EARLY EUROPEAN MOTOR STAGE CARS PACKAGING ITEMS AND DESIGN ELEMENTS: COMPARATIVE ANALYSIS

Packaging Items and Design Elements: Comparison of Car Design (1)

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Abstract: Through the comparison of the packaging items and design elements of four early European motor stage cars, the relationship between the design concept and packaging design of each car was analyzed. As a result of the influence of Roman chariots on the roads width and cars width, it was found that it is possible to classify them in two groups based on the design concept of "Environment". Here, Morris Mini and Fiat 500 represent the packaging designed for islands and peninsulas (with Roman influence). And Volkswagen Type 1 and Citroën 2CV represent the packaging designed for a continental area (without Roman influence). For the selected cars, the successful packaging was made taking into account the features of the environment where they were going to be used. These features, reflected in the designs, would be taken into account when developing a new car packaging.

Key words: Early European Motor Stage Cars, Packaging Items, Design Elements, Design Concepts, Roman Chariots.

1. Introduction and Method

Making decisions require some form of deliberation and evaluation by the decision maker. When there is a single decision maker, the process may not have to be rigid or repeatable or even justified to anyone other than the decision maker. In car design planning and execution, there are multiple decision makers and other interested parties making inputs into the decision making process. This process also needs to be replicated and used to justify or, at minimum, explain why specific decisions were made and who was involved in the decision making, as there is an increased need for tools and guidance to conduct the process analysis and the collaborative decision making.

1.1. Purpose

This paper is a planning analysis for designers willing to break down to a small scale problem of specific samples built in particular moments of history. To build a new car, several decisions should be made before the final design is reached. Among the several goals to be accomplished for a new car, some may be fully achieved and others may not, and the best way to determine which goal should prevail is to give a priority order to the objectives. The packaging is the organization of elements in space, particular to every car. To reach the best possible resulting packaging, an intrinsic set of small decisions are taken.

In a previous research [1] a car design was proposed, based on a web survey for potential Argentine users. And, it was found out that to build a successful car it is necessary to add design concepts in the decision making process in order to make clear what kind of goal is the most desired.

Based on the findings mentioned above, and in order to understand the design process as a whole, the present research focus is to find out the relationship between a car packaging and the main underlying design concepts that makes some specific cars so popular. Showing the previously mentioned relationship in the cars made in the past, it will be possible to determine how to proceed in a decision making process during the development stage of the packaging of a new car.
1.2. Research Direction

Four European cars were selected for this research, based on discussions of a previous paper [1], to understand the historical background of the Argentine users, whose population is mainly composed of European immigrants and their descendants.

The packaging items' classification was performed according to the methodology exposed in the paper of Kamaike and Arballo [2]. In this paper, the packaging items' classification in passenger car design development was achieved.

1.3. Method

In this research, the following methodology was used:

- Direct comparative analysis: The same types of packaging items of each car were compared and the design elements used in these cars identified.
- Kipling method of 5W1H: It was also used as a complementary method [3].

2. Cars Selection

Four European popular cars, produced after the Second World War, were chosen for this study. The cars, in chronological order of production (Figure 1), were as follows.

2.1. Citroën 2CV (France, 1948)

It was first presented at the Paris Motor Show in 1948. It has changed a little since. This car was largely aimed at the rural population of France. It had to be cheap [4]. It had to be economical in the running. It had to be capable of taking the family on a day trip to anywhere. It had to be able to be driven across a ploughed field with a basket of eggs on the back seat without breaking a single egg. It had to be capable of carrying livestock or large loads or drunk peasants in the back. Due to these design criteria it was known as "the car of the French farmers" [5].

2.2. Volkswagen Type 1 Sedan (Germany, 1949)

The original design, similar to the one shown in Figure 1, dates back to the 1930’s when Ferdinand Porsche provided the design framework for the "Car of the People" (the literal translation of Volkswagen). It was built since 1938 with a sturdy platform chassis and an amazingly reliable air-cooled, flat-four cylinder engine. It has independent four wheel’s suspension for crisp handling and driving comfort. An enlarged engine displacement and a better visibility are two of the notable changes that enabled this car, nicknamed "Beetle" to set standards for the compact car market for decades. The design of Porsche was based on aerodynamics research and economical use of steel; and a rear-mounted, air-cooled engine contributed much to the success of this car. Adolf Hitler seized the opportunity to develop the project, but few civilian models were produced before the Second World War. And, it is only after this war that the Volkswagen Corporation was re-established. The design and engineering of the Volkswagen was modified, but the overall appearance resembled the design of Porsche [6].

2.3. Fiat 500 Nuova (Italy, 1957)

Following the famous French Citroën 2CV and German Volkswagen Beetle, the Italian Fiat company released the 500 or "Cinquecento" (Figure 1) in 1957. This petite commuter had only the minimum equipment needed for an automobile. Its air-cooled, in-line twin cylinder engine had less than 500cc displacement, and was considered to be rather underpowered when climbing a slope. However, thanks to its lightweight and compactness, the 500 could cruise nimbly through town. Its suspension showed little tendency to roll during cornering, and its crisp steering and rear engine configuration gave it a sporty feel [7].
Figure 2. Cars Packaging Front and Side View with Passengers.

Figure 3. Packaging with Packaging Items.

2.4 Morris Mini (United Kingdom, 1959)

It was shown to the press on the 26th, August 1959, creating a great wave of interest within the press and public because it was a shift from automotive designs of that era [8]. This car, had a 2-box styling (Figure 1). It was a 4-seat compact car about 3 meters long, with a front engine, front wheel drive layout to keep the passenger compartment flat. It initially had an 848 cc, 34 hp engine, which allowed a speed of 115 km/h. This outstanding design allowed 80% of the overall car length for the driver and passengers’ space, which provided enough room for four big adults to be seated comfortably.

3. Packaging Items Comparison

The most important and significant packaging elements as shown in Figure 2 were compared to understand the relationship between the packaging items and the design elements. From a set of packaging items used in a Japanese company the list was narrowed down for comparison convenience and, the packaging items finally selected are shown in Figure 3, and highlighted in yellow color in Table 1. The following items, considered the most important were extracted:

| Full length (A) | Full Height (H) | Overall Width (W) |

Table 1. Packaging Items Measurements Table.

<table>
<thead>
<tr>
<th>Various Elements/Care Model</th>
<th>Citroen 2CV</th>
<th>VW Type 1</th>
<th>Fiat 500</th>
<th>Morris Mini</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full length (A)</td>
<td>3700</td>
<td>3670</td>
<td>3975</td>
<td>3630</td>
<td>mm</td>
</tr>
<tr>
<td>Full Height (H)</td>
<td>1660</td>
<td>1560</td>
<td>1335</td>
<td>1335</td>
<td>mm</td>
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<td>Overall Width (W)</td>
<td>1480</td>
<td>1540</td>
<td>1325</td>
<td>1410</td>
<td>mm</td>
</tr>
<tr>
<td>Wheelbase (B)</td>
<td>2600</td>
<td>2600</td>
<td>1840</td>
<td>2070</td>
<td>mm</td>
</tr>
<tr>
<td>Tread F (U)</td>
<td>1260</td>
<td>1290</td>
<td>1121</td>
<td>1310</td>
<td>mm</td>
</tr>
<tr>
<td>Tread R (V)</td>
<td>1200</td>
<td>1210</td>
<td>1110</td>
<td>1180</td>
<td>mm</td>
</tr>
<tr>
<td>Interior Length (F)</td>
<td>1710</td>
<td>1424</td>
<td>1482</td>
<td>1689</td>
<td>mm</td>
</tr>
<tr>
<td>Hood room (F)</td>
<td>1025</td>
<td>1033</td>
<td>905</td>
<td>995</td>
<td>mm</td>
</tr>
<tr>
<td>Head room R (Q)</td>
<td>900</td>
<td>911</td>
<td>846</td>
<td>889</td>
<td>mm</td>
</tr>
<tr>
<td>Interior Height (N)</td>
<td>1216</td>
<td>1217</td>
<td>1111</td>
<td>1070</td>
<td>mm</td>
</tr>
<tr>
<td>Interior Width (WQ)</td>
<td>1140</td>
<td>1141</td>
<td>1200</td>
<td>1372</td>
<td>mm</td>
</tr>
<tr>
<td>Minimum Ground Clearance (Y)</td>
<td>100</td>
<td>1272</td>
<td>184</td>
<td>120</td>
<td>mm</td>
</tr>
<tr>
<td>Overhang E</td>
<td>600</td>
<td>600</td>
<td>510</td>
<td>490</td>
<td>mm</td>
</tr>
<tr>
<td>Overhang F</td>
<td>700</td>
<td>980</td>
<td>620</td>
<td>530</td>
<td>mm</td>
</tr>
<tr>
<td>Front Deck Height (BD)</td>
<td>1000</td>
<td>1014</td>
<td>899</td>
<td>922</td>
<td>mm</td>
</tr>
<tr>
<td>Front Deck Point Length (D)</td>
<td>630</td>
<td>620</td>
<td>312</td>
<td>279</td>
<td>mm</td>
</tr>
<tr>
<td>Hip Point Height (H)</td>
<td>848</td>
<td>537</td>
<td>491</td>
<td>453</td>
<td>mm</td>
</tr>
<tr>
<td>Hip Point Height (H)</td>
<td>848</td>
<td>537</td>
<td>458</td>
<td>498</td>
<td>mm</td>
</tr>
<tr>
<td>FR Hip Point Distance (C)</td>
<td>784</td>
<td>775</td>
<td>669</td>
<td>775</td>
<td>mm</td>
</tr>
<tr>
<td>Attack Angle (J)</td>
<td>25.7</td>
<td>27.3</td>
<td>33.4</td>
<td>38.3</td>
<td>Degree</td>
</tr>
<tr>
<td>Vertical Tread (V)</td>
<td>720</td>
<td>720</td>
<td>720</td>
<td>720</td>
<td>mm</td>
</tr>
<tr>
<td>Tread Displacement</td>
<td>375</td>
<td>1131</td>
<td>479</td>
<td>889</td>
<td>cm</td>
</tr>
<tr>
<td>Power n.m/s.r.m</td>
<td>9/3500</td>
<td>25/3300</td>
<td>16/900</td>
<td>24/500</td>
<td>Kg.m/s.r.m</td>
</tr>
<tr>
<td>Ratio (F)</td>
<td>125/15</td>
<td>115/15</td>
<td>125/15</td>
<td>135/15</td>
<td>rpm/1000</td>
</tr>
<tr>
<td>Suspension System F</td>
<td>23/24</td>
<td>27/39</td>
<td>26/24</td>
<td>26/24</td>
<td>N/mm</td>
</tr>
<tr>
<td>Suspension System R</td>
<td>55/28</td>
<td>28/24</td>
<td>26/24</td>
<td>26/24</td>
<td>N/mm</td>
</tr>
<tr>
<td>Power Weight Ratio</td>
<td>19/24</td>
<td>24/28</td>
<td>18/24</td>
<td>16/24</td>
<td>%</td>
</tr>
<tr>
<td>Wheelbase/Tread R</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>%</td>
</tr>
<tr>
<td>Overall length/Wheelbase</td>
<td>1.04</td>
<td>1.04</td>
<td>1.04</td>
<td>1.04</td>
<td>%</td>
</tr>
<tr>
<td>Wheelbase/Overall length</td>
<td>0.71</td>
<td>0.71</td>
<td>0.71</td>
<td>0.71</td>
<td>%</td>
</tr>
</tbody>
</table>

Wheelbase (B), Tread F (U) (hereinafter F = Front), Tread R (V) (hereinafter R = Rear), Indoor Length (F), Indoor Height (H), Indoor Width (WQ), Minimum Ground Clearance (Y), Front Deck Height (HD), Front Deck Point Length (LD), Hip Point Height F (M), Hip Point Height R (N), Driving System, Wheelbase/Tread F Ratio, Wheelbase/ Tread R Ratio, Over-all length/Wheelbase Ratio, Indoor Length/ Wheelbase Ratio.

3.1. Driving System Comparison

The packaging items comparison was performed according to the driving system used in the packaging layout. The two following types of groups as shown in Figure 4 were found:

- FF layout (Front Engine – Front Drive): It was used in the Citroën 2CV and Morris Mini.
- RR layout (Rear Engine – Rear Drive): It was used in the Volkswagen Type 1 and Fiat 500.
3.2. Body Size Comparison

The body size (occupied area) groups shown in Figure 5 presents the car exterior body-size groupings. Figure 6, a comparison of car side and front views, is further clarified in the graph of Figure 7. The packaging items used in this comparison were the following:

- **Supermini (EU) / Subcompact car (USA) [9 ~ 10]**: In the case of the Fiat 500 and Morris Mini.
- **Small family car (EU) / Compact car (USA) [9 ~ 10]**: In the case of the Volkswagen Type 1 and Citroën 2CV.

It was interesting to notice that the body size comparison result was not related to the car driving system found layouts.

3.3. Interior Space Comparison

The Indoor Length (F) car packaging item, Indoor Height (X), Indoor Width (WO) and Front Hip Point Height (M) were used for this comparison as seen in Figure 8.

From the comparison between the interior measurements it was noticed that the amount of interior space can vary according to the driving system type and the space it takes. According to this relationship, the following two groups were found:

- **Large Interior Space**: Morris Mini and Citroën 2CV were roomier than the other two cars because they used the **FF Packaging Layout** configuration introduced before. This layout type does not take any passengers cabin space. No longitudinal tunnel between the car seats is necessary. With this layout, a flat floor and more interior space for the passengers can be achieved.
- **Small Interior Space**: Fiat 500 and Volkswagen Type 1 were less roomy because they used the **RR Packaging Layout** configuration.
Figure 7. Exterior Packaging Items Comparison.

Figure 8. Interior Packaging Items Comparison.

The interior space, regarded as the "Space Efficiency" design element, was further clarified in Figure 9.

3.4. Wheelbase and Tread Comparison

The proportions between the wheelbase and the front and rear treads shown in Figure 10 were compared in order to understand the similarities and differences between the four cars. This comparison led to the recognition of the following two groups:

- Long Wheelbase and Wide Treads: The proportions of the Volkswagen Type 1 and the Citroën 2CV were very similar and were included in this group.
- Short Wheelbase and Narrow Treads: The proportions of the Morris Mini and the Fiat 500 Nuova were very similar and were included in this group.

3.5. Front Hip Point Height Comparison

It is obvious that the four cars packaging comparison can not be followed only by observing the differences between the numerical values. Figure 11 serves as a supplementary comparison showing the side view silhouette of the four cars and drivers. Thereby, the natural relationship between each of the body shapes, indirectly related to the numerical values became clear. At this point, the comparison was performed taking into account the position of the hip point height of the driver. All the vehicles were arranged according to the driver relative hip point position and compared at the same scale in order to easily see the indoor space related to the driver. In the comparison the following groups were found:

- Near Front End & Far From Windshield: The smaller the car the closest the distance between the front end and the driver hip point becomes. The distance between the driver hip point and the deck point should be forcefully increased in small cars, together with the distance between the hip point and the front end of the car in order to achieve a satisfactory level of safety for the front passengers.

- Far From Front End & Near Windshield: In bigger cars,
the driver’s seat was far from the front end, achieving a good level of safety, and, nearer to the windshield to give more room for the back seat passengers.

The driver’s seat was far nearer to the windshield in bigger cars and, it was more distant in smaller cars. And, this feature is related to the design element of “Safety”.

4. Design Elements Comparison

From this comparison, the following design elements were identified and analyzed.

4.1. Environment Comparison

It was found in the body size measurements comparison that the car size was affected directly by the “Environment” design element. It was linked to the country environmental features directly reflected in the car, especially to the place where it was built and mainly aimed to be used in daily life. This leads to the classification of the latter, dividing them according to the following land features:
- Island and Peninsula: In this kind of environment the Fiat 500 Nuova and the Morris Mini were included.
- Continental Area: The Volkswagen Type 1 Sedan and the Citroën 2CV belong to this type of environment.

Furthermore, it was found that “Environment” was related to car “Drivability” and “Maneuverability”.

4.2. Drivability Comparison

The drivability (also known as Driving Control) comparisons revealed the following two groups:
- City Commuter: It is appropriate when moving at short distances like inside a city area. Here a small body size like the one of the Fiat 500 Nuova and the Morris Mini is excellent.
- Long Distance Cruiser: The distance that a car can travel also depends on the car size. Bigger cars are more suitable for traveling long distances as it’s the case of the Volkswagen Type 1 and Citroën 2CV.

The “Drivability” was closely related to the interior space and the exterior vehicle body size, as well as the wheelbase and tread measurements.

4.3. Space Efficiency Comparison

From the driving system comparison and the interior space measurement comparison it was found that the “Space Efficiency” design element can vary very much according to the positioning of the engine and traction system. From this comparison, the following groups were found:
- Low Efficiency: The RR packaging layout was proved to make a poor use of space because the driving controls should be connected with the rear engine through a tunnel, reducing passengers’ space considerably.
- High Efficiency: The cars built with the FF packaging layout have a better components’ distribution and leave more space for passengers’ use, as in the case of the Morris Mini and the Citroën 2CV.

4.4. Performance Comparison

Through the “Performance” comparison it was found that cars could be divided in the following two groups:
- Fast and Straight: The performance of the Volkswagen Type 1 and the Citroën 2CV were considered related to a straight moving direction because their large body size provide them with good stability. And, also they are more suitable for running at high speed.
- Slow and Curvy: The performance of the Morris Mini and the Fiat 500 were considered suitable for smooth running on curvy roads because they can easily make tight turns while moving at low speed.

4.5. Runability Comparison

The “Runability” is the design element that consider the ability to run smoothly or not over certain types of surfaces. The following two groups were obtained:
- Good Runability: The cars with large body size it were considered good, because they can travel at low speed over rough surfaces like the roads with poor maintenance conditions in the countryside and bumpy unpaved roads. In this group, the Citroën 2 CV and the Volkswagen Type 1 were included.
- Poor Runability: The cars with small body size like the Morris Mini and the Fiat 500 were considered as having a limited or poor runability, since they can run smoothly mainly in paved roads, due to their small tire size.

5. Preliminary Results and Question

Based on the preliminary results, two different size groups were obtained. The direct comparison between cars was not enough to find out the most influencing design element in the decision making process. And, at this point, the following question arose:
- Where is the real difference between the four European cars?

At this stage, the Kipling method of 5W1H [3] shown in Figure 12 was adopted as a complimentary method for a new direction which, will be followed in this research. This
5W1H method includes six questions described as follows.

5.1. What?
   *What kind of product is this?* The answer to this question was mentioned in the product background description, where it was said, they were *Popular European Cars.*

5.2. When?
   *When was the production time of those cars?* The answer to this was introduced as *Early European Motor Stage Cars* and, these were followed by the exact production dates.

5.3. Who?
   *Who was the intended user?* Again we found the answer in the background because the cars were popular, that means for a *Very General Public.*

5.4. Where?
   *Where were the intended environments for the cars to be used?* The answer is, each of the four cars was made and meant to be used in the *Country Where It Was Built.* The following two questions remained without answer until this stage.

5.5. Why?
   *Why did they make it that way?* To find out the answers to this question it was necessary to search in the countries, the historical background and the possible relationship with the time the cars were built.

5.6. How?
   *How did they make it to achieve their goals?* To find out the answers to this question it was necessary to search in the countries, the historical background and the possible relationship with the time the cars were built.

6. Roman Empire Legacy in European Cars

In this section it was analyzed the historical background of the four cars in order to solve the two remaining questions (*Why?* and *How?*) of the previous section.

6.1. Historical Legacy

Through the study of the cars' original country history, it was possible to find a *Historical Legacy* linking several centuries ago and current times through the influence left by the Roman Empire in European countries. The Romans extended their power to different countries and they also built roads to travel between Rome and the far corners of their Empire. They created a transportation network for the movement of their soldiers and products for making wars, trading and commerce as shown in the map of the Roman Empire of Figure 13 [11].

6.2. Roman Roads

The *Roman Roads* set a standard width for the construction of carts and chariots. They should fit in the roads' width and had to be able to use the roads efficiently as stated in a documentary about the origin of trains [12], where it was pointed out the relationship between the Roman roads and the measurement of modern train tracks.

6.3. Width Measure

The Roman roads (Figure 14) *Width Measure* were practically same as the width of two horses, one at the side...
of the other, because the Roman chariots had two horses in front of it, as stated in “How Military Specs Live Forever” [13]. These roads were so masterly built that several of them remained without being destroyed for centuries and some of them are even currently preserved in good conditions without the need of any maintenance. This is seen in several Roman roads built in the city of Pompeii, Herculaneum, Ostia Antiqua, Cuma, etc. That is why cars built where Roman roads still had an influential presence, were built in small sizes to fit in the roads of several places in the country, with the objective of becoming popular. The cars built in the places where they were not any more influenced by Roman roads were made bigger.

6.4. Roman Influence in Italy

Italy was the most directly influenced country, because it was completely under Roman control. England was also provided with a Roman road network connecting main cities of the south of the Great Britain Island, and the road width was proportional to the width of one Roman War Chariot, as it was the case in Italy. Also, as only one Chariot could use the road in one direction at a time, simultaneous two-way circulation was disabled. This was due to the lack of space in some cases and various difficulties found to build wider roads in those places.

6.5. Chariot Size

An original Roman Chariot (Figure 15) [14–15] and a full scale statue of a Roman Chariot with two horses (Figure 16) [16] were compared to know precisely the real Chariot Size measurements (Figure 15) [14–15]. Both chariots are part of the permanent exposition of the Vatican Museums.

6.6. Roman Communication Networks

The Roman Communication Networks between several cities under Roman control were part of the common legacy in various European cities. As the Empire grew bigger several roads reached Germany and France territories.

6.7. End of Roman Influence in Germany and France

The German and French Roads did not remain intact, as opposed to the Italian and the British Roman roads. Some of them were destroyed, various became unusable and the rest were replaced by new roads and routes to communicate between modern cities. That is why the Roman Empire with its narrow roads was not influenced by the consideration of
the road width and further design of new cars in Germany and France.

7. Consideration

As it was observed in this research, the influence of the roads width built during the Roman Empire made the difference between what was suitable or not, regarding the measurements of the car width.

7.1. Cars Main Difference

According to the previously mentioned main question of:

- Where is the real difference between the four European cars?

The answer to this question was that the real difference relied in the fact that each car type was built taking into account the location features. The Roman roads determined the width and the general size of the cars. The analysis of the measurements of the chariots of the Vatican Museums shown in Figure 17 revealed that several measurements differ in the chariot packaging. On the other hand, the wheel axes were consistently very similar.

7.2. Width Standard and Width Range Measurements

The idea of a standard measure is very contemporary and it can not be said that Roman chariots had a "width standard" measure. On the other hand, they do have a width measure range in which all Roman chariots width falls into. And, that "width range" was the key measure that influenced the total width of the Morris Mini and Fiat 500 Nuova, as shown in Figure 18.

7.3. Kipling Method Remaining Answers

The finding about the "width range" also helped answer the Kipling Method’s remaining questions:

- Why did they make it that way? Because they should fit in, the road type they have in each country, mainly divided in two road types.
- How did they make it to achieve their goals? They made the cars with two different widths and according to the type of location features. The overall length also varies from one group to another to keep the proportions.

8. Additional Findings

This research started with, a car for the Argentine users in mind. To understand the historical background of these users, it was necessary to research in Europe because Argentina’s population is mainly composed of European immigrants. The fact led to the selection of four European sample cars for study. It was shown that the direct comparison an insufficient method to determine the main design concept of these cars. At this point, the Kipling method was introduced and it was found that "Environment" was a very important factor to understand the car as a "complete product" and not as an "isolated object".

Finally, it was noticed that a car should be understood as a complex system composed by the following parts.

8.1. Object

It represents the crucial aspects of the future product and the basic features it should have. In the Kipling method it was stated as "What?" And the answer was: A car (Personal Mean of Transportation).

8.2. User

It represents the target person to which the product will be marketed and aimed for. In the Kipling method it is stated as "Who?" The answer is: For a nationwide general public.

8.3. Environment

It represents the place where the product will be used. In the Kipling method it is represented by "Where?" The answer is: Each car was made and meant to be used in the country where it was built.

8.4. Time

It represents the moment or opportunity in history for the product to appear in the market. In the Kipling method it was stated as "When?" The answer is that the cars were introduced in the European post World War II.

8.5. Technology

It represents the way it is made, based on the tools available. In the Kipling method it was represented by
"How?" The answer is: The cars were built with the tools available after the war, and were supported to be used in one case in an outdated road infrastructure and in the other case in a modern infrastructure, which also falls in the technology field. In this case, technology includes: Infrastructure, Tools and Design (Ideation, Planning and Manufacturing).

8.6. Purpose

It represents the reason that gives a meaning to the product. In the Kipling method it was stated as by "Why?" The answer is, they were introduced in the European post World War II to offer a nationwide, popular and affordable personal mean of transportation.

9. Conclusion

The two different environmental features found were translated to the cars packaging as the design element, know as "Environment". The latter was identified as the main design concept. And this finding can be applied in the design of a new car in which the land features have a higher relative importance between all the design elements. In this case, the "Environment" became the main "design concept".

For easy recognition and convenience purposes, the two types of environments were classified according to the most representative feature of the place where the two car types originated. And the names assigned to the two groups were as follows:

- **Island and Peninsula**, which includes the Fiat 500 Nuova and the Morris Mini (related to the Roman chariots and Roman roads width).
- **Continental Area**, which includes the Volkswagen Type 1 Sedan and the Citroën 2CV (related to the use of new roads and not related to the Roman chariots and Roman roads width).

10. Forthcoming Paper

The results of this paper were based on the direct comparison of the four cars packaging measurements and the analysis of the Roman chariot packaging to understand the car design concept relationship with the design elements and the packaging items.

In the next paper, the suitability of the results will be evaluated with the use of scattergram graphs, created using correspondence analysis. The four car graphs created with this method will be compared to understand the car patterns’ differences by an analytical method.

References