

Appendix

Table A.1 Ford’s product and market segmentation

Model	Number of trim	Category
Crown victoria	4	Passenger
Econoline	18	Mini vans and vans
Escape	13	Sport utility vehicle
Excursion	31	Sport utility vehicle
Expedition	14	Sport utility vehicle
Explorer	34	Pick-up trucks
Explorer sport	16	Sport utility vehicle
F-150	43	Pick-up trucks
Focus	16	Passenger
Mustang	14	Passenger-luxus
Ranger	25	Pick-up trucks
Super duty F-250	33	Pick-up trucks
Super duty F-350 DRW	24	Pick-up trucks
Super duty F-350 SRW	32	Pick-up trucks
Taurus—4dr Sdn LX	1	Passenger
Taurus—4dr Sdn SE	12	Passenger
Thunderbird	5	Passenger-luxus
Windstar	6	Passenger
ZX2	3	Passenger

Table A.2 Grouping niche market products in car’s characteristic

Characteristic	Product’s group
Exterior	Accessories for exterior, accessories for tyres, tyre, electrical product: lightening, wheel accessories
Interior	Accessories for interior
Performance	Chassis suspension and brakes, intake and fuel system, product for engine (external), product for temperature control
Specification	Special components, engine, wheel, electrical product for engine, drive train product, product for engine (internal), exhaust system products
Safety	Electrical product: safety, security equipment
comfort-entertainment	Mobile electronic

Source SEMA and NADA websites. My elaboration

Table A.3 Variables in the dataset

Variable	Type of variable	Notes on the variable	Variable	Type of variable	Notes on the variable
<i>Price</i>					
Base MSRP price	Continuous	In the analysis	AM/FM Stereo	Continuous	In the analysis
Base invoice price	Continuous	Replication	Cassette Player	Continuous	In the analysis
Destination charge	Continuous	No interest	CD Player	Continuous	In the analysis
			CD Changer	Continuous	In the analysis
<i>Specifications</i>					
Engine type	Multinomial	In the analysis	<i>Performance</i>		
Displacement	Multinomial	In the analysis	Horsepower	Continuous	In the analysis
Fuel system	Multinomial	In the analysis	Torque	Continuous	In the analysis
Drive train e	Multinomial	In the analysis	Dead weight hitch—max trailer	Continuous	In the analysis
Transmission type	Multinomial	In the analysis	Dead weight hitch—max tongue	Continuous	In the analysis
Transmission description	Multinomial	In the analysis	Distribution hitch—max trailer	Continuous	Tautological
EPA fuel economy est.—city	Continuous	Missing values	Distribution hitch—max tongue	Continuous	Tautological
EPA fuel economy est.—hwy	Continuous	Missing values			
Fuel tank capacity	Continuous	In the analysis	<i>Interior</i>		
Cruising range—city	Continuous	Missing values	Passenger capacity	Discrete	In the analysis
Cruising range—hwy	Continuous	Missing values	Cargo volume	Continuous	In the analysis
Fuel type	Multinomial	No differentiation	Front head room	Continuous	In the analysis
			Second row head room	Continuous	In the analysis
			Front leg room	Continuous	In the analysis
<i>Safety</i>					
Air bag—driver—front	Binary	No differentiation	Second row leg room	Continuous	In the analysis
Air bag—passenger—front	Binary	No differentiation	Front hip room	Continuous	In the analysis
Air bag—passenger switch	Binary	In the analysis	Second row hip room	Continuous	In the analysis
Air bag—side—body—front	Binary	Missing values	Front shoulder room	Continuous	In the analysis
Air bag—side—head only	Binary	Missing values	Second row shoulder room	Continuous	In the analysis
ABS brakes—4 wheel	Binary	Missing value			

(continued)

Table A.3 (continued)

Variable	Type of variable	Notes on the variable	Variable	Type of variable	Notes on the variable
ABS brakes—rear wheels only	Binary	In the analysis	<i>Exterior</i>		
Traction control	Binary	In the analysis	Wheelbase	Continuous	In the analysis
Child Safety locks	Binary	In the analysis	Length	Continuous	In the analysis
Headlights—automatically on	Binary	No differentiation	Width, max w/o mirrors	Continuous	In the analysis
Headlights—daytime running lights	Binary	No differentiation	Height—overall 54.5	Continuous	In the analysis
			Base curb weight 3,920	Continuous	Missing values
<i>Comfort</i>			Ground clearance	Continuous	Missing values
Cruise control		In the analysis	Turning diameter—curb to curb 36.1	Continuous	Missing values
Air conditioning—front	Binary	In the analysis	Front tires	Multinomial	In the analysis
Automatic climate control	Binary	In the analysis	Rear tires	Multinomial	Same information
Dual zone climate control	Binary	Never available	Sunroof / moonroof	Binary	In the analysis
Remote keyless entry	Binary	In the analysis	Rear window defroster	Binary	In the analysis
Vehicle anti-theft protection	Binary	In the analysis			
Power windows	Binary	Standard	<i>Warranty</i>		
Power door locks	Binary	Standard	Basic 4 years	Multinomial	Not relevant
Power steering	Binary	Standard	Drivetrain 4 years	Multinomial	Not relevant
Power mirrors—driver	Binary	Standard	Corrosion 5 years	Multinomial	Not relevant
Power mirrors—passenger	Binary	Standard	Roadside assistance	Multinomial	Not relevant
Power seats—driver	Binary	In the analysis			
Power seats—passenger	Binary	Tautological			
Leather seats	Binary	In the analysis			
Steering wheel audio controls	Binary	Never available			
Navigation system	Binary	Never available			
Universal garage door opener	Binary	In the analysis			

Source NADA website. My elaboration

Table A.4 Products sold in the niche market and categorisation. Source SEMA website. My elaboration

Product	Category	Product	Category
Air_dams	Accessories for exterior	Electronic parking sensors	Mobile electronic
Bed drawers	Accessories for exterior	Equalizers	Mobile electronic
Bed extenders	Accessories for exterior	Gaskets/washers	Mobile electronic
Bed rail caps	Accessories for exterior	Head Units/receivers	Mobile electronic
Bed_mats	Accessories for exterior	Insulating material	Mobile electronic
Bedliners—drop-In/carpet	Accessories for exterior	Miscellaneous hardware	Mobile electronic
Bedlinersspray-on	Accessories for exterior	Monitors	Mobile electronic
Body decals/graphics	Accessories for exterior	MP3 players	Mobile electronic
Body parts/panels—fiberglass	Accessories for exterior	Navigation systems/GPS	Mobile electronic
Body parts/panels—sheet metal	Accessories for exterior	Radar detectors	Mobile electronic
Body styling kits	Accessories for exterior	Radar scramblers	Mobile electronic
Body trim/molding	Accessories for exterior	Speakers	Mobile electronic
Bras/masks	Accessories for exterior	Subwoofers	Mobile electronic
Bug deflectors/bug guards	Accessories for exterior	Telematics	Mobile electronic
Bumper covers	Accessories for exterior	TV tuners	Mobile electronic
Bumpers	Accessories for exterior	Video antennas	Mobile electronic
Cab extenders	Accessories for exterior	Videocassette players	Mobile electronic
Camper shells	Accessories for exterior	Alternators	Electrical product for engine
Car/truck covers	Accessories for exterior	Batteries	Electrical product for engine
Cargo/trunk organizers	Accessories for exterior	Computer chipsvehicle	Electrical product for engine
Conversions	Accessories for exterior	Computersvehicle	Electrical product for engine
Convertible tops	Accessories for exterior	Cruise control units	Electrical product for engine
Custom truck beds	Accessories for exterior	Electronic control modules	Electrical product for engine
Doors	Accessories for exterior	Generators	Electrical product for engine
Fascias	Accessories for exterior	Insulating productselectronic	Electrical product for engine
Fender trim and molding	Accessories for exterior	Sensors	Electrical product for engine
Flaresfender/body/etc.	Accessories for exterior	Solenoids	Electrical product for engine

(continued)

Table A.4 (continued)

Product	Category	Product	Category
Fuel filler doors	Accessories for exterior	Starters	Electrical product for engine
Gas caps	Accessories for exterior	Voltage regulators	Electrical product for engine
Gaskets/body accessories	Accessories for exterior	Wiring harnesses	Electrical product for engine
Gold trim	Accessories for exterior	Automotive bulbs	Electrical product: lightening
Grille guards/brush guards	Accessories for exterior	Backup lights	Electrical product: lightening
Grille guards/push bars/brush guards/bull bars	Accessories for exterior	Center/high-mounted stoplights	Electrical product: lightening
Grilles	Accessories for exterior	Driving/foglights	Electrical product: lightening
Ground effects	Accessories for exterior	Halogen bulbs	Electrical product: lightening
Hardtops	Accessories for exterior	Handheld lights	Electrical product: lightening
Headache racks	Accessories for exterior	HID/Xenon headlights	Electrical product: lightening
Headlight lenses	Accessories for exterior	Industrial/work lights	Electrical product: lightening
Hitch covers	Accessories for exterior	Interior lighting	Electrical product: lightening
Hoods	Accessories for exterior	leds	Electrical product: lightening
Ladder racks	Accessories for exterior	Lighting harnesses	Electrical product: lightening
License plate frames	Accessories for exterior	Neon lighting	Electrical product: lightening
License plates	Accessories for exterior	Off-road lights	Electrical product: lightening
Lift gates	Accessories for exterior	Projector headlights	Electrical product: lightening
Light bars	Accessories for exterior	Rear foglights	Electrical product: lightening
Loading ramps	Accessories for exterior	Sealed beam bulbs	Electrical product: lightening
Louvers	Accessories for exterior	Strip lighting	Electrical product: lightening
Luggage racks	Accessories for exterior	Taillights	Electrical product: lightening
Mirrors	Accessories for exterior	Power window/door/trunk locks	Electrical product: safety
Mud flaps/splash guards	Accessories for exterior	Security devices/alarms	Electrical product: safety
Nerf bars, accent bars	Accessories for exterior	Diesel engines	Engine
Pinstriping	Accessories for exterior	Engine blocks	Engine
Racks/carriers	Accessories for exterior	Engines/complete	Engine
Rear decorating lenses	Accessories for exterior	Air cleaners/accessories	Product for engine (external)

(continued)

Table A.4 (continued)

Product	Category	Product	Category
Rocker panel trim	Accessories for exterior	Air conditioning compressors	Product for engine (external)
Running boards	Accessories for exterior	Air conditioning hoses	Product for engine (external)
Simulated convertibles/landaas	Accessories for exterior	Air conditioning units	Product for engine (external)
Spare tire covers	Accessories for exterior	Dipsticks	Product for engine (external)
Spoilers	Accessories for exterior	Engine adapters	Product for engine (external)
Stepscab/side/tire	Accessories for exterior	Engine dress-up items	Product for engine (external)
Sunroof deflectors	Accessories for exterior	Engine hoses	Product for engine (external)
Sunroofelectric power sliding	Accessories for exterior	Harmonic balancers/dampers	Product for engine (external)
Sunroofpop-up tilting	Accessories for exterior	Hose clamps	Product for engine (external)
Sunroofs spoiler top-mount	Accessories for exterior	Motor mounts	Product for engine (external)
SunroofsT-top	Accessories for exterior	Oil caps	Product for engine (external)
Tailgate nets	Accessories for exterior	Oil pans	Product for engine (external)
Tailgate protectors	Accessories for exterior	Timing covers	Product for engine (external)
Tailgates	Accessories for exterior	Valve covers	Product for engine (external)
Taillight covers	Accessories for exterior	Boltsrod, head, etc.	Product for engine (internal)
Taillight lenses	Accessories for exterior	Camshafts	Product for engine (internal)
Tape friction/masking/stripping	Accessories for exterior	Connecting rods	Product for engine (internal)
Tie-downs	Accessories for exterior	Crankshafts	Product for engine (internal)
Tire covers	Accessories for exterior	Cylinder heads	Product for engine (internal)
Tonneau covers	Accessories for exterior	Engine bearings	Product for engine (internal)
Toolboxes/bed boxes	Accessories for exterior	Engine rebuilding kits	Product for engine (internal)
TopsT-tops/bikini tops/umbrella tops	Accessories for exterior	Freeze plugs	Product for engine (internal)
Towing accessories	Accessories for exterior	Gasketsinternal engine	Product for engine (internal)
Truck bed accessories	Accessories for exterior	Gear drives	Product for engine (internal)
Truck bed bars	Accessories for exterior	Lifters	Product for engine (internal)
Truck caps	Accessories for exterior	Main caps	Product for engine (internal)
Truck slider windows	Accessories for exterior	Oil pumps	Product for engine (internal)

(continued)

Table A.4 (continued)

Product	Category	Product	Category
Vents	Accessories for exterior	Piston ring sets	Product for engine (internal)
Visors	Accessories for exterior	Pistons	Product for engine (internal)
Winches	Accessories for exterior	Push rods	Product for engine (internal)
Window boots	Accessories for exterior	Rocker arms	Product for engine (internal)
Window deflectors	Accessories for exterior	Timing chains/belts/gears	Product for engine (internal)
Window tint film	Accessories for exterior	Valve springs	Product for engine (internal)
Windows	Accessories for exterior	Valves	Product for engine (internal)
Wings	Accessories for exterior	Windage trays/baffles	Product for engine (internal)
Wiper blades	Accessories for exterior	Catalytic converters	Exhaust system product
12-Volt accessories	Accessories for interior	Engine/exhaust brakes	Exhaust system product
Armrest	Accessories for interior	Exhaust headers	Exhaust system product
Car/truck floor mats	Accessories for interior	Exhaust manifolds	Exhaust system product
Cargo area liners	Accessories for interior	Exhaust pipes/tubing	Exhaust system product
Carpeting	Accessories for interior	Exhaust tips	Exhaust system product
Consoles	Accessories for interior	Gasket/exhaust system	Exhaust system product
Cupholders	Accessories for interior	Hangers/clamps	Exhaust system product
Dashboard covers	Accessories for interior	Mufflers	Exhaust system product
Dashboard trim/overlays	Accessories for interior	Air snorkels	Intake and fuel system
Door panels	Accessories for interior	Auxiliary tanks	Intake and fuel system
Doorsill protectors	Accessories for interior	Boost controls	Intake and fuel system
Headliners	Accessories for interior	Carburetor adapters	Intake and fuel system
Interior graphics	Accessories for interior	Carburetor baseplates	Intake and fuel system
Leather	Accessories for interior	Carburetors	Intake and fuel system
Litter baskets	Accessories for interior	Cold air intake systems	Intake and fuel system
Seat covers	Accessories for interior	Electronic control units/fuel system	Intake and fuel system
Seat heaters	Accessories for interior	Fuel injection systems	Intake and fuel system
Seat upholstery	Accessories for interior	Fuel injectors	Intake and fuel system

(continued)

Table A.4 (continued)

Product	Category	Product	Category
Seats/custom	Accessories for interior	Fuel lines	Intake and fuel system
Steering wheel covers	Accessories for interior	Fuel pressure regulators	Intake and fuel system
Steering wheels	Accessories for interior	Fuel pumps	Intake and fuel system
Storage boxes/compartments	Accessories for interior	Fuel tanks	Intake and fuel system
Tables/snack trays	Accessories for interior	Gaskets/fuel system	Intake and fuel system
Trunk liners/mats	Accessories for interior	Intake manifolds	Intake and fuel system
Trunk organizers	Accessories for interior	Intercoolers	Intake and fuel system
Van furniture	Accessories for interior	Nitrous oxide systems	Intake and fuel system
Weatherstripping	Accessories for interior	Octane boosters	Intake and fuel system
Window	Accessories for interior	Racing fuels	Intake and fuel system
Window blinds/curtains	Accessories for interior	Superchargers	Intake and fuel system
Window shades	Accessories for interior	Throttle bodies	Intake and fuel system
Air bags suspension	Chassis suspension and brakes	Turbochargers	Intake and fuel system
Air brake parts	Chassis suspension and brakes	Velocity stacks	Intake and fuel system
Antilock brake systems	Chassis suspension and brakes	Airbags	Safety
Bearings/wheel/axle/etc.	Chassis suspension and brakes	Alcohol detectors	Safety
Brake cables	Chassis suspension and brakes	Backup cameras	Safety
Brake callipers	Chassis suspension and brakes	Blankets	Safety
Brake conversion kits	Chassis suspension and brakes	Camera vision products	Safety
Brake cylinders	Chassis suspension and brakes	Child restraints	Safety
Brake drums	Chassis suspension and brakes	Child seats	Safety
Brake lines/clamps	Chassis suspension and brakes	Crash test dummies	Safety
Brake parts, disc	Chassis suspension and brakes	Fire extinguishers	Safety
Brake rotors	Chassis suspension and brakes	Fresh air breathing apparatus	Safety
Brake shoes/pads	Chassis suspension and brakes	Heat shields/firewall insulation	Safety
Bushings/rubber	Chassis suspension and brakes	Helmets	Safety
Bushings/synthetic/poly	Chassis suspension and brakes	Hood locks	Safety

(continued)

Table A.4 (continued)

Product	Category	Product	Category
Chassis kits	Chassis suspension and brakes	Parachutes	Safety
Coil springs	Chassis suspension and brakes	Pet restraints	Safety
Computer-controlled ride control systems	Chassis suspension and brakes	Racing seats	Safety
Control arms	Chassis suspension and brakes	Racing shoes/apparel	Safety
CV boots	Chassis suspension and brakes	Roll bars	Safety
CV joints	Chassis suspension and brakes	Roll cages	Safety
Frames vehicle	Chassis suspension and brakes	Safety belts/harnesses	Safety
Idler arm gussets	Chassis suspension and brakes	Scatter shields/guards/blankets	Safety
Idler arms	Chassis suspension and brakes	Replica cars	Specialty component
Independent front suspension	Chassis suspension and brakes	Condensers	Product for temperature control
Independent rear suspension	Chassis suspension and brakes	Conventional fans	Product for temperature control
Leaf springs	Chassis suspension and brakes	Defoggers/defrosters	Product for temperature control
Lift kits	Chassis suspension and brakes	Electric fans	Product for temperature control
Line lock system	Chassis suspension and brakes	Engine cooling systems	Product for temperature control
Lowering kits	Chassis suspension and brakes	Fan belts	Product for temperature control
Multiple shock kits	Chassis suspension and brakes	Gaskets/cooling system	Product for temperature control
Off-road suspension kits	Chassis suspension and brakes	Hoses/cooling system	Product for temperature control
Race car chassis building supplies	Chassis suspension and brakes	Oil coolers	Product for temperature control
Rubber springs and suspension	Chassis suspension and brakes	Pulleys	Product for temperature control
Shackles	Chassis suspension and brakes	Radiator caps	Product for temperature control
Shock absorbers/struts	Chassis suspension and brakes	Radiators	Product for temperature control
Skid plates	Chassis suspension and brakes	Thermostats	Product for temperature control
Steering boxes	Chassis suspension and brakes	Transmission coolers	Product for temperature control
Steering columns	Chassis suspension and brakes	Transmissions	Product for temperature control
Steering conversion kits	Chassis suspension and brakes	Water pumps	Product for temperature control
Steering stabilizers	Chassis suspension and brakes	Agricultural tires	Tire
Steering U-joints/assemblies	Chassis suspension and brakes	Antique/classic/vintage tires	Tire

(continued)

Table A.4 (continued)

Product	Category	Product	Category
Strut tower braces	Chassis suspension and brakes	ATV/ATC tires	Tire
Subframe connectors	Chassis suspension and brakes	Drag racing tires	Tire
Subframes	Chassis suspension and brakes	Heavy truck tires	Tire
Sway bars	Chassis suspension and brakes	High-performance street tires	Tire
Tie-rod ends	Chassis suspension and brakes	Industrial tires	Tire
Torsion bars	Chassis suspension and brakes	Light-truck/SUV tires	Tire
Traction bars/controls	Chassis suspension and brakes	Off-road tires	Tire
Trusses	Chassis suspension and brakes	Oval track/road racing tires	Tire
Axles	Drivetrain product	Passenger car tires	Tire
Bell housings	Drivetrain product	Sand sports tires	Tire
Clutches	Drivetrain product	Inner tubes	Accessories for tyres
Differential covers	Drivetrain product	Pressure gauges	Accessories for tyres
Differential gears	Drivetrain product	Snow chains	Accessories for tyres
Driveshaft loops	Drivetrain product	Tire covers	Accessories for tyres
Driveshafts/half shafts	Drivetrain product	Tire deflators	Accessories for tyres
Flexplates	Drivetrain product	Tire inflating systems	Accessories for tyres
Flywheels	Drivetrain product	Tire inflation accessories	Accessories for tyres
Gaskets drivetrain	Drivetrain product	Tire lubricants	Accessories for tyres
Hubsaxle	Drivetrain product	Tire pressure monitoring systems	Accessories for tyres
Linkage kits	Drivetrain product	Tire pumps	Accessories for tyres
Overdrive/underdrive units	Drivetrain product	Tire repair materials	Accessories for tyres
Positive traction devices	Drivetrain product	Tire sealants	Accessories for tyres
Pressure plates	drivetrain product	Tire studs	Accessories for tyres
Ring-and-pinion gears	Drivetrain product	Valve stem caps	Accessories for tyres
Shift improvement kits/performance/manual/auto	Drivetrain product	Valve stems	Accessories for tyres
Shifters automatic	Drivetrain product	Aluminum wheels/cast/forged	Accessories for tyres
Shifters manual	Drivetrain product	Composite wheels	Wheel
			Wheel

(continued)

Table A.4 (continued)

Product	Category	Product	Category
Throttle bearings standard/hydraulic	Drivetrain product	Dual wheels	Wheel
Torque converters	Drivetrain product	Modular wheels	Wheel
Transaxles	Drivetrain product	Original (OEM)/replica wheels	Wheel
Transfer cases	Drivetrain product	Steel wheels	Wheel
Transmission components	Drivetrain product	Three-piece wheels	Wheel
Transmission mounts	Drivetrain product	Two-piece wheels	Wheel
Transmissions automatic	Drivetrain product	Wire wheels	Wheel
Transmissions manual	Drivetrain product	Accent lighting-wheels	Accessories for wheels
Universal joints	Drivetrain product	Lug nuts	Accessories for wheels
Amplifiers	Mobile electronic	Wheel adapters	Accessories for wheels
Antennas	Mobile electronic	Wheel center caps	Accessories for wheels
Cameras	Mobile electronic	Wheel covers	Accessories for wheels
Cassette players/recorders	Mobile electronic	Wheel hubs	Accessories for wheels
CD changers	Mobile electronic	Wheel locks	Accessories for wheels
CD players/recorders	Mobile electronic	Wheel lug pattern tools	Accessories for wheels
Crossover networks	Mobile electronic	Wheel spacers	Accessories for wheels
DVD players	Mobile electronic	Wheel spinners	Accessories for wheels

Conclusion

In this book I carried out an investigation on product variety in the U.S. automobile industry. This investigation is interesting for two reasons. The first reason is the presence in the industry of a niche market that provides opportunities for post sales customisation. This peculiar structure allows the development a new type of analysis of product variety. Secondly, niche markets are an important source of qualitative variety, according to Saviotti the most important factor for the economic growth. In order to further develop this issue, I aimed to shed fresh empirical light both on the nature of niche market in this industry and on the limits of variety generation.

Chapters 1 and 2 provided the historical context and the theoretical background to define a framework for the data analysis. Chapter 1 explained how variety broadened over the last century and how a niche market for specialty components developed. From the description of the sector emerged a paradox that is the co-existence of a growing niche market that provide post sale customisation and of the successful effort of increasing variety in the automobile industry. Chapter 2 described two different theoretical approaches to the analysis of variety that lead to different hypotheses on its nature and on the nature of its limits. PLC theories consider variety as improvement in product and suggest that its limits depend on the hierarchical structure of the product design, whilst Lancastrian approach stresses the interplay of market forces. The attempt both of finding a reason for the paradox and of testing these two different frameworks has steered the route of the empirical analysis.

In Chap. 3, I first explained why methodologies used in other studies that addressed similarly issues could not be applied to this research and, thus, why the need of a new tool emerged. I, thereafter, introduced the niche market analysis as tool of analysis and I discussed its assumption and limits.

Finally, Chap. 3 disclosed the results of the empirical analysis. Concerning the nature and the operation of the niche market, it first highlighted a sharp division of labour between large companies and the niche market: the niche market generates variety where market knowledge is a key competitive advantage. Large companies, as represented by Ford, on the contrary, produced two kinds of variety: “variety as customisation”, in those fields where the economies of scale are not

crucial but the niche market did not develop any market knowledge and “variety as segmentation” where economies of scale are important and variety is set before the production. “Variety as customisation” is relatively high and “variety as segmentation” is narrow. From the analysis, it also emerged that this niche market is not a homogenous entity but, as a fractal, it presents again at a smaller scale the same dualism between large and small companies. A last result concerned the relationship between demand heterogeneity and emergence and survival of niche markets: heterogeneity is required but preference should be not too diverse.

Concerning the limits of variety generation, as premise, it was shown that, in line with the predictions of the theory, modularity plays a key role in the customisation process. The paradox put forward in the first chapter finds a solution. For large companies modularity has been a double edge sword: the same modularity introduced by car producers to broaden the variety’s supply allowed the development of a niche market that can better exploit it. Modularity reduces the fixed cost and, therefore the importance of economies of scale, as competitive advantage for large companies. The fact that only by introducing modularity, *id est* an architectural innovation, firms can produce more variety implies that the limits of production are indeed in the structure of the product, as explained by PLC theory. However, it was explained that modularity itself makes the hierarchy more flexible and shifts the limits of variety from the design to the Lancastrian market forces. *Rebus sic stantibus*, the two limits coexist and, since the design of the car is far from being modular, the limits of design hierarchy still play a major role. In addition, even if the future car design is fully modular, PLC theory will still hold for the explanation of the evolution of variety in the single components.

These results have few implications for this industry and call for more research.

First, they warn expertises of the industry about the possible disruption coming from a further modularisation. In many industries, where modularity has reached a higher degree, there is a competitive tension between the owner of platform and producers of devices for post sales product. On the one hand post sale customisation can be considered as a way to increase the appealing of the product that generates positive externalities and, therefore, more sales for platform owner. On the other hand, it can be seen as a threat because it can shift the perceived valued (thus, the highest mark up) from the platform to the module. This goes to detriment of the profits of the platform owner. The relation between hardware and software in the computer industry is paradigmatic for this competitive tension.

This book has a poor dynamic dimension and it cannot forecast the future evolution of modularity. For the moment, modularity is limited and niche market negligible compared with the figure of the large producers. It is pointed out, however, the strategic importance of the direction of modularity. Large firms compete in variety by producing increasing modular artefact, but this results suggest that the niche market can partly appropriate of the benefits from increased modularity. Results also suggest large companies a strategy in order to have higher appropriability of benefits from variety generation gained through modularity. Further development of modularity should concern those components where the

niche market does not have any market competitive advantages.¹ This issue calls for more empirical research to understand along what kinds of path the design of vehicles can evolve in the industry.

I can add two final comments, which are not industry specific. First, the new methodology applied here can be generalized to other sector, *mutatis mutandis*. The automobile industry is not the only industry that presents this dualism in its industrial structure: the bicycle industry show a similar dualism, in computer industry there is niche market for customising the machine (by adding more memories, buying different devices, etc.) and even in the furniture industry there is the possibility of buying modules for self assembling and of a concrete “do it yourself”. Moreover, as seen in these conclusions, niche market analysis can be a tool for a researcher interested in the economics of variety generations, but it can also be a way to assess the strategic position of firm in the generation of variety and a promising tool for marketing research on consumer preferences.

Finally, the evidence of the coexistence of different types of limits has few implications. It implies that the distinction operated in literature makes little sense: variety as innovation, in the PLC theory, and variety as differentiation, in the Chamberlain and Lancastrian approaches, occur together and are hardly distinguishable. This book therefore calls for a holistic approach that take into account the two varieties and their interplay. This support the view of those scientists (Freeman 1994, for instance p. 480) that suggested that the ancient dichotomy demand-pull/technology-push in innovation studies should be buried. Modularity, by releasing the variety from architectural boundaries empowered the market forces and thus demand to pull variety and innovation; however the persistence of constrains erected by technological trajectory and design architecture has still to be considered. This result could be generalise to other industries since it is a challenge to scientific community to bridge the economics of variety and the economic of innovation and technical change, although they are often considered as alternative. In sum, this book supports the view of the existence of a strong link between variety and innovation that should be taken into account in economic theory.

¹ The recent attempt of GM of providing information to disables for adapting vehicles can be read as strategic choice in this direction (GM website). In US there are 33.7 million of persons with limitations in usual activities (*source* Centre for Decease Control and Prevention, US Department of Health and Human Services, website).

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