan and Freeman, 1989). Such relationships between niche width and the environment led to the "jack of all trades" phenomenon: does an organization place all of its chips on a single bet, or should it hedge its bets? (Freeman and Hannan, 1983).

Notwithstanding this body of work, research on the niche shifted attention from measuring niche width in terms of capacity for changing environments, to assess inter–organizational dynamics (Carroll, 1985). Thus, the realized niche "takes account of the presence of competitors, because fitness depends on appeal relative to competitors" (Hannan et al., 2007:193). By analyzing the niche in these terms, niche width relates to the fitness of an organization as a consequence of competitive pressures exerted by other organizations in the population. Niche width in this sense corresponds to the resources in the population an organization is able to utilize in order to survive. An organization which uses diverse resources from the population is said to be characterized as having a broad realized niche. Whereas, an organization which uses a narrow range of resources from the population possesses a narrow realized niche. Carroll (1985:1266) observed "daily" newspapers were more likely to attract readers from diverse backgrounds, and thus classified as possessing a broad niche. Newspapers which relied on a narrow range of reader -such as "ethnic" newspapers - had a relatively narrow niche. When a broad niche organization competes for resources at the same position as a narrow niche organization, the narrow niche organization has a higher level of fitness as a result of being better aligned to the taste dimensions of audience members located there. The broad niche organization caters for a more diverse audience, and cannot align its tastes as closely to audience members at any given social position as a narrow niche organization can. Levels of fitness for the broad niche organization are lower at this position than for the narrow niche organization. Research on the newspaper industry (Carroll, 1985, Olzak and West, 1991; Boone, Carroll, and van Witteloostuijn, 2002) provided examples of this scenario being present. Ethnic newspapers were more detailed in their reports concerning issues pertinent to a particular ethnic readership than large daily newspapers. Local Dutch newspapers reported issues that affected local areas in more detail than the larger nationwide newspapers, if they reported on them at all.

One strand of niche theory examines the effects of niche width to survival chances in changing environments, the other assesses the niche width in relation to survival in differing resources in the population. What both have in common though is the idea of a principle of allocation (Hannan and Freeman, 1989; Péli, 1997; Hsu, 2006; Hannan et al., 2007): narrow niche width comes at the expense of not gaining resources (or appealing to audience members) at different social positions in the population. It is with this allocation principle in mind that the dynamics of intrinsic appeal and engagement are expanded upon.

Intrinsic appeal, engagement, and actual appeal

Intrinsic appeal relates to an organization's product offering, and how attractive it is to audience members. An attractive offering to audience members at a given social position possesses high intrinsic appeal. The intrinsic appeal of a product offering depends on two factors: "the affinity between the offering and the taste - the degree to which the offering fits the taste. The second factor is the availability of the offering, its mode of presentation, and the organizational identity of the offerer" (Hannan, Carroll, and Pólos, 2003:316). To have non– zero intrinsic appeal, the offering is aligned to some degree with audience tastes at a given social position. Hence, it seems unlikely that fast food outlets and the "food" they serve have high (if any) intrinsic appeal with more health conscious audience members. Intrinsic appeal need not only span a single social position, but can potentially encompass many audience members at different social positions. However, at social positions where intrinsic appeal is non–zero, the level of intrinsic appeal is not flat: an offering is more intrinsically appealing to certain audience members over others. This introduces the notion of intrinsic appeal having a peak distribution at a certain social position(s). Having a peak entails intrinsic appeal is higher at some positions over others; intrinsic appeal declines monotonically the further away from that peak position (Hannan et al., 2003). If intrinsic appeal relates to the degree of fit between an offering and audience tastes, then there needs to be a process carried out by an organization to convert the relative fit of an offering with audience tastes into sales or revenue. Engagement plays this role, and entails an organization "(1) learning about the idiosyncrasies of the local sub-audience and its aesthetics; (2) designing or redesigning features of the offering to make it attractive to that audience; and (3) trying to establish a favorable identity in the relevant sub-audience" (Hannan et al., 2007: 179). The engagement niche can be defined as "a fuzzy subset of the set of social positions; the grade of membership in a position is the share of x's engagement devoted to the audience at that position" (Hannan et al., 2007:180). This can be expressed as the following:

$$\epsilon(l, x, z, t) = \frac{en(l, x, z, t)}{En(l, x, t)},$$

where

$$En(l, x, t) = \Sigma_{z \in p^{en(l,x,z,t)}}$$

Although an offering might be intrinsically appealing, this does not necessarily mean audience members purchase the product. Likewise, an organization might engage audience members and carry out market research, but this too does not relate to audience members purchasing a product offering. Actual appeal then, is the measure of how successful a product offering is in a market place. Specifically, actual appeal "depends on the offering's intrinsic appeal to the position's prototypical taste and on the intensity of the organization's engagement at that social position" (Hannan et al., 2007: 181). In order for actual appeal to be non–zero, intrinsic appeal *and* engagement are required.

Therefore, actual appeal is zero if an organization engages at a position of zero intrinsic appeal: the offering does not have any fit with audience tastes at that social position. Even if an organization focusses its engagement to this position, trying to market a product that is not aligned with audience tastes at all is a fruitless exercise: one hundred percent engagement to zero intrinsic appeal equals zero actual appeal. In the alternate scenario, actual appeal remains at zero if an organization has zero engagement: the offering is not marketed to audience members at that position, and is therefore unknown. When an offering fits an audience segment's tastes well, and the organization is able to engage those audience members, actual appeal becomes positively valued. The offering is intrinsically appealing to audience members, and the organization has engaged and understood the requirements of audience members at that position. As Hannan et al., (2007:182) observe"[T]he expected actual appeal of an offering normally increases with the fit of the offering to the typical taste at a position and the engagement at the position... The expected actual appeal of an offer normally increases with the producer's engagement at the position".

7.2 Theory: measuring diversity and niche width

How is the diversity of a population, and the engagement niche measured? Early research suggested applying Shannon's (1948) information entropy, as this was the measure typically applied by population biologists at the time (Hannan and Freeman, 1989). More recently, theoretical arguments have suggested utilizing Simpson's (1949) index of diversity (Hannan et al., 2007), which has been applied in empirical settings (Hsu et al., 2009).

Simpson diversity

In discussing the many different ways of measuring diversity in species, Simpson (1949) noted how traditional measurements defined by Yule (1944) and Fisher, Corbet and Williams (1943) used the logarithmic distribution. As noted by Simpson (1949:688), such measures had their limitations: "[i]t cannot be used everywhere, as it does not always give values which are independent of sample size". The purpose of Simpson's new measurement was to measure concentration levels in terms of population constants. As Simpson (1949:688) put it, his diversification measure "can be simply interpreted as the probability that two individuals chosen at random and independently from the population will be found to belong to the same group". Hence, individuals from groups which comprise a large subset of the population have a higher probability of being chosen than individuals from groups which comprise a small subset of the population. This is known as Simpson's Index:

$$D = \sum_{i=1}^{S} p_i^2$$

where p_i denotes the proportion of organisms belonging to the i - th species. When D approaches 1, diversity decreases; as D gets closer to 0, diversity increases. To overcome the somewhat counter–intuitive nature of this, the Simpson index can be redefined as:

$$D = 1 - \sum_{i=1}^{S} p_i^2$$

which is more commonly applied by ecologists and statisticians as the Simpson index of diversity. Again, p_i denotes the proportion of organisms belonging to the i - th species. When D approaches 1, diversity is high, when D approaches zero, diversity is low. This chapter applies this manifestation of the Simpson index of diversity. With respect to the kit car movement, p_i denotes the proportion of product offerings belonging to the i - th product category. Therefore, the closer to 0 D is, the more unevenly distributed the product categories: one or a few product categories might comprise a large proportion of the total product offerings in the population at a given time. As D approaches 1, product categories are more evenly distributed in the population.

Shannon diversity

This index derives from the somewhat unrelated field of computer science and information theory, where Shannon (1948) devised a way of calculating how much information was produced by a certain process, or the rate at which such information was produced. Shannon (1948:10) sets out the problem: "[s]uppose we have a set of possible events whose probabilities of occurrence are $p_1, p_2, ...p_n$.. These probabilities are known but that is all we know concerning which event will occur. Can we find a measure of how much 'choice' is involved in the selection of the event or of how uncertain we are of the outcome?". The result was for an entropy measure to capture such "choice":

$$H = -\sum_{i=1}^{S} p_i \log p_i$$

In the terminology of population biology, p_i denotes the proportion of species (i), with respect to the total number of species in the population. For the kit car movement, p_i denotes the proportion of product offerings in the population belonging to the i- th product category. Indeed, Hannan and Freeman (1989:105) note population biologists generally use Shannon's information measure (or Shannon's entropy) as it can "generalize naturally to multiple dimensions for both continuous and discrete resources".

Herfindahl–Hirschman Index

The Herfindahl–Hirschman index is synonymous to the Hirschman index, or the Herfindahl index, owing to the disputed origins of the measurement. Hirschman (1945) devised a way of measuring the concentration of the US steel industry, but a similar measurement of industrial concentration was used by Herfindahl (1950) in an assessment of industrial concentration in the copper industry. However, in 1964 Hirschman published an article laying claim to the paternity of such an index, citing studies by Rosenbluth (1955) as incorrectly attributing the index to Herfindahl. Despite the confusion surrounding the paternity of the index, it has grown in popularity amongst economists as a method for indexing the concentration of an industry. Indeed, the HHI has been widely used in law, where it is applied as a way of determining industrial concentration in cases of anti–trust (http://www.justice.gov/atr/public/testimony/hhi.htm). The HHI is defined as:

$$HHI = \sum_{i=1}^{N} s_i^2$$

where s_i is the market share of organization i , and N the number of organizations present in the industry. The maximum value of the index is 1.0 as this indicates a single organization being present in an industry and having 100% market share. A high HHI value entails high market concentration, a low HHI value entails low concentration in an industry. Note that although the HHI concerns industry concentration, values of the HHI cannot be converted into the four firm concentration ratio - C4 - as "they mask the fact that markets with significantly lower and higher...[C4]... values have the same Herfindahl Index" (Weinstock, 1984:707). Moreover, the HHI gives a value for the concentration in an industry, not sub–sections of the industry. For example, a bank may have an 80 % share of Mergers and Acquisitions deals in Investment Banking, yet have a low overall HHI score in the Investment Banking industry, as M & A comprises one component of the industry (the other components being debt and capital markets, for example).

Fuzzy niche width

Consider how the realized niche of an organization is constructed by the analyst. A determinant of niche width might be something such as engine sizes in product offerings (Dobrev et al., 2001; Dobrev et al., 2003), where a broad niche entails organizations having a large spread of engine sizes and a narrow niche entails organizations having a lower spread of engine sizes. Depending on the population, product offerings, and available data, there are many ways of constructing niche width. In the case of kit cars, engine size has not been used as a way of determining niche width as it was in the mainstream automotive industry studies mentioned above. Kit cars come supplied without engines, it is up to the owner to procure one second hand from a donor vehicle; many kit car enthusiasts use motorcycle engines to fit in their cars, as these are lighter, more powerful and higher revving than standard car engines (see Complete Kit Car, various years). Therefore, it makes little sense in determining the niche width of a product offering using engine size when the engine is not (at least initially) part of the product offering. However, niche width can be determined by assessing the number of product categories organizations are engaged in: the greater the number of product categories engaged in, the broader the engagement niche (see Hsu, 2006). Due to data constraints (see the empirical methodology chapter for a more detailed explanation of data sources and constraints), the volume of product offerings was not included as an element of constructing the engagement niche of an organization. Generating the engagement niche in a fuzzy construction entails the analyst taking account of the strength of organizations' engagement at a given social position at time t . Below is a possible construction of the engagement niche:

$$nw_t = \frac{1}{N(kit)_{jt}}$$

where $N(kit)_{jt}$ represents the j - th product category a kit car organization is present at time t . Should organizations have product offerings in a single category, their niche width would be calculated as 1/1 =1; organizations with product offerings in 2 categories would have a niche width calculated as 1/2 = 0.5, and so on. A value approaching 1 corresponds to a narrow engagement niche with high concentration of an organization in a product category, with a value approaching (but never reaching) 0 equating to a broad engagement niche. However, such a variable does not take into account the number of offerings organizations produce in a particular category, so although organizations might be considered to have equal presence in categories under the construction of nw_t , the reality might be somewhat different. Consider an organization which has five product offerings: two in one category, and three in another. The weighting of its engagement in both categories appears to be 0.4 (2/5) and 0.6 (3/5), respectively. Moreover, nw_t , does not control for the number of product categories present in the population at a given time. Perhaps a less arbitrary construction of the engagement niche is required,

$nw_{1,t}$ provides a different way in which to measure the engagement niche:

$$nw_{1,t} = \frac{N(kit)_{jt}}{N_{jt}}$$

where $N(kit)_{jt}$ represents the *j*- th product category a kit car organization is present at time *t,* and N_{jt} represents the *j*- th product category present in the population at time *t.* Normally - or at least in mature populations with a stable number of product categories- as this value approaches 1, the broader an organization's engagement niche. [2] If an organization has product offerings in two product categories, and the total number of product categories in the population is ten, that organization has a niche width of 0.2 (2/10). Such a measure does not take account of the number of product offerings organizations have in an individual product category. The following variables try to measure the effects of organizations engaging in differing intensities in product categories, as a proportion of the product category. Such measures better capture the fuzzy engagement niche. The first of these measures is defined as:

$$nw_{2,t} = \frac{N(kit)_{ijt}}{N_{ijt}} \text{x} \frac{1}{N(kit)_{jt}}$$

where $N(kit)_{ijt}$ represents the *i*- th number of product offerings produced by a kit car organization in the *j*- th product category at time *t,* N_{ijt} represents the *i*- th number of product offerings in the $\hat{\text{j}}$- th product category at time *t,* and $N(kit)_{jt}$ represents the *j*- th number of product categories a kit car organization is engaged in at time *t.* The first part of the equation determines the proportion of the category comprising an organization's offerings; the second part of the equation determines (albeit in a somewhat arbitrary manner) the breadth of an organization's activities across product categories.

[2]However, note the following anomaly. At the inception of the movement in 1949, only one product category existed for a decade or so. In this case, organizations producing 1950's specials would have a niche width of 1.0, despite them producing a product offering belonging to a single category. Contrast that to organizations producing offerings in only one product category in more recent times, and their niche width might be 0.1 (being present in a single product category, but with ten product categories comprising the population). With the onset of new product categories emerging over time, an organization's engagement niche decreases by default; therefore the eleven product category dummy variables are included in the analyses.

Hence, organizations that have their offerings comprising a large proportion of a product category, and only engaging in a single category, have a narrow engagement niche. A value approaching 1 corresponds to a narrow engagement niche with high concentration of organizations in a product category, with a value approaching (but never reaching) 0 equating to a broad engagement niche and low proportion of the category comprising an organization's offerings. However, a finer grained construction of the breadth of engagement across product categories can be constructed, and so $nw_{3,t}$ is calculated as:

$$nw_{3,t} = \frac{N(kit)_{ijt}}{N_{ijt}} \text{x} \frac{N(kit)_{ijt}}{N(kit)_{it}}$$

where $N(kit)_{ijt}$ represents the i- th number of product offerings produced by a kit car organization in the j- th product category at time t, , $N(kit)_{it}$ represents the i-th number of product offerings produced by a kit car organization at time t, and N_{ijt} represents the i-th number of product offerings in the j-th product category at time t. The first part of the equation determines the proportion of the category comprising an organization's offerings; the second part of the equation determines the breadth of an organization's activities across product categories by measuring the product offerings it allocates to a given category as a proportion of the organization's overall size (in terms of product offerings) in a category. This is a more detailed way of determining the breadth of engagement than that provided for in $nw_{2,t}$, above. Organizations with offerings comprising a large proportion of a product category, and their total number of offerings focussed in a single category, have a narrow engagement niche. A value approaching 1 corresponds to a narrow engagement niche with high concentration of the organization in a product category, with a value approaching (but never reaching) 0 equating to a broad engagement niche and low proportion of the category comprising the organization's offerings.

7.3 Variables

Population age (T)

The kit car movement began in 1949 with Buckler Cars selling the Mk. V. The population age ranges between 0 and 61, since the data extends to the end of 2009.

Macro economy controls

Seeing as kit cars are relatively expensive items (ranging from around £2,000 for a basic Lotus Seven replica, to over £80,000 for a Ford GT40 replica), macro economic conditions presumably have an influence on the evolution of the movement. Two proxies capture the more global macro economy trends. The first is UK levels of GDP (Office for National Statistics, `www.statistics.gov.uk`), as a proxy for determining periods of positive economic growth versus periods of negative economic growth. The second is inflation adjusted oil prices (obtained from `www.inflationdata.com`) to gauge general economic prosperity [3].

Population specific controls

Two events are salient for the kit car population. The first of these occurred in 1973, when tax exemption on component cars was phased out. Prior to that, purchasers could save considerable money by purchasing their car in component form, thus avoiding a sales tax. However, when the loophole was closed in 1973, it is possible this had an effect on some companies stopping producing cars in kit form - or even leaving the movement - given the tax advantage disappeared. This appears to be the case of Lotus, who stopped selling cars like the Elan in component form after 1973. A dummy variable coded "1" for the year 1973 and all subsequent years, and "0" for all years prior to 1973. The phasing out of the tax was widely known in the kit

[3]Note that oil prices are for the price of crude oil, not petroleum. The intention of this variable is to try and capture global macro–economic trends - periods of positive or negative growth. It should not be interpreted as a control for the price of petroleum at fuel stations, which could arguably be a determining factor to some audience members in their choice of kit car

car movement, and manufacturers still enjoyed a tax break selling cars in component form until 1973; it made little sense for organizations to stop producing cars in kit form when the tax advantage was still present.

The second population specific event occurred with the introduction of the SVA car safety test in 1998 (later renamed and updated as the IVA). Legislation required any self-build car to undergo a relatively rigorous test before it could be deemed road legal. Should a car fail this test, it could not be driven (legally) on British roads until it was altered in some form and satisfied a re-test. At the time of the legislation's introduction, kit car magazines were hailing this as the British government trying to destroy the kit car movement. They worried many kit car manufacturers would cease production with the application of extra safety features and having to conform to this strict test (Kit Car Magazine, various years). Undoubtedly, many kit car manufacturers did exit under this additional strain, but gatekeepers have observed the introduction of the SVA has seen the standard of kit cars improve, and consider its introduction beneficial for the long-term competitiveness and reputation of the kit car movement (Complete Kit Car, various years). A dummy variable is coded “1” for the year 1998 and all subsequent years, and “0” for all years prior to 1998. From the early 1990's the kit car movement had anticipated legislation emphasizing safety features would have to be phased in, so it was not a sudden shock when the SVA was introduced. Manufacturers had years to prepare for the relatively simple but necessary safety upgrades required in their product offerings. Organizations wishing to sell road legal kit cars knew they would have to alter their product offerings to comply with this law from 1998 onwards. Similarly, due to the attention it received in the kit car media (see Kit Car Magazine , various years, for example), enthusiasts in the movement were equally aware of these looming changes. However, such an event is a watershed moment in the history of the population: all kit cars after this event have to conform to the regulations if they are to be sold to members of the public.

Population density (N_{pop})

Population density is the total number of organizations operating in the movement in a given year. It is calculated as the number of organizations entering at time t, minus the number of firm exits at time t, plus the number of organizations present at t-1.

Organizational product density (*Org prod N*)

Organizational product density is calculated as the number of product offerings an organization produces in a given year. It is calculated as the number of an organization's product offerings entering at time t, minus the number of product offerings an organization produces ceasing at time t, plus the number of product offerings an organization produces at t -1.

Type of entry

A *de–novo* dummy variable coded "1" for an organization being a *de–novo* entrant and "0" for *de–alio* entrant was included to control for the type of entry made by the organization (see Carroll et al., 1996; McKendrick and Carroll, 2001 and McKendrick et al., 2003 for implications concerning entry type).

Product category dummies

Dummy variables were constructed to control for the eleven product categories that have been present in the kit car population's history. The category dummy variables were coded "1" for an organization which had product offerings present in a specific category, "0" otherwise. For example, "cat 1 = 1" was coded "1" for an organization having product offerings present in category one, "0" otherwise; "cat 7 = 1" was coded "1" for an organization having product offerings present in category seven, "0" otherwise.

Authenticity based dummies

To control for the authenticity class an organization claims membership of, two dummy variables relating to authenticity were constructed. The first dummy, “type = 1” determines whether an organization produces only type authentic offerings: it is coded “1” if an organization produces only type authentic product offerings, “0” otherwise. Similarly, the dummy “generalist = 1” determines whether the organization is a category generalist or not: it is coded “1” if an organization claims membership of both the type authentic and craft authentic labels, “0” otherwise.

7.4 Results

Tables providing descriptive statistics and correlations are provided in an appendix, found at the end of this chapter. Table 7.1 reports the influence of the model’s covariates on population diversity and the engagement niche on the failure rate, with Model 1 the baseline. As the population ages, the time to failure increases, having a coefficient of 0.048 which is statistically significant at the 1 percent level. Of the two macro - economy controls, both GDP and Oil increase the time to failure, having coefficients of 0.001 and 0.003, respectively. However, neither coefficient is statistically significant. The closing of the tax loop hole in 1973 leads to a decrease in the time to failure, having a coefficient of -0.002, although this was not statistically significant. Introducing the SVA test leads to an increase in the time to failure, having a coefficient of 0.291, although this is not statistically significant. As the density of organizations in the population increases, the time to failure decreases, having a coefficient of -0.008 which is statistically significant at the 1 percent level. Increasing density of an organization’s product offerings leads to the time to failure decreasing, with a coefficient of -0.002, but this is not statistically significant. Being a de - novo producer decreases the time to failure, having a coefficient of -0.497, statistically significant at the one percent level. Such a finding is consistent with earlier research (Carroll et al., 1996) that *de–alio* producers are able to cross–subsidize their entry into a new market. Next are the dummy variables for membership of the eleven product categories. Membership of category 1 (Lotus Seven inspired replica) increases the time to failure, having a coefficient of 0.318, although this is not statistically significant. Category 2 (beach buggies) increases the time to failure with a coefficient of 0.086, but this is not statistically significant. Membership of category 3 (AC replicas) increases the time to failure, having a coefficient of 0.089, although this is not statistically significant. Category 4 (super cars) increases the time to failure with a coefficient of 0.307, but this is not statistically significant. Membership of category 5 (classic cars) increases the time to failure, having a coefficient of 0.343, although this is not statistically significant. Category 6 (vintage cars) increases the time to failure, having a coefficient of 0.067, but this is not statistically significant. Membership of category 7 (1950's specials) increases the time to failure, having a coefficient of 0.008, although this is not statistically significant. Category 8 (cycle cars) decreases the time to failure, having a coefficient of -0.219, but this is not statistically significant. Membership of category 9 (racing cars) increases the time to failure, having a coefficient of 0.069, although this is not statistically significant. Category 10 (craft cars) decreases the time to failure, having a coefficient of -0.035, but this is not statistically significant. Membership of category 11 (4x4) increases the time to failure, having a coefficient of 0.508, although this is not statistically significant. The type authenticity dummy has a coefficient of 0.012, but this is not statistically significant; the category generalist dummy has a coefficient of 0.541, but this is not statistically significant either. Model 1 has a log - likelihood of -616.981, and a LR χ^2 value of 103.73 (21 d.f.).

Model 2 reports the effects of Simpson Diversity, with a coefficient of -2.522, statistically significant at the 1 percent level. A more heterogeneous population (with respect to product offerings and the product categories they are present in) substantially decreases the time to failure. Bearing in mind Simpson Diversity in the present context accounts for the relative diversity of product categories, having product categories of unequal size in the population increases the time to failure. Model 2 has a log - likelihood of -613.112 and LR χ^2 of 111.47 (22 d.f.). There is a significant improvement in fit of Model 2 over Model 1 (Haberman's χ^2 = 7.74; Δ d.f. = 1; $p = < 0.01$). For Model 3, the Shannon Diversity variable has a coefficient of -4.374, statistically significant at the 1 percent level. With increased diversity in the population, the time to failure decreases, corroborating the findings of the

Simpson Diversity measure in Model 2. The more that product categories are of unequal size to one another in the population, the time to failure increases. Model 3 has a log − likelihood of -612.334, an improvement over Model 1 (-616.981), with a LR χ^2 value of 113.02 (22 d.f.), compared to a value of 103.73 (21 d.f.) of Model 1. There is a significant improvement in fit over Model 1 (Haberman's χ^2 = 9.29, Δ d.f. = 1, $p = < 0.01$). Model 4 includes a proxy for the Herfindahl–Hirschman Index, with a coefficient of 0.905, statistically significant at the 1 percent level. As concentration in the population increases, the time to failure increases. This appears to be at odds with the principle of allocation (Hannan and Freeman, 1977; 1989; Péli, 1997; Hannan et al., 2007). An increase in the HHI - higher concentration of organizations' product offerings relative to the population - may be attributable to organizations having many product offerings in different product categories. Equally, an increase in the HHI might be due to organizations having many product offerings focussed in a single product category. The HHI cannot distinguish between such scenarios: high concentration as a result of organizations focussing all of their product offerings in a single product category is different to high concentration as a result of organizations having their product offerings in many product categories. This issue is returned to in the discussion. Model 4 has a log - likelihood of -610.703 and LR value of 116.29 (22 d.f.). There is a significant improvement in fit over Model 1 (Haberman's χ^2 = 12.55, Δ d.f. = 1, $p =< 0.01$).

Table 7.1: Maximum Likelihood estimates of log - normal models for population diversity and niche width in kit car population, 1949-2009

Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**
T	0.048 ***	0.070 ***	0.044 **	0.052 ***
	(0.015)	(0.017)	(0.016)	(0.015)
GDP	0.001	0.021	-0.001	-0.000
	(0.035)	(0.036)	(0.035)	(0.034)
Oil	0.003	0.004	0.005	0.002
	(0.004)	(0.004)	(0.004)	(0.004)

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Table 7.1 – Continued

Variable	Model 1	Model 2	Model 3	Model 4
Tax 1973	-0.002	0.044	-0.187	-0.040
	(0.260)	(0.262)	(0.269)	(0.257)
SVA	0.291	0.102	0.209	0.219
	(0.232)	(0.243)	(0.235)	(0.229)
N_{pop}	-0.008 ***	-0.009 ***	-0.008 ***	-0.006 **
	(0.003)	(0.003)	(0.002)	(0.002)
Org prod N	-0.002	-0.001	0.001	-0.019
	(0.022)	(0.022)	(0.022)	(0.022)
de - novo	-0.497 ***	-0.481 ***	-0.493 ***	-0.493 ***
	(0.131)	(0.131)	(0.132)	(0.129)
cat 1 = 1	0.318	0.295	0.315	0.354
	(0.316)	(0.316)	(0.317)	(0.312)
cat 2 = 1	0.086	0.119	0.109	0.207
	(0.278)	(0.278)	(0.279)	(0.275)
cat 3 = 1	0.089	0.067	0.090	0.148
	(0.287)	(0.288)	(0.288)	(0.284)
cat 4 = 1	0.307	0.277	0.309	0.244
	(0.314)	(0.314)	(0.316)	(0.312)
cat 5 = 1	0.343	0.334	0.354	0.375
	(0.275)	(0.275)	(0.276)	(0.272)
cat 6 = 1	0.067	0.057	0.066	0.161
	(0.270)	(0.270)	(0.271)	(0.267)
cat 7 =1	0.008	-0.616	-0.461	0.266
	(0.393)	(0.466)	(0.433)	(0.389)
cat 8 =1	-0.219	-0.233	-0.232	-0.326
	(0.348)	(0.349)	(0.349)	(0.345)
cat 9 =1	0.069	0.027	0.040	0.118
	(0.248)	(0.249)	(0.249)	(0.245)
cat 10 =1	-0.035	-0.069	-0.043	0.197
	(0.296)	(0.260)	(0.261)	0.263)
cat 11 =1	0.508	0.507	0.492	0.577
	(0.287)	(0.287)	(0.288)	(0.282)
type = 1	0.012	0.008	-0.005	0.079
	(0.338)	(0.338)	(0.339)	(0.333)
generalist =1	0.541	0.557	0.527	0.567
	(0.370)	(0.371)	(0.371)	(0.364)
Simpson		-2.522 ***		

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Table 7.1 – Continued

Variable	Model 1	Model 2	Model 3	Model 4
		(0.943)		
Shannon			-4.374 ***	
			(1.531)	
HHI				0.905 ***
				(0.264)
constant	1.181 ***	2.452 ***	2.784 ***	0.695 **
	(0.436)	(0.660)	(0.727)	(0.448)
Σ	1.048	1.049	1.057	1.032
	(0.042)	(0.043)	(0.043)	(0.041)
log–likelihood	-616.981	-613.112	-612.334	-610.703
LR χ^2 (d.f.)	103.73 (21)	111.47 (22)	113.02 (22)	116.29 (22)
Haberman's χ^2(d.f.)		7.74 (1) ***	9.29 (1) ***	12.55 (1) ***
No. obs.	4386	4386	4386	4386

Significance levels:

* :10% ** : 5% *** : 1 %

Standard errors are in parentheses

The standard error term of the coefficents deserve assessment, given the standard error acts as a measure of how 'good' the estimates are by having, "some measure of the reliability or precision of the estimators" (Brooks, 2007:58). The standard error $\hat{\sigma}$ is defined as:

$$\hat{\sigma} = \sqrt{\frac{\sum \hat{\mu}_i^2}{n-2}}$$

with $\sum \hat{\mu} i^2$ being

$$\sum \hat{\mu} i^2 = \sum y_i^2 - \frac{(\sum x_i y_i)^2}{\sum x_i^2}$$

When there is high variation in the X variables (they are narrowly dispersed) the precision of the estimators is low, and the standard error term is large. Whereas, when there is low variation in the X variables (they are more broadly dispersed) the precision of the estimators is high, with the error term being low (Gujarati, 2003; Brooks, 2007). The coefficient of Simpson Diversity in Model 2 is -2.522 (statistically significant at $p = < 0.01$), with a standard error term of 0.943. In Model 3, Shannon Diversity has a coefficient of -4.374 (statistically significant at $p =< 0.01$), and a standard error term of 1.531. Model 4 shows the HHI coefficent to be 0.905 (statistically significant at $p = < 0.01$), the standard error term of the coefficient is 0.264. The relatively large standard error terms for both Simpson Diversity and Shannon Diversity lead to wide confidence intervals; the relatively small standard error term for the HHI leads to a comparatively narrow confidence interval. The Simpson Diversity measure has an upper confidence limit of -0.674 and a lower confidence limit of -4.369; Shannon Diversity exhibits an upper confidence limit of -1.372 and a lower confidence limit of -7.375, the HHI has an upper confidence limit of 1.421 and a lower confidence limit of 0.388. [4] Note that the standard error gives an indication as to the *likely* accuracy of the regression parameters: they do not reflect the accuracy of the current coefficient estimates (Brooks, 2007; Greene, 2003).

Table 7.2 reports additional findings on engagement niche variables: Model 1 of Table 7.1 is used as the baseline. Model 5 introduces the variable nw_t , which has a coefficient of 2.140, statistically significant at the 1 percent level. A narrow engagement niche significantly increases the time to failure, a result which is consistent with the principle of allocation (Hannan and Freeman, 1977; 1989; Péli, 1997; Hsu, 2006). Model 5 has a log–likelihood of -612.170 and a LR χ^2 value of 113.35 (22 d.f.). There is an improvement in fit of Model 5 over Model 1 (Haberman's $\chi^2 = 9.62$; Δ d.f. $= 1$, $p = < 0.01$). Model 6 comprises $nw_{1,t}$, with a coefficient of -1.126, statistically significant at the 5 percent level. A broad engagement niche significantly decreases the time to failure, a result which is consistent with the principle of allocation (Hannan and Freeman, 1977; 1989; Péli, 1997; Hsu, 2006). Model 6 has a log - likelihood of -614.065 and LR χ^2 of 109.56 (22 d.f.), and shows an improvement in fit over Model 1 (Haberman's $\chi^2 = 5.83$; Δ d.f. $= 1$; $p < 0.01$). For Model 7, the more complex variable $nw_{2,t}$ tries to better capture

[4]the upper confidence limit can be expressed as $\hat{\beta}_2 + \delta$, and the lower confidence limit expressed as $\hat{\beta}_2 - \delta$.

the engagement niche, and has a coefficient of 1.157 (statistically significant at the 5 percent level). Once again, a narrow engagement niche increases the time to failure. Model 7 has a log - likelihood of -613.797 and a LR χ^2 of 110.10 (22 d.f.), Not only this, but Model 7 shows a significant improvement over Model 1 (Haberman's $\chi^2 = 6.37$, Δ d.f. $= 1$, $p = < 0.01$). Model 8 comprises $nw_{3,t}$, with a coefficeint of 1.809, statistically significant at the 1 percent level. A narrow engagement niche constructed in this way increases the time to failure. Model 8 has a log - likelihood of -610.009, and has a LR χ^2 of 117.38 (22 d.f.). There is a significant improvement in fit over Model 1 (Haberman's $\chi^2 = 12.96$, Δ d.f. $= 1$, $p =< 0.01$). The results from Models 5 - 8 suggests the more concentrated organizations are (by remaining in a single category, but with product offerings being an increasing proportion of the overall product offerings present in the category), the longer the time to failure.

Table 7.2: Maximum Likelihood estimates of log - normal models of engagement niche for organizations in kit car population, 1949-2009

Variable	**Model 5**	**Model 6**	**Model 7**	**Model 8**
T	0.058 ***	0.052 ***	0.052 ***	0.052 ***
	(0.016)	(0.015)	(0.0135	(0.016)
GDP	0.007	0.001	0.001	-0.000
	(0.035)	(0.035)	(0.035)	(0.034)
Oil	0.004	0.002	0.002	0.002
	(0.004)	(0.004)	(0.004)	(0.004)
Tax 1973	-0.045	-0.046	-0.053	-0.040
	(0.260)	(0.260)	(0.260)	(0.257)
SVA	0.138	0.242	0.241	0.219
	(0.237)	(0.232)	(0.232)	(0.229)
N_{pop}	-0.008 ***	-0.007 ***	-0.007 ***	-0.006 ***
	(0.003)	(0.003)	(0.003)	(0.002)
Org prod N	-0.002	-0.014	-0.023	-0.019
	(0.022)	(0.023)	(0.024)	(0.022)
de- novo	-0.480 ***	-0.501 ***	-0.498 ***	-0.493 ***
	(0.131)	(0.131)	(0.131)	(0.129)

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Table 7.2 – Continued

Variable	**Model 5**	**Model 6**	**Model 7**	**Model 8**
cat 1 = 1	0.145	0.307	0.257	0.354
	(0.319)	(0.314)	(0.315)	(0.312)
cat 2 = 1	-0.005	0.125	0.068	0.207
	(0.278)	(0.276)	(0.276)	(0.275)
cat 3 = 1	-0.091	0.095	0.037	0.148
	(0.292)	(0.286)	(0.286)	(0.284)
cat 4 =1	0.137	0.211	0.151	0.223
	(0.317)	(0.316)	(0.319)	(0.312)
cat 5 =1	0.234	0.307	0.275	0.375
	(0.276)	(0.275)	(0.275)	(0.272)
cat 6 = 1	-0.090	0.095	0.040	0.161
	(0.274)	(0.269)	(0.268)	(0.267)
cat 7 =1	-0.590	0.116	0.090	0.266
	(0.441)	(0.391)	(0.390)	(0.389)
cat 8 =1	-0.357	-0.365	-0.426	-0.326
	(0.350)	(0.352)	(0.336)	(0.345)
cat 9 = 1	-0.084	0.017	-0.025	0.118
	(0.252)	(0.248)	(0.250)	(0.245)
cat 10 =1	-0.191	0.042	0.001	0.197
	(0.263)	(0.260)	(0.259)	(0.263)
cat 11 =1	0.357	0.482	0.420	0.577
	(0.289)	(0.286)	(0.287)	(0.283)
type =1	0.020	0.014	0.020	0.079
	(0.335)	(0.336)	(0.336)	(0.332)
generalist=1	0.434	0.582	0.555	0.567
	(0.369)	(0.369)	(0.369)	(0.364)
nw_t	2.140 ***			
	(0.725)			
$nw_{1,t}$		-1.126 **		
		(0.476)		
$nw_{2,t}$			1.157 **	
			(0.470)	
$nw_{3,t}$				1.809 ***
				(0.528)
constant	0.729 **	0.919 **	0.953 **	0.694 **
Σ	1.044	1.041	1.041	1.032
	(0.042)	(0.042)	(0.042)	(0.042)

Continued on Next Page...

Table 7.2 – Continued

Variable	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Log–likelihood	-612.170	-614.065	-613.797	-610.009
LR χ^2 (d.f.)	113.35 (22)	109.56 (22)	110.10 (22)	117.38 (22)
Haberman's χ^2 (d.f.)	9.62 (1) ***	5.83 (1) ***	6.37 (1) ***	12.96 (1) ***
No. obs.	4386	4386	4386	4386

Significance levels:

* :10% ** : 5% *** : 1 %

Standard errors are in parentheses

In Model 5 the variable nw_t has a coefficient of 2.140 and a standard error of 0.725, resulting in an upper confidence limit of 3.561 and a lower confidence limit of 0.718. The variable $nw_{1,t}$ of Model 6 has a coefficient of -1.126 and a standard error of 0.476, resulting in an upper confidence limit of -0.193 and a lower confidence limit of -2.059. Model 7 contains $nw_{2,t}$ with a coefficient of 1.157 and standard error of 0.470, leading to an upper confidence limit of 2.079 and a lower confidence limit of 0.236. For Model 8 $nw_{3,t}$ has a coefficient of 1.809 and a standard error of 0.528, entailing an upper confidence limit of 2.842 and a lower confidence limit of 0.776. Figure 7.1 graphically illustrates the spread of confidence intervals of all seven variables used to measure either population diversity or the fuzzy engagement niche. The spread of the upper confidence limit and lower confidence limit of Shannon Diversity is the largest of all the variables, closely followed by Simpson Diversity, with standard errors of 1.531 and 0.943, respectively. The variables $nw_{1,t}$, $nw_{2,t}$, and $nw_{3,t}$ have similar spreads of upper confidence limits and lower confidence limits as a result of their relatively similar standard error terms: 0.476, 0.470, and 0.528. The variable with the lowest spread from the upper confidence limit to the lower confidence limit is the HHI variable, due to a standard error term of 0.264.

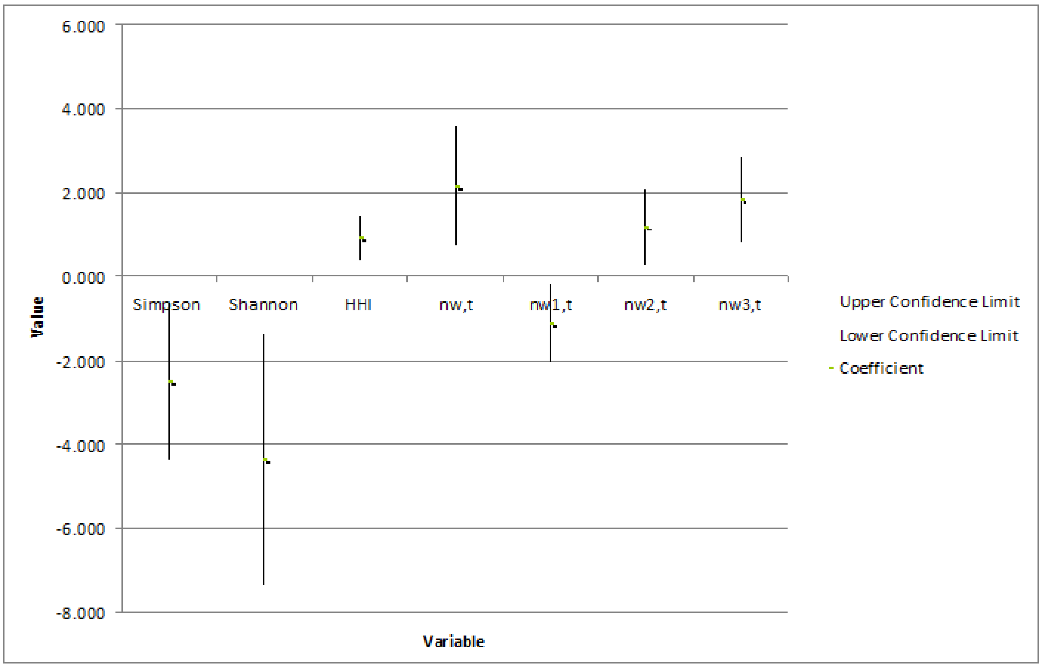

Figure 7.1: Coefficients and confidence limits of diversity and engagement niche variables

7.5 Discussion

This chapter has concerned itself with examining whether there is an optimal or preferred way of measuring the diversity of a population and the fuzzy engagement niche of organizations in the population. In addition to the Simpson Diversity measure, the Shannon Diversity measure- itself at home in the realm of computer science and information theory - was utilized. Four different variables were generated from the data that captured differing ways in which the engagement niche might be measured, as well as the Herfindahl – Hirschman Index. With the exception of Model 4, the variables constructed for determining the fuzzy engagement niche are consistent with the principle of allocation (Hannan and Freeman, 1989, Péli, 1997; Hsu, 2006; Hsu et al., 2009).

Given the Herfindahl–Hirschman Index (HHI) measures concentration of organizations and their product offerings with respect to the population, Model 4 suggests high concentration increases the time to failure. Concentration in the case of the kit car population is not in the form of overall market share (i.e. the volume of offerings sold by an organization), but by the total number of product offerings organizations produce at a given time, in proportion to the overall number of product offerings present in the population [5]. The HHI cannot differentiate between concentration as a result of organizations having product offerings in a single product category, or having product offerings in multiple product categories. The former proposition would be consistent with the central tenets of niche theory and the principle of allocation; the latter position is at odds with the theory. Using the example earlier from investment banking, the HHI cannot discriminate between organizations with a high market share in a single product area of the banking market (such as M & A advice), and those with a low market share in many product areas. One way of trying to understand the HHI result is to look at the data, and assess how many organizations focus in a single product category. If the majority of organizations are present in a single product cat-

[5] This is due to sales data being unavailable, as discussed in the empirical methodology chapter.

egory, the HHI variable might be capturing the share of those organizations' product offerings in the given product category - concentration in a product category as a proportion of the overall population. Therefore, organizations with many product offerings in a single product category lead to a higher HHI value. In this way, the HHI result could be interpreted as organizations with a large number of product offerings in a single product category leading to an increase in concentration, and hence time to failure. Examination of the data reveals 496 organizations have product offerings in a single product category, 129 organizations have product offerings spread across two product categories, 37 organizations have product offerings in three product categories, and 9 organizations have product offerings in four product categories [6] With nearly three quarters of organizations in the population having product offerings in only one product category, it seems possible the HHI is reflecting this unobserved phenomenon: the concentration of organizations' product offerings in a single product category, relative to the overall size of product offerings in the population at that time.

Model 2 applied Simpson Diversity, with the results indicating the more homogeneous the population is – or less diverse – the longer the time to failure. Recall what Simpson Diversity is actually measuring. In the case of the kit car movement, it is measuring the relative heterogeneity of the product categories in a given year. Should the product categories be of roughly the same size, diversity is relatively high; if one or a few product categories are considerably larger than others, diversity decreases. Model 2 entails having product categories of roughly the same size and proportion (a more heterogeneous population) leads to a decrease in the time to failure. In Model 3, Shannon Diversity was applied, indicating increased diversity decreasing the time to failure. When product categories are of a similar size, diversity in the population increases. As the introductory chapter notes, there have been periods in the kit car movement's history when product categories have been larger than others at a given time. During the 1960's, craft

[6] Note the total of this is 671 - higher than the total number of organizations present in the population (635). However, the figure of 671 accounts for some organizations changing from producing product offerings in say, only one product category, to two product categories at some point in their history.

cars and beach buggy product offerings comprised the majority of product offerings available in the domain. Craft cars took off on the back of the success of the 1950's specials, and a beach buggy craze swept across America and eventually landed in the UK at around this period as well, where a substantial proportion of the audience members were new to the kit car movement (Hale, 2006). An increase in the size of the buggy product category (and therefore the relative decrease in overall population diversity) led to an inflow of audience members. Then, in the 1980's an increased interest in vintage replicas led to them comprising a substantial proportion of the population, as well as the craft cars (specifically, those attached to category 10 - see the introductory chapter for further details of this category) - many seeing this as the zenith of craft cars (see Kit Car Magazine, various years, for example). The decade since 2000 has witnessed a rapid increase in the number of Lotus Seven Inspired Replicas entering the kit car movement (see Complete Kit Car, various years, for example), an increase in road legal racing cars and a continued appeal of craft cars. The increased number of racing circuits having open track days to members of the general public may have led to renewed interest in the racing car product category (for an example of this, see the number of track days organized throughout the UK in 2010 in Complete Kit Car Guide To Track Days 2010. Indeed, the very fact there is now a publication dedicated to track days and racing cars illustrates the demand of audience members for this information). With the buggy craze of the 1960's, many of the audience members who purchased a buggy replica were new to the kit car movement (Hale, 2006): the prominence of the buggy scene resulted in attracting new audience members and reinvigorating the kit car movement. Similarly, the Lotus Seven Inspired Replica, racing, and craft product categories have led to an increase in interest over the past decade from many audience members new to the kit car movement. For example, one LSIR manufacturer is worthy of mention: Robin Hood Sports Cars. Despite various changes in ownership in the past, it is widely accepted to produce one of the cheapest cars available. With its low price tag and relatively straightforward build process, industry insiders concede the majority of the company's customers are new to the kit car scene and are attracted by the low price and relative ease of build, [7] "Robin Hood was one of the most - if not *the* most - prolific kit car companies in the business. Thousands of kit car enthusiasts have cut their teeth (and knuckles) assembling Robin Hoods over the last two decades" (Complete Kit Car, June 2008, p.15). Indeed, in the craft car product category, MEV has recently produced an offering that is straightforward to build and relatively cheap, leading reviewers to note"[a]s well as keeping costs down, this simplicity is bound to appeal to first–time builders" (Complete Kit Car, October 2010, p.19). The aim of this kit appears to be to entice new enthusiasts to the kit car movement with an affordable, straightforward build, where in subsequent years the enthusiasts might feel confident to move onto more advanced and expensive kit car build projects: "[e]ntry level kits need to be good if their builders are to enjoy the experience and subsequently move on to build another kit car later" (Complete Kit Car, October 2010, p.5). New audience members are attracted and retained in the movement, with the possibility of them acquiring product offerings (perhaps more expensive and challenging to build) from different product categories. Anecdotally it would appear that disproportionately sized product categories arise as a result of organizations and their product offerings attracting new audience members to the kit car movement. With an influx of new audience members, existing organizations are able to persist, and new ones might consider entering due to an increase in the overall size of the movement.

With five different variables for measuring the engagement niche, it is worth summarizing their results. First, take the levels of statistical significance attached to the estimates. For all of the niche width variables, the estimates are statistically significant. Both $nw_{1,t}$ and $nw_{2,t}$ of Model 6 and Model 7 are statistically significant at the 5 percent level; HHI, nw_t, and $nw_{3,t}$ of Model 4, Model 5, and Model 8 are statistically significant at the 1 percent level. Most studies and texts on econometrics stipulate a significance level of 5 percent to be required, almost as a default (see Greene, 2003; Gujarati, 2003, for example). As noted by Heij et al., (2004:57) in large samples "nearly every null hypothesis will be rejected at the 5 per cent

[7] Interview with various kit car manufacturers, Stoneleigh Kit Car Show, May 2009

significance level"; they suggest bearing in mind "significance levels should in practice be taken as a decreasing function of the sample size". A comparison of other studies with large sample sizes (Carroll and Hannan, 1989; Carroll and Swaminathan, 1992; Barron, West, and Hannan, 1994; Swaminathan, 1995; Carroll and Swaminathan, 2000) shows a consistent trend towards a statistical significance level of 5 percent being applied. Standard errors – and hence, confidence limits – of the estimates deserve attention. The HHI of Model 4 has a standard error term of 0.264, and is the lowest standard error of all the engagement niche variables. This is closely followed by $nw_{2,t}$ of Model 7 (with a standard error term of 0.470), $nw_{1,t}$ of Model 6 (with a standard error term of 0.476), $nw_{3,t}$ of Model 8 (having a standard error term of 0.528), and nw_t of Model 5 (with a standard error term of 0.725). A high standard error term entails the precision of the estimators decreases (Brooks, 2007); conversely, a low standard error term leads to an increase in the precision of the estimators (see Hill, Griffiths, and Judge, 1997, for an illustrative example of this). Accordingly, with a high standard error term, the precision of the nw_t coefficient in Model 5 is lower when compared to the precision of the coefficient for HHI in Model 4. Next, consider the log–likelihood ratio of the models. Recall the log–likelihood is a maximization of the logarithmic likelihood function, defined as:

$$L(\theta) = p(y, X, \theta)$$

with the log–likelihood

$$l(\theta) = \log(L(\theta))$$

The baseline model (Model 1) has a log–likelihood of -616.981, with Model 8 ($nw_{3,t}$) having the lowest log–likelihood of -610.009, closely followed by Model 4 (HHI) with a log–likelihood of -610.703. This is tempered by the fact all of the Models having relatively similar log–likelihood values; whilst Model 8 does have the lowest value, the other models are clustered closely to this. Utilizing the LR χ^2 score, Model 1 has value of 103.73 (21 d.f.), an improvement is evidenced across all models; Model 8 ($nw_{3,t}$) sees the greatest improvement over the baseline, with a LR χ^2 of 117.38 (22 d.f.). Model 4

(HHI) has the second greatest improvement over the baseline, with a LR χ^2 of 116.29 (22 d.f.). Assessing Haberman's χ^2 shows the greatest improvement in fit over the baseline model resides with Model 8 ($nw_{3,t}$), with a value of 12.96 (1 d.f.) which is statistically significant at the 1 percent level. Again, Model 4 has a similar score, having a Haberman's χ^2 value of 12.55 (1 d.f.) which is statistically significant at the 1 percent level. Accordingly, Model 4 is to be favored as a measurement of the engagement niche if precision of the estimators is the goal of the analyst. It has a standard error term of 0.264, with an upper confidence limit of 1.421 and a lower confidence limit of 0.388. The HHI has a coefficient statistically significant at the 1 percent level, with the second lowest log–likelihood value, and the second best improvement in fit over Model 1 (Haberman's χ^2 = 12.55; Δ d.f. = 1; p = < 0.01). Although the HHI produces a coefficient statistically significant and appears to be among the best fitting models (alongside $nw_{3,t}$ of Model 8) , the interpretation of the HHI to the present setting remains a concern. Not only should its interpretation be a concern in this setting, but in other settings also. It cannot differentiate between concentration as a consequence of focus in a single product category, or concentration as a consequence of a lack of focus. For this reason, the HHI should be excluded from consideration as a way of measuring the engagement niche. Therefore, this leaves the choice of variable between nw_t of Model 5, nw_{1t} of Model 6, $nw_{2,t}$ of Model 7, and $nw_{3,t}$ of Model 8. It appears $nw_{3,t}$ is to be favored over the other variables: it is statistically significant at the 1 percent level and has a relatively low standard error term. Not only this, it has the lowest log − likelihood value, the best LR χ^2 score, and best improvement in fit over Model 1 (Haberman's χ^2 = 12.96; Δ d.f. = 1; p = < 0.01). The above analysis has illustrated not only should the fuzzy engagement niche capture how many product offerings an organization has in the product categories it is engaged at, but it should also weight this as a proportion of the total number of product offerings in each product category in relation to the total number of product offerings present in the population.

7.6 Appendix

Table 7.3: Descriptive statistics

Variable	**mean**	**std. dev.**	**min.**	**max.**
(1) population age	43.008	13.241	0	60
(2) gdp	2.568	1.588	-2.1	7.2
(3) oil price	41.117	20.666	15.770	98.070
(4) tax 1973	0.885	0.319	0	1
(5) SVA	0.398	0.490	0	1
(6) density	141.319	60.456	2	237
(7)Org prod d	2.045	2.731	0	43
(8) de novo	0.640	0.480	0	1
(9) cat 1 = 1	0.084	0.277	0	1
(10) cat 2 = 1	0.083	0.276	0	1
(11) cat 3 = 1	0.085	0.279	0	1
(12) cat 4 = 1	0.051	0.22	0	1
(13) cat 5 = 1	0.118	0.322	0	1
(14) cat 6 = 1	0.140	0.347	0	1
(15) cat 7 = 1	0.032	0.176	0	1
(16) cat 8 = 1	0.036	0.182	0	1
(17) cat 9 = 1	0.148	0.355	0	1
(18) cat 10 = 1	0.256	0.436	0	1
(19) cat 11 = 1	0.070	0.255	0	1
(20) replica = 1	0.480	0.500	0	1
(21) spanner = 1	0.1	0.3	0	1
(22) Simpson Diversity	0.824	0.116	0	0.888
(23)Shannon Diversity	0.282	0.043	0	0.368
(24) HHI	0.123	0.241	0	1
(25) nw_{it}	0.777	0.375	0	1
(26) $nw_{1,it}$	0.120	0.109	0	1
(27) $nw_{2,it}$	0.075	0.138	0	1
(28) $nw_{3,it}$	0.089	0.152	0	1

Table 7.4: Correlation of covariates

Variable	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)
(2)	-0.04																										
(3)	0.29	-0.39																									
(4)	0.71	-0.17	0.38																								
(5)	0.75	-0.02	0.31	0.29																							
(6)	0.92	0.02	0.41	0.50	0.75																						
(7)	0.11	0.00	-0.01	0.05	0.10	0.10																					
(8)	0.06	0.02	0.05	0.11	-0.02	0.06	-0.03																				
(9)	0.15	-0.01	0.03	0.10	0.11	0.13	0.25	-0.00																			
(10)	-0.13	-0.03	0.00	-0.10	-0.10	-0.12	0.01	-0.11	-0.09																		
(11)	0.12	-0.00	-0.00	0.13	0.03	0.10	0.02	0.03	-0.03	-0.09																	
(12)	0.10	-0.00	0.02	0.08	0.06	0.09	-0.03	0.07	-0.03	-0.06	0.03																
(13)	0.20	0.01	0.00	0.15	0.13	0.17	0.12	-0.07	-0.03	-0.10	0.00	-0.07															
(14)	0.05	-0.01	0.04	0.13	-0.03	0.04	0.02	0.00	-0.11	-0.08	-0.15	-0.11	-0.11														
(15)	-0.47	0.04	-0.19	-0.52	-0.15	-0.39	-0.01	-0.26	-0.07	-0.07	-0.07	-0.05	-0.09	-0.09													
(16)	0.06	-0.01	0.00	0.04	0.06	0.03	0.05	0.10	0.02	-0.03	-0.01	-0.05	-0.07	0.03	-0.04												
(17)	0.24	-0.01	0.06	0.10	0.23	0.23	0.21	-0.11	0.06	-0.15	-0.08	-0.07	0.29	-0.17	-0.09	-0.08											
(18)	-0.11	0.01	0.00	-0.08	-0.08	-0.10	0.14	0.14	-0.07	-0.08	-0.17	-0.14	-0.17	-0.15	-0.13	-0.016	-0.17										
(19)	0.00	0.00	0.04	0.06	-0.04	0.00	0.15	0.01	-0.06	-0.06	-0.02	-0.07	0.00	-0.08	-0.06	-0.06	-0.05	0.03									
(20)	0.18	-0.01	0.02	0.20	-0.05	0.15	-0.13	-0.03	0.10	0.20	0.24	0.23	0.16	0.31	-0.20	-0.20	-0.19	-0.61	-0.29								
(21)	0.11	-0.01	0.03	0.10	0.09	0.10	0.35	0.00	0.30	0.10	0.06	-0.08	0.20	0.10	-0.07	0.21	0.14	0.17	0.14	-0.32							
(22)	0.75	0.01	0.23	0.73	0.35	0.63	0.06	0.16	0.09	-0.02	0.10	0.07	0.14	0.10	-0.75	0.05	0.12	-0.02	0.06	0.22	0.09						
(23)	-0.46	-0.05	-0.04	-0.32	-0.42	-0.42	-0.06	0.07	-0.08	0.15	-0.06	-0.05	-0.12	-0.01	-0.16	-0.02	-0.13	0.16	0.02	-0.04	-0.05	0.08					
(24)	-0.25	-0.15	-0.03	-0.18	-0.32	-0.42	0.17	-0.05	0.00	0.06	-0.03	0.21	-0.06	-0.13	0.19	0.23	-0.02	-0.14	-0.04	0.07	-0.14	-0.21	0.18				
(25)	-0.38	0.01	-0.13	-0.40	-0.11	-0.31	0.23	-0.14	0.12	0.01	0.04	-0.03	0.05	-0.02	0.55	0.06	0.04	0.09	0.08	-0.29	0.36	-0.73	-0.38	0.09			
(26)	-0.30	-0.04	-0.05	-0.21	-0.20	-0.33	0.21	-0.01	0.02	0.03	-0.03	0.14	-0.03	-0.09	0.12	0.16	0.02	-0.16	0.04	0.01	-0.03	-0.22	0.14	0.97	0.14		
(27)	-0.28	-0.04	-0.05	-0.18	-0.20	-0.30	0.41	-0.01	0.09	0.08	0.01	0.13	0.03	-0.05	0.08	0.21	0.06	-0.08	0.13	-0.07	0.19	-0.19	0.14	0.85	0.27	0.93	
(28)	-0.32	-0.04	-0.06	-0.23	-0.20	-0.34	0.10	-0.01	0.00	0.02	-0.04	0.13	-0.09	-0.09	0.14	0.15	-0.05	-0.19	-0.01	0.03	-0.10	-0.23	0.15	0.92	0.09	0.97	0.85

Chapter 8

Conclusions

This final chapter of the thesis comprises a summary of the main findings of the one qualitative chapter and two empirical chapters, as well as their theoretical contribution and advancement to ecology. As well as this, the generalizability of these findings from the kit car movement to other social movements and corporate populations receives attention. Finally, possible future research arising from this body of work is briefly sketched.

8.1 Summary of main findings

Recall that in the introductory chapter, the aims of this thesis were to advance: (1) the theoretical construction and empirical [1] evidence in support of a frequency code that is applied by critics, (2) organizational vital rates with respect to multiple category membership (3) measuring population dynamics: diversity and the engagement niche. This was achieved by using the UK kit car movement as the population under study from its inception in 1949 to 2009.

First, this thesis sought to further develop the theory of the code as constructed by Pólos et al. (2002) and Hannan et al., (2007). Codes have been considered in a slightly different light, with an emphasis being on a *frequency* code, where the intensity of scrutiny of certain feature values is considered as a key component. The more audience scrutiny a certain feature value

[1] "empirical" in the meaning of qualitative researchers

- or set of feature values - receives, the longer the frequency code. Taken for grantedness has been modified somewhat to be inversely proportional to the length of the frequency code. Moreover, the fuzziness of category labels in determining the length of the frequency code has been considered, and implications derived. The code length of those organizations belonging to a fuzzy label is more likely to be longer than the code length of organizations belonging to a crisp label. However, being attached to a fuzzy label does have some advantages. It is more difficult for critics to determine whether a code violation has been perceived by an organization or offering belonging to a fuzzy label than it is for organizations belonging to a crisp label. Consequently, the number of code violations perceived by critics is higher for members of a crisp category label than it is for those attached to a fuzzy category label. In the case of the kit car movement, the labels of the categories were demarcated according to grounds of authenticity: either an offering was type authentic, or craft authentic; the former being a crisp label, the latter a fuzzier such label. By using a content analysis of critical reviews of kit cars, the frequency code can be tested. The hypotheses derived from the new theoretical development of the frequency code generally found support from the results of the content analysis.

Second, Multiple category membership was considered, with respect to the impact increased density of category generalism has on the vital rates of category specialists. Considerable empirical and theoretical work has been achieved in a relatively short space of time in this area of organization theory (see Negro et al., 2010, for a detailed review). The tenets of the theory stipulate category generalists have lower appeal than category specialist organizations in a population. This thesis sought to apply the mechanics of multiple category membership to an evolutionary perspective, with respect to the the impact increased density of category generalism has on the vital rates of category specialists. In doing so, it extends the theory not only by its application to vital rates, but also considers the effects multiple category generalism has on legitimation of category specialist identities. Increased density of category generalists was found to inhibit the legitimation of both the type authentic category specialist identity and the craft authentic category specialist identity. This manifested itself in the category specialist identities having lower entry rates and higher failure rates when increased density of category generalists interacted.

Finally, a methodological issue of measuring the population dynamics of diversity and the engagement niche was considered. Recent theoretical and empirical research (Hannan et al., 2007; Hsu et al., 2009) has emphasized using the Simpson index to measure an organization's engagement niche. However, this chapter sought to construct several variables arising directly from the data, which treated the engagement niche in subtle but differing ways. As a result of this, a more detailed insight is gained into how the engagement niche is constructed, and how slightly different measurements impact upon the overall utility of the engagement niche variable, which should be considered by analysts when constructing an engagement niche variable. Measuring population diversity was also considered, applying Shannon diversity which was more common in earlier ecological research (see Hannan and Freemen, 1989, for example), and Simpson diversity, which has become more prevalent in recent research (Hannan et al., 2007). An unintended consequence of this research was to discover that in the kit car movement, decreased diversity actually improved the survival chances, contra to what might normally be expected.

8.2 Generalizability and limitations

Are these findings salient only to the kit car movement, or are they more universal in nature? Consider the theory development of the frequency code found in Chapter 5. The code concerned how a specific sub-set of the audience - critics - scrutinize product offerings and organizations. Although seemingly suitable for application to other critical reviews in different domains, it is specific to a discrete sub- set of the audience, and in this respect cannot therefore be considered to be a process that is carried out by all audience members. Note also the categories (conceived along lines of authenticity) are already well established and existing categories that have been constructed by audience members over the intervening years. It does not and cannot explain audience codes at what Hannan et al., (2007) termed the "primal soup" stage, where audience categorize organizations and their offerings according to degrees of similarity. Moreover, the code relates to the attention critics give to organizations or their product offerings, but what if reviews are merely graded on a scale? Clearly, the frequency code would fail in this situation, but so would the notion of a code as defined by Pólos et al. (2002) and Hannan et al., (2007). The hypotheses developed are kit car specific, but the theory of the frequency code should be universal in character (with respect to critics), as it is a variation of Pólos et al's., (2002) conception of a code.

In Chapter 6, assessing the impact increased density of category generalists has on the vital rates of category specialists was the focus of attention. By using data comprising entry and exit rates, hypotheses relating to the legitimation of the category specialist identities were derived. Increasing density of category generalists hampers the legitimation of category specialists, manifested in decreasing the entry rate and increasing the exit rate. With a lack of distinction between the product offerings of a category generalist and those of a category specialist, the crispness of the category specialist identities declines. Having only two categories based on authenticity (type and craft), category generalism is likely more pronounced or noticeable by audience members. Indeed, claims of one form of authenticity over another are reminiscent of Rao et al. (2003), who documented the struggle between classical cuisine and adopt the nouvelle cuisine movement. With two categories present, there is an inherent oppositional character taken on. This seems to be the case with respect to the two kit car movement categories; for type authenticity, emphasis is on getting an offering to be as close a replica to the original as possible. For craft authenticity, the artisanal flair of the designer is encouraged. Perhaps the deleterious effects of category generalist density is stronger in populations where only two or a few categories exist; a population with more categories might not have such strong interactions.

The final empirical chapter (Chapter 7) sought to measure the engagement niche of organizations, and competitive intensity of niche overlap. A problem lay in the fact sales volumes of individual product offerings were unobtainable, and so the variables could arguably be lacking a competitive crowding mechanism. The principles underlying the different constructions of the engagement niche can be applied to not just the automotive industry, but other manufacturing populations and service populations. Although the Shannon and Simpson indexes can be applied across populations with relative ease, their theoretical interpretation should be treated with some caution. Generally, diversity improves the survival chances of organizations (Hannan et al., 2007), with no one species or category dominating the population (Hawley, 1950; MacArthur, 1972). In the case of the kit car population though, lower diversity actually *improved* survival chances.

8.3 Recommendations for future research

Having outlined the theory of a frequency code, it might be sensible to take time to engage in a logical formalization attempt, in order that any inconsistencies of the theory are identified and eliminated - if possible. First order logic offers a sufficient degree of abstraction to test the central tenets or axioms of a theorem (Barwise and Etchemendy, 2003; Gamut, 1991a; Hodges, 2001). The application of first order logic to the field of organizational ecology has led to significant new insights into theory fragments that might otherwise not have been noticed (Pólos and Hannan, 2002; Pólos, Hannan and Carroll, 2002; Pólos, Carroll, and Hannan, 2003; Hannan et al., 2007). Given the frequency code deal with the perceptions of audience members - especially when concerning code violations being perceived, an intensional logic (Gamut, 1991b) would be more suitable. In this vein, Pólos and collaborators have been at the vanguard of introducing a modal logic (van Benthem, 1988) to organizational ecology (Pólos, Hannan, and Hsu, 2011; Hsu, Hannan, and Pólos, 2011). In terms of the empirical side of the frequency code, a longer period of critical reviews should be sought to assess the temporal nature of the frequency code. Perhaps the length of the code appeals to fads or cycles: a code that is long at one point in time might become short at another. Temporal stability is thus a direction to be taken. Moreover, comparing the code of more than one critic or set of critics working for the same publication would gather insight into the variability of the code length along the lines of critic or attachment of critics to organizations. Perhaps other methodologies such as latent semantic analysis (Popping, 2000) need to be deployed instead of content analysis to enrich the knowledge of codes.

Despite much research on multiple category membership, more research needs to be conducted into how this affects the vital rates of organizations. A dataset comprising appeal (critical ratings of a product or organization, for example) and entry and entry and exit variables could be used in an attempt to unify the findings of chapter 6 and current research on multiple category membership (see Hsu et al., 2009, for example). What role does appeal have on the vital rates of category specialists and generalists, and how does this interact with densities of category specialists and generalists? Can higher appeal with audience members by category specialists counteract the deleterious effect increasing density of category generalism has on the vital rates of those category specialists? Perhaps one of the most intriguing aspects of this thesis has been the somewhat odd result arising from the diversity measures. Why does less diversity decrease the failure rate in the kit car movement? A suggestion has already been proposed that the dominance of one or a few product categories has led to increased visibility of the movement, leading to more audience members being attracted to the movement. In this sense, there is an exogenous drift of audience members from neighboring populations to the kit car movement, which improves the life chances of organizations in the movement. Future research might want to explore this further, as the same issues appear to have been present in the rapid growth of the microbrewery movement (Carroll and Swaminathan, 2000). Perhaps a survey of kit car enthusiasts could be undertaken, in order to establish how and why they joined the movement, as hard data alone cannot derive an answer.

Appendix I: critical reviews of kit cars

Replica reviews

replica	number	positive	negative	total	total minus neg
body	26	13	0	39	39
chassis	3	2	0	5	5
mechanics	14	2	0	16	16
engine	6	0	0	6	6
handling	9	12	3	24	21
company	6	2	0	8	8
boss	4	0	0	4	4
cost	2	0	0	2	2
interior	14	9	4	27	23
total	84	40	7	131	124

replica	number	positive	negative	total	total minus neg
body	5	5	0	10	10
chassis	1	0	0	1	1
mechanics	22	2	0	24	24
engine	17	13	3	33	30
handling	2	5	2	9	7
company	10	1	0	11	11
boss	3	3	0	6	6
cost	9	5	0	14	14
interior	5	4	1	10	9
total	74	38	6	118	112

replica	number	positive	negative	total	total minus neg
body	16	4	0	20	20
chassis	7	3	0	10	10
mechanics	28	10	2	40	38
engine	2	1	0	3	3
handling	5	6	7	18	11
company	8	2	1	11	10
boss	2	0	0	2	2
cost	5	3	0	8	8
interior	22	11	8	41	33
total	95	40	18	153	135

replica	number	positive	negative	total	total minus neg
body	5	3	1	9	8
chassis	10	8	0	18	18
mechanics	21	10	0	31	31
engine	3	0	0	3	3
handling	2	2	0	4	4
company	5	0	0	5	5
boss	7	4	0	11	11
cost	2	1	0	3	3
interior	10	5	0	15	15
total	65	33	1	99	98

replica	number	positive	negative	total	total minus neg
body	11	1	0	12	12
chassis	1	1	0	2	2
mechanics	24	7	0	31	31
engine	7	0	0	7	7
handling	4	5	0	9	9
company	11	4	1	16	15
boss	4	0	0	4	4
cost	8	3	0	11	11
interior	3	0	1	4	3
total	73	21	2	96	94

replica	number	positive	negative	total	total minus neg
body	21	8	2	31	29
chassis	11	5	0	16	16
mechanics	10	3	1	14	13
engine	6	0	0	6	6
handling	2	3	1	6	5
company	3	0	0	3	3
boss	5	3	0	8	8
cost	6	0	1	7	6
interior	17	17	1	35	34
total	81	39	6	126	120

replica	number	positive	negative	total	total minus neg
body	7	10	0	17	17
chassis	6	5	0	11	11
mechanics	17	2	2	21	19
engine	7	6	1	14	13
handling	4	4	2	10	8
company	5	1	0	6	6
boss	1	0	0	1	1
cost	4	2	0	6	6
interior	15	10	3	28	25
total	66	40	8	114	106

replica	number	positive	negative	total	total minus neg
body	6	3	0	9	9
chassis	9	6	0	15	15
mechanics	17	0	3	20	17
engine	3	0	0	3	3
handling	6	8	2	16	14
company	3	2	0	5	5
boss	1	1	0	2	2
cost	7	4	0	11	11
interior	20	8	3	31	28
total	72	32	8	112	104

replica	number	positive	negative	total	total minus neg
body	21	17	3	41	38
chassis	8	5	1	14	13
mechanics	15	4	2	21	19
engine	7	3	1	11	10
handling	5	8	3	16	13
company	2	3	0	5	5
boss	1	0	0	1	1
cost	6	2	0	8	8
interior	12	12	6	30	24
total	77	54	16	147	131

replica	number	positive	negative	total	total minus neg
body	8	3	1	12	11
chassis	0	0	0	0	0
mechanics	5	4	1	10	9
engine	7	3	1	11	10
handling	3	4	2	9	7
company	3	3	0	6	6
boss	1	0	0	1	1
cost	1	0	1	2	1
interior	2	6	1	9	8
total	30	23	7	60	53

replica	number	positive	negative	total	total minus neg
body	4	2	0	6	6
chassis	12	8	0	20	20
mechanics	20	6	1	27	26
engine	4	1	0	5	5
handling	5	7	3	15	12
company	6	4	0	10	10
boss	5	0	0	5	5
cost	2	1	1	4	3
interior	17	12	6	35	29
total	75	41	11	127	116

replica	number	positive	negative	total	total minus neg
body	5	3	0	8	8
chassis	5	6	0	11	11
mechanics	25	8	0	33	33
engine	7	4	1	12	11
handling	8	14	0	22	22
company	1	0	0	1	1
boss	1	0	0	1	1
cost	7	4	0	11	11
interior	4	0	0	4	4
total	63	39	1	103	102

replica	number	positive	negative	total	total minus neg
body	6	0	0	6	6
chassis	6	0	0	6	6
mechanics	19	3	1	23	22
engine	5	0	0	5	5
handling	2	2	1	5	4
company	6	1	3	10	7
boss	4	0	0	4	4
cost	5	7	1	13	12
interior	6	2	3	11	8
total	59	15	9	83	74

Craft reviews

craft	number	positive	negative	total	total minus neg
body	36	21	1	58	57
chassis	15	2	0	17	17
mechanics	21	9	2	32	30
engine	2	0	0	2	2
handling	6	2	2	10	8
company	4	1	0	5	5
boss	12	1	0	13	13
cost	5	1	0	6	6
interior	14	3	0	17	17
total	115	40	5	160	155

craft	number	positive	negative	total	total minus neg
body	11	5	0	16	16
chassis	0	0	0	0	0
mechanics	31	16	2	49	47
engine	12	6	1	19	18
handling	14	16	2	32	30
company	4	0	0	4	4
boss	6	0	0	6	6
cost	4	0	0	4	4
interior	14	11	4	29	25
total	96	54	9	159	150

craft	number	positive	negative	total	total minus neg
body	27	23	1	51	50
chassis	8	3	0	11	11
mechanics	17	5	0	22	22
engine	6	2	0	8	8
handling	0	0	0	0	0
company	13	9	0	22	22
boss	4	3	0	7	7
cost	0	0	0	0	0
interior	8	4	1	13	12
total	83	49	2	134	132

craft	number	positive	negative	total	total minus neg
body	20	23	1	44	43
chassis	3	2	0	5	5
mechanics	42	23	1	66	65
engine	19	9	4	32	28
handling	12	10	0	22	22
company	6	7	0	13	13
boss	2	3	0	5	5
cost	3	2	0	5	5
interior	12	12	2	26	24
total	119	91	8	218	210

craft	number	positive	negative	total	total minus neg
body	27	21	2	50	48
chassis	9	4	0	13	13
mechanics	14	7	0	21	21
engine	12	12	0	24	24
handling	14	17	0	31	31
company	5	4	0	9	9
boss	2	4	0	6	6
cost	3	7	1	11	10
interior	30	23	6	59	53
total	116	99	9	224	215

craft	number	positive	negative	total	total minus neg
body	48	20	0	68	68
chassis	13	2	0	15	15
mechanics	13	2	0	15	15
engine	2	0	0	2	2
handling	2	4	0	6	6
company	9	12	0	21	21
boss	4	4	0	8	8
cost	9	6	0	15	15
interior	10	3	0	13	13
total	110	53	0	163	163

craft	number	positive	negative	total	total minus neg
body	15	12	1	28	27
chassis	12	5	0	17	17
mechanics	29	18	2	49	47
engine	18	14	0	32	32
handling	15	29	1	45	44
company	11	1	0	12	12
boss	3	4	0	7	7
cost	7	3	5	15	10
interior	31	31	6	68	62
total	141	117	15	273	258

craft	number	positive	negative	total	total minus neg
body	37	21	4	62	58
chassis	28	0	0	28	28
mechanics	31	4	2	37	35
engine	2	0	0	2	2
handling	1	1	0	2	2
company	6	2	0	8	8
boss	5	0	0	5	5
cost	3	3	2	8	6
interior	12	1	0	13	13
total	125	32	8	165	157

craft	number	positive	negative	total	total minus neg
body	7	6	1	14	13
chassis	5	1	1	7	6
mechanics	15	7	2	24	22
engine	2	1	0	3	3
handling	13	22	3	38	35
company	3	0	0	3	3
boss	1	0	0	1	1
cost	4	1	1	6	5
interior	14	2	5	21	16
total	64	40	13	117	104

craft	number	positive	negative	total	total minus neg
body	15	7	2	24	22
chassis	9	0	0	9	9
mechanics	24	11	1	36	35
engine	8	6	2	16	14
handling	12	22	1	35	34
company	3	4	0	7	7
boss	4	1	0	5	5
cost	3	2	0	5	5
interior	9	9	3	21	18
total	87	62	9	158	149

craft	number	positive	negative	total	total minus neg
body	22	8	2	32	30
chassis	15	14	0	29	29
mechanics	25	3	0	28	28
engine	3	1	0	4	4
handling	2	2	0	4	4
company	2	1	0	3	3
boss	7	7	0	14	14
cost	8	0	0	8	8
interior	8	3	3	14	11
total	92	39	5	136	131

craft	number	positive	negative	total	total minus neg
body	11	4	1	16	15
chassis	8	0	0	8	8
mechanics	33	4	1	38	37
engine	4	0	1	5	4
handling	7	6	4	17	13
company	3	0	0	3	3
boss	2	0	0	2	2
cost	5	0	0	5	5
interior	14	6	2	22	20
total	87	20	9	116	107

Appendix II: Standard Deviation calculations for kit car reviews

Table 8.1: Standard deviation calculations for type authentic kit reviews: Hypothesis 1

x	$\bar{x}$	x - $\bar{x}$	$(x$- $\bar{x})^2$
83	67.846	15.154	229.644
44	67.846	-23.846	568.632
101	67.846	33.154	1099.188
72	67.846	4.154	17.256
48	67.846	-19.846	393.864
92	67.846	24.154	583.416
72	67.846	4.154	17.256
69	67.846	1.154	1.332
94	67.846	26.154	684.032
28	67.846	-39.846	1587.704
81	67.846	13.154	173.028
56	67.846	-11.846	140.328
42	67.846	-25.846	668.016
		Σ	6163.692
		n-1	12
		$\Sigma/n-1$	513.641
		S.D. =	35.96

Table 8.2: Standard deviation calculations for craft authentic kit reviews: Hypothesis 1

x	$\bar{x}$	x - $\bar{x}$	$(x$- $\bar{x})^2$
121	107.750	13.250	175.563
88	107.750	-19.750	390.063
95	107.750	-12.750	162.563
137	107.750	29.250	855.563
135	107.750	27.250	742.563
111	107.750	3.250	10.563
153	107.750	45.250	2047.563
134	107.750	26.250	689.063
57	107.750	-50.750	2575.563
84	107.750	-23.750	564.063
98	107.750	-9.750	95.063
80	107.750	-27.750	770.063
		Σ	9078.256
		n-1	11
		$\Sigma/n-1$	825.296
		S.D. =	28.723

Table 8.3: Standard deviation calculations for type authentic kit reviews: Hypothesis 2

x	$\bar{x}$	x - $\bar{x}$	$(x$- $\bar{x})^2$
12	10.923	1.077	1.160
17	10.923	6.077	36.930
12	10.923	1.077	1.160
16	10.923	5.077	25.776
19	10.923	8.077	65.238
11	10.923	0.077	0.006
7	10.923	-3.923	15.390
7	10.923	-3.923	15.390
6	10.923	-4.923	24.236
7	10.923	-3.923	15.390

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Table 8.3 – Continued

x	$\bar{x}$	x - $\bar{x}$	$(x$- $\bar{x})^2$
15	10.923	4.077	16.622
2	10.923	-8.923	79.620
11	10.923	0.077	0.006
		Σ	296.924
		n-1	12
		$\Sigma/n-1$	24.744
		S.D. =	4.974

Table 8.4: Standard deviation calculations for craft authentic kit reviews: Hypothesis 2

x	$\bar{x}$	x - $\bar{x}$	$(x$- $\bar{x})^2$
18	15.750	2.250	5.063
10	15.750	-5.750	33.063
29	15.750	13.250	175.563
18	15.750	2.250	5.063
15	15.750	-0.750	0.563
29	15.750	13.250	175.563
19	15.750	3.250	10.563
13	15.750	-2.750	7.563
4	15.750	-11.750	138.063
12	15.750	-3.750	14.063
17	15.750	1.250	1.563
5	15.750	-10.750	115.563
		Σ	682.256
		n-1	11
		$\Sigma/n-1$	62.023
		S.D. =	7.876

Table 8.5: Standard deviation calculations for type authentic kit reviews: Hypothesis 3

x	$\bar{x}$	x - $\bar{x}$	$(x$- $\bar{x})^2$
7	7.692	-0.692	0.479
6	7.692	-1.692	2.863
18	7.692	10.308	106.255
1	7.692	-6.692	44.783
2	7.692	-5.692	32.399
6	7.692	-1.692	2.863
8	7.692	0.308	0.095
8	7.692	0.308	0.095
16	7.692	8.308	69.023
7	7.692	-0.692	0.479
11	7.692	3.308	10.943
1	7.692	-6.692	44.783
9	7.692	1.308	1.711
		Σ	316.771
		n-1	12
		$\Sigma/n-1$	26.398
		S.D. =	5.138

Table 8.6: Standard deviation calculations for craft authentic kit reviews: Hypothesis 3

x	$\bar{x}$	x - $\bar{x}$	$(x$- $\bar{x})^2$
5	7.667	-2.667	7.113
9	7.667	1.333	1.777
2	7.667	-5.667	32.115
8	7.667	0.333	0.111
9	7.667	1.333	1.777
0	7.667	-7.667	58.783
15	7.667	7.333	53.773
8	7.667	0.333	0.111
13	7.667	5.333	28.441

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Table 8.6 – Continued

x	$\bar{x}$	x - $\bar{x}$	$(x$- $\bar{x})^2$
9	7.667	1.333	1.777
5	7.667	-2.667	7.113
9	7.667	1.333	1.777
		Σ	194.668
		n-1	11
		$\Sigma/n-1$	17.697
		S.D. =	4.207

Table 8.7: Standard deviation calculations for type authentic kit reviews: Hypothesis 4

x	$\bar{x}$	x - $\bar{x}$	$(x$- $\bar{x})^2$
124	105.308	18.692	349.391
112	105.308	6.692	44.783
135	105.308	29.692	881.615
98	105.308	-7.308	53.407
94	105.308	-11.308	127.871
120	105.308	14.692	215.855
106	105.308	0.692	0.479
104	105.308	-1.308	1.711
131	105.308	25.692	660.079
53	105.308	-52.308	2736.127
116	105.308	10.692	114.319
102	105.308	-3.308	10.943
74	105.308	-31.308	980.191
		Σ	6176.771
		n-1	12
		$\Sigma/n-1$	514.731
		S.D. =	22.688

Table 8.8: Standard deviation calculations for craft authentic kit reviews: Hypothesis 4

x	$\bar{x}$	x - $\bar{x}$	$(x$- $\bar{x})^2$
155	160.917	-5.917	35.011
150	160.917	-10.917	119.181
132	160.917	-28.917	836.193
210	160.917	49.083	2409.141
215	160.917	54.083	2924.971
163	160.917	2.083	4.339
258	160.917	97.083	9425.109
157	160.917	-3.917	15.343
104	160.917	-56.917	3239.545
149	160.917	-11.917	142.015
131	160.917	-29.917	895.027
107	160.917	-53.917	2907.043
		Σ	22952.918
		n-1	11
		$\Sigma/n-1$	2086.629
		S.D. =	45.680

Appendix III: Z –score calculations for kit car reviews

Table 8.9: Z–score calculations for type authentic kit reviews: Hypothesis 1

x	μ	**s.d.**	x - μ	**z–score**
83	67.846	22.664	15.154	0.669
44	67.846	22.664	-23.846	-1.052
101	67.846	22.664	33.154	1.463
72	67.846	22.664	4.154	0.183
48	67.846	22.664	-19.846	-0.876
92	67.846	22.664	24.154	1.066
72	67.846	22.664	4.154	0.183
69	67.846	22.664	1.154	0.051
94	67.846	22.664	26.154	1.154
28	67.846	22.664	-39.846	-1.758
81	67.846	22.664	13.154	0.580
56	67.846	22.664	-11.846	-0.523
42	67.846	22.664	-25.846	-1.140

Table 8.10: Z–score calculations for craft authentic kit reviews: Hypothesis 1

x	μ	**s.d.**	x - μ	**z–score**
121	107.750	28.728	13.250	0.461

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Table 8.10 – Continued

x	μ	**s.d.**	x - μ	**(z–score**
88	107.750	28.728	-19.750	-0.679
95	107.750	28.728	-12.750	-0.444
137	107.750	28.728	29.250	1.018
135	107.750	28.728	27.250	0.949
111	107.750	28.728	3.250	0.113
153	107.750	28.728	45.250	1.575
134	107.750	28.728	26.250	0.914
57	107.750	28.728	-50.750	-1.767
84	107.750	28.728	-23.750	-0.827
98	107.750	28.728	-9.750	-0.339
80	107.750	28.728	-27.750	-0.966

Table 8.11: Z–score calculations for type authentic kit reviews: Hypothesis 2

x	μ	**s.d.**	x - μ	**z–score**
12	10.923	4.974	1.077	0.217
17	10.923	4.974	6.077	1.222
12	10.923	4.974	1.077	0.217
16	10.923	4.974	5.077	1.021
19	10.923	4.974	8.077	1.624
11	10.923	4.974	0.077	0.016
7	10.923	4.974	-3.923	-0.789
7	10.923	4.974	-3.923	-0.789
6	10.923	4.974	-4.923	-0.990
7	10.923	4.974	-3.923	-0.789
15	10.923	4.974	4.077	0.820
2	10.923	4.974	-8.923	-1.794
11	10.923	4.974	0.077	0.016

Table 8.12: Z–score calculations for craft authentic kit reviews: Hypothesis 2

x	μ	**s.d.**	x - μ	**z–score**
18	15.750	7.876	2.250	0.286
10	15.750	7.876	-5.750	-0.730
29	15.750	7.876	13.250	1.682
18	15.750	7.876	2.250	0.286
15	15.750	7.876	-0.750	-0.095
29	15.750	7.876	13.250	1.682
19	15.750	7.876	3.250	0.413
13	15.750	7.876	-2.750	-0.349
4	15.750	7.876	-11.750	-1.492
12	15.750	7.876	-3.750	-0.476
17	15.750	7.876	1.250	0.159
5	15.750	7.876	-10.750	-1.365

Table 8.13: Z–score calculations for type authentic kit reviews: Hypothesis 3

x	μ	**s.d.**	x - μ	**z–score**
7	7.692	5.138	-0.692	-0.135
6	7.692	5.138	-1.692	-0.329
18	7.692	5.138	10.308	2.006
1	7.692	5.138	-6.692	-1.303
2	7.692	5.138	-5.692	-1.108
6	7.692	5.138	-1.692	-0.329
8	7.692	5.138	0.308	0.060
8	7.692	5.138	0.308	0.060
16	7.692	5.138	8.308	1.617
7	7.692	5.138	-0.692	-0.135
11	7.692	5.138	3.308	0.644
1	7.692	5.138	-6.692	-1.303
9	7.692	5.138	1.308	0.255

Table 8.14: Z–score calculations for craft authentic kit reviews: Hypothesis 3

x	μ	**s.d.**	x - μ	**z–score**
5	7.667	4.207	-2.667	-0.634
9	7.667	4.207	1.333	0.317
2	7.667	4.207	-5.667	-1.347
8	7.667	4.207	0.333	0.079
9	7.667	4.207	1.333	0.317
0	7.667	4.207	-7.667	-1.822
15	7.667	4.207	7.333	1.743
8	7.667	4.207	0.333	0.079
13	7.667	4.207	5.333	1.268
9	7.667	4.207	1.333	0.317
5	7.667	4.207	-2.667	-0.634
9	7.667	4.207	1.333	0.317

Table 8.15: Z–score calculations for type authentic kit reviews: Hypothesis 4

x	μ	**s.d.**	x - μ	**z–score**
124	105.308	22.688	18.692	0.824
112	105.308	22.688	6.692	0.295
135	105.308	22.688	29.692	1.309
98	105.308	22.688	-7.308	-0.322
94	105.308	22.688	-11.308	-0.498
120	105.308	22.688	14.692	0.648
106	105.308	22.688	0.692	0.031
104	105.308	22.688	-1.308	-0.058
131	105.308	22.688	25.692	1.132
53	105.308	22.688	-52.308	-2.306
116	105.308	22.688	10.692	0.471

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Table 8.15 – Continued

x	μ	**s.d.**	x - μ	**(z–score**
102	105.308	22.688	-3.308	-0.146
74	105.308	22.688	-31.308	-1.380

Table 8.16: Z–score calculations for craft authentic kit reviews: Hypothesis 4

x	μ	**s.d.**	x - μ	**z–score**
155	160.917	45.680	-5.917	-0.130
150	160.917	45.680	-10.917	-0.239
132	160.917	45.680	-28.917	-0.633
210	160.917	45.680	49.083	1.075
215	160.917	45.680	54.083	1.184
163	160.917	45.680	2.083	0.046
258	160.917	45.680	97.083	2.125
157	160.917	45.680	-3.917	-0.086
104	160.917	45.680	-56.917	-1.246
149	160.917	45.680	-11.917	-0.261
131	160.917	45.680	-29.917	-0.655
107	160.917	45.680	-53.917	-1.180

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