

A Work Project, presented as part of the requirements for the  
Award of a Masters Degree in Management from the  
Faculdade de Economia da Universidade Nova de Lisboa.

Categorization and integration of new and innovative materials  
in the development process of semi-finished products at the Dr. Ing. h.c. F. Porsche AG

## **APPENDIX**

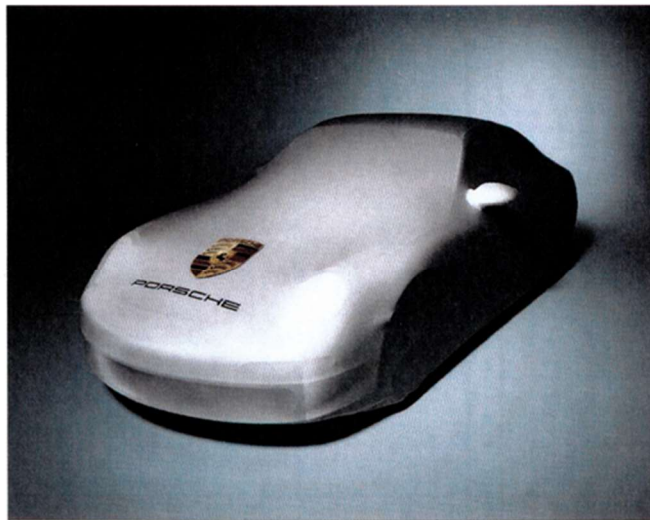
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A project carried out on the Masters in Management Program, under the supervision of:  
Professor Manuel Baganha

January 6<sup>th</sup>, 2017



PORSCHE



## Restrictive Clause

The present dissertation consists in part of information which is not intended to become public knowledge. All rights relating to the dissertation, including dissemination via electronic media, are held by Dr. Ing. h.c. F. Porsche AG.

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Stuttgart, *22.12.2016*

A handwritten signature in blue ink, appearing to read 'H. Schmitt'.

Signature Department Manager



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## List of Abbreviations

etc.	et cetera
ff.	and the following
OEM	Original Equipment Manufacturer
PEP	Porsche Entwicklungsprozess (Porsche Development Process)
SOP	Start of Production
VDA	Verein der Automobilindustrie (German Association of the Automotive Industry)


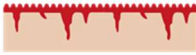

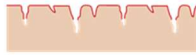
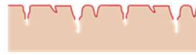







# Appendix 1: Semi-finished Products in the Interior


## Leather

**Differences in leather qualities**



← Adjustment (varnish) → (Quality) Genuineness →

				
<b>split leather</b>	<b>embossed leather</b>	<b>nappa leather</b>	<b>natural leather</b>	<b>authentic leather</b>
				


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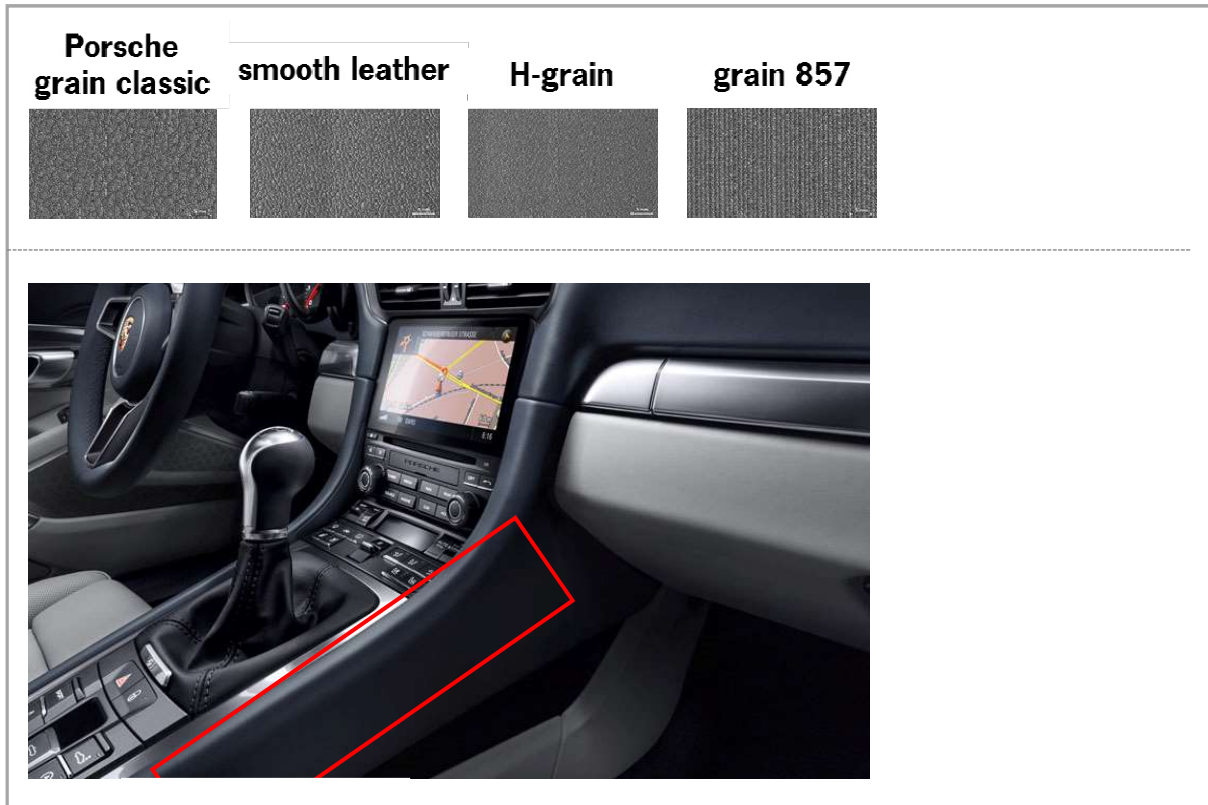
## Coats

<b>black matt</b>	<b>black glossy</b>
	

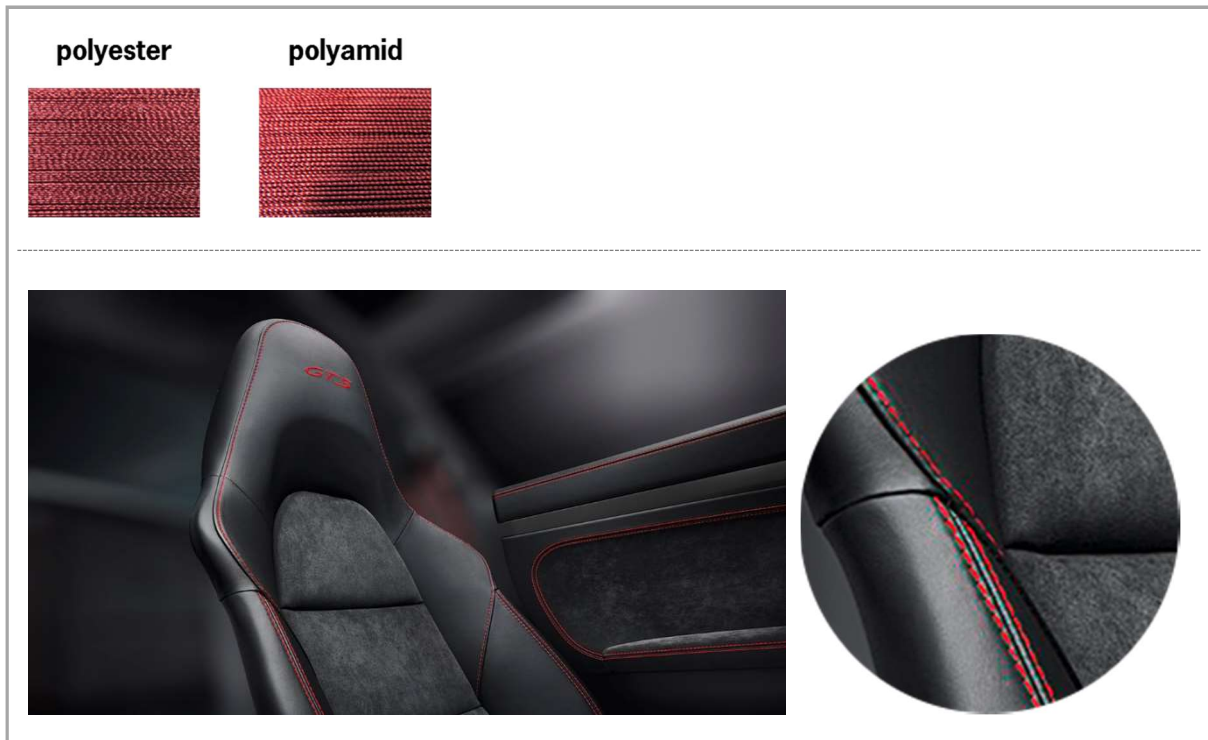
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## Foils



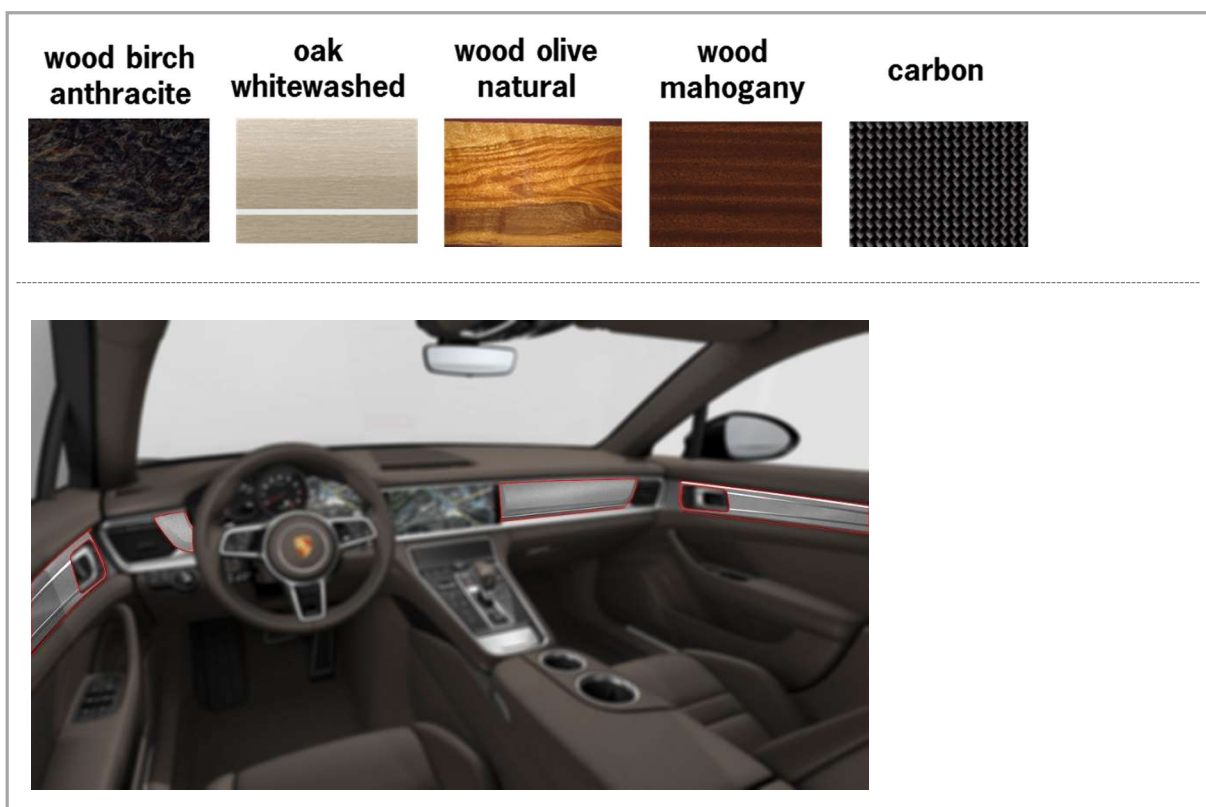
## Yarns



## Textiles



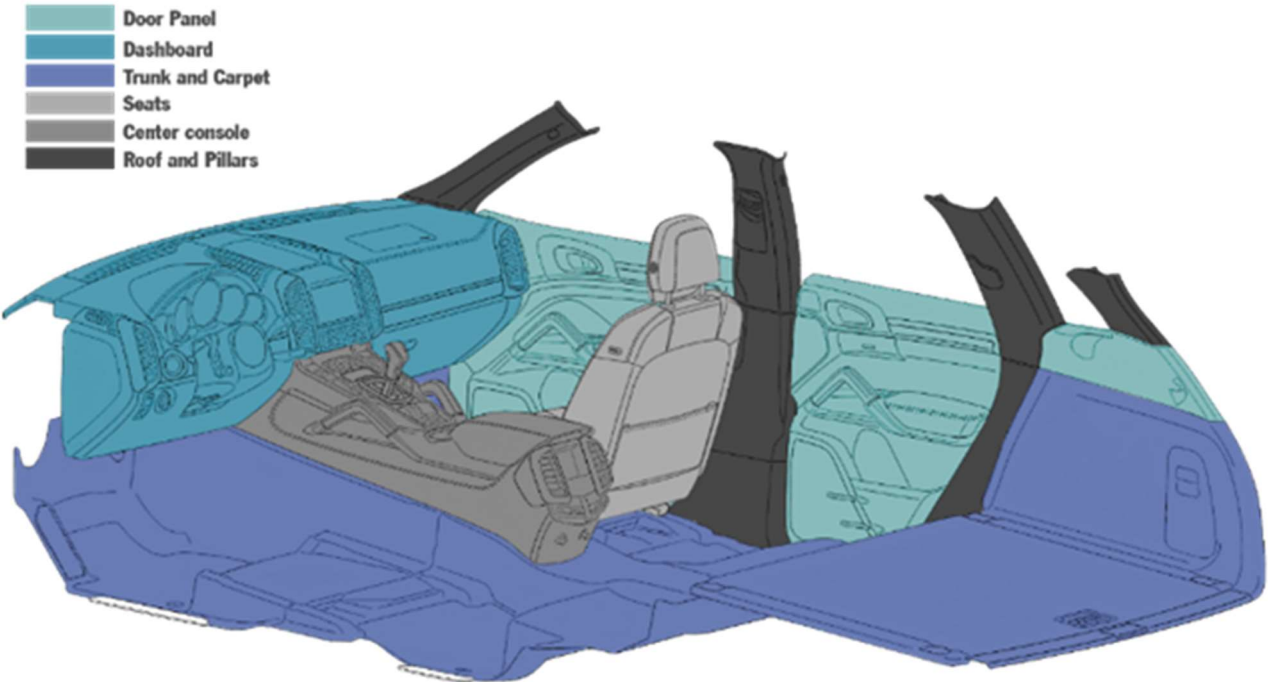
## Decors



source: own figures based on Porsche data



**Appendix 2: Areas of Material Application in the Porsche Interior**



source: own figure based on Porsche data

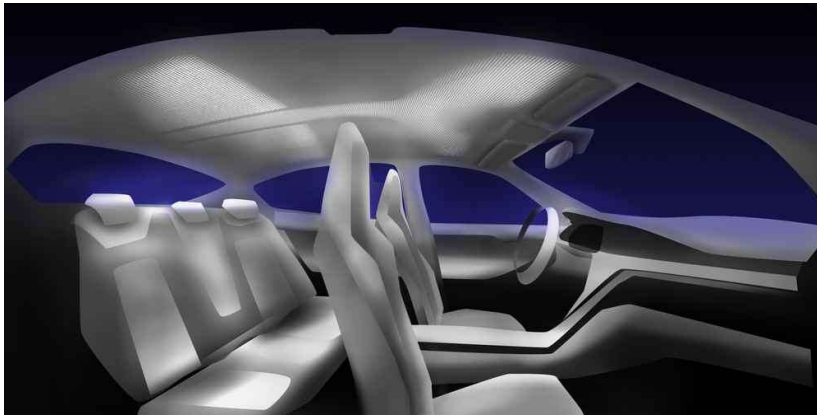
**Appendix 3: BMW i3 Textile Material**



source: BMW  
<http://www.bmw.com/com/de/insights/corporation/bmwi/sustainability.html>



## Appendix 4: Intelligent Light Systems



source: FLT-Licht  
<http://www.flt-licht.de/index.php/de/unternehmen>



source: FLT-Licht  
<http://www.flt-licht.de/index.php/de/unternehmen>

## Appendix 5: Interview Partners and Guideline

In total five persons have been separately questioned in interviews of about 30-45 min, in order to gain insights in how they deal with new and innovative materials currently, how it has been in the past and what they suggest in order to improve the process from their point of view and the department view.

- Person 1:** Design Department
- Person 2:** Design Department
- Person 3:** Material Management Department
- Person 4:** Material Management Department
- Person 5:** Quality Management



Question 1

### Introduction

What changes do you see in the automotive industry in general?  
And in particular in the automotive interior field?

- xxx
- xxx

Question 2

### Current Situation

In the future innovative materials will become of higher importance in the interior.  
How is your department affected by new innovative materials? How do you deal with these?

- xxx
- xxx

Question 3

### Examples from the Past

What examples do you have in mind from the past, where a new material has been applied?  
How did it work? What challenges did you have to face? Did you notice any similarities in the  
development of the various materials?

- xxx
- xxx

Question 4

### Recommendations

What adjustments are pursued to improve the process with new materials?  
What recommendations can you give from your point of view in order to improve the process?

- xxx
- xxx

Question 5

### Responsibilities

Who else needs to be involved in the process?

- xxx
- xxx



## Appendix 6: Dinamica



source: Dinamica by Miko  
<http://www.dinamicamiko.com/en/dinamica/>

## Appendix 7: Woven Leather




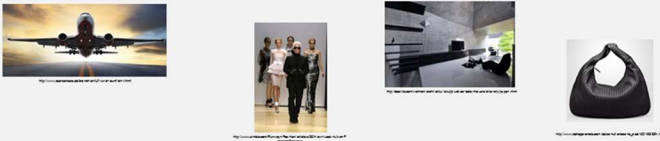
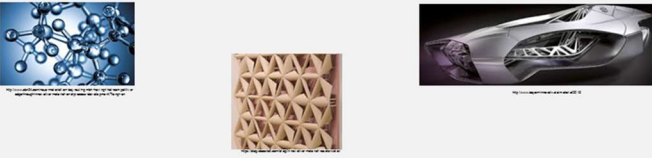
source: Bottega Veneta  
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source: Auto Bild  
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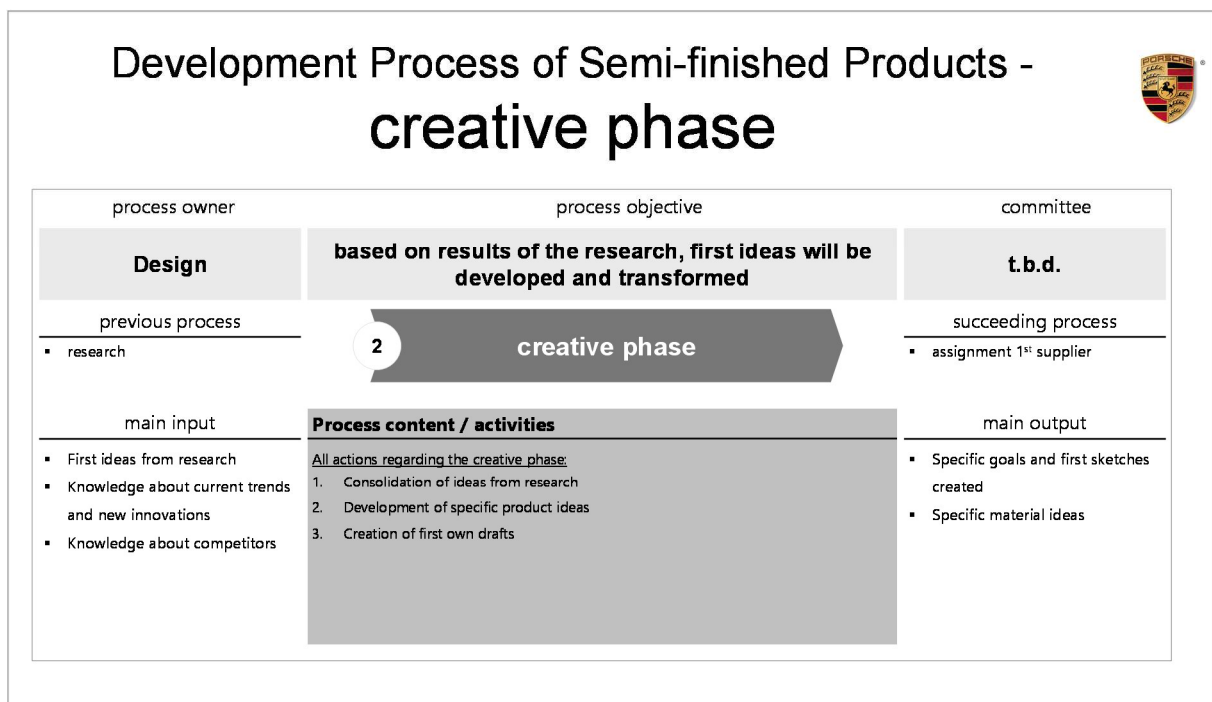
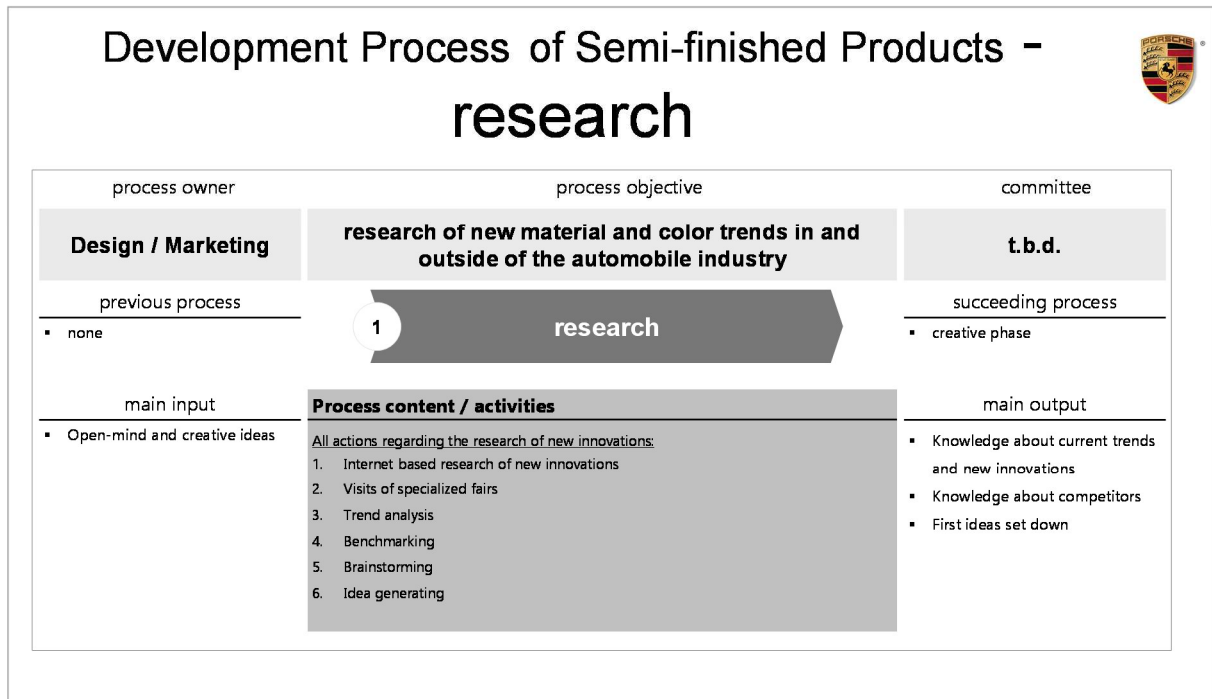
## Appendix 8: Category Overview

Category Overview		
Category 1	Materials with application <b>within</b> the Automotive Industry	
Category 2	Materials with application <b>outside</b> the Automotive Industry	
Category 3	Materials that <b>haven't been applied yet</b>	

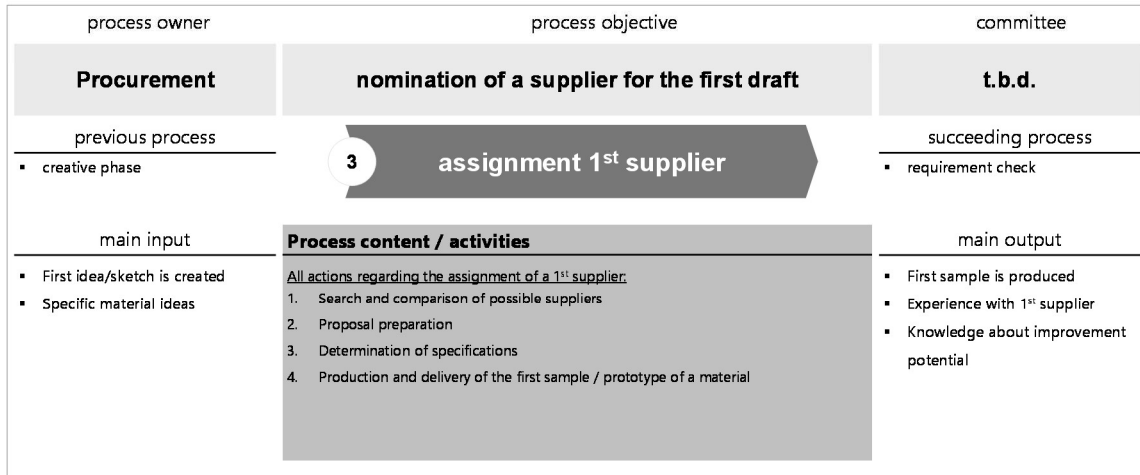
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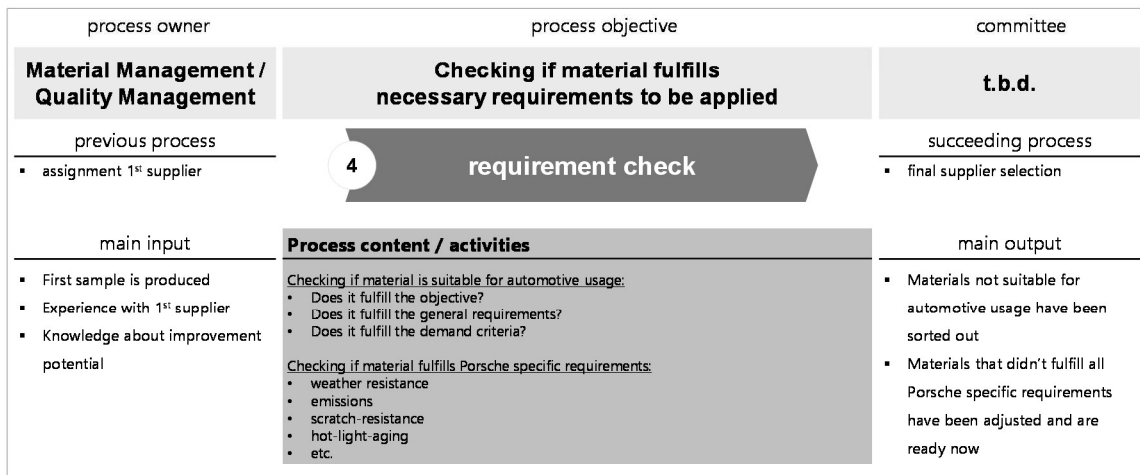
## Appendix 9: Detailed Process Description



# Development Process of Semi-finished Products - assignment 1<sup>st</sup> supplier



# Development Process of Semi-finished Products - requirement check

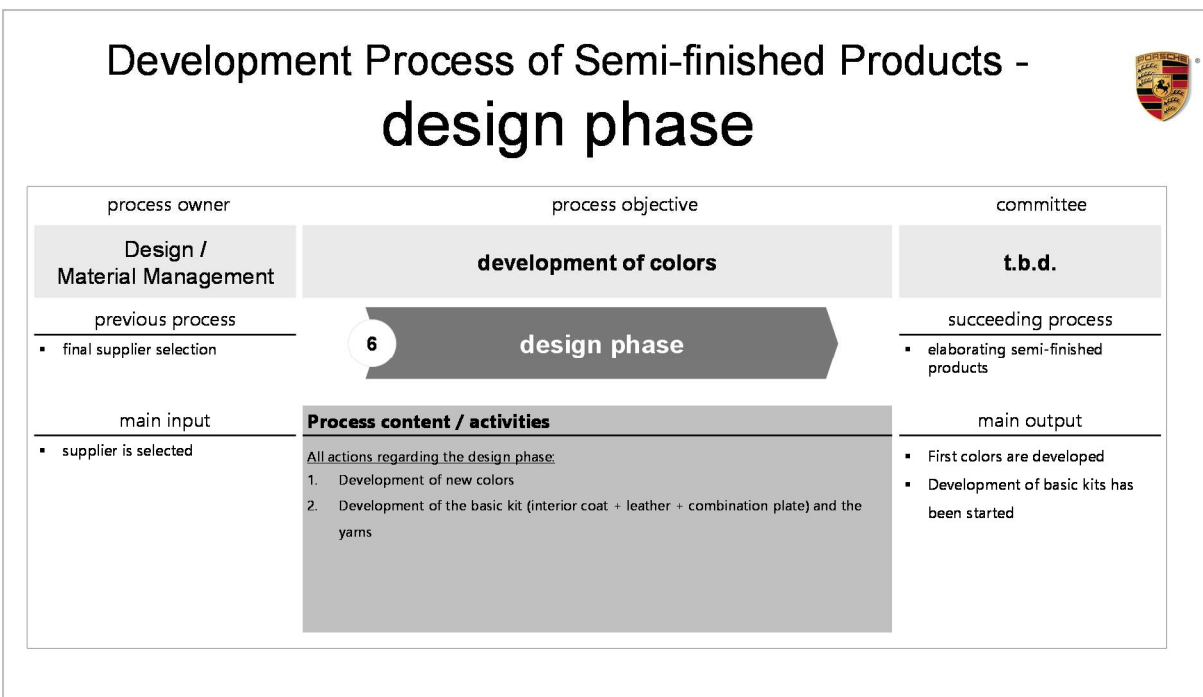


# Development Process of Semi-finished Products - final supplier selection



The following process steps are not part of the pre-development phase however of the current development process of semi-finished products (2.3.4):

# Development Process of Semi-finished Products - design phase



# Development Process of Semi-finished Products - elaborating semi-finished products



process owner	process objective	committee
<b>Material Management / Design</b>	<b>development of color targets and master samples</b>	<b>t.b.d.</b>
previous process	<b>7 elaborating semi-finished products</b>	succeeding process
<ul style="list-style-type: none"> <li>design phase</li> </ul>		<ul style="list-style-type: none"> <li>color matching process</li> </ul>
main input	<b>Process content / activities</b>	main output
<ul style="list-style-type: none"> <li>First colors are developed</li> <li>Development of basic kits has been started</li> </ul>	<p><u>All actions regarding the elaborating of semi-finished products:</u></p> <ol style="list-style-type: none"> <li>Further development of the colors and materials</li> <li>Development of the color target</li> <li>As soon as the color target is available, further materials such as carpets and foils can be developed</li> <li>Steering Committee decides about the assignment of new colors to vehicle projects</li> </ol>	<ul style="list-style-type: none"> <li>Color target is available</li> <li>Basic kit and yarns are available as master samples</li> <li>Further materials like carpets and foils are available and serve as a master sample for optic and haptic</li> <li>Colors are assigned to specific vehicle projects</li> </ul>

# Development Process of Semi-finished Products – color matching process



process owner	process objective	committee
<b>Quality Management</b>	<b>final poof of coherency of colors and materials</b>	<b>t.b.d.</b>
previous process	<b>8 color matching process</b>	succeeding process
<ul style="list-style-type: none"> <li>elaborating semi-finished products</li> </ul>		<ul style="list-style-type: none"> <li>series preparations</li> </ul>
main input	<b>Process content / activities</b>	main output
<ul style="list-style-type: none"> <li>All master samples are available</li> <li>Color targets are defined</li> <li>Colors are assigned to specific vehicle projects</li> </ul>	<p><u>All actions regarding the color matching process:</u></p> <ol style="list-style-type: none"> <li>Minor adjustments of colors</li> <li>Final adjustments in installation position</li> </ol>	<ul style="list-style-type: none"> <li>All interior colors and materials are matching and are coherent with the color targets and master samples</li> </ul>

source: own figures



## Appendix 10: Quality Gate - Automotive Suitability

Automotive Suitability	
<b>applicability</b> Is it applicable in a vehicle at all?	<input checked="" type="checkbox"/>
<b>objective</b> Does it fulfill the main objective?	<input checked="" type="checkbox"/>
<b>general requirements</b> Does it fulfill the requirements regarding: attractiveness, comfort, quality, ergonomics, price, etc.?	<input checked="" type="checkbox"/>
<b>specific demand</b> Does it fulfill the demand? Is there a market for such a material?	<input checked="" type="checkbox"/>

source: own figure based on Porsche data

All criteria need to be fulfilled in order to be suitable for automotive usage. The automotive suitability will be checked by Porsche.

## Appendix 11: Quality Gate - Porsche Specific Requirements

Porsche Specific Requirements	
Extract from technical specifications for leather:	
weather resistance	<input checked="" type="checkbox"/>
emissions	<input checked="" type="checkbox"/>
scratch resistance	<input type="checkbox"/>
hot-light aging (color fastness to hot-light)	<input type="checkbox"/>
optic	<input type="checkbox"/>
haptic	<input type="checkbox"/>
others	<input type="checkbox"/>

source: own figure based on Porsche data

All criteria need to be fulfilled in order to apply the material at Porsche. The inspections will also be conducted by Porsche.

Due to confidentiality matters, the detailed requirement criteria cannot be mentioned in this work project.



**Appendix 12: Quality Gate - Supplier Satisfaction Criteria**

<b>Supplier Satisfaction Criteria</b>	
reliable	<input checked="" type="checkbox"/>
on-time delivery	<input checked="" type="checkbox"/>
stable quality	<input checked="" type="checkbox"/>
good communication	<input checked="" type="checkbox"/>
flexible	<input type="checkbox"/>
constant delivery readiness	<input type="checkbox"/>
price guarantee	<input type="checkbox"/>

source: own figure based on Porsche data

All criteria need to be fulfilled in order to continue the project with the supplier.

